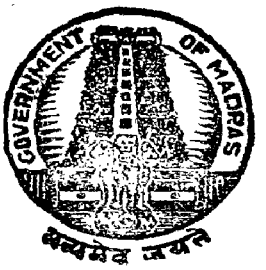

DEPARTMENT OF AGRICULTURE

REPORTS ON THE WORK

OF THE

AGRICULTURAL STATIONS

IN THE MADRAS STATE

FOR

1953-54

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ANNUAL REPORT OF THE AGRICULTURAL RESEARCH STATION, ADUTHURAI, FOR 1953-54 (FASLI 1363).

Season.—There was a total rainfall of 30·45 inches recorded in 52 rainy days as against 32·02 inches recorded in 42 days during the previous year and against a ten-year average of 36·05 inches recorded in 49·6 rainy days. During the south-west monsoon period, July-September 7·12 inches of rain were received. The timely onset of the south-west monsoon in the West Coast and consequent rise of water level in the Mettur reservoir enabled the release of water for irrigation in the Cauvery delta from 5th July 1953 and the canal water was received on this station on 11th July 1953. Sowing of *kuruvai* nurseries was commenced in advance of the receipt of the water with the help of lift irrigation from filter points and transplanting was commenced on 17th July 1953 after the receipt of channel water. The north-east monsoon rains which were received in heavy down-pours proved to be harmful to the then standing crops of *kuruvai* which were ready for harvest over the entire Tanjore delta. The crops lodged severely and the incidence of insect-pests, such as jassids and fulgorids which are usually associated with the fungus disease "stem rot" (*Sclerotium oryzae*) was severe. In addition, the incidence of stem-borer pest was severe in the *samba* and *thaladi* seasons so much so the yields of these crops were considerably reduced due to the severe damage caused by the insect-pests. Canal water-supply was cut off from 15th February 1954 and thereafter lift irrigation from all the three-filter point tube wells on the high pieces adjoining the office buildings and the open well in "D" block had to be resorted to in order to irrigate some of the late planted *thaladi* crops and the third crop of paddy in "B" block. Sowings of the *kuruvai* nurseries of the 1954–55 season were commenced on 3rd June 1954 with the help of lift irrigation. The Mettur reservoir was opened for irrigation in the second week of June 1954 and water in channels was received on the station from 20th June 1954.

The weekly rainfall data of the year under report along with that of 1952–53 and that of the previous ten years are given in Table I. The maximum temperature ranged between 105·3°F. and 76·9°F. and the minimum between 83·4°F. and 62·9°F. and the humidity ranged from 94 per cent to 72 per cent. The highest temperature was recorded in the month of April and the lowest in the month of February. February was the most humid month and June the least humid month.

TABLE I.—*Statement of Rainfall* (1953–54).

Month.	Week.	1953–54.		1952–53.		Average of the past ten years.	
		Quantity in inches.	Number of rainy days.	Quantity in inches.	Number of rainy days.	Quantity in inches.	Number of rainy days.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		South-west monsoon.					
June	7—13	..	..	..	..	0·06	0·1
	14—20	0·33	1	..	..	0·15	0·3
	21—27	0·35	1	0·80	2	0·22	0·7
June-July	28— 4	0·08	..	0·74	1	0·44	0·4
July	5—11	0·59	1	3·23	5	1·31	
	12—18	..	..	0·35	2	0·20	0·7
	19—25	0·52	1	..	..	0·17	0·2
July-August ..	26— 1	0·08	..	..	..	0·64	1·0
	2—8	..	..	..	..	0·67	0·6
	9—15	..	..	0·01	..	0·73	1·3
	16—22	..	..	1·60	2	1·13	1·2
	23—29	1·66	1	1·02	1	1·38	1·5
August-September ..	30— 5	0·42	1	..	..	1·06	1·0
September	6—12	1·36	3	1·69	1	1·21	1·8
	13—19	1·73	2	..	..	0·51	0·9
	20—26	..	..	..	..	0·47	0·9
..	Total ..	7·12	11	9·44	14	10·35	14·2

TABLE I.—*Statement of Rainfall* (1953–54)—cont.

Month.	Week.	1953–54. Quantity in inches.	1953–54. Number of rainy days.	1952–53. Quantity in inches.	1952–53. Number of rainy days.	Average of the past ten years. Quantity in inches.	Average of the past ten years. Number of rainy days.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
North-east monsoon.							
September-October	27—3	..	..	0·01	..	1·31	1·5
October	4—10	1·59	2	0·60	2	0·95	1·4
	11—17	1·33	3	0·95	2	1·07	2·1
	18—24	1·30	4	1·62	2	1·49	2·3
	25—31	2·51	3	0·64	1	1·14	2·0
November	1—7	..	..	..	..	1·33	1·5
	8—14	0·55	1	..	..	1·98	2·2
	15—21	4·35	4	3·11	2	3·96	3·6
	22—28	1·39	3	0·60	2	1·97	2·5
November-December.	29— 5	0·57	2	4·64	3	2·51	2·0
December	6—12	..	..	4·18	3	0·85	1·4
	13—19	0·67	3	0·58	1	0·83	1·4
	20—26	0·16	1	0·41	1	0·24	0·7
December-January ..	27— 3	1·01	2	0·06	..	0·48	0·9
January	4—10	1·94	4	1·07	2	0·67	1·4
	11—17	0·68	2	0 08	..	0·11	0·3
	18—24	..	..	0·05	..	0·29	0·3
	25—31	..	..	..	..	0·42	0·6
	Total ..	18·05	34	18·60	21	21·60	28·7
Hot weather period.							
February	1— 7	0·04	..	..	..	0·01	..
	8—14	..	..	..	..	..	..
	15—21	..	..	..	..	0·50	0·5
	22—28 or 29	..	..	0·49	1	0.24	0·3
March	1—7	..	..	..	..	0·14	0·2
	8—14	2·59	2	..	..	0·31	0·4
	15—21	..	..	..	..	..	..
	22—28	..	..	..	..	0·12	0·3
March-April ..	29— 4	..	..	..	..	0·26	0·5
April	5—11	..	..	0·08	..	0.02	0·1
	12—18	..	..	2·40	2	0·41	0·7
	19—25	1·77	2	0·67	2	0·32	0·6
April-May	26— 2	..	..	..	..	0·01	..
May	3— 9	0·38	1	..	..	0·29	0·5
	10—16	..	..	..	..	0·39	0·6
	17—23	..	..	..	..	0·32	0·5
	24—30	0·50	2	0·10	1	0·65	1·1
May-June	31—6	..	..	0·24	1	0·11	0·4
	Total ..	5·28	7	3·98	7	4.10	6·71
	Grand total ..	30·45	52	32·02	42	36·05	49·6

2. *Crops—Paddy-kuruvai season (first crop).*—The preparation of *kuruvai* nursery plots were delayed due to inadequate summer showers. However, the nursery plots in A, C, D, E and F blocks were got ready with the help of showers received and irrigation from filter points. The sowings were commenced on 17th June 1953 and continued up to 19th July 1953. The transplant fields were ploughed three times with iron ploughs and green leaf at 5,000 lb. per acre was applied and trampled in by working the 'Burmese settun'. They also received superphosphate at 150 lb. per acre as basal dressing. Ammonium sulphate at 100 lb. per acre was top dressed to the crop three weeks after transplanting. Transplanting of *kuruvai* crop was commenced on 17th July 1953 and completed on 12th August 1953. A total area of 30·45 acres was transplanted with *kuruvai* during the season of which 13·90 acres were utilized for experiment and the remaining 16·55 acres for multiplication of nucleus seed of improved strains. The average yields of *kuruvai* strains recorded during the year are given in Table II.

TABLE II.—*Acre yield for Kuruvai* (1953-5).

Strain number.	Area in Acres.	Average yield in lb. per acre. 1953—54.	1951—52.	1952—53
ADT. 3	3·51	2,322	3,716	3,267
ADT. 9	1·25	2,470	2,869	3,297
ADT. 14	0·82	1,682	2,402	2,418
ADT. 16	0·41	1,723	2,975	2.505
ADT. 20	4·81	2,337	3,107	2,783
CO. 13	1·12	2,841	..	3,377

3. *Improvement of local varieties by pure-line selection*—(i) *Cultures under yield trials*—(*a*) *Mattai kuruvai.*—This is a popular red-riced *kuruvai* variety reputed for its tolerance to soil salinity and grown in the coastal taluks of Tanjore district. Fifty-six cultures were under comparative yield trial during the year of which 14 cultures were under third year of yield trial and 42 cultures under first year of trial. A total of 13 cultures from the first set and 34 cultures from the second set were carried forward based on observations recorded during the crop growth. The incidence of jassids and fulgorids and " stem rot " was severe and so valid conclusions regarding the performance of the cultures could not be drawn.

(*b*) *Tiruthuraipoondi kar.*—Eleven cultures in Tiruthuraipoondi kar, a short-term, flood resistant, red-riced variety popular in the deep water areas of Tiruthuraipoondi and adjacent taluks were grown under comparative yield trial. The results were vitiated due to severe incidence of jassids, fulgorids and ' stem rot ' disease of paddy. Hence all the eleven cultures were carried forward for repeating the trial during the next season.

4. *Hybridization for crop improvement.*—(*a*) Two hundred and one progenies of crosses of F-2, F-4 and F-5 generations intended for the evolution of dormant short duration strains which do not germinate immediately after harvest were studied for their agronomic characters and single plants were selected from promising progenies. These single plants were tested in the laboratory for their dormancy and a total number of 530 selections which showed either complete or partial seed dormancy alone were carried forward for further trial. The details of the single plants carried forward from the different sets of crosses are furnished below :—

Particulars of cross.	Number of progenies studied.	Number of selections carried forward.
T. 568 × ADT. 3–F2	10	85
ADT. 3 × T. 406–F2	11	93
ADT. 9 × GEB. 24–F4	4	51
ADT. 20 × GEB. 24-F4	112	178
ADT. 18 × GEB. 24–F5	64	123
Total ..		530

(*b*) To evolve saline resistant strains of different durations, ten single plant selections and 12 Svalof bulks of crosses between saline resistant varieties, SR. 26-B and Thellathokavadlu on one hand and popular Aduthurai strains on the other hand, were under study for their morphological and economic characters. A total of 72 single plants and 18 Svalof bulks were carried forward. These progenies are intended for trial in typical saline areas.

(*c*) In order to breed non-lodging strains with stiff straw 13 single plants in different generations ranging from F1 to F4 and seven Svalof bulks of crosses between the popular *kuruvai* strains, namely, ADT. 3, ADT. 4 and ADT. 20 on one hand and some of the exotic varieties, mainly Chinese, which possess stiff straw on the other hand were under study for their segregation of characters. Seven Svalof bulks and 258 promising single plants possessing stiff straw and non-lodging habit were carried forward for further study.

(*d*) With the idea of evolving a fine grained konakuruvai strain which do not shatter easily 90 progenies of cross between ADT. 16 and GEB. 24 were under study and 215 promising single plants with desirable characters were carried forward for further study.

(*e*) *Cross-progenies of season and period bound varieties.*—Fifty-three progenies of crosses between GEB. 24 and Co. 18 were under comparative yield trial and 49 promising ones were carried forward for further trial. Since the crop was severely affected by Fulgorids and ' stem-rot ' the results were vitiated and could not be subjected to statistical scrutiny.

(*f*) *japonica* × *indica crosses.*—Eleven F2 progenies and 274 F3 progenies of ten sets of japonica × indica crosses received from the Director, Central Rice

Research Institute, Cuttack, were studied for their morphological and economic characters. It was observed that sterility was prevalent to a great extent in the progenies due to improper pairing of chromosomes since the two parents involved belong to the two different races of rices, namely, japanica and indica. Promosing single plant with less sterility suitable for the *kuruvai* season where selected after study of individual plants. A total of 297 single plants and 11 Svalof bulks from the F2 population and 409 single plants and five Svalof bulks from the F3 population were carried forward for further study.

5. *Inter-varietal trials*—(*a*) *Departmental strains*.—The following *kuruai* and *kar* strains, namely, ADT.3, ADT 5, ADT. 12, ADT. 15, ADT. 16, ADT. 19, ADT. 20, ASD. 1, ASD. 2 and Co. 13 were under comparative yield trial to find out the best yielder. But, no results could be had from the trial since the crop was damaged by severe incidence of 'stem-rot' (*Sclerotium oryzae*).

(*b*) *Exotic varieties*.—Ten short-duration varieties, namely, CH. 2, CH. 41, CH. 42, CH. 43, CH. 45, CH. 47 CH. 62, CH. 63, B. 76-1 and Benibhog received from the Director, Central Rice Research institute, Cuttack, during 1952–53 season were compared for yield with ADT. 3, ADT. 4, ADT. 20 and PTB. 10 as standards. All the ten Chinese varieties resisted lodging to a certain extent in the early stages of their growth but in the ripening stage they also lodged due to heavy rains. Thereafter the incidence of 'stem-rot' and Fulgorids took a serious turn in all the varieties tried and so no reliable data could be gathered. From the observations recorded, it was observed that CH. 2 was the earliest to flower and it was earlier than ADT.3, the shortest duration *kuruvai* strain of the station by seven days.

Samba season (*main single crop*).—An area of 5·54 acres in 'H' block was under single crop during the year. The entire area was grown with a pure crop of sesbania in the rice fallows which was estimated to produce 65,000 lb. of green manure per acre. The green manure crop was pulled out and the *samba* transplant fields were manured with 5,000 lb. of sesbania per acre. Superphosphate at 150 lb. per acre at the time of last ploughing and ammonium sulphate at 100 lb. per acre as top dressing a month after planting were applied to the fields. *Samba* nurseries were shown on 29th and 30th July 1953 and transplanting was done from 1st September to 30th September 1953. The average acre yields obtained are given in Table III.

TABLE III.—*Acre yield of Samba* (1953–54).

Strain number.	Area in acres.	Average yield in lb. per acre. 1953–54.	1951–52.	1952–53.
ADT. 25	0·40	2,696	..	..
ADT. 1	0·17	2,854	..	..
ADT. 2	0·17	3,213	..	..
ADT. 22	0·18	2,515	2,344	2,093
ADT. 24	0·18	2,817	..	..

7. *Improvement of local varieties by pure-line selection*—(i) *Kattaivellai, Kodaivellai and Kaivarisamba*.—Three cultures in each of Kattaivellai, Kodaivellai and Kaivarisamba, the three important rainfed varieties of Arantangi taluk were under yield tests on the section 'Z' test was not satisfied in the case of kattaivellai and kaivarisamba yield trials though it was found that one culture in the former and two cultures in the latter had given higher yields than their respective standards. Though one culture 762 of kodaivellai had given 6·4 per cent higher yield than the standard the difference was not significant. The results are presented in Table IV.

TABLE IV (*a*).—*Kattaivellai Comparative yield trials*.

Field No.—H6b.
Size of plot—20' × 4' gross.
Lay out—4 × 4 randomized blocks.
Treatments (cultures)—
(1) 418, (2) 414, (3) 470, (4) Kattaivellai standard.

Sown—29th July 1953.
Transplanted—1st September 1953.
Harvested—2nd February 1954.

Summary.

Particulars.	418.	424.	470.	Kattaivellai.	General mean.	Standard error.	'Z' test.	Critical difference. (P=0·05).
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
Acre yield in lb.	4,230	3,823	3,973	4,046	4,018	2,966	Not satisfied.	
Percentage on standard ..	104·5	94·5	98·2	100	99·2	7·38	..	..
Powering duration ..	157	157	157	157	..	..	..	..

TABLE IV (*b*).—*Kodaivellai Comparative yield trials.*

Field No.—H6b.
Size of plot—20′ × 4′ gross.
Lay out—4 × 4 randomized blocks.

Sown—29th July 1953.
Transplanted—1st September 1953.
Harvested—2nd February 1954.

Treatments (cultures)—
(1) 655, (2) 718, (3) 762, (4) Kodaivellai (standard).

Summary of results.

Particulars.	655.	718.	762.	Kodaivellai stadnard.	General mean.	Standard error.	'Z' test.	Critical difference. (P = 0·05)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Acre yield in lb. ..	4,197	4,422	4,713	4,427	4,440	133·69	Satisfied.	302,35
Percentage on standard.	94·8	99·9	106·4	100	100·3	3·02	..	6·83
Flowering duration ..	144	145	145	145	..	..	..	..

Conclusion—762, standard, 718, 655.

TABLE IV (*c*).—*Kaivari Samba Comparative yield trials.*

Field No.—H6b.
Size of plot—20′ × 4′ gross.
Lay out—4 × 4 randomized blocks.

Sown—29th July 1953.
Transplanted—1st September 1953.
Harvested—2nd February 1954.

Treatments (cultures)—
(1) 898.
(2) 977.
(3) 1057.
(4) Kaivarisamba (standard).

Summary of results.

Particulars	898.	977.	1057.	Kaivari samba.	General mean.	Standard error.	'Z' test.	Critical difference. (P = 0·05).
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Acre yield in lb. ..	3,848	3,693	4,125	3,752	3,855	157·0	Not satisfied.	
Percentage on standard.	102·6	98·5	110·0	100	102·7	4·18	..	..
Flowering duration ..	140	140	140	140	..	..	..	..

(ii) *Kattuvanam.*—Eleven cultures in kattuvanam, a flood resistant variety of long duration, grown in Tiruturaipundi taluk were under replicated yield trial. 'Z' test was not satisfied and the yield differences were not significant. Hence all the cultures were carried forward for repeating trial. The results are presented in Table V.

TABLE V.—*Kattuvanam Comparative yield trials.*

Field No.—H3b.
Size of plot—20′ × 4′ gross.
Lay out—12 × 4 randomized blocks.

Sown—29th July 1953.
Transplanted—19th September 1953.
Harvested—1st February 1954.

Treatments (cultures)—
(1) 2526.
(2) 2445.
(3) 2493.
(4) Kattuvanam standard.
(5) 2473.
(6) 2589.
(7) 2611.
(8) 2522.
(9) 2467.
(10) 2586.
(11) 2562.
(12) 2539.

Summary of results.

Particulars.	2526.	2445.	2493.	Kattu-vanam standard.	2473	2589	2611	2522
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Acre yield in lb. ..	3,145	2,797	3,137	2,759	3,152	2,960	3,073	3,007
Percentage on standard.	114·0	101·4	113·7	100	114·2	107·3	111·4	109·0
Flowering duration ..	151	151	148	148	148	151	151	151

Particulars.	2467	2586	2562	2539	General mean.	Standard error.	'Z' test.	Critical difference (P = 0·05).
	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
Acre in yield in lb. ..	3,127	2,799	3,166	2,717	2,987	283·2	Not satisfied.	
Percentage on standard.	113·3	101·5	114·8	98·5	108·3	10·27	..	..
Flowering duration ..	146	151	148	151	..	..	..	..

8. *Hybridization for crop improvement*—(i) *Evolution of blast resistant strains.*—(*a*) F1 plants of the following crosses, namely, Co. 4 × Co. 19, Co. 4 × ADT. 1, Co. 4 × ADT. 11 and Co. 4 × ADT. 2 were studied for their resistance to blast. These crosses are intended for the evolution of high yielding blast resistant strains with better commercial quality of rice than Co. 25. Fifteen desirable selections which were free from blast disease were carried forward for further study.

(*b*) *ADT. 2 × Co. 4.*—Five blast resistant cultures of this cross were under replicated yield trial with ADT. 2 and Co. 25 as standards. The cultures were studied for their resistance to blast with a view to fix and evolve a blast resistant strain with fine, round grain similar to white sirumani. It was found that the yield differences were not statistically significant though four cultures had given higher yields than ADT. 2 and one culture higher than Co. 25. The results are presented in Table VI.

TABLE VI.—*ADT. 2 × Co. 4 Comparative yield trials.*

Field No.—H6a.
Size of plot—14 × 4' gross.
Lay out—7 × 4 randomized block.

Sown—30th July 1953.
Transplanted—23rd September 1953.
Harvested—30th January 1954.

Treatments (cultures)—
(1) 1947.
(2) 1560/2.
(3) 1950.
(4) Co. 25 Standard.
(5) 1951.
(6) 1560/1.
(7) ADT.2 Standard.

Summary of results.

Particulars.	1947	1560/2	1950	Co. 25	1951	1560/1.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Acre yield in lb.	3,125	2,970	3,334	3,687	3,449	3,919
Percentage on standard—						
ADT. 2	105·1	99·8	112·6	123·9	113·4	131·7
Co. 25	86·8	80·6	90·4	100	93·6	106·4
Flowering duration	145	143	143	144	143	143

Particulars.	ADT. 2.	General mean.	Standard error.	'Z' test.	Critical difference (P=0·05.).
	(8)	(9)	(10)	(11)	(12)
Acre in yield in lb.	2,975	3,351	266·6 / 257·8	Not satisfied.	..
Pecentage on standard—					
ADT. 2	100	112·3	8·90	..	..
Co. 25	80·7	91·2	7·02	..	..
Flowering duration	143	..	..	..	..

(*c*) *Trial of culture No.* 2092.—Culture 2092 is a pure line selection isolated at the Rice Research Station, Buchireddipalayam, and it is said to be resistant to blast. This was compared against Co. 25 for the first year on this station. The crop was free from blast but the performance of this culture was disappointing as it was out yielded by Co. 25 by 36 per cent. The yield figures are given in Table VII.

TABLE VII.—*Culture 2092 yield trial.*

Field No.—H3b.
Size of plot—20' × 4' gross.
Lay out—2 × 12 "Paired method".

Sown—30th July 1953.
Transplanted—19th September 1953.
Harvested—1st February 1954.

Treatments—
1 2092.
2 Co. 25.

Summary of results.

Particulars.	2092.	Co. 25.	General mean.	Standard error.	'Z' test.	Critical difference (P=0·05).
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Acre yield in lb.	3,031	4,158	3,619	99·84	Satisfied.	219·60
Percentage on standard	74·0	100	87·0	2·4	..	5·28
Flowering duration	144	144	..	..	..	..

Conclusion—Co. 25,2092.

(ii) *Evolution of saline resistant strains possessing commercial rice quality.*—Four svalof bulks of saline resistant crosses, namely, ADT. 8 × SR.26B in F2 generation, ADT. 1 × SR.26B and ADT. 8 × SR.26B in F5 generations were studied for their agronomic characters. The materials were carried forward as such without any selection. These cultures are intended for trial in typical saline areas.

9. *Inter-varietal trial.*—The following long duration strains, namely, Co. 19, Co. 25, ADT. 10, ADT. 24 and ADT. 25 were grown under replicated yield trial during the samba season to compare their merits. There was severe incidence of 'Soorai', paddy mealy bug and so reliable results could not be had.

10. *Thaladi (second crop).*—The second crop fields were ploughed thrice with iron plough after the harvest of *kuruvai* crop. Manuring was done at 5,000 lb. green leaf per acre consisting of *sesbania speciosa* grown in the margins of field bunds during *kuruvai* season and Gliricidia leaves from plants grown on field bunds and boundaries. Super phosphate at 150 lb. per acre was applied at the time of last ploughing. The transplanted crop was top dressed with ammonium sulphate at 100 lb. per acre. Sowing of *thaladi* nurseries was commenced on 5th September 1953 and completed on 30th October 1953. Transplanting was commenced on 14th October 1953 and completed on 21st December 1953. The sowings of blast resistant cultures were purposely delayed for affording better chances of blast infection under bombardment test. There was a severe incidence of stem-borer in the late planted *thaladi* crop and the severely affected plots were top dressed with 300 lb. of ammonium sulphate per acre. The crop made a remarkable recovery due to this heavy dose of manuring but the yield of the *thaladi* crop was below normal except in the case of blast resistant strain Co. 25. The average acre yields are give in Table VIII.

TABLE VIII.—*Acre yield of Thaladi,* 1953-54.

Strain number.	Area in acres.	Average yield in lb. per acre.		
		1953–54.	1951–52.	1952–53.
(1)	(2)	(3)	(4)	(5)
ADT. 25	3·05	2,948	..	3,314
ADT. 8	4·25	2,601	2,325	2,689
Co. 25	14·47	3,461	3,052	3,592
ADT. 24	0·41	3,172	..	3,348
ADT. 2	0·41	3,056	..	..

11. *Hybridization for crop improvement.—Evolution of blast resistant strains.*—A total number of 639 progenies of crosses between Co. 4, the blast resistant variety on one hand and popular strains, namely, ADT. 1, ADT. 3, ADT. 8, ADT. 15, ADT. 20, Co. 19, and Co. 25 on the other and progenies of cross ADT. 2 × Co. 25 ranging from F2 to F5 generations were under study for their resistance to blast under disease bombardment test. Incidence of blast was severe during the season and 1,448 promising plants combining the desirable parental combinations and free from blast disease were carried forward for further studies.

12. *Third crop of paddy.*—Trials were conducted for raising a third crop of paddy after the harvest of the *thaladi* crop with the help of lift irrigation. Some of the short-duration varieties, namely, ADT. 3, ADT. 9, ADT. 12, ADT. 14, ADT. 19, ADT. 20, ADT. 23, Co. 13, Co. 20, SW. 1251, PLR 2, TKM 3, Co. 13 and blast resistant culture 6522 (Co. 13 × Co. 4) were grown to fix up the suitable varieties for the season. Sowing was done on 31st January 1954 and 8th February 1954 and transplanting lasted from 28th February to 8th March 1954. The plots were manured with a basal dressing of 10 cartloads of compost and 150 lb. of super per acre and a top dressing of ammonium sulphate at 100 lb. per acre. In addition, nine early Chinese varieties were grown under observation plots and it was observed that these exotic varieties did not come up well during the season and found unsuitable. The performance of other strains were equally disappointing since setting of grains was not proper, resulting in very low yields. The incidence of blast disease was severe in all the varieties except the blast resistant hybrid culture 6522 (Co. 13 × Co. 4). The damages caused by field rats were also heavy. From this year's experience, it can be stated that the cultivation of third crop paddy under lift irrigation cannot be recommended for Tanjore delta.

13. *Manurial experiments.*—The following manurial experiments were conducted at the station during the year :—

(i) *Organic matter requirement of soil in the form of cattle manure, farm waste compost and green manure.*—The experiment was conducted both in the *kuruvai* and *thaladi* seasons. The results in the *kuruvai* season were vitiated due to incidence of Fulgorids and 'stem rot'. There was slight incidence of stem borer in *thaladi* season. However, the observations recorded in the early stages of the growth of the crop revealed that plots applied with green leaf were more vigorous. The result

obtained in the *thaladi* season showed that the yield differences were statistically significant. The results are given in the Table IX. In the previous year, the results of *kuruvai* were vitiated due to severe incidence of 'stem rot'. The *thaladi* results showed that the yield differences were not significant but the trend was in favour of green manure.

TABLE IX.—*Organic matter requirements of soil.*

Field No.—2b, 3b.
Size of plot—44' × 14' gross.
Lay out—10 × 4 randomized blocks.

Sown—18th September 1953.
Transplanted—27th November 1953.
Harvested—31st March 1954.
Variety—Co. 25.

Treatments—
1 No manure.
2 Farmyard manure 2,500 lb. per acre.
3 Farmyard manure 5,000 lb. per acre.
4 Farm yard manure 7,500 lb per acre.
5 Compost equivalent to organic matter in Treatment 2.
6 Compost equivalent to organic matter in Treatment 3.
7 Compost equivalent to organic matter in Treatment 4.
8 Green manure equivalent to organic matter in Treatment 2.
9 Green manure equivalent to organic matter in Treatment 3.
10 Green manure equivalent to organic matter in Treatment 4.

Summary of results.

Particulars.	1	2	3	4	5	6	7
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Acre yield in lb.	2,815	3,116	3,053	2,846	2,750	2,479	3,108
Percentage on control	100	110·7	108·3	101·1	97·7	88·1	110·4

Particulars.	(8)	(9)	(10)	General mean.	Standard error.	'Z' test.	Critical difference P=(0 05).
	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Acre yield in lb.	3,120	2,546	2,250	2,809	258·95	Satisfied.	531·12
Percentage on control	110·9	90·4	79·9	99·8	9·20	..	18·87

Conclusion—8, 2, 7, 3, 4, 1, 5, 9, 6, 10

(ii) *Nutrient requirements of paddy.*—This experiment was conducted for the second year both in the *kuruvai* season as well as the *thaladi* seasons. The object of the experiment is to find out the economic dose of nitrogen and phosphoric acid required for paddy. *Kuruvai* results were vitiated due to severe incidence of Fulgorids and 'stem rot' and the *thaladi* results by severe stem borer attack. From the observations recorded, the following general conclusions may be drawn (1) plots receiving the combination of fertilizers, namely, 45 lb. N.+45 lb. P_2O_5 and 60 lb. N.+60 lb. P_2O_5 were found to be better than the remaining treatments, (2) the differences between the two levels of Nitrogen and P_2O_5, namely, 45 lb. and 60 lb. are not perceptible, (3) at the same level of manurial application, nitrogen would appear to have a better effect on the crop than super-phosphate, when applied individually, (4) plots receiving superphosphate looked yellowish and stunted in growth, (5) the plots which received the highest dose of super phosphate, namely, 60 lb. P_2O_5 per acre were the earliest to flower, the latest being the one receiving ammonium sulphate alone at 60 lb. nitrogen per acre, the difference in flowering being nearly a fortnight. During 1952-53 *thaladi* season, ammonium sulphate at 45 lb. nitrogen gave the best result. The response to phosphate was too meagre.

(iii) *Permanent manurial experiment.*—This is to find out the direct manurial value of organic manures and inorganic fertilizers and to find out the necessity of liming the paddy soils. This was the second year of the experiment. The results of this experiment, both in the *kuruvai* and *thaladi* seasons, as in the case of other experiments during the year, were vitiated due to severe incidence of Fulgorids and 'stem rot' in the *kuruvai* season and stem borer in the *thaladi* season. Hence no results could be obtained. From the observations recorded during the crop growth, the following conclusions may be drawn: (1) Of the four main treatments and the control, namely, green manure, compost, cattle manure and ammonium sulphate to supply 60 lb. nitrogen and the control plot receiving no nitrogen, plots manured with ammonium sulphate had the best stand, the next being the one receiving green leaf alone; cattle manure and compost when applied alone, exhibit rather poor crop response. (2) The crop showed no perceptible response to any of the other soil nutrients, namely, super-phosphate, lime and

potash either alone or in combination. (3) There was a marked delay of nearly a fortnight in the flowering duration of the crop manured with ammonium sulphate alone. The results obtained in the previous year showed that the yield differences were not significant. But there was a clear indication that the crop had responded well to both green leaf and ammonium sulphate whereas the response for cattle manure and farm-waste compost was not perceptive.

(iv) *Green* versus *air dried sesbania experiment.*—This experiment with the following treatments, namely, (1) No manure, (2) green sesbania at 5,000 lb. per acre and (3) dried sesbania at 1,550 lb. per acre (equal to 5,000 lb. of green stuff) was conducted in *kuruvai* and *thaladi* seasons during the year to determine the manurial value of dried sesbania. The manured plots were found to be earlier by two days than the unmanured plots in respect of flowering but no difference was noticeable between the different manurial treatments themselves in the *kuruvai* season. In the *thaladi* season, in the early stages of the crop growth, the application of sesbania in green state appeared to be distinctly superior to the air dried form, though the latter treatment was markedly superior to no manure plot. However, the experimental results both in the *kuruvai* and *thaladi* seasons were vitiated due to the incidence of fulgorids and 'stem rot' and stem-borer respectively and so definite conclusions could not be drawn.

(v) *Maximization of yield trial.*—This experiment was laid out in *kuruvai*, *thaladi* and *samba* seasons. Results of *kuruvai* and *thaladi* seasons were vitiated due to damages by the incidence of fulgorids and 'stem rot' in the *kuruvai* season and stem-borer in the *samba* season. Results obtained in the *samba* season showed that treatment 2, that is, 5,000 lb. green leaf + 150 lb. superphosphate + 150 lb. of ammonium sulphate, treatment 4, that is, 10,000 lb. green leaf + 300 lb. superphosphate + 100 lb. ammonium sulphate and treatment 6, that is, 10,000 lb. green leaf + 300 lb. superphosphate + 100 lb. ammonium sulphate + 1,000 lb. lime per acre were superior to other treatments. However, the treatment differences were not statistically significant and 'Z' test was not satisfied. The results are presented in Table X.

TABLE X.—*Maximization of yield trial—Samba season.*

Field No.—H. 7a.
Size of plot—46′ × 9½′ gross.
Layout—6 × 4 randomized blocks.

Sown—30th July 1953.
Transplanted—28th September 1953.
Harvested—9th February 1954.
Variety—Co. 25.

Treatments—
1 2,000 lb. green leaf.
2 5,000 lb. green leaf + 150 lb. superphosphate + 150 lb. ammonium sulphate.
3 10,000 lb. green leaf + 300 lb. superphosphate.
4 As in treatment 3 + 100 lb. ammonium sulphate.
5 As in treatment 3 + 1,000 lb. of lime.
6 As in treatment 4 + 1,000 lb. of lime.

Summary of results.

Particulars.	1	2	3	4	5	6	General mean.	Standard error.	'Z' test.	Critical difference (P=0·05).
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Acre yield in lb. ..	4,960	5,238	4,679	5,379	4,890	5,238	502·9	1,315·78	Not satisfied.	..
Percentage on control.	100	105·6	94·3	108·4	93·6	105·6	101·4	26·53	..	..

14. *Cultural experiments*—(i) *Japanese method* versus *farm method of cultivation.*—The experiment was conducted in *kuruvai*, *samba* and *thaladi* seasons with two varieties and two treatments to test the merits of the Japanese method with that of the farm method of cultivation. Due to thinner seed rate in the nursery, wider spacing at transplantation and heavier manuring both in the nursery and transplant fields, the crop in Japanese method of cultivation was more vigorous in growth and had more number of tillers per plant. In the *kuruvai* season, the crop was infected with fulgorids and 'stem rot' and damages due to the pests were more in the Japanese method plots since the crop had lodged earlier in these plots due to heavier manuring. Hence the results were vitiated. The incidence of stem-borer pest was severe in the *thaladi* season and the results were not fit to be subjected to statistical analysis. The general observations recorded during the crop growth

as in the *kuruvai* season. that the Japanese method of plots were more vigorous in growth, had better tillering per plant but the number of tillers in an unit area were less than that in the farm method plots. This would serve more or less as an index of the prospective yields of the crops under the two methods. The experiment in *samba* season with Co. 19 and Co. 25 was also badly affected by 'soorai' and no useful result could be obtained.

(ii) *Time of planting*-cum-*manurial experiment.*—The object of the experiment is to study the advantages of early planting in *kuruvai* and intensive manuring of *kuruvai*, *thaladi* and *samba* crops with reference to the maximization of paddy production. In the *kuruvai* season, except the control (ryots method—cattle manure alone at 5,000 lb. per acre), the crop under all the other treatments uniformly lodged towards the late ripening stage. The incidence of fulgorids and jassids, 'stem rot' (*Sclerotium oryzae*) was severe and hence results were vitiated and could not be subjected to statistical scrutiny. Similarly the *thaladi* results were vitiated by severe incidence of stem-borer pest and *samba* results by incidence of 'soorai' (paddy mealy bug).

(iii) *Optimum age of seedlings at transplantation.*—This experiment was conducted with the popular strains in Tanjore delta, namely, ADT. 3 and ADT. 20 in *kuruvai*, Co. 19 and Co. 25 in *samba* and *thaladi* seasons. No useful information could be obtained owing to the severe incidence of fulgorids and 'stem rot' in the *kuruvai* season and 'soorai' and stem-borer pest in the other seasons.

(iv) '*Udu*' *trials.*—An experiment to determine the optimum seed proportion of *kuruvai* and *ottadan* for 'Udu' cultivation and to find out the economics of manuring *ottadan* crop after harvest of *kuruvai* with 2 : 1, 3 : 1 and 4 : 1 of *kuruvai* (ADT. 4) to *ottadan* (ADT. 7) was conducted. Both the *kuruvai* and *ottadan* crops were severely damaged by pests and diseases and so no reliable results could be had.

15. *Plant protection trials*—(i) *Insecticidal trials* (*in collaboration with the Agricultural Entomologist*)—(*a*) *Soorai* (*rice mealy bug, Ripersia oryzae*).—Trials were conducted to control the pest which is almost epidemic in this delta and causes considerable damage to all varieties in both *samba* and *thaladi* seasons. A number of insecticides such as BHC 0·1 per cent spray, BHC 10 per cent dust and Folidol 0·025 per cent in the nursery and BHC 0·2 per cent spray, Folidol 0·025 per cent, hexidole 950 0·1 per cent, BFPO 0·05 per cent and systox 0·05 per cent in the transplanted field where infection was noticed were tried. Folidol gave the best results followed by systox in controlling the pest. However, definite conclusions could not be arrived at as the incidence of the pest was not severe.

(*b*) *Stem-borer* (*Schoenobius incertellus*).—The incidence of this serious pest was very severe during the year in the *thaladi* season and the damages caused to the crop, both experimental and bulk plots were considerable resulting in low yields and complete failure of the experiments. The *thaladi* seed-beds were treated with BHC 0·1 per cent spray BHC 10 per cent dust and folidol 0·025 per cent and the seedlings transplanted. The transplanted field was similarly treated 15 days after and 30 days after planting and the counts of infection showed a percentage of 1·66, 1. 97, 2·30 and 4·20 in the case of BHC 0·1 per cent Folidol 0·025 per cent, BHC 10 per cent dust and control respectively. In another experiment the same variants as above were tried at the pre-flowering stage without any treatment to the nursery. The percentage of infection was least in BHC 0·1 per cent spray followed by Folidol 0·025 per cent. Stem-borer moths were caught by light traps and the maximum catches were recorded in the months of March and April. Good catches were recorded from November-December onwards.

Cotton boll-worm.—Experiments on the control of cotton boll-worm were in progress with Folidol 0·025 per cent, BHC 0·1 per cent and Ekatox 0·025 per cent. The least incidence of the pest was noted in plots treated with Folidol 0·025 per cent and Ekatox 0·025 per cent. The plot treated with BHC 0·1 per cent showed only half the population noted under control.

(ii) *Paddy* '*blast*' *bombardment test.*—Under the auspices of the Indian Council of Agricultural Research a scheme was sanctioned from 1st July 1953 to pursue the study for the evolution of blast resistant hybrid strains. A total number of 402

sultures of short, medium and long-duration crosses were under blast bombardment test in the *thaladi* season. The experimental cultures were sown and planted late in the season so as to get the incidence of disease. Further, heavy dose of ammonium sulphate at the rate of 500 lb. per acre was applied to the plots in two doses, 250 lb. 15 days after planting and another 250 lb. 30 days after planting so that the plants become more susceptible to the disease. The incidence of disease was severe which facilitated elimination of susceptible material. A total of 1,863 disease free selections were carried forward for further study.

16. *All-India Co-ordinated Crop Weather Scheme.*—The All-India Co-ordinated Crop Weather Scheme on paddy was continued in *kuruvai* and *samba* seasons. Observations regarding the performance of the two crops in relation to weather were recorded. In addition the general weather data and soil moisture estimations were recorded and sent to the Director of Agricultural Meteorology, Poona. ADT. 3 and ADT. 20 were the varieties under observation in *kuruvai* season and ADT. 1 and Co. 25 for *samba* season.

17. *Pests and diseases.*—Incidence of pests was severe during the year. The *kuruvai* crop was severely affected by Iassids, Fulgorids and stem-rot (*Sclerotium oryzae*) and the *samba* and *thaladi* crops by 'soorai' and stem-borer respectively. The damages caused were very severe which resulted in low yield of the bulk crops and most of the experimental results were vitiated. The field rat which is a major pest of paddy was effectively controlled by systematically adopting control measures such as baiting with zinc phosphide, setting up of bow traps and systematic digging of rat burrows on field bunds and killing the adults. A total number of 3,068 rats were killed during the year by adopting the above methods.

18. *Seed distribution.*—A total quantity of 90,824 lb. of nucleus seed of paddy of various strains was distributed during the year.

19. *Other crops*—(i) *Cotton on rice fallows.*—After the harvest of the paddy crop an area of 6·75 acres was sown with bulk crop of P216F cotton and an area of 4·79 acres sown with varietal and cultural experiments bringing the total area under this crop to 11·54 acres. Sowing commenced from 9th February 1954 and continued up to 4th March 1954. The first sowings were done in *samba* area whereas sowing was late in *thaladi* area due to the late harvest of the *thaladi* crop. Hence yield of the late sown crop was poor since the crop had not completed flowering by the time the plots were required for *kuruvai*. A total quantity of 2,096 lb. of kapas was gathered from the bulk crop. The yield from the early sown crop in the *samba* area worked out to 660 lb. of kapas per acre.

The results of the varietal and cultural trials were gathered and sent to the Assistant Cotton Specialist, Srivilliputhur.

(ii) *Groundnut in rice fallows.*—An area of 90 cents was sown with TMV 2 groundnut after the harvest of paddy crop. Sowing was done on 6th and 21st March 1954 and the crop was harvested on 21st and 24th June 1954. A very poor yield of 9 pounds of pods only per acre was obtained thereby showing that growing of groundnut in rice fallows was an absolute failure.

(iii) *Green manure crops.*—Intensive work on green manure crops such as *Gliricidia maculata. Sesbania speciosa* and *Indigofera teysmanni* were under progress at the station. Sesbania raised on the margin of field bunds during the *kuruvai* season of 1953–54 yielded 46,000 lb. of green matter which was utilized for manuring the *thaladi* crop. The average yield of sesbania from the marginal planting worked out to 2,875 lb. of green matter per acre field bund. From a unit length of 100 feet of field bund 240 lb. of green matter was obtained. Pure crop of sesbania sown in rice fallows in 1954 summer on an area of 1·99 acres in *samba* area yielded 70,150 lb. of green leaf which worked out to 39,774 lb. of green matter per acre. Planting of Gliricidia and Indigofera seedlings on channel bunds were continued. All the shrubs of Gliricidia were lopped and the green matter utilized for *thaladi* crop.

The following gives the quantities of green manure produced and utilized for manuring, and the quantities of seeds, cuttings and seedlings produced and distributed :—

	Quantities of green matter produced.	Quantity of seed collected.	Quantity of seed supplied.	Number of seedlings supplied.
(1)	(2)	(3)	(4)	(5)
Sesbania	325,150 lb.	546 lb.	113 lb.	58,500
Gliricidia	135,522 ,,	..	13 ,,	18,387
Indigofera	..	11 lb. 3 oz.	7 lb. 2 oz.	..

(iv) *Fodder crops.*—The quantity of green grass cut and fed to milch cows and the number of slips of Napier, Guinea and Buffalo grasses sold during the year are given below :—

Green grass cut and fed to milch cows	61,334 lb.
Slips of Napier grass sold	275 Nos.
Slips of Guinea grass sold	2,350 ,,
Slips of Buffalo grass sold	1,925 ,,

(v) *Fruit trees and plants*—(*a*) *Banana.*—From the different varieties maintained on the office high piece, a total number of 62 bunches was obtained and disposed of.

(*b*) *Mango.*—From the 17 graft mango trees on the station a total of 225 lb. of fruits were harvested during the period and sold besides 28 grafts were also produced and sold.

(*c*) *Citrus.*—The following gives the quantities of fruit obtained from the different citrus plants on the station and the number of rooted cuttings and seedlings produced and sold during the period :—

	Quantity of fruits obtained.	Number of seedlings and rooted cutting produced and sold.
	LB.	
Sathugudi	186	..
Pummelo	122½	..
Malta lemon	13	76
Acid lime	..	483
Sour orange	..	26

(*d*) *Jack.*—A total number of 250 seedlings were raised and sold during the year from selected fruits obtained from Pattukkottai, Orathanad and Palur.

(vi) *Vegetables.*—The vegetable area in 'K' block to an extent of 1·4 acres and 0·38 acre in rice fallows in 'A' block was grown with bitter gourd, snake gourd, bendai, tomato, chillies, brinjal, amaranthus and other vegetables for production of beds and seedlings. A total number of 213,444 seedlings and 135 lb. 2¾ oz. of seed of the different vegetable plants grown at the station were distributed during the period.

(vii) *Coconuts.*—The coconut trees in the station totalling 232 were given a digging and manured with superphosphate and compost at 5 lb. and 20 lb. respectively per tree. One thousand three hundred and sixty-two nuts were harvested during the period from 150 trees that were in bearing and disposed of. The other trees have not yet commenced bearing.

20. *Livestock.*—(*a*) *Work animals.*—One pair of work animals was purchased during the year and two animals were auctioned. The total number of work animals at the station was 18. All the animals maintained good condition and had enough work during the season.

(*b*) *Breeding bull.*—There were five breeding bulls, four Scindhis and one Murrah buffalo at beginning of the year to which one bull at the station was added by conversion for stud purpose. Two stud bulls were transferred to the District Veterinary Officer, Tanjore, leaving a balance of three stud bulls, two Scindhis and one Murrah buffalo. They performed a total number of 199 and 69 services respectively.

(*c*) *Cows.*—Eight Scindhi cows were maintained at the station and a total quhntity of 11.506 ib. 4 oz. milk was obtained and sold during the pear.

(*d*) *Calves.*—Thero were elght heifers and three bull calves at the beginning of the year to which oue heifer calf and three bull calves were added by births· One heifer calf died aue to machanical bronchities leaving closinfl baiance of eight heifers and five bull calves.

21. *Poultry.*—A small unit of Rhode Island Red breed was maintniued at the station. Thiee was ān opening balance of 68 birds of which 14 were Rhode Island Red hens, four cocks, three pullets, 40 chicks and 7 desi hens. A total number of 72 birds died duging the period, 64 birds sold aad 144 received by internal transfer and purchase leaving a closing balance of 76 birds consisting of 10 Rhode Island Red hens, four cocks, eight cockrels, two pullets, 44 thicks and eight desi hens, To an opening balance of eight Rhode Island Red eggs and three desi eggs, 1098 Rhode Island Red eggs and 249 desi eggs were added during the year. Of these 249 eggs were set for farm hatch, 767 sold for hatching purposes, 10 fed to chicks ann 336 sold table for leaving a closing balance of six Rhode Island Red eggs.

22. *Agriculture.*—There were eight bees colonies working at the beginning of the year. Seven colenies were hived during the year and two transferred to Agricultural Research Station, Pattukottai and six swarmed leaving a closing balanbe of seven colonies. Sixteen pounds of honey was collected during the period.

23. *Pisciculture.*—Fish reariag in paddy flelds was tried as an experimental measure during the year. About 600 fingerlings of Labeo variety of fish were introdvced in *samba* rice fields on 18th November 1953. The population got eonsidrably reduced and they failed to make any appreciable growth when they were caught on 6th February 1954, a fortnight before the harvest of the paddy. Only 85 of them survived weighing 4½ pounds and the reduction in population was due to natural enemies like crabs, rats and other predatory creatures common in the rice fields and the period was also too short for the fingsrlings to make any appreciable growth Indigenous varieties of fiish form irrigation canals were reared ia the two fish ponds at the station anp only two ponnds of fish was caught and sold.

24. *General*—"*New source of lift irrigation.*—Two more filter point tube wells one in "E" block and one in 'K' block vegitable areas were sunk during the year. A total number ofseven filter point tube wells are functioning in the station and these serve a remarkably well was additional sources of irrigation during summer months for raising vegetables in garden lands, cotton and green manure crops in rice fallows as well as for rising *nuruvai* nusery in advance of the receipt of the canal water.

V. SRINIVASAN.
Superintendent.

A MUHAMMAD ALI.
Deputy Director of Agriculture.

AGRICULTURAL RESEARCH STATION, ADUTHURAI,
7th September 1954

TANJORE, 1st January 1955.

APPENDIX I.

COST OF CULTIVATION FOR BULK CROPS.

Serial number and details of expenditure.	Actual expenditure for three years. 1951-52.	1952-53.	1953-54.	
	RS. A. P.	RS. A. P.	RS. A. P.	
1 Pay and allowance of the staff (one-third of actuals) Farm Manager and Fieldman.	764 0 0	764 0 0	764 0 0	
2 Miscellaneous cultivation expenses (one-third of actuals).	2,187 1 11	2,524 1 9	1,857 4 6	
3 Working expenses (actuals).	14,204 15 1	11,933 15 5	7,497 12 10	
4 One-tenth of expenditure on live and dead stock.	280 8 0	38 6 0	63 3 2	
5 Rent on land ..	3,382 0 0	3,267 0 0	3,160 0 0	Rent on land calculated at Rs. 10C per acre.
6 Unforeseen contingencies.	..	..	..	
Grand total ..	20,818 1 0	18,628 7 2	13,342 4 6	

APPENDIX II.

RECEIPTS.

Table I-A.

Serial number and details of crops.	Area in acres.	Seed. Yield in lb.	Seed. Value.	Grain. Yield in lb.	Grain. Value.	Straw. Yield in lb.	Straw. Value.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
I. Crops—							
(1) Paddy—							
(a) Kuruvai ..	16·50	31,515	5,417 2 6	2,426	266 1 0	69,795	1,163 4 0
(b) Samba ..	2·30	7,574	815 13 11	339	37 1 6	11,799	196 10 6
(c) Thaladi	29·30	72,390	10,228 12 1	3,307	479 7 6	148,770	2,505 2 6
(2) Cotton in rice fallows.	6·70	3,869 lb. of kapas.	1,692 11 0	..	..	33,500 lb. of stalks.	33 8 0
II. Miscellaneous—							
(1) Dairy produce (milk)		11,506 lb. 4 ozs.	2,157 6 9	..	..	..	..
(2) Poultry		..	..	..	..	..	..
(3) Sale of seedlings and plants, etc.—							
(a) Vegetable seeds. ..		490 lb. 3½ oz.	1,977 12 3				
(b) Seedlings		209,135 Nos.	1,243 4 0	..	..	..	..
(c) Green vegetables ..		2,624½ lb.	243 7 0				
(d) Auction of cattle...		..	285 0 0				

serial number and details of crops—

	Total receipts for the year.	Total receipts for three years.		
		1951-52.	1952-53.	1953-54.
	(9)	(10)	(11)	(12)
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
I Crops—				
(1) Paddy—				
(a) Kuruvai ..	6,846 7 6	8,461 4 10	13,949 4 8	6,846 7 6
(b) Samba	1,049 9 11	2,544 9 10	1,950 7 9	1,049 9 11
(c) Thaladi	13,213 6 1	11,255 13 0	21,334 0 0	13,213 6 1
(2) Cotton in rice fallows.	1,726 2 0	4,704 0 0	4,529 4 11	1,726 2 0
II. Miscellaneous—				
(1) Dairy produce (milk).	2,157 6 9	2,568 13 0	2,141 13 0	2,157 6 9
(2) Poultry	489 7 6	516 0 0	463 12 0	489 7 6
(3) Sale of seedlings and plants, etc.—				
(a) Vegetable seeds ..				
(b) Seedlings	3,749 11 3	3,033 8 3	3,480 15 2	3,749 11 3
(c) Green vegetables.				
(d) Auction of cattle ..				
Total ..	29,232 4 0	33,174 0 11	47,849 9 7	29,232 7 0

Table I-B.

Crop.	Seed.				Grain.			
	Retained on the station.		Transferred or sold.		Retained on the station.		Transferred or sold.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	LB.	Rs. A. P.	LB.	Rs. A. P.	LB.	Rs. A. P.	LB.	Rs. A. P.
Paddy.	2,000	462 3 0	108,479	15,999 9 6	..	..	6,072	782 10 0

Crop	Straw.				Total value.	Total receipts for three years.		
	Retained on the Station		Transferred or sold.			1951-52.	1952-53.	1953-54.
	Quantity.	Value.	Quantity.	Value.				
	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
	LB.	Rs. A. P.			Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
Paddy.	100,864	8,865 1 0	..	..	21,109 7 6	22,261 11 8	37,233 12 5	21,109 7 6

APPENDIX III.

STATEMENT OF EXPENDITURE AND RECEIPTS (ABSTRACT).

Serial number and particulars.	1951-52.	1952-53.	1953-54.
(1)	(2)	(3)	(4)
	Rs. A. P.	Rs. A. P.	Rs. A. P.
1 Expenditure	20,818 1 0	18,628 7 2	13,342 4 6
2 Revenue	33,174 0 11	47,849 9 7	29,232 4 0

APPENDIX IV.

CONSOLIDATED STATEMENT SHOWING THE QUANTITY OF SEEDS, SEEDLINGS, ETC., DISTRIBUTED DURING 1953-54.

Particulars.	Produce sold or distributed as seed.		Seedlings.	
	Quantity.	Value.	Quantity. or number.	Value.
(1)	(2)	(3)	(4)	(5)
	LB. OZ.	RS. A. P.		RS. A. P.
1 Paddy	1,77,091 ..	23,180 0 3	149¼ cents	447 12 0
2 Vegetables and fruits	490 5¼	1,977 12 3	209,435	1,243 4 0
3 Green manures	113 ..	28 4 0	76,887	99 4 0
4 Fodder crops	..	..	6,200	7 12 0
5 Fibres	..	..	..	..
6 Live fence	..	..	110,825	282 13 9
7 Coconut	..	..	..	

Particulars.	Other than seed.		Remarks.
	Quantity.	Value.	
	(6)	(7)	(8)
	LB. OZ.	RS. A. P.	
1 Paddy	..	..	
2 Vegetables and fruits	2,624 12	243 7 0	Consisting of amaranthus, bendai gourds, tomato, brinjal, chilly mango, sathugudi, lemon, etc.
3 Green manures	..	..	Sesbania and gliricidia.
4 Fodder crops	..	..	Guinea, buffalo and napier grass.
5 Fibre	12,041	5,162 7 7	Cotton kapas.
6 Live fence	..	..	
7 Coconut	1,315	350 5 6	

APPENDIX V.

STATEMENT OF RECEIPTS AND EXPENDITURE OF THE AGRICULTURAL RESEARCH STATION, ADUTHURAI, FOR THE YEAR ENDING JUNE 1954 (FASLI 1963).

I. Expenditure.

	Rs	A.	P.
1. Pay of officer	4,259	5	0
Dearness allowance	425	15	0
2. Pay of establishment (permanent)	12,240	10	0
Dearness allowance	4,276	10	9
3. Travelling allowance	695	10	0
4. Capital outlay	2,319	5	7
5. Working expenses	34,548	4	6
Dearness allowance to menials	3,783	4	0
6. Other charges—			
Other contingencies	1,216	13	0
Petty construction and repairs	2,973	9	9
Total	66,739	6	9

II. Receipts.

1. Station receipts (sale-proceeds of seeds, seedlings, etc.)	18,269	12	6
2. Rent on buildings (rest house rent)	335	6	0
3. Miscellaneous receipts	399	0	0
4. Transfers (Value of seeds, seedlings, etc. transferred)	15,976	0	6
Total	34,980	4	0
Deduct refund	71	8	0
Net total	34,908	12	0
5. Value of farm produce received during the year and held as balance of stock at the end of the year	23,380	0	0
Grand total	58,088	12	0

APPENDIX VI.

STEPS TAKEN TO INCREASE THE REVENUE OF STATION.

1. *New sources of lift irrigation.*—The more filter point tube wells, one in E block and one in K block were sunk during the year bringing the total number to seven filter point tube wells. These additional sources of lift irrigation facilitated the raising to *Kuruvai* nursery in advance of the receipt of canal water, growing cotton and green manure crops in rice fallows and vegetables in gardenland thereby increasing the revenue of the station.

2. *Enhanced paddy production.*—Intensive manuring with a judicious combination of green manure, super phosphate and ammonium sulphate was adopted for all the three crops of paddy viz. *Kuruvai*, *Thaladi* and *Samba* and fairly high average yields in all the crops were obtained. However, the incidence of insect pests and diseases was severe during the year which caused much reduction in the yields of the paddy crop.

3. *Green manure* —Work on green manure crops was intensified which resulted in enhanced green leaf production thereby reducing the manure bill. *Sesbania speciosa* was raised on margins of *Kuruvai* field bunds and applied to the succeeding *Thaladi* crop and from plants grown on the margin of *Thaladi* and *Samba* field bunds, seeds were collected. Pure crop of sesbania was raised in Samba rice fields and utilised for manuring the kuruvai crop. From glirioidia plants on field bunds and boundaries, large quantity of green leaf was obtained for manuring *Samba* and *th ladi* crops. Work on *Idigofera teysmanni* was intensified and fairly large number of seedlings were planted during the year.

4. *Vegetables and fruits.*—A large number of vegetable seedlings, fruit plants and fairly large quantity of vegetable seeds were produced and distributed during the year from an area of 1·78 acres. A high profit of nearly Rs. 1,000 was obtained during the year.

5. *Cotton in rice fallows.*—An area of 11·54 acres of rice fallows was under cotton crop. An average acre yield of 660 lb. kapas per acre was obtained which added to the revenue of the station. In addition, the cotton plants which were estimated to produce 8,000 lb. of green matter per acre applied as a manure for the paddy crop.

ANNUAL REPORT OF THE CENTRAL BANANA RESEARCH STATION, ADUTHURAI, FOR THE FASLI YEAR 1363 (1953–54).

I. This forms the Fifth Annual Report of the Central Banana Research Station, Aduthurai, Madras State.

II. *Season.*—The weekly rainfall distribution during the period 7th June 1953 to 6th June 1954 recorded at the Agricultural Research Station, Aduthurai, situated within a distance of about a mile from the Central Banana Research Station is given in Appendix I.

The rainfall was below the average for the past ten years by 5·60 inches. The inadequate south-west and north-east monsoon rains affected the standing crops of bananas rather adversely.

III. *Banana variety collection*—(*a*) *Collection.*—The up-to-date number of banana varieties in the collection is one hundred and sixty-one. The list of banana varieties as it stood on 30th June 1953 and the places from where they were obtained are given in Appendix II.

The varieties, namely, Nanguneri Peyan [two types (i) rind ashy coated and (ii) rind coloured green], Erachi Vazhai, Erode Nadan, Erode Monthan, Benares, Hadagalli, Kallar Laden, Kallar Anaikomban, Uthiran Vazhai and Ela Arisi were added to the collection during the period under report.

(*b*) *Survey.*—A survey of banana growing areas in the districts of Chingleput, Salem, North Malabar, Tirunelveli and parts of Coimbatore, Nilgiris and South Arcot was undertaken during the period under report.

(*c*) *Systematic studies—Cultivated banana varieties.*—Detailed morphological descriptions as per descriptive blank of 126 cultivated banana varieties including synonyms, were recorded of which 104 varieties are indigenous while the rest are exotic. It has been found possible to reduce the above number into fifty-five distinct varieties based on certain diagnostic characters. The number of cultivated banana varieties described is not exhaustive. An attempt has been made to group the varieties described so far, taking into consideration, the stature of the pseudostem as a primary character to separate the five dwarf varieties from the medium and tall varieties. It is difficult to have a clear demarcation between medium and tall varieties as cultural practices and environmental conditions tend to influence the stature of the plant. However taking the range of colouration of the pseudostem of the cultivated banana varieties as a secondary character it was possible to group the medium and tall varieties into four distinct groups, namely, (*a*) black or bluish black, (*b*) red or purple, (*c*) green or yellowish green and (*d*) green with various shades of pink colouration. This grouping has facilitated the distribution of rest of the fifty varieties. The distinguishing characters of each variety under the above-mentioned groups are detailed in Appendix III.

(*d*) *Preliminary studies on suckering.*—The extent and frequency of suckering of banana varieties varies widely. This character is of little value in the classification of bananas though of some economic importance. The data collected under wet land and perennial systems of cultivation in respect of eighty-seven cultivated varieties and four wild species are given in Appendix IV. They are classified as poor or moderate or free-stooling varieties based on the number of suckers produced. Production of one to three suckers is classed as poor, up to six as moderate and above six as free-stooling. The data were collected only during one season.

(*e*) *Duration of varieties.*—The duration of the banana varieties from the date of planting to harvest is an important economic character. The Cavendish group of varieties like Vamanakeli, Jahaji, etc., in particular are distinctly short duration varieties while a few like Red Banana, Batheesa, Nalla Bontha, Pacha Bontha, etc., are longer duration varieties. Climatic and environmental conditions including altitude are known to affect the duration of the varieties. The data collected during

the year under wet land conditions in respect of the varieties studied are furnished below :—

TABLE I.—*Yield and duration of banana varieties—Wet land area.*

Serial number and variety.	Mean Number of plants harvested.	Mean duration from planting to harvest in days.	Mean Number of fruits per bunch.	Mean weight of bunch in lb.
(1)	(2)	(3)	(4)	(5)
1 Vamanakeli	12	332	77	17·0
2 Jahaji	2	334	103	20·0
3 Harichal	3	390	64	15·0
4 Batheesa Green	4	392	62	19·0
5 Kach Kol	4	402	64	20·0
6 Madhuranga Bale	5	402	60	22·0
7 Poovan	3	425	92	17·4
8 Booditha Bontha Batheesa	6	426	100	18·0
9 Pacha Bontha Batheesa	7	427	160	34·4
10 Malai Monthan	5	430	49	16·0
11 Ponthan	5	431	42	15·0
12 Sambrani Monthan	5	432	51	18·0
13 Soneli	5	432	78	15·5
14 Ayiranka Rasthali	2	433	206	22·0
15 Lambi	2	434	38	16·5
16 Kanch Kela	10	436	75	23·0
17 Ash Monthan	6	448	57	20·0
18 Batheesa Ashy	5	450	46	16·0
19 Pacha Batheesa	6	450	125	32·0
20 Pidi Monthan	6	453	50	24·0
21 Ney Poovan	3	461	132	18·8
22 Bainsa	6	462	90	21·0
23 Lal Velchi	3	464	112	18·8
24 Bontha	7	468	43	16·0
25 Adukku Monthan	7	468	200	35·0
26 Bhurkel	4	472	89	16·0
27 Kallu Monthan	6	472	52	16·0
28 Thella Bontha	2	473	48	16·0
29 Pacha Bontha	7	482	94	33·0
30 Nalla Bontha	7	484	57	20·0
31 Batheesa	6	486	89	20·8
32 Red Banana	3	525	50	16·0

Remarks.—As some of the plants under the varietal collection were affected in the young stage by the cyclone of November 1952 it was not possible to present yield data of all the varieties in the collection.

(*f*) *Wild banana species.*—The following wild species of bananas in the collection at the station are intended to serve as male parents in hybridization work and also for systematic studies :—

(1) *Musa balbisiana and its clones*—
- (*a*) Ela Vazhai,
- (*b*) Neer Bale,
- (*c*) Kadu Bale,
- (*d*) Ramkel,
- (*e*) Sawai, and
- (*f*) Wild Banana (Hassan-Mysore) ;

(2) *Musa acuminata* ;
(3) *Musa banksii* ;
(4) *Musa chiliocarpa* and ;
(5) *Musa coccinea.*—

(1) *Musa balbisiana.*—The plants of this species in the collection which came to flower during the period under report were described and the important diagnostic characters recorded are furnished below. The description of the species recorded at this station was in conformity with that of Cheesman's description.

(i) Plants are tall and very robust with predominant green colouration of the pseudostem. The leaf sheaths closely clasp the pseudostem. Adaxial channel of the petiole is almost closed. Petiole margins are incurved and not scarious and they are bordered by purplish black line. Leaf sheaths and petioles are waxy coated.

(ii) The inflorescence is pendent with glabrous peduncle and rachis.

(iii) The male flower bud is broadly ovate and rounded at spex ; *several bracts lift at the same time.* Bracts are not usually decidu us, they persist in a withered condition especially in the latter stages of blooming. Bracts are cloured purple on the outer surface and crimson on the inner surface without fading towards the base. No distinct transverse corrugations are observed between the ribs on the inner surface.

(iv) Male flowers are often deciduous before bracts. Free tepal is translucent with imperceptible pink tinge and a short mucronate apicula.

(v) Fruit bunch is compact. The fruits do not exhibit marked geotropic curvature and the response is confined only to the pedicel. The basal hands stands out distinctly from the rachis. Fruits are angulate at maturity. *Seeds are irregularly globose, scarcely depressed and minutely warty.*

Clones of Musa balbisiana—(*a*) *Ela Vazhai.*—The description of Ela Vazhai recorded at this station agrees with the description recorded by Jacob (1952), Cheesman also makes a mention of this plant, collected under the names of Ela Bale (Kanada), Ela Vazhai (Tamil) and Ginja Arati (Telugu) from South India. Cheesman considers this as a clone of *Musa balbisiana.* Ela Vazhai possesses all the important characters of *Musa balbisiana.*

(*b*) *Neer Bale.*—This clone of *Musa balbisiana* was introduced from the collections made at Poona. The plant is medium tall and rather slender and is not as rubust as *Musa balbisiana.* Except for this in all the other morphological characters Neer Bale resembles *Musa balbisiana.*

The other clones of *Musa balbisiana* namely Kadu Bale, Ramkel, Sawai and Wild Banana are still in the pre-flowering stage.

(2) *Musa acuminata.*—The seedlings of *Musa acuminata* grown from the seeds brought from Trinidad by the Banana Research Officer, have failed to establish at this station. But these seedlings supplied to the Fruit Research Station, Kallar, have established well. The descriptions recorded at Kallar agree with Cheesman's description of the species.

(i) Plant produces suckers freely and is slender and medium tall. The adaxial channel of the petiole is open and the margins are spread out and scarious.

(ii) The inflorescence axis is characteristically pubescent.

(iii) The male bud is turbinate in the advanced blooming stage with acute apex. Bracts extend to apex and are *raised only one at a time.* The inner surface of the bract is light red distinctly paling towards the base.

(iv) The free tepal in the male flower is generally unpigmented with transverse corrugations below apicula.

(v) Fruit bunch is compact with fruits exhibiting marked geotropic curvature. Fruits are sub-cylindrical with distinct apex. The ridges on the fruit disappear on full ripening. Seeds are *dull black to brown in colour, smooth on the facets, irregularly angulate and depressed in some.*

(3) *Musa banksii.*—Plants of this species introduced at the Central Banana Research Station, Aduthurai, have failed to establish. The detailed description of this species was recorded under natural conditions in the hills of Singampatti (Tirunelveli district) by Sri T. Gopalan Nayar and was published in the Indian Journal of Horticulture, Volume IX, No. 1, March 1952, " On the occurrence of *Musa banksii* (F. Muell) Var-Singampatti (Nayar, T. G.)."

The description of the species agrees with that of Cheesman's to a greater extent except for the minor variations noted below :—

Particulars of plant character.	Cheesman's description of the species.	Description of the species collected from Singampatti.
(1)	(2)	(3)
Male flowers—		
1 Colour of the united tepal.	White	Dull white in ground colour.
2 Number of flowers per bract.	10	15 to 20.
3 Apicula in the free tepal ..	Prominent 5 mm.	Not prominent 1 mm.
4 Ovary length	8 to 10 cm.	4 to 5 cm.
5 Free tepal	Boat shaped deep ; transversely corrugated.	Shallow, no transverse corrugations.

Particulars of plant character.	Cheesman's description of the species.	Description of the species collected from Singampatti.
(1)	(2)	(3)
Fruit—		
6 Length	10 to 12 cm.	6 to 9 cm.
7 Persistance of the perianth parts on the fruits.	Fruits are crowned by the remains of the perianth in a withered condition.	Perianth parts are not persistent.
8 Colour of the fruit pulp ..	Cream	White.
9 Seeds	Black, irregularly angulate, smooth on the facets, 5 mm. across and 4 mm. high.	Black, irregularly angulate, minutely tuberculate on the facets, 6 to 8 mm. across and 3 to 4 mm. high.

(4) *Musa chiliocarpa*.—Plants of this species were introduced from the Philippines. Detailed morphological descriptions were recorded. The important distinguishing characters are given below.

(i) The plant is medium tall with green pseudostem and is of free-suckering habit. The adaxial groove of the petiole is open and the petiole margins are prominent with wings which are spread out and scarious.

(ii) The inflorescence axis is glabrous.

(iii) Pistillate flowers are produced first and a tendency towards the production of hermaphrodite flowers was distinctly noticed in many hands. Variations were observed in respect of floral characters in the female hands and the important ones are given below :—

(*a*) In some flowers, in addition to five staminodes, there are three fully developed stamens but they are devoid of any pollen.

(*b*) The complete absence of free tepal is noticed in a few cases.

(*c*) Bifid to five lobed stigmas are common in many flowers.

(*d*) Flowers with six well developed stamens with pollen are also observed.

(iv) Male bud is turbinate. The bracts lift one at a time and the inner surface of the bract is pink in colour with a distinct paling towards the base.

(v) There are 12 to 15 male flowers per bract. The colour of the united tepal is light yellow turning into distinct bright yellow at the lobes. Free tepal is translucent and unpigmented with a mucronate apicula. There are no distinct transverse corrugations below the apicula.

(vi) Fruit bunch is pendent and very compact. One bunch possessed 34 hands and 454 fingers. Fruits are uniform and terete and not reflexed geotropically. The mean length of fruit is 6·3 cm. and diameter 2·4 cm. The apex of the fruit is blunt with a pointed tip of the withered stylar base. The ridges on the fruit disappear on full ripening. The ripening of the fruits in the bunch is uneven. Fruits are bright yellow in colour on full ripening. The pulp is cream coloured and firm. Taste is sweet with a characteristic spicy odour.

According to Baker this species is distinguished from its relatives by the reverse position of staminate and pistillate flowers, that is, the male flowers are produced ahead of pistillate flowers. In the Philippines this species is said to have produced rachis many portions of which are vacant due to alternating male and female phases. But the plants of this species grown at this station have produced compact hands of female flowers in succession, followed by a continuous male phase in the end.

(5) *Musa coccinea*.—Detailed description of the species was recorded. According to Cheesman *Musa coccinea* is said to possess only one series of fruits in a hand. But a plant of this species was observed to bear fruits in two series in a hand, at this station.

Hybridization.

IV. The following wild species of bananas were utilized as male parents for crossing the cultivated varieties :—

(1) ***Musa balbisiana*** and its colones Ela Vazhai and Neer Bale.

(2) ***Musa acuminata.***

(3) *Musa banksii.*

(4) *Musa Chiliocarpa.*

(5) *Musa coccinea.*

During the period under report 210 inflorescences of 75 cultivated varieties were crossed. Of the crosses effected twenty-three parental combinations listed below have set seeds of which the seeds of only four parental combinations, have germinated.

TABLE II—*Hybridization—Parental combinations that have set seeds.*

Serial number and female name.	Male parent.	Number of seeds set.	Number of seeds germinated.	Remarks.
(1)	(2)	(3)	(4)	(5)
1 Monthan	*Musa coccinea* ..	33	Nil.	
2 Do.	*Do.* ..	19	Nil.	
3 Do.	*Musa banksii* ..	2	Nil.	
4 Poovan	*Do.* ..	6	Nil.	
5 Do.	*Do.* ..	2	Nil.	
6 Do.	*Do.* ..	14	Nil.	
7 Do.	*Do.* ..	10	Nil.	
8 Pacha Bontha	*Do.* ..	2	Nil.	
9 Ney Poovan	*Musa coccinea* ..	2	Nil.	
10 Pey Kunnan	*Do.* ..	1	Nil.	
11 Do.	*Do.* ..	29	1	Hybrid is under study.
12 Kostha Bontha	*Do.* ..	1	Nil.	
13 Kunnan	*Do.* ..	8	Nil.	
14 Monthan	*Do.* ..	1	Nil.	
15 Pey Kunnan	*Musa accuminata* (Kattu Vazhai).	6	1	Seedling did not survive.
16 Vella Vazhai	*Musa coccinea* ..	2	Nil.	
17 Pacha Nadan	*Do.* ..	1	Nil.	
18 Cheni Champa	*Do.* ..	1	Nil.	
19 Monthan	*Musa balbisiana* ..	9	Nil.	
20 Venneetin Kunnan	*Do.* ..	284	7	Three seedlings are under study.
21 Poovan	*Do.* ..	2	Nil.	
22 Do.	*Do.* ..	1	Nil.	
23 Suganthi	*Do.* ..	7	Nil.	
24 Pey Kunnan	*Do.* ..	48	Nil.	
25 Nalla Bontha	*Do.* ..	1	Nil.	
26 Thote	*Musa balbisiana* (Ela Vazhai).	46	Nil.	
27 Raja Vazhai	*Do.*	144	8	Seeds have just germinated and the seedlings are under study.
28 Peyan	*Musa balbisiana* ..	158	Nil.	
29 Thote	*Musa balbisiana* (Ela Vazhai).	17	Nil.	
30 Pey Kunnan	Do.	80	Nil.	

It is evident from the table given above that the variety Pey Kunnan has successfully crossed with (*a*) *Musa coccinea*, (*b*) *Musa accuminata* (Kattu Vazhai), (*c*) *Musa balbisiana* and (*d*) *Musa balbisiana* (Clone-Ela-Vazhai).

The following hybrid progenies are now under study :—

Serial number and hybrid progeny.	Number of seedlings under study.
1 Venneetin Kunnan × *Musa balbisiana* (male)	3
2 Pey Kunnan × *Musa coccinea* (male)	1
3 Raja Vazhai × *Musa balbisiana* (male) (Ela Vazhai)	3

Hybrid-Monthan × *Musa coccinea* (male).—Five new clumps of the hybrid [Monthan × *Musa coccinea* (male)] with a total of twelve plants were studied. The plants exhibited intermediate characters between the parents. A total of 170 male flowers from 18 hands were examined and found to contain no pollen. This goes to prove that this hybrid is of no value as a potential male parent in banana breeding work as it appears to be completely male sterile.

V. *Mutants and selections.*—The progeny test of the plants of Monthan and Rasthali selected for high grade of fruits have revealed that the progenies are not true to type as they have produced bunches with a few hands just like any other normal Monthan and Rasthali bunches.

The following selections based on certain desirable economic characters were made during the period under report and are under progeny tests :—

(*a*) Two Poovan plants for high grade of fruits.
(*b*) One Poovan plant for earliness in fruiting.
(*c*) One Nendran for semi-tall stature.
(*d*) One Nanguneri Peyan for semi-tall stature.
(*e*) One Nanguneri Peyan for ashy bloom of the fruits.
(*f*) One Kanch Kela for high grade of fruits.
(*g*) One Madhuranga Bale for high grade of fruits.
(*h*) One Red Banana for high grade of fruits.

VI. *Propagation and plantation practices*—A. *Propagation studies*—1. *Method of propagation—Object.*—This trial is to find out if whole rhizomes and bits of rhizomes can provide quantitatively more conveniently available material for raising new plantations.

The trial was initiated on 22nd June 1954, with four treatments, namely, planting of suckers produced from—

(*a*) whole mother rhizomes,
(*b*) whole daughter rhizomes,
(*c*) bits from mother rhizomes, and
(*d*) bits from daughter rhizomes,

adopting a split plot system of layout with two varieties Monthan and Poovan, replicated six times. A guard row has been provided all round with equal aged suckers from the respective varieties. A basal dose of 25 lb. cattle manure per plant was applied to all the plants.

2. *Season of planting trial—Object.*—The object of this trial is to assess the relative merits of the various months of the year for planting purposes. This is an observational trial.

This trial is in progress from March 1953 onwards. Monthly planting of twenty-five suckers in each of Monthan and Poovan varieties was completed up to June 1954. A basal dose of 25 lb. cattle manure per plant was applied to all the plants at the time of planting. Two doses of manures were applied at the end of third and fifth months respectively after planting, at the rate of 10 oz. ammonium sulphate and 25 lb. cattle manure per plant. The data pertaining to the flowering and harvest of the plants are being recorded. Only three plants have come for harvest so far.

Mean values of up-to-date growth measurements pertaining to height, girth, and leaf count of the plants, recorded at an interval of every four months from the date of planting are furnished below :—

TABLE III-A—*Season of planting trial—Growth measurements recorded four months after planting of the suckers.*

Serial number and month of planting.	Monthan.			Poovan.		
	Height in cm.	Girth in cm.	Leaf-count in number.	Height in cm.	Girth in cm.	Leaf-count in number
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1953.						
1 March	57	16	11	54	15	
2 April	84	21	15	76	22	10
3 May	130	32	17	118	28	14
4 June	145	32	14	140	34	14
5 July	154	34	16	118	28	13
6 August	123	26	14	103	24	12
7 September	101	28	12	67	22	11
8 October	134	28	12	111	24	11
9 November	110	28	14	68	18	12
10 December	106	23	11	71	20	10
1954.						
11 January		23	13	68	21	12
12 February	94	32	13	76	27	13

TABLE III-B.—*Season of planting trial—Growth measurements recorded eight months after planting of the suckers.*

Serial number and month of planting.	Monthan.			Poovan.		
	Height in cm.	Girth in cm.	Leaf count in No.	Height in cm.	Girth in cm.	Leaf count in No.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1953.						
1 March	146	29	16	151	35	17
2 April	182	31	16	146	28	16
3 May	218	51	1[illegible]	168	42	20
4 June	291	63	27	198	48	21
5 July	238	52	22	178	42	20
6 August	179	44	18	151	38	15
7 September	185	53	20	145	38	17
8 October	165	49	17	158	41	18

TABLE III-C.—*Season of planting trial—Growth measurements recorded twelve months after planting of the suckers.*

Serial number and month of planting.	Monthan.			Poovan		
	Height in cm.	Girth in cm.	Leaf count in No.	Height in cm.	Girth in cm.	Leaf count in No.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1953.						
1 March	186	45	21	184	44	21
2 April	232	48	23	225	51	21
3 May	258	58	22	206	52	21
4 June	303	77	25	230	59	23

(*a*) From a comparison of the growth measurements (Table III-A) recorded four months after planting of the suckers, over a continuous period of twelve monthly planting series, it is seen that the suckers of the variety Monthan planted during July have recorded the maximum height and girth measurements over the plantings done during the other eleven months. March planting of the trials with the variety Monthan has registered poorest growth measurements.

In respect of the variety Poovan the planting done during June has registered maximum height and girth measurements, while with this variety also March planting has recorded poorest growth measurements.

(*b*) From a comparison of the growth measurements (Table III-B) recorded after eight months from the date of planting of the trial over a continuous planting series of eight months from March to October 1953, it is seen that both the varieties Monthan and Poovan have recorded the maximum growth measurements in respect of height, girth and leaf count for the June planting of the trial. The poorest growth measurements were recorded for the March and April plantings in respect of Monthan and Poovan varieties respectively.

(*c*) The comparison of the growth measurement data (Table III-C) recorded twelve months after planting of the trial over a continuous planting series of four months from March 1953 to June, 1953 has revealed that June is the favourable month for planting both Monthan and Poovan varieties as it facilitates vigorous plant growth, which is evidenced by the maximum growth measurements recorded. Based on the same data, the month of March seems to be the least favourable month for planting, both Monthan and Poovan varieties, as seen from the poorest growth measurements recorded from the plantings done during that month. The trial is in progress.

B. *Plantation practices*—1. *Ratooning trial—Object.*—The object of this trial is to assess the utility of taking one to three ratoon crops after a plant crop of bananas.

This trial was initiated on 15th November 1953 by planting uniform aged suckers of Monthan and Poovan varieties as per split plot system of layout replicated six times. The treatments adopted are—

(*a*) One ratoon crop after a plant crop.
(*b*) Two ratoon crops after the plant crop.
(*c*) Three ratoon crops after the plant crop.

After an application of a basal dressing of 25 lb. cattle manure at the time of planting, all the plants were given the first and second dose of manures, at the end of the third and fifth months respectively at the rate of 25 lb. cattle manure and 10 oz. of ammonium sulphate per plant per dose. The trial is in progress.

2. *Mattocking trial—Object.*—The object of this trial is to study the influence of the extent of mattocking on the growth and performance of the sucker that follows on.

This trial was relaid after damage caused by cyclone, on 2nd August 1953 by planting uniform aged suckers of Monthan and Poovan varieties adopting a split plot system of lay-out replicated six times.

After harvest of the bunches the pseudostems are being given the following three treatments—

(*a*) Control-Parent pseudostem left untouched.

(*b*) Parent pseudostem cut back to half the length after harvest.

(*c*) Parent pseudostem cut to ground level after harvest.

Uniform treatments by way of manuring and cultural operations are being given. So far 85 plants under the variety Monthan and 14 plants under Poovan have flowered and of this 14 bunches of the variety Monthan and 3 bunches of Poovan were harvested. The details are furnished below :—

TABLE IV.—*Mattocking trial—Progressive data on flowering and harvest.*

Replication.	* Treatment.	Monthan.			Poovan.		
		Number of plants flowered so far.	Number of plants harvested so far.	Mean weight of bunch in lb.	Number of plants flowered so far.	Number of plants harvested so far.	Mean weight of bunch in lb.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
I	A	6	1	17	1	..	
	B	6	2	19	..	..	..
	C	6	1	17	1	..	..
II	A	6	2	20	2	1	16
	B	5	1	18	3	1	14
	C	4	1	23	1	..	..
III	A	6	..	..	1	1	15
	B	6	3	18	2	..	..
	C	5	2	18	2	..	..
IV	A	3	..	..	..	..	..
	B	5	1	21	..	..	..
	C	3	..	..	..	..	..
V	A	5	..	..	..	..	..
	B	5	..	..		..	..
	C	5	..	..	1	..	..
VI	A	2	..	..	..	..	..
	B	3	..	..	..	..	..
	C	4	..	..	..	..	..

*Treatment particulars as given above.

The trial is in progress.

VII. *Improvement of Perennial Crops*—1. *Desuckering trial—Object.*—The object of this trial is to devise the optimum desuckering practice in perennial banana plantations.

This trial was relaid during January 1953, adopting a randomized block design replicated six times with the following four treatments :—

(A) All daughter suckers permitted to grow.

(B) Removal of all suckers except the first daughter sucker.

(C) Removal of all suckers except the first and third daughter sucker.

(D) Removal of all except the one that emerges after the parent plant has flowered.

Uniform treatments by way of manuring and cultural operations were given. So far twenty desuckering operations were done and the total number of suckers

desuckered is 286. The progressive desuckering data under each treatment are furnished below :—

TABLE V (*a*) *Desuckring trial—Data on particulars of desuckering.*

Treatment.* (1)	Number of plants which have produced suckers upto 22nd June 1954. (2)	Number of suckers desuckered upto 22nd June 1954. (3)	Number of plants with suckers allowed as per treatments. (4)
A	53	..	53
B	41	74	41
C	35	35	35
D	54	177	5

* Treatment particulars as given above.

The progressive data on flowering and harvest of the bunches are furnished below. So far, only seven bunches were harvested.

TABLE V (*b*)—*Desuckering trial—Progressive data on flowering and harvest.*

Treatment.* (1)	Number of plants flowered so far. (2)	Number of plants harvested so far. (3)	Mean weight of bunch in lb. (4)
A	6	2	15·8
B	6	2	14·0
C	7	1	13·0
D	7	2	15·5

* Treatment particulars are given above.

The trial is in progress.

2. *Spacing trial—Object.*—The object of this trial is to determine the optimum spacing in perennial plantations.

This is an observational trial with four treatments replicated twice. There are eight plots each having an area of 17·4 cents.

The treatments adopted are—

A. Spacing of clumps to give a spacing of 9 feet.
B. Spacing of clumps to give a spacing of 10 feet.
C. Spacing of clumps to give a spacing of 11 feet.
D. Spacing of clumps to give a spacing of 12 feet.

The observational trial is being continued in the perennial area retaining the best sucker in the clump after removal of the plants broken by cyclone. One harvest of all the plants was completed on 15th June 1954. The details are given below:—

TABLE VI.—*Spacing trial—Yield data.*

Treatment.	Spacing in feet. (1)	Total number of plants under each treatment. (2)	Mean weight of bunch in lb. (3)	Total bunch weight in lb. obtained per area of 34·8 cents. (4)
A.	9′ × 9′	186	14·6	2,716
B.	10′ × 10′	150	16·7	2,505
C.	11′ × 11′	124	18·0	2,232
D.	12′ × 12′	104	18·2	1,893

Treatment D-12′ × 12′ spacing is leading the rest in respect of mean bunch weight with 18·2 lb. per bunch while in total yield from plots of equal area the highest yield is obtained from the closest spacing of 9′ × 9′ and the total yield gradually decreased with the increase in spacings.

This observational trial is being continued in the same perennial area with followers from the same clumps with a view to study the progressive data for a number of years in respect of mean yield per plant and total yield from unit area.

3. *Manurial trial—Object.*—The object of this trial is to find out the value of different manurial practices in perennial banana areas by the application of cattle

manure, ammonium sulphate and groundnut cake either alone or as a mixture of any two and to ascertain how far the addition of potash or potash and phosphoric acid would contribute to yield. Time of application of treatments was also taken as an additional factor for study.

This trial was relaid adopting a 2^6 confounded factorial design in eight blocks of eight plots, with only one replication on 13th January 1954.

Treatments.—All possible combinations of the following six factors each at two levels :—

Factors.		*Levels.*		
Farm yard manure	f o	f		
	o	50 lb.	in lb. per plant.	
Qualities of nitrogen—				
(*a*) Ammonium sulphate	a o	a		,,
	o	½ lb.		
(*b*) Groundnut cake	g o	g		,,
	o	½ lb.		
Phesphoric acid	p o	p		,,
	o	½ lb.		
Potash	k o	k		,,
	o	½ lb.		
Time of application of treatments	y o	y		
	every year.	alternate year.		

The confounded factors are FAG, GPK, FPY, AKY, FAPK, AGPY and FGKY.

The application of the first and second doses of manures as per the schedule was done during August and December 1953 respectively.

So far, out of a total of 567 experimental plants only 329 plants have flowered and of which 202 plants have come for harvest. The progressive data on flowering and harvest of the experimental plants are furnished below:—

TABLE VII.—*Manurial trail in the perennial area—Progressive data on flowering and harvest.*

Plot number and Treatment *.	Number of plants flowered so far.	Number of plants harvested so far.	Mean weight of bunch in lb.	Total duration from planting to harvest in days.
(1)	(2)	(3)	(4)	(5)
1 f a p k	7	4	22·0	439
2 f a y	5	1	11·0	521
3 f g p	9	7	17·0	466
4 (1) (control)	5	3	21·0	497
5 f g k y	9	7	21·0	494
6 a g p y	9	7	20·0	469
7 a g k	9	7	19·0	459
8 p k y	6	5	20·0	496
9 a g	9	7	18·0	488
10 f a k y	6	4	23·0	491
11 f g y	6	3	21·0	505
12 f g p k	7	6	18·0	494
13 p y	1	1	21·0	494
14 f a p	7	2	23·0	477
15 a g p k y	5	1	24·0	449
16 k	6	5	19·0	439
17 f p k y	7	6	18·0	467
18 f a g k	8	4	23·0	454
19 f a g p y	8	6	19·0	471
20 f	8	5	20·0	457
21 a p k	6	5	21·0	484
22 g p	7	4	23·0	497
23 a y	6	2	17·0	498
24 g k y	7	4	20·0	479
25 g k	8	7	20·0	478
26 g p y	9	6	26·0	468
27 f y	6	5	24·0	495

Plot number and treatment.* (1)	Number of plants flowered so far. (2)	Number of plants harvested so far. (3)	Mean weight of bunch in lb. (4)	Total duration from planting to harvest in days. (5)
28 f a g k y	3	2	21·0	484
29 f p k	5	2	21·0	484
30 a p k y	5	2	22·0	495
31 a	5	3	21·0	494
32 f a g p	7	4	22·0	482
35 f a g y	6	4	19·0	481
36 a k	7	3	20·0	490
37 g	8	6	27·0	414
38 f a g p k	5	2	23·0	491
39 a p y	3	1	20·0	449
40 g p k y	3	2	24·0	441
41 a g p k	7	5	22·0	498
44 f a p y	7	5	18·0	458
45 f g p k y	5	3	17·0	506
47 f a k	7	2	26·0	478
48 p	1	1	27·0	449
49 f a p k y	5	2	21·0	507
50 a g k y	5	3	22·0	508
52 f g k	6	1	20·0	489
53 f a	4	2	23·0	504
54 y	2	1	26·0	449
55 f g p y	8	3	18·0	491
56 a g p	8	7	20·0	505
57 g p k	2	1	21·0	511
58 f k	3	1	17·0	494
59 f p y	2	1	22·0	449
60 a k y	5	3	20·0	505
61 f a g p k y	2	1	16·0	521
62 f a g	2	2	20·0	499
63 g y	4	1	17·0	494
64 a p	3	2	22·0	486

* *f*. farmyard manure (cattle manure).
a. Ammonium sulphate.
g. groundnut cake.
p. super phosphate.
y. sulphate of potash.
y. time of application of treatments (once in two years).

The trial is in progress and it is too early to draw any inference at this stage.

4. *Soil culture trial—Object.*—The object of this trial is to determine the frequency of soil digging in perenial banana plantations.

This trial was relaid during January 1953, adopting a randomized block design replicated six times with the following four treatments :—

(A) Digging once every month.

(B) Digging once every two months.

(C) Digging once every three months.

(D) Digging once every four months.

Digging operations are being done as per schedule. Uniform treatments by way of manuring was given. So far only 61 plants have come for harvest out of 384 experimental plants. The progressive data on flowering and harvest of the bunches are furnished below :—

TABLE VIII—*Soil culture trial—progressive data on flowering and harvest.*

Treatment. * (1)	Number of plants flowered so far. (2)	Number of plants harvested so far. (3)	Mean weight of bunch in lb. (4)
A	41	28	19·9
B	20	9	23·5
C	25	11	13·1
D	22	13	16·3

* Treatment particulars are given above.

Digging once in two months with a mean bunch weight of 23·5 lb. is leading the rest at present, although it is too early to draw any conclusions.

The trial is in progress.

VIII. *Other crops.*—An area of 3·50 acres were under double crop and 4·50 acres under single crop of paddy in wet lands. The acre yields of paddy obtained are given in Table IX.

TABLE IX—*Yield of Paddy.*

Serial number and particulars.	Yield per acre in lb.
1 First crop—Kuruvai—ADT. 3	2,546
2 Second crop—Thaladi—CO. 25	2,022
CO.19	2,098
3 Single crop—Samba—CO.25	2,600

After the harvest of paddy sesbania was raised in 2·50 acres of wet land as green manure and an acre yield of 7,500 lb. is estimated. The stand of the green manure crop was patchy.

IX. *Statement of expenditure and receipts.*—The statement of charges and receipts for the year is detailed in Appendix V.

T. GOPALAN NAYAR,
Banana Research Officer.

CENTRAL BANANA RESEARCH STATION, ADUTHURAI,
16*th August* 1954.

APPENDIX I.

Rainfall statement.

Months.	Week.	1953–54. Quantity in inches.	1953–54. Number of rainy days.	1952–53. Quantity in inches.	1952–53. Number of rainy days.	Average of ten years. Quantity in inches.	Average of ten years. Number of rainy days.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		South-west monsoon					
June	7—13	0·33	1	..	..	0·06	0·1
	14—20	0·35	1	..	..	0·15	0·3
	21—27	0·08	..	0·80	2	0·22	0·7
June-July	28—4	0·59	1	0·74	1	0·44	0·4
July	5—11	..	..	3·23	5	1·31	1·5
	12—18	0·52	1	0·35	2	0·20	0·7
	19—25	0·08	..	..	..	0·17	0·3
July-August ..	26— 1	..	..	..	..	0·64	1·0
	2—8	..	..	..	..	0·67	0·6
	9—15	..	..	0·01	..	0·73	1·3
	16—22	1·66	1	1·60	2	1·13	1·2
	23—29	0·42	1	1·02	1	1·38	1·5
August-September ..	30—5	1·36	1	..	..	1·06	1·0
	6—12	1·73	2	1·69	1	1·21	1·8
	13—19	..	..	..	..	0·51	0·9
	20—26	..	..	..	..	0·47	0·9
	Total ..	7·12	11	9·44	14	10·35	14·2
		North-east monsoon.					
September-October.	27— 3	1·59	2	0·01	..	1·31	1·5
	4—10	1·33	3	0·60	2	0·95	1·4
	11—17	1·30	4	0·95	2	1·07	2·1
	18—24	2·51	3	1·62	2	1·49	2·3
	25—31	..	..	0·64	1	1·14	2·0
November	1— 7	0·55	1	..	..	1·33	1·5
	8—14	4·35	4	..	..	1·98	2·2
	15—21	1·39	3	3·11	2	3·96	3·6
	22—28	0·57	2	0·60	2	1·97	2·5
November-December.	29— 5	..	..	4·64	3	2·51	2·6
	6—12	0·67	3	4·18	3	0·85	1·4
	13—19	0·16	1	0·58	1	0·83	1·4
	20—26	1·01	2	0·41	1	0·24	0·7
December-January.	27— 3	1·94	4	0·06	..	0·48	0·9
	4—10	0·68	2	1·07	2	0·67	1·4
	11—17	..	..	0·08	..	0·11	0·3
	18—14	..	..	0·05	..	0·29	0·3
	25—31	..	..	..	..	0·42	0·6
	Total ..	18·05	34	18·60	21	21·60	28·7
		Hot weather.					
February	1— 7	0·04	..	..	..	0·01	..
	8—14	..	..	..	..	..	..
	15—21	..	..	..	..	0·50	0·5
	22—28	..	..	..	..	..	..
	29	..	..	0·49	1	0·24	0·3
March	1— 7	..	..	..	..	0·14	0·2
	8—14	2·59	2	..	..	0·31	0·4
	15—21	..	..	..	..	..	..
	22—28	..	..	..	..	0·12	0·3
March-April ..	29— 4	..	..	..	..	0·26	0·5
April	5—11	..	..	0·08	..	0·02	0·1
	12—18	..	..	2·40	2	0·41	0·7
	19—25	1·77	2	0·67	2	0·32	0·6
April-May	26— 2	..	..	..	..	0·01	..
May	3— 9	0·38	1	..	..	0·29	0·5
	10—16	..	..	..	..	0·39	0·6
	17—23	..	..	..	..	0·32	0·5
	24—30	0·50	2	0·10	1	0·65	1·1
May-June	31— 6	..	..	0·24	1	0·11	0·4
	Total ..	5·28	7	3·98	7	4·10	6·7
	Grand total ..	30·45	52	32·02	42	36·05	49·6

APPENDIX II.

List of Banana Varieties in the collection at the Central Banana Research Station, Aduthurai.

Name of varieties.	Place from where obtained.
Adakka Kunnan, Adukku Monthan, Anai Komban, Ash Monthan, Attu Nendran, Ayiranka Rasthali, Banaras, Bainsa, Batheesa Green, Batheesa Ashy, Bontha, Booditha Bontha Batheesa, Bontha Arati, Chakkara Keli, Chen Kadali, Chinali, Chinna Chenkadali, Dorai Vazhai, Elari, Enna Banian, Etha Chingan, Erachi Vazhai, Erode Nadan, Erode Monthan, Ela Arisi, Giant Governor, Gros Michel, Hadagalli, Kali, Kadali, Kommu Arati, Kapur, Kari Vazhai, Krishna Vazhai, Krishna Bontha, Kostha Bontha, Kunnan, Kuri Bontha, Kuzhi Poovan, Kallu Monthan, Karpura Chakkarakeli, Kelethan, Kallar Ladan, Kallar Anaikomban, Ladan, Mannan, Monthan, Malai Monthan, Mayil Vazhai, Matti, Mauritius, Manoranjitham, Motta Poovan, Moongil, Monthan Poovan, Myndoli, Nalla Bontha Batheesa, Namarai, Nana Nendran, Nattu Poovan, Nendran, Nendra Kunnan, Nendra Padathi, Ney Mannan, Ney Vannan, Ney Poovan, Ney Vazhai, Nanguneri Peyan (Green) Nanguneri Peyan (Ashy Coated), Nalla Chakkara keli, Pacha Nadan, Pacha Bontha Batheesa, Pacha Vazhai, Padathi, Pacha Bontha, Pacha Batheesa, Pedda Pacha Arati, Peyan, Pey Ladan, Pey Kunnan, Pidi Monthan, Ponthan, Poovilla Vazhai, Poovilla Shundan, Poovan, Pisang Raj, Puttu Vazhai, Rasa Kadali, Raja Vazhai, Rasthali, Singampatti Sirumalai, Sanna Chenkadali, Sambrani Monthan, Suganthi, Sorra Monthan, Thattilla Kunnan, Then Kadali, Then Kunnan, Thella Chakkara keli, Thiruvanandapuram, Uthiran Vazhai, Valanthodan, Vamanakeli, Vella Kadali, Vannan, Venneetin Kunnan, Virupakshi, Vella Vazhai, Valparai, Venkadali, Venneettu Mannan, West Indian.	Madras State.
Agniswar, Champa, Kancha Kela, Kanthali Kela, Lambi, Martaman, Rai Kel, Supari, Thote.	West Bengal.
Anupan, Batheesa, Chinia, Melbhog	Bihar.
High Gate	Jamaica.
Bluggoe	Trinidad.
Basarai, Bombay Green, Bhurkal (or) Govakkar, Harichal, Kanyal, Lal Velchi, Mendol, Mutheli, Rajeli, Red Banana, Safet Velchi, Soneli, Walha.	Bombay State.
Boothi Bale, Cheena Bale, Kari Bale, Ladies Finger, Madhuranga Bale, Mons Marie, Naga Bale, Rasa Bale, Chingam.	Mysore State.
Kodappanilla Kunnan, Karim Kadali, Pacha Kadali, Vadakkan Kadali.	Travancore-Cochin.
Bhimkol, Cheena Champa, Jahaji, Kach Kol, Octoman, Wathere ..	Assam.
Marthamana	Ceylon.

APPENDIX III.

Banana Varieties—Grouping of.

I. Dwarf Varieties.

1 *Mauritius.* Syn. Vamanakeli. Jahadji. Pacha Vazhai.	.. Male flowers persistent and marcescent.
2 *Basarai.*	.. Male flowers often deciduous; bunch and fruits resemble Mauritius but develop a dull yellow colour when ripe.
3 *Harichal* .. .. Syn. (Bombay green).	.. Fruits-more curved, longer and retain the green colour even when ripe.
4 *Pedda Pacha Arati* ..	.. Slightly taller, fruit size large with heavy bunching habit. Resembles 'Harichal.'
5 *Giant Governor* ..	.. Withered bracts and male flowers persistent at the terminal region, slightly *taller than Mauritius.*

II. Medium and tall varieties.

(a) Black or bluish-black pseudostem.

6 Krishna Vazhai	.. Pseudostem and abaxial side of the petiole black or bluish-black, bunch sub-horizontal, anthers dark.

(b) Red or purple pseudostem.

7 *Red Banana* .. .. .. Syn. Chenkadali. Sev Vazhai. Anupan.	.. Pseudostem and petiole on the abaxial side and fruit rind deep red. Male bud turbinate-bracts reaching apex, markedly revolute, rachis pubescent, apex of the fruit blunt.
8 *Sanna Chenkadali* .. Syn. Chinna Chenkadali.	.. Fruit—*slender and long, apex distinct*, abaxial side of the lamina and midrib purplish.

(c) Green or yellowish green pseudostem.

Monthan Group.

9 *Monthan.* .. .. Syn. Erode Monthan. Nattu Monthan. Madhuranga Bale. Bontha. Bainsa. Malai Monthan. Ponthan. Pacha Bontha. Sorra Monthan. Supari. Lambi. Kanch Kela. Kachkol. Bontha Arati. Bhurkel.	.. Heavy bunching nature, with large fruits held loosely and knob shaped apex; deciduous male flowers; fruits-angular, five sided with prominent ridges.
10 *Pidi Monthan* ..	.. Fruit size--small but the male bud is comparatively large in size.
11 *Nalla Bontha* ..	.. Peduncle—very long, distinguished from Montha by having more or less *pointed apex* in the fruit.
12 *Sambrani Monthan* .. Syn. Ash Monthan. Bontha Ashy.	.. Resembles Monthan except for *ashy coated fruits.*
13 *Thella Bontha* ..	.. Resembles Nalla Bontha but for the ashy bloom of the fruits.
14 *Kuri Bontha* ..	.. Bunch—compact with *smaller sized fruits*, often simulating table varieties. Brown dots are visible on the unripe fruits. Bract outside light purple with yellow tinge towards base.

Batheesa group.

15 *Pacha Bontha Batheesa* .. Syn. Batheesa Green. Batheesa. Ther Vazhai.	More heavy bunching nature ; hands about 15 in a very compact form. Fruits gradually diminish in size from base to the tip ; stylar base accrescent. Bract-purple and glaucous ; corrugations towards be half prominent. Pedicel has a tendency to curve upwards. Apex broad and blunt. Appears as a sport of Monthan.
16 *Booditha Bontha Batheesa* .. Syn. Batheesa Ashy.	Differs from Pacha Bontha Batheesa by having ashy coated fruits. Appears as a sport of Sambrani Monthan.
17 *Nalla Bontha Batheesa* ..	Differs from Pacha Bontha Batheesa by the fruits having pointed apex. Fruits green without any bloom. Appears as a sport of Thella Bontha.
18 *Pacha Nadan.* .. .. Syn. Padathi.	Petiole margin red ; fruits-angular, tapering to an indistinct apex. Ripe fruits easily drop off ; Anther-dark ; anther filament with a sigmoid reflex at the junction of the anther.
19 *Kali* .. .. Syn. Cheena Bale.	Resembles Pacha Nadan excepting a distinct apex of the fruit.
20 *Kapur*	Bunch and fruits are comparatively large ; fruits are radially spread out from the axis.
21 *Vannan.* .. .. .. Syn. Laden.	Bunch subhorizontal. Fruits-spread out radially from the axis ; easily drop off when ripe. Rudimentary infertile seeds are absent in this variety, Anthers-dark ; stamens bent at the junction of filament and anther.
22 *Sirumalai* .. .. .. Syn. Mala Vazhai.	Colour of ripe fruits-yellow with greenish tinge but turns dark when over ripe. Fruits do not easily drop off from the pedicel like Vannan ; hands contain fibrous tissue on the wrists ; fruit pulp juicy.
23 *Virupakshi*	Fruits do not easily drop off ; keeping quality good ; pulp-dry, sweeter and richer in flavour. The wrist portion of the hand is circular and smooth.

Kunnan group.

24 *Kunnan*	The leaves are more or less erect and narrower than in other varieties, petiole margin pink, not ashy coated. Male flowers deciduous. Fruits strongly held on the pedicel, small in size, terete and sweet with white firm pulp.
25 *Venneetu Kunnan*	Similar to Kunnan except for the ashy bloom on the fruits.
26 *Adakka Kunnan*	Leaves are larger and broader than Kunnan and not so erect ; plants take longer duration. Fruits-more in number than Kunnan and much smaller in size ; fruits-five ridged and strongly attached to the pedicel ; pulp-dull yellow and sweet.
27 *Then Kunnan*	Fruits-medium sized tapering with pronounced apex, five ribbed, easily drop off from pedicel. Pulp-very sweet but white in colour.
28 *Thattilla Kunnan* .. .. Syn. Kodapanilla Kunnan. Poovilla Chendu. Poovilla Vazhai.	Male phase absent. Heavy bunches. Fruit has the apex longer than fruit of Then Kunnan.
29 *Peyan* .. .. .. Syn. Mala Vazhai.	Plant-very tall and stout; peduncle glabrous ; a few male hands persist in the bunch. Fruits-five sided, compressed, unequal, tapers to apex, compact and closely set ; rind-very thick ; pulp juicy and sweet.
30 *Boothi Bale*	Similar to Peyan, distinguished by the copius waxy bloom on the fruits, heavier bunch.
31 *Enna Benian*	Male flowers completely deciduous ; anther lobes dark brown ; pistillode pink-white tapering to base ; *unripe fruit*-colour shining green ; ripe fruits-strongly attached with pulp cream and insipid.
32 *Ney Mannan* .. .. Syn. Nattu Vazhai. Nanguneri Peyan. Vayal Vazhai. Chinna Monthan.	Plant-medium tall, stout stem, leaves large with longer lamina base on the left side. Bunch with fruits-closely set, bunch heavy, peduncle-glabrous ; Male flowers-deciduous ; anther lobes grey with slight pollen ; fruit tapers to an indistinct apex ; rind-very thick ; pulp juicy ; cream coloured, soft and inspid. Ripe fruits do not drop off.

33 *Venneetin Mannan* .. .. Similar to Ney Mannan except the ashy coating on the fruits.

34 *Ney Poovan* .. .. .. Petiole margin-deep red; staminate flowers-persistent in a few hands and followed by deciduous male flowers; prominent wrist; fruit terete, tapers towards apex; acumen pronounced; rind papery thin; pulp-very firm-white. Very sweet, Fruits drop off.
Syn. Puttu Vazhai.
Vadakkan Kadali.
Safet Velchi.

(d) Pseudostem green with various shades of pink and purple.

35 *Poovan* .. .. .. Pesudlstem-green with purplish tinge; petiole purplish green margin deep red, Bunch penulous; hands and fingers very compact; peduncle and rachis pubescent. Fruits-terete, cylindrical with pronounced acumen at the apex. Ripe fruits do not easily drop off. Pulp-cream coloured, slightly sub-acid.
Syn. Dorai Vazhai.
Erode Poovan.
Karupura Chakkarakeli.
Mysore Poovan.
Lal Velchi.
Champa.
Cheeni Champa.
Palayangoden.

36 *Motta Poovan* .. .. Resembles Poovan, except for the absence of apex.

37 *Rasthali* .. .. .. Plants possess very strong root system. Petiole-yellowish green, margin-red; Left side of the lamina base is longer than the right. Peduncle-glabrous; staminate flowers persistent in a few hands and latter deciduous. Hands and fruits not compact. Fruits-terets-tapering towards apex. Apex-distinct with persistent style. Rind-fairly thin tiny reddish spots appear on ripening; taste-very sweet with excellent flavour. Fruits drop off easily from the pedicel on full ripening.
Martaman.
Rasa Bale.
Mutheli.

38 *Ayiranka Rasthali* .. .. Resembles Rasthali in all respects except in not having the male phase. A small or large gap or gaps are sometimes formed on the peduncle when plants lack optimum conditions of growth. This is a sport of Rasthali.
Syn. Poovilla Vazhai.

39 *Suganthi* .. .. .. Petiole-yellowish green with deep red margins; united tepal more or less tubular. Lamina base right side longer; peduncle pubescent with a bent rachis; stamens bent at the junction of filament and anther; filament with two bends in the middle. Fruit-terete, tapering towards apex; style persistent; fruits dot not drop of easily; rind is of medium thickness. Pulp is rather tough and sweet.

40 *Chakkarakeli* .. .. Petiole margin bright red with a purple border; reflexed towards the base of the leaf stalk; peduncle and rachis glabrous; staminate flowers-persistent in a few hands. No difference between persistent male and deciduous male flowers. Hands and fingers loose: fruit-tapering towards-apex, style accrescent. Unripe fruits whitish green but turn bright yellow when ripe. Ripe fruit very strongly attached to the pedicel, spotted; wrist disc shaped; pulp light yellow, very sweet juicy, with an excellent flavour. Keeping quality poor.
Syn. Thella Chakkarakeli.
Then Kadali.

41 *Rasa Kadali* . .. Resembles Chakkarakeli in all respects except that this variety is more robust and the colour of the fruit remains green even after ripening and the pulp is inferior.

42 *Wathere* .. .. .. Plant resembles Chakkarakeli in certain characters and colouration of pseudostem; Fruits-long, terete with an indistinct apex. Pedicel very short. Fruit looking inflated and smooth without any ridges on full maturity. Fruits markedly reflexed negatively geotropically at the baes. The wrist is prominent, disc shaped and profusely pink coloured; pulp-tough.
Syn. Singampatti.
Naga Bale.

43 *Anai Komban* .. .. Inflorescence axis characteristically hairy, staminate flowers-deciduous; pollen present; Pedical long; fruit long, five ridged, tapering towards apex; apex not distinct but the stylar base is persistent; fruits not markedly reflexed, almost straight. Pulp juicy and sweet.
Syn. Kommu Arati.
Attu Komban.

44	*Nendran* .. .. .. Syn. Nana Nendran. Thiruvodan. Chengazhikodan.	Leaves leathery and polished; adaxial groove of the petiole almost closed; inflorescene axis-glabrous. Withered bracts and staminate flowers persistent, stamens five to six with cream coloured anthers. Fruits-long with two to three distinct ridges, tapering towards apex. Apex very prominent. Fruits very strongly attached to the pedicel with a persistent stylar base. Rind bright yellow turning dark when fully ripe, thick; pulp-buff coloured and tough.
45	*Attu Nendran* .. .. Syn. Elari. Nedu Nendran.	Resembles Nendran; fruit and its apex longer than Nendran. Number of hands and fruits are more than Nendran; plants are longer in duration than Nendran.
46	*Myndoli*	Plants much taller and stouter; longer in duration; stem colour resembles Attu Nendran; left side of the lamina base longer; bunches are heavier than those of ordinary Nendran.
47	*Moongil*	Resembles Nendran except for the absence of the male phase. Number of hands one or two. The fruit and its apex are much longer.
48	*Chinali*	Most of the withered bracts and staminate flowers are intermittently deciduous forming gaps on the peduncle. The peduncle is slightly pubescent. Units prominent. Hands and fruits are more compact than Nendran. Pedicel and apex of fruit stout. Ripe fruits do not easily drop off; pulp in unripe fruits buff coloured but turns deeper on ripening and resembles Nendran in taste.
49	*Chignan*	A slender plant with withered bracts and staminate flowers persistent throughout; petiole-margin conspicuous and spread out with a red border; peduncle pubescent; wrist not prominent. Fruits are held in a lax manner. Apex prominent with persistent perianth and style. Pulp light cream and soft.
50	*Kullan* .. .. .. Syn. Walha.	Slightly taller and stouter than Mauritius and withered bracts and staminate flowers persistent. Bunches not very compact; fruit distinctly angular and the marcescent perianth and style persistent. The skin is thick and yellow, pulp-white, fairly juicy and slightly sub-acid.
51	*Nendra Padathi*	Staminate flowers persistent but most of the withered bracts are deciduous. Fruits angulate, resembling Pacha Nadan. Perianth and style persistent, skin fairly thick but less thick than Pacha Nadan, wrist prominent only in the basal hands.
52	*Kari Vazhai* .. .. Syn. Manoranjitham.	Petiole margins-straight and tinged red but the left margin of the leaf stalk has a tendency for wings. Peduncle and rachis pubescent and long. Bracts are usually split in the extreme tip; wrist prominent and pedicel is almost absent; fruit tapers with a pronouuced apex and drop off easily; pulp soft and sweet; in case of Manoranjitham the fruit possess a strong and pleasent flavour.
53	*Pey Kunnan*	Petiole adxial channel completely closed; peduncle glabrous: male flowers deciduous; hands and fingers very compact resembling Poovan. Fruit-one or two ridges prominent with a pronounced acumen; ripe fruits do not easily drop off; rind medium thick, pulp-cream coloured and sweet; fruits have a tendency to set seed.
54	*Kostha Bontha* .. .. Syn. Raja Vazhai.	Tall and very sturdy plant. Inflorescence axis-glabrous. Wrist is quite prominent. Hands and fingers compact. The fingers turn upwards due to the reflexion of the pedicel. Fingers of fruits are always straight. Apex distinct. Ripe fruits do not easily drop off; pulp cream coloured, a little firm and sweet with a good flavour.
55	*Gros Michel*	Petiole margins-tendency for wings with pink colour. Bunch is held characteristically with a sigmoid bend; Bunch-compact and cylindrical; inflorescence axis pubescent; male flowers persistent in one or two hands; fruit-tapers towards the apex, ridges prominent with bent fruits; appex-pronounced; fruits ripen to uniform yellow colour, drop off easily when fully ripe. Pulp cream coloured, very sweet with excellent flavour.

APPENDIX IV.

II. Suckering in Bananas.

Serial number and variety.	*Number of suckers.*	*Distance range in cm.*	*Wet or perennial.*	*Remarks.*
(1)	(2)	(3)	(4)	(5)
1 Gros Michel	8 to 10	13 to 28	W	Free.
2 Kali	3 to 6	23 to 47	W	Do.
3 Pey Kunnan	6 to 8	22 to 40	P	Do.
4 Nendrapadathi	6 to 8	22 to 40	P	Do.
5 Peyan	7 to 8	29 to 62	P	Do.
6 Veenneetin Kunnan	6 to 12	16·2 to 22	P	Do.
7 Singampatti	6 to 8	22·3 to 28·5	P	Do.
8 Poovilla Shundan	8 to 12	20·7 to 25·2	P	Do.
9 Nendran	5 to 8	17·2 to 24	W	Do.
10 Krishna Vazhai	6 to 8	29 to 37	P	Do.
11 China Chenkadeli	9 to 11	14 to 21	P	Do.
12 Attu Nendran	6 to 8	13 to 20	W	Do.
13 Padathi	5 to 8	17 to 34	P	Do.
14 Rasa Kadali	5 to 8	18·2 to 26·7	P	Do.
15 Valanthodan	10 to 12	13·5 to 46	P	Do.
16 Veeneetin Mannan	6 to 9	17 to 26	W	Do.
17 Kachkol	6 to 8	21 to 39	W	Do.
18 Pey Ladan	6 to 10	22·7 to 28·2	W	Do.
19 Vella Vazhai	5 to 8	20·7 to 28·8	P	Do.
20 Mayil Vazhai	8 to 14	15·3 to 35·6	P	Do.
21 Bhimkol	6 to 8	26 to 37	W	Do.
22 Soneli	6 to 8	23 to 26	W	Do.
23 Chinia	6 to 8	20 to 24	W	Do.
24 *Musa coccinea*	20 to 30	11·5 to 18·3	W	Do.
25 *Musa balbisiana*	6 to 10	30 to 35	W	Do.
26 Neer Bale	8 to 10	23·4 to 35·2	W	Do.
27 Bainsa	3 to 4	28 to 31	W	Moderate.
28 Maduranga Bale	3 to 4	26 to 37	W	Do.
29 Batheesa Green	4 to 5	27 to 36	W	Do.
30 Nalla Bontha Batheesa	3 to 4	29 to 37	W	Do.
31 Batheesa	3 to 4	24 to 37	W	Do.
32 Pidi Monthan	4 to 5	25 to 28	W	Do
33 Adukku Monthan	3 to 4	27 to 29	W	Do.
34 Sorra Monthan	3 to 4	35 to 36	W	Do.
35 Ash Monthan	4 to 5	21 to 34	W	Do.
36 Ladies Finger	4 to 6	21 to 27	W	Do.
37 Safet Velchi	3 to 4	21 to 25	W	Do.
38 Wathere	3 to 6	17 to 22	W	Do.
39 Naga Bale	3 to 4	16 to 21	P	Do.
40 Mutheli	4 to 5	16 to 44	W	Do.
41 Bhurkel	3 to 4	17 to 38	W	Do.
42 Suprai	5 to 6	26 to 35	W	Do.
43 Lambi	5 to 6	25 to 31	W	Do.
44 Motta Poovan	3 to 4	27 to 30	W	Do.
45 Kali	3 to 6	23 to 47	P	Do.
46 Octoman	3 to 4	37 to 41	P	Do.
47 Kapur	3 to 5	21 to 31	P	Do.
48 Chinali	4 to 5	18 to 21	P	Do.

Serial number and variety.	*Number of suckers.*	*Distance range in cm.*	*Wet or perennial.*	*Remarks.*
(1)	(2)	(3)	(4)	(5)
49 Vadakkan Kadali	4 to 6	24 to 43	P	Moderate.
50 Enna Banian	4 to 6	22 to 38	P	Do.
51 Valparai	4 to 5	21 to 24	P	Do.
52 Mauritius	3 to 5	20 to 23	W	Do.
53 Basarai	3 to 4	20 to 25	W	Do.
54 Walha	3 to 5	23 to 32	W	Do.
55 Vamanakeli	3 to 4	16 to 30	W	Do.
56 Harichal	3 to 4	16 to 30	W	Do.
57 Thote	4 to 5	17·4 to 24·2	P	Do.
58 Manoranjitham	4 to 5	22 to 22·6	P	Do.
59 Then Kadali	3 to 4	22 to 33·4	P	Do.
60 Boothi Bale	4 to 5	20·3 to 23·2	P	Do.
61 Rasa Bale	4 to 5	17 to 23	W	Do.
62 Lal Velchi	5 to 6	18 to 31	W	Do.
63 Jahaji	4 to 5	19 to 29	W	Do.
64 Marthaman	4 to 6	22 to 28	P	Do.
65 Ney Mannan	4 to 6	25·4 to 31	P	Do.
66 Mannan	4 to 5	21 to 26	P	Do.
67 Nendra Kunnan	3 to 4	27 to 36	P	Do.
68 Ayaranka Rasthali	3 to 4	21 to 28·5	W	Do.
69 Kommu Arati	2 to 4	21·4 to 33	P	Do.
70 Batheesa Ashy	3 to 5	25 to 30	W	Do.
71 Pach Bontha-Batheesa	2 to 4	28 to 38	W	Do.
72 Melbhog	3 to 4	30 to 34	W	Do.
73 Kullan	3 to 4	17 to 26	P	Do.
74 Suganthi	3 to 5	17·4 to 31	P	Do.
75 Kostha Bontha	4 to 5	24 to 31	W	Do.
76 Thella Chaakkarakeli	4 to 5	17 to 26	W	Do.
77 Padathi	3 to 4	14 to 31	W	Do.
78 Thiruvananthapuram	3 to 4	25·9 to 40·3	P	Do.
79 Kari Bale	4 to 5	21·6 to 24·8	P	Do.
80 Virupakshi	4 to 6	21 to 30·3	P	Do.
81 Cheeni Champa	4 to 5	19 to 26	P	Do.
82 Champa	4 to 5	25 to 29	W	Do.
83 *Musa chiliocarpa*	4 to 6	18 to 26	W	Do.
84 Kuri Bontha	2 to 3	21 to 26	W	Do.
85 Pach Bontha	2 to 3	21 to 46	W	Do.
86 Rajeli	2 to 3	17 to 26	W	Do.
87 Giant Governor	2 to 3	17 to 23	W	Do.
88 Anupan	2 to 3	20 to 33	P	Poor.
89 Puttu Vazhai	2 to 3	26 to 30	P	Do.
90 Bontha Arati	2 to 3	21 to 28	P	Do.
91 Sirumalai	2 to 3	29·3 to 36·5	W	Do.

1 to 3 poor, up to 6 moderate, above 6 free.

W = Wet land conditions. P = Perennial conditions.

APPENDIX V.

STATEMENT OF EXPENDITURE AND RECEIPTS OF THE CENTRAL BANANA RESEARCH STATION, ADUTHURAI, FROM 1ST JULY 1953 TO 30TH JUNE 1954.

Budget Head—40. G. Agricultural Experiments and Research (i) Excluding Postwar Reconstruction—III. Other Schemes—E. Scheme of Central Banana Research Station, Authurai.

Serial number and particulars.	Expenditure met by the Indian Council of Agricultural Research.	Expenditure met by the State Government.	Total.
(1)	(2)	(3)	(4)
I. Expenditure.			
	RS. A. P.	RS. A. P.	RS. A. P.
1 Pay of officers and establishment	7,641 6 0	7,641 6 0	15,282 12 0
2 Dearness allowance	2,143 14 6	2,143 14 6	4,287 13 0
3 Travelling allowance	988 6 3	715 9 0	1,703 15 3
4 Dearness allowance to menials	1,175 8 6	1,175 8 6	2,351 1 0
5 Other charges—			
(*a*) Working and plantation expenses ..	5,106 4 10½	5,106 4 10½	10,212 9 9
(*b*) Other contingencies	294 15 1½	885 8 1½	1,180 7 3
(*c*) Dead stock	..	98 11 6	98 11 6
(*d*) Petty construction and repairs	..	24 12 3	24 1
Total ..	17,350 7 3	17,791 10 9	35,142 2 10
II. Receipts.			
XXIX. Agriculture—Agricultural Receipts—Miscellaneous.	5,739 12 7	5,739 12 7	11,479 9 2

APPENDIX VI.

STATEMENT OF ABSTRACT—EXPENDITURE AND RECEIPT.

Serial number and particulars.	Fasil years. 1951-52.	1952-53.	1953-54.
(1)	(2)	(3)	(4)
	RS. A. P.	RS. A. P.	RS. A. P.
1 Expenditure under working and plantation expenses (including the lease value of land Rs. 2,480 each year).	11,974 5 0	10,300 7 0	10,212 9 9
2 Revenue	9,458 7 8	10,523 2 0	11,479 9 2

APPENDIX VII (*a*).

Cost of Cultivation for Bulk Crops.

Serial number and details of expenditure.	Actuals, 1951-52.	Expenditure for 1952-53.	Three years. 1953-54.
1 Pay and allowances of the staff. (⅓rd of actuals) Farm Manager, Maistry and Fieldman.	The entire banana area in the station is under experiments and as such there is no bulk crop.		
2 Miscellaneous cultivation expenses (half of actuals).	An area of 110 cents under spacing trial and outskirts is taken as bulk crop area.		
3 Working expenses for 110 cents (1·1) acre of perennial area (Fd. 9-B1-I).	RS. A. P. 224 2 0 labour. 18 4 0 manure.	RS. A. P. 124 11 0 labour. 70 4 0 manure.	RS. A. P. 137 6 0 labour. 53 12 0 manure.
Total ..	242 6 0	194 15 0	191 2 0
4 One-tenth of expenditure on live and dead stock.	....	....	....
5 Proportionate rent for the land if the station is on leased land.	110 0 0	110 0 0	110 0 0
6 Unforeseen contingencies, if any.	....	....	....
Total ..	352 6 0	304 15 0	301 2 0

APPENDIX VII (*b*).

Serial number and details of crop.	Area in acres.	Seed.		Grain.	
		Yield in lb.	Value.	Yield in lb.	Value.
(1)	(2)	(3)	(4)	(5)	(6)
			RS.		RS.
I.					
1 Paddy ..	11·5	..	..	25,154	3,080
		Number—Suckers.		*Number—Bunches.*	
2 Banana (Fd. 9 B1-1)	1·10 (Fd. 9 B1-I partly bulk and partly occupied by spacing trial).	720	90	720 (12,215 lb.).	585
Other crops.	..	..	Nil.	..	
II *Miscellaneous*— Dairy produce, etc.	..	..	Nil	..	..

	Straw yield in lb.	Value.	Total receipts for the year.	1950-51.	1951-52	1952-54.
	(7)	(8)	(9)	(10)	(11)	(12)
		RS. A. P.	RS. A. P.	RS.	RS.	RS, A. P.
	2,8050	192 12 0	3,272 12 0	2,021	2,274	4,562 2 0
2 Banana (Fd 9. BI-1),	..	..	675 0 0	587	570	459 12 0
Other crops.	..	..	..	..	..	..
II. *Miscellaneous*— Daily produce, etc.	..	..	..	..	..	..
Total ..	..	..	3,947 12 0	2,608	2,844	5,020 14 0

APPENDIX VIII.

ACCOUNT OF ACTION TAKEN TO STEP UP THE REVENUE OF THE STATIO .

Adequate manuring was done to the crop to increase the yield and thereby the revenue of the station. The revenue attained is the highest in record, viz., Rs. 11,479–9–2 as against Rs. 10,523–2–0 of the previous year and the expenditure less than revenue.

Further steps were taken for addition of irrigation facilities to the sandy block by the purchase of one more filter point and purchase of one oil engine.

ANNUAL REPORT OF THE AGRICULTURAL RESEARCH STATION, WYNAAD COLONIZATION SCHEME, AMBALAVAYAL (MALABAR DISTRICT), FOR THE FASLI YEAR 1363 (1953–54).

I. Season and Rainfall.

A total rainfall of 90·59 inches distributed over 107 rainy days was received during the year. The average annual rainfall for the previous seven years worked out to 84·99 inches covered by 154 5 rainy days. The rainfall received during the year was therefore above normal. It was also more evenly distributed during the south-west monsoon and the hot weather periods than in the previous year. Drought, however, prevailed over a continuous period of 12 weeks in the north-east monsoon season. The summer rains were adequate though they were a little late in their onset.

The weekly rainfall distribution for the years 1952–53 and 1953–54 and the average weekly rainfall for the previous seven-year period is summarized in Table I.

Table I.—*Weekly rainfall distribution for* 1952–53 *and* 1953–54 *and the average for the past seven-year period* 1946 *to* 1953 *at the Agricultural Research Station, Ambalavayal.*

Month and week.		1952–53.		1953–54.		Average for previous seven years (1946–47 to 1952–53)	
		Inches.	Days.	Inches.	Days.	Inches.	Days.
South-west monsoon period.							
June	7—13	0·85	6	0·39	2	2·94	5·14
	14—20	4·12	7	1·95	5	3·02	4·71
	21—27	2·29	7	9·02	4	3·34	5·30
June-July	28— 4	2·98	7	11·83	6	3·02	5·14
	5—11	0·34	5	14·52	6	3·52	5·00
	12—18	2·04	7	9·38	1	6·33	6·14
	19—25	3·13	7	1·35	4	6·54	6·00
July-August ..	26— 1	3·60	7	6·10	6	4·36	6·14
	2— 8	2·08	7	2·52	5	4·42	6·57
	9—15	4·77	7	4·26	5	3·75	6·14
	16—22	1·86	7	4·37	7	3·05	6·14
	23—29	1·22	6	0·69	4	3·68	6·43
August-September ..	30— 5	0·36	6	1·12	4	1·58	5·71
	6—12	..	..	1·83	2	1·12	4·30
	13—19	..	..	0 54	2	0·99	3·42
	20—26	1·67	2	0·49	2	1·43	5·00
	Total ..	31·31	88	70·36	65	53·04	87·28
North-east monsoon period.							
September-October.	27— 3	2·65	5	2·03	3	2·28	4·42
	4—10	5·93	7	2·96	5	2·37	4·57
	11—17	1·10	3	2·18	3	2·56	4·57
	18—24	0·06	1	2·95	4	1·48	3·42
	25—31	1·55	2	1·69	3	0·91	2·57
November	1— 7	0·78	1	..	..	2·04	2·71
	8—14	..	..	1·21	1	1·43	2·28
	15—21	..	..	0·19	..	0·52	2·14
	22—29	..	..	..	..	0·48	1·14
November-December.	30— 5	1·65	2	..	..	0·52	2·14
	6—12	0·15	2	..	..	0·14	1·14
	13—19	0·32	1	0·02	..	0·16	1·28
	20—26	..	..	..	..	0·09	0·43
December-January	27— 3	..	..	..	..	..	..
	4—10	..	..	0·20	..	0·02	0·01
	11—17	..	..	..	..	0·01	0·01
	18—24	0·87	2	..	..	0·30	0·85
	25—31	..	..	..	..	0·12	0·04
February	1— 7	..	..	0·01	..	0·05	0·02
	8—14	..	..	..	..	..	..
	15—21	..	..	..	..	0·04	0·03
	22—29	1·15	2	0·02	..	0·67	1·70
	Total ..	16·21	28	13·46	19	16·19	35 47

TABLE I.—*Weekly rainfall distribution for* 1952–53 *and* 1953–54 *and the average for the past seven-years period* 1946 *to* 1953 *at the Agricultural Research Station, Ambalavayal.*

Month and week.		1952–53.		1953–54.		Avarage for previous seven years (1946-47 1952–53).	
		Inches.	Days.	Inches.	Days.	Inches.	Days.
		Hot weather period.					
March	1—7	..	..	..	..	0·11	0·04
	8—14	..	..	0·38	1	0·17	0·05
	15—21	..	..	0·02	1	0·37	0·05
	22—28	0·20	1	0·07	..	0·20	1·00
March-April ..	29— 4	..	..	1·41	2	1·05	1·85
	5—11	0·50	2	0·17	1	0·84	2·70
	12—18	1·11	3	0·47	2	1·65	3·14
	19—25	3·34	6	1·09	2	1·39	2·57
April-May	26— 2	0·76	2	1·11	2	1·52	3·43
	3— 9	0·25	2	2·13	2	1·30	8·43
	10—16	..	..	0·88	1	1·56	3·00
	17—23	2·00	3	0·83	3	1·20	2·54
	24—30	0·76	4	1·07	2	1·37	3·43
May-June	31— 6	1·27	3	5·69	5	2·93	4·57
	Total ..	10·19	26	15·77	23	15·66	31·80
Grand total ..		57·71	142	99·59	107	84·89	154·55

2. *Crops.—I. Paddy—(a) Trial of different varieties, strains and types.*—The trial of the varieties, types and strains of paddy found to be promising in the previous year was further continued with a view to select the most promising selections, for ultimate distribution in Wynaad. From among the eight varieties under trial in the previous year; two, viz. *Puncha* and T 2191 were eliminated on account of their poor yields, The remaining six selections were raised on a ten-cent plot each in May 1953. The data of their relative duration and yields recorded during the past three years are set out in Table II.

TABLE II.—*Showing duration and yield of types, strains and varieties.*

Serial number.	Strain, type or variety.	1951–1952.		1952–1953.		1953–1954.	
		D.	Y.	D.	Y.	D.	Y.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Mancora	205	2,300	201	2.360	210	2,460
2	*Jeerakasala*	200	1,740	201	2,720	211	1,550
3	S.R. 26 B.	175	2,560	184	2,170	178	1,150
4	*Puncha*	..	..	174	1,040	..	..
5	C.E.B. 24	..	..	207	2,406	232	350
6	T 2191	243	2,100	244	1,700	..	..
7	T 2201	168	1,860	196	2.230	177	1,970
8	T 2203	158	1,620	159	2,100	161	1,920

(D) Duration in days. (Y) Yield of grain in lb. per acre.

Mankora an introduction from Kenya has recorded a consistently high yield over the rest during the previous three seasons and was therefore the most promising for multiplication and distribution. *Puncha* was unsuitable for the first-crop season and T 2191 with its long duration of 244 days was equally unfit for introduction in the tract.

(*b*) *Co-operative trial with Chinese types.*—A co-operative trial with eight Chinese types, five departmental strains and two local varieties was initated at the instance of the Director, Central Rice Research Station, Cuttack, in 1952–53 on an All-India basis. The trial was in progress for the second season.

Nurseries were raised on 3rd May 1953 and seedlings were transplanted on 8th June 1953 in plots of $25' \times 10'$ each, randomized and replicated four times. The yield data and the analysis thereof are presented in Table III below :—

TABLE III.—*Showing yield data and analysis of the Chinese and other types of paddy.*

Variety.	Replications.					Yield in lb. per acre.
	I.	II.	III.	IV.	Total.	
China 2	4·50	5·00	6·22	3·00	18·75	817
China 41	11·25	16·50	8.00	10·60	46·25	1,971
China 42	10·50	18·50	8·00	6·00	46·00	1,004
China 43	3·25	8·25	1·50	8·50	29·50	1,285
China 45	7·00	13·00	6·50	3·00	26·50	1,285

TABLE III.—*Showing yield data and analysis of the Chinese and other types of paddy*—cont.

Variety.	Replications. I.	II.	III.	IV.	Total.	Yield per acre.
China 47	4·00	5·50	5·00	2·00	16·50	719
China 62	10 50	20·00	10 00	14·00	54·50	2,374
China 63	12·00	13·50	10·50	13·50	49·50	2,156
ADiT 20	1·50	1·50	1·50	1·50	9·00	392
ADT 4	0·25	0·25	0·06	4·00	4·56	199
PTB 10	11·00	8·00	2·50	8·00	28·00	1,220
WND 1	29·00	19·00	23 00	19·00	90 00	3,920
Puncha	8 00	5·50	9·00	8·50	31·00	1,350
Bhembhog	8·75	6·00	7·75	3·75	26·25	1,143
B 76–1	9·80	8·00	2 80	8·00	28·00	1,220
Total ..	94·80	87·25	72·11	82 25	337·31	196·93

Table of analysis of variance.

Source of variation.	D.F.	S.S.	M.S.	F.
Due to Replications	3	61·12	20·37	
Due to varieties	14	1,523 90	108,85	11·97 *
Error	42	381·71	9·09	
Total ..	59	1,966 73		

* Means significant at 1 per cent level.

S.E. of a mean	1·51
S.E. of a mean per acre	263·10
C.D. at percentage for comparing means	4·31(per unit plot).
C.D. at do.	750·97 per acre,

Conclusions —The local variety WND 1 is significantly superior to all the varieties giving 3,920 of paddy per acre Among the Chinese types China 62, China 63, China 42 and China 41 have given good results. PTB 10 although has given less yield than the above Chinese varieties, the difference are not significant. The other varieties have given very low yield, the lowest yield of 199 lb. per acre being obtained with ADT 4.

(c) *Trial of Siamese and other types of paddy.*—Out of thirteen Siamese types and nine other varieties received from the Paddy Specialist, Coimbatore, seven were found promising for cultivation under Wynaad conditions. These seven along with another strain, viz., TKM 6 also obtained from the Paddy Specialist, were again tried during the year. The data on their duration and yield for the past two years of trial are set out in Table IV.

TABLE IV.—*Showing the durations and yields of eight paddy types, varieties and strains.*

Serial number.	Type, strain or variety.	1952–1953. D.	1952–1953. Y.	1953–1954. D.	1953–1954. Y.
1	Chennellu (Ceylon)	197	3,226	212	3,360
2	Maranellu (Ceylon)	210	2,420	218	3,260
3	Ninidhan (Araku)	171	2,145	176	1,460
4	T 1040	131	2,178	153	1,900
5	T 1648	210	1,936	228	2,220
6	Hatic	253	686	239	1,200
7	TKM-6	..	..	158	110
8	T 988	128	1,936	153	1,700

(D) Duration in days. (Y) Yield of grain in lb. per acre.

From the above data it is apparent that the Ceylon varieties Chennellu and Maranellu recorded the best performance in yield in both seasons. These varieties have therefore been put under further observations for confirmation of results.

(d) *Bulk trial of selected cultures of local paddy varieties.*—Cultures of six local varieties and the strains SLO 17 and MTU 19 were raised for seed multiplication. The details of performance of the cultures, strains, etc., grown are given in Table V.

TABLE V.—*Showing the performance of cultures of local varieties and strains.*

Serial number.	Culture numbers or strain.	1952–1953. Area (acres).	1952–1953. D.	1952–1953. Y.	1953–1954. Area (acres).	1953–1954. D.	1953–1954. Y.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	*Palthondy* 1914	2·00	178	2,020	2·96	179	2,140
2	*Marathondy* 8748	1·08	204	2,473	2·98	205	2,570
3	*Velumpala* 8393	2·61	220	2,598	0·99	224	3,000
4	*Kothandan* 517	2 08	213	2,670	1·76	202	3,016
5	*Chettuvalian* 8939	1·83	209	2,973	1·00	208	2,526
6	*Maranellu* 881	1·11	206	1,885	0·45	196	2,649
7	SLO. 17	3·14	227	2,628	2·03	229	2,898
8	MTU 19	0·69	218	2,628	2·06	230	2,636

(D) Duration in days. (Y) Yield of grain in lb. per acre.

(e) *Evolving high yielding and superior strains of Jeerakasala by selection.*—Seedlings from sixty-two cultures of promising performance of *Jeerakasala* selected from 145 selections obtained in the previous year were put under further test for high yields and other desirable qualities. Twenty of these promising cultures were selected for further trial during 1954–55.

A summary of their performance of the twenty cultures in respect of yield and duration is presented in Table VI.

TABLE VI.—*Showing the duration and yield of twenty Jeerakasala single plant selections.*

Serial number.	Culture number.	Date of sowing.	Date of planting.	Duration in days.	Acre yield in lb.
1	190	12th May 1953	5th July 1953	221	4,879
2	179	Do.	Do.	221	4,530
3	553	Do.	Do.	221	4,530
4	41	Do.	Do.	226	4,530
5	62	Do.	Do.	226	4,182
6	588	Do.	Do.	221	4,095
7	347	Do.	Do.	224	4,008
8	332	Do.	Do.	226	4,008
9	923	Do.	Do.	226	4,008
10	969	Do.	Do.	226	4,008
11	173	Do.	Do.	226	4,008
12	338	Do.	Do.	226	4,008
13	316	Do.	Do.	226	4,008
14	244	Do.	Do.	226	4,008
15	868	Do.	Do.	221	4,008
16	534	Do.	Do.	226	3,920
17	160	Do.	Do.	226	3,920
18	809	Do.	Do.	221	3,920
19	172	Do.	Do.	224	3,833
20	191	Do.	Do.	221	3,833

The highest yield of 4,879 lb. per acre was obtained from the culture No. 190.

(f) *Second-crop paddy.*—A total area of 4·59 acres was brought under second-crop paddy during the year as against 2·83 acres in the previous year. The crop included the varieties *Puncha*, WND 1 (*Palthondy*), PTB 10 and the Chinese types 42, 62 and 63. The data on their duration and yield are given in Table VII.

TABLE VII.—*Showing the performance of the second-crop paddy varieties in* 1953–1954.

Serial number.	Name of type, variety or strain.	Transplanted or broadcasted.	Duration in days.	Yield of grain in lb. per acre.
(1)	(2)	(3)	(4)	(5)
1	WND 1	Transplanted	168	1,563
2	*Puncha*	Broadcasted	147	1,549
3	Do.	Transplanted	165	1,791
4	Chinese type 42	Do.	174	1,140
5	Do.	Broadcasted	141	740
6	Chinese type 62	Do.	141	1,120
7	Do.	Transplanted	176	1,220
8	Chinese type 63	Do.	176	840
9	Do.	Broadcasted	142	690
10	PTB 10	Do.	114	1,646

The transplanted crop in all the varieties and types has given uniformly better yields than the broadcasted crop. Among the broadcasted crops PTB 10 and *Puncha* exhibited a better yield performance. The performance of the Chinese types has generally indicated their unsuitability for growing as a second crop under Wynaad conditions.

II. *Cultivation of paddy in dry lands.—Trial to determine the effect of organic matter as soil amendment.*—With a view to assess the influence of organic matter supplied in the shape of green leaf, cattle manure and compost in different doses on the soil condition, as reflected in the yields of paddy under dry cultivation, a trial was initiated at the instance of the Government Agricultural Chemist in June 1953 employing the following treatments :—

(a) *Application of green leaf in different doses.*—Observation plots measuring two and a half cents each were sown to *Karuthan paddy* broadcast on 20th June 1953. The plots received three different doses of green leaf of *Crotalaria anagyroides* at 2,500 lb. 5,000 lb. and 7,500 lb. per acre. A no manure plot of the same dimensions was

maintained for comparison. The crop was harvested on 23rd November 1953. The yield data and the analysis there of is presented in Table VIII.

TABLE VIII.—*Showing yields under three different treatments of green leaf manure as organic amendment.*

Serial number and treatment.	Dry weight. Acre yield in lb.		Deviation. From mean.		Treatment. Deviation over or below.	
	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.
1 Control (no manure)	1,360	2,720	55	—30	4·21	—1·09
2 Green leaf at 2,500 lb. per acre.	1,680	2,800	375	50	28·73	1·81*
3 Do. at 5,000 lb. per acre.	780	2,080	—525	—670	— 40·23	—24·37
4 Do. at 7,500 lb. per acre.	1,400	3,400	95	650	7·28	23·63†
Mean 1,305 lb. per care	2,750	..	..	..	..	..

* Significant for grain.
† Significant for straw.

The maximum grain yield was obtained from the plot which received 2,500 lb. of green leaf, while the straw yield was the heaviest in the case of the plot which received 7,500 lb. of green leaf.

(*b*) *Application of green leaf, cattle manure and compost*—

(i) 2,500 *lb. level.*—2,500 lb. of green leaf per acre.

1,000 lb. of cattle manure per acre to provide an equivalent quantity of organic matter available in 2,500 lb. of green leaf.

1,000 lb. of compost per acre to supply an equivalent quantity of organic matter available in 2,500 lb. of green leaf.

(ii) 5,000 *lb. level.*—5,000 lb. of green leaf per acre.

2,000 lb. of cattle manure per acre to provide an equivalent quantity of organic matter available in 5,000 lb. of green leaf.

2,000 lb. of compost per acre to supply an equivalent quantity of organic matter available in 5,000 lb. of green leaf.

(iii) 7,500 *lb. level.*—7,500 lb. of green leaf per acre.

3,000 lb. of cattle manure per acre to provide an equivalent quantity of organic matter available in 7,500 lb. of green leaf.

3,000 lb. of compost per acre to supply an equivalent quantity of organic matter available in 7,500 lb. of green leaf.

For every treatment a plot of equal dimensions was maintained without any organic manure as control.

All the manured and no manure plots received a common basal dressing at the rate of 45 lb. of ammonium sulphate and 30 lb. of P_2O_5 per acre.

The yield data obtained from the different treatments are summarised in Table IX below.

TABLE IX.—*Showing yields under three different treatments of organic manures as soil amendments.*

Serial number and treatment.	Dry weight acre yield in lb.		Devition from mean.		Treatment deviation over or below mean.		Remarks.
	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(*a*) (i) (No manure) control	1,280	3,520	— 132·5	+ 805	9·38	25·96	*
(ii) Green leaf at 2,500 lb. per acre.	1,580	2,520	167·5	— 195	11·86	7·18	†
(iii) Cattle manure§	1,500	2,260	87·5	— 455	6·19	16·76	
(iv) Compost †	1,290	2,560	— 122·5	— 155	8·67	5·51	
Mean	1,412	52,715					
(*b*) (i) Control (no manure)	1,320	2,840	47·5	420	3·47	12·89	
(ii) Green leaf at 5,000 lb. per acre.	1,400	4,240	32·5	980	2·38	30·06	‡
(iii) Cattle manure† ‖	1,330	2.640	37·5	620	2·74	19·02	†
(iv) Compost manure‖	1,420	3,320	52·5	60	3·83	1·84	†
Mean	1,367	5,3260					
(*c*) (i) Control (no manure)	940	1,840	— 275·0	70	22·63	4·00	
(ii) Green leaf at 7,500 lb. per acre.	1,420	1,720	205·0	— 50	16·87	2·82	†
(ii) Cattle manure¶	1,180	1,520	— 35·0	— 250	2·90	14·12	
(iv) Compost manure¶ ..	1,320	2,000	105·0	230	11·70	13·0C	‡
Mean	1,215	1,770					

* Significant for straw.
‡ Significant for grain.
‖ Significant for grain and straw.
Equivalent to organic matter in item (*a*) (ii).
Equivalent to organic matter in item (*b*) (ii).
¶ Equivalent to organic matter in item (*c*) (ii)

Cattle manure application has led to comparatively poorer yields of grain and straw with the increase in higher levels of organic matter.

In all cases of green leaf application there has been a significant increase in yield of grain, while unmanured plots and plots manured with compost have responded with conflicting results.

III. *Fruits*—A. *Mandarin orange*—(i) *Cultural trial.*—The trial has for its object the determination of the optimum cultural operations to maintain the trees in good vigour.

The treatments comprise —

(*a*) No soil disturbance round the plants except the removal of weed growth to a diameter of six feet round each tree, to be done twice a year once in June and once in November. These trees were kept as control for comparison.

(*b*) The soil round the plants to a diameter of six feet was dug to a depth of 4 inches in November and again in June.

(*c*) A cover crop of *Calapogonium muconoides* was raised round the plant to a diameter of six feet.

(*d*) A leaf mulch four inches in depth was provided throughout the year to cover a distance of six feet in radius round each plant.

(*e*) Application of 100 lb. of cattle manure, three pounds of ammonium sulphate, 1·5 lb. of superphosphate and six pounds of woodash in June 1954.

Twenty-four plants of uniform age were subjected to each treatment.

The data on growth measurements of girth and height of the plants were recorded in March 1954 which is presented in Table X below :—

TABLE X.—*Showing comparative mean girth and height measurements of trees under different cultural treatments.*

Serial number and treatment.	Mean girth at the time of planting June 1951.	Mean girth in 1953.	Mean increase girth in 1953.	Mean girth in 1954.	Mean increase girth in 1954.	Mean height at the time of planting.	Mean height in March 1953.	Mean increase in 1953.	Mean height in March 1954.	Mean increase in 1954.
	(cm)	(cm)	(cm)	(cm)	(cm)	(cm)	(cm)	(cm)	(cm)	(cm)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1 Control	2·53	4·66	2·33	6·83	4·50	51·70	85·80	34·10	103·50	51·80
2 Digging	2·20	6·80	4·70	11·02	8·82	45·20	107·00	61·80	143·42	98·22
3 Mulching	2·30	7·74	5·44	12·35	10·05	52·10	120·50	68·20	159·60	107·30
4 Cover cropping ..	2·35	4·59	2·24	7·29	4·94	55·30	78·60	23·30	105 04	49·74
5 Manuring and digging.	2·55	6·87	4·32	11·77	9·22	60·30	112·10	51·80	154·71	94·41
6 Manuring and mulching.	2·38	8·87	6·59	15·16	12·78	57·50	143·20	85·70	201·46	143·96

The above data have indicated that treatment No. 6, viz., " manuring and mulching " has contributed towards the maximum tree girth and height. The trees under treatments 3 and 6 tolerated the drought conditions as could be observed from their general health better than the others. The trees cover cropped with Calapogonium muconoides and the " controls " were the least vigorous in growth. It was also interesting to note that fruits were developing in the trees treated by " manuring and mulching " and " mulching " during 1954 season, thereby indicating their comparative earliness in bearing which perhaps brings out the healthy influence of these cultural operations in comparison with the rest.

(ii) *Budded plants versus seedlings.*—Seedlings and budded plants on rough lemon raised from a selected scion tree, were planted out in June 1952 for a comparative study. The layout was done by the A B B A method at the rate of four plants in each treatment replicated eight times. Growth measurements of the trees were recorded in March 1954. The mean increments in tree height and stem girth of the budlings and seedlings worked out to 58·6 and 73·8 cm. and 7·3 and 5·6 cm. respectively.

A better tree height in the case of seedlings and a greater stem girth in the case of budlings is evident. A few budlings were also observed to develop stray blossom nearly 21 months after their planting.

(iii) *Rootstock trial.*—The trial was initiated on 30th June 1952. Six budded plants of mandarin orange on each of rough lemon, sweet orange, marmalade orange, kichili and Wynaad country orange as rootstocks along with six unworked seedlings of the same scion tree were planted out with a view to determine the optimum rootstock for this fruit. The growth data recorded over the two seasons of their growth are presented in the following Table.

TABLE XI.—*Showing the relative tree height and stem girth measurements on five rootstocks.*

Serial number and treatment.	March 1953.			March 1954.			March 1953.		March 1954.	
	A.	B1.	C1.	B2.	C2.	D.	E1.	F1.	E2.	F2.
1 Rough lemon ..	79·00	100·83	21·83	158·00	79·00	5·53	8·63	3·10	13·44	7·91
2 Sweet orange	51·00	57·17	6·17	107·00	56·00	4·20	4·71	0·51	7·92	3·72
3 Marmalade orange ..	48·50	71·00	22·50	123·00	79·50	3·99	5·72	1·73	9·59	5·60
4 Wynad country orange.	59·00	65·33	6·33	133·00	74·00	4·00	5·12	1·22	8·65	4·65
5 Kichili	50·00	55·50	5·50	99·00	49·00	4·30	4·97	0·67	7·61	3·31
6 Scion seedling ..	55·50	80·66	25·16	144·00	88·50	1·94	4·22	2·28	8·86	6·92

Reference—
A. Mean height at the time of planting in cm.
B1 and B2 Mean height recorded in March in cm.
C1 and C2 Mean increase in height in cm.
D. Mean stem girth at the time of planting.
E1 and E2 Mean stem girth recorded in March.
F1 and F2 Mean increase in stem girth in cm.

From the above data, it is seen that among the five rootstocks used marmalade orange has shown the maximum growth in tree girth and rough lemon in tree height.

It was also interesting to note that 66·6 per cent of the trees on the rough lemon stock, 16·6 per cent of the trees on sweet orange and marmalade orange and 33·6 per cent of the trees on Wynaad country orange had attained bearing in 1954 while the budlings on Kichili and the unworked seedlings were still in their prebearing life.

(iv) *Mandarin orange bulk cultivation.*—Individual tree yields of bearing orange trees in the bulk area were recorded. During the year under report 140 out of 147 trees successfully matured crop. The total production amounted to 60,090 fruits yielding an income of Rs. 700. The table below summarises the yields realised from the area in the course of the past five seasons.

TABLE XII.—*Showing the comparative yields of mandarin orange in bulk area for the period 1949 to 1954.*

Year.	Number of bearing trees.	Total number fruits harvested.	Weight of fruits harvested in lb.
1949–50	136	23,891	6,433
1950–51	147	46,588	11,610
1951–52	145	29,707	7,653
1952–53	103	37,788	7,684
1953–54	140	60,090	10,015

During the year under report, the maximum individual yield of 1,740 fruits weighing 348 lb. was recorded by tree No. 1/7. The orchard average worked out to 428 fruits weighing 71·5 lb. per tree. Though the crop was fairly heavy there was appreciable reduction in individual fruit weight, which is attributed to adverse weather conditions.

B. *Pineapple*—(i) *Influence of phyto-hormones on cropping in pineapple.*—The Kew suckers planted in June 1952 for pursuing the trial of phyto-hormone in two sets of concentration viz., 0·001, 0·003 and 0·006 per cent to advance flowering and 0·01, 0·05 and 0·10 per cents to delay flowering could not be usefully utilized due to the unusually heavy infestation of insect pests. The plantings were therefore abandoned and a newly laid out trial was taken up. The fresh plantings were yet to be done at the time of this report.

(ii) *Cultural and manurial trial.*—A complex cultural trial was laid out in April 1952 with a view to determine the optimum cultural and manurial operations for the crop. The progress of the trial was, however, vitiated due to severe drought conditions. A fresh trial was therefore being laid out.

(iii) *Mulching trial.*—A mulching trial was laid out in May 1953. Grass mulch was provided in a 10 cent plot, while another 10 cent plot was left unmulched for comparison. The mulch was renewed as and when needed to maintain a continuous mulch throughout the year. Since the method of mulching did not fully serve the purpose of determining the object of mulching, a more comprehensive trial was being laid out.

(iv) *Trial on the effect of removal of suckers on fruit size.*—The trial which was initiated in 1951 with two treatments failed to give conclusive results due to prevailing drought conditions. The trial has therefore been abandoned.

(v) *Trial of different kinds of planting material of pineapple.*—Suckers and slips from the plants were planted out in May 1952. But due to the ununiform growth of plants and a very severe infestation of pests, no data useful for valid comparison could be obtained. The trial had therefore to be abandoned.

(vi) *Bulk plantation of pineapple.*—Over 850 Kew fruits weighing 920 lb. and 106 Mauritius fruits weighing 98 lb. were obtained from bulk area of 1·10 acres. The growth and yield performance of the crop during the year was poor.

C. *Varietal collection of fruit crops*—(i) *Sathgudi orange.*—Out of 98 budded plants raised on rough lemon and planted in June 1947, 81 trees matured a successful crop of 868 lb. for the third season in succession as against 733 lb. in the previous year.

(ii) *Acidlime.*—Two thousand three hundred and forty-five fruits were harvested during the year from 28 budded plants planted in June 1947 for the third season since planting. Two hundred and thirty-six fruits were harvested from 35 seedlings, out of 200 planted in 1950 for the first time since planting. During May 1954, 80 seedlings and all the 28 budded plants were observed to be developing a moderate blossom.

(iii) *Lemon—Malta lemon.*—Out of 238 rooted cuttings and layers planted in 1946 to 1950, 194 plants attained the bearing age at the time of this report. The mean yield of the 1946 plantings, worked out to 20 fruits per tree, while that of the 1950 plantings worked out to eight fruits.

Seville lemon.—A mean yield of eight fruits from five-year old plants and five fruits from the three-year old plants was recorded. The variety was however, superior to the Malta lemon in flavour and fruit shapes.

Nepali round.—Two rooted cuttings of this variety planted in August 1951, attained the bearing age in October 1953 and yielded a small crop of eight fruits. Six Nepali Round budlings on rough lemon planted in August 1952 were yet to flower.

Nepali Oblong.—Out of twenty rooted cuttings planted in August 1951, eight were developing a small blossom in October 1953.

Villa Franca.—Four rooted cuttings and six budlings on rough lemon (planted in 1951 and 1952 seasons) were yet to flower.

Lisbon.—Two rooted cuttings and six budlings on rough lemon were planted in August 1951 and August 1952 respectively. The rooted cuttings were observed to have flowered in October 1953 but without any successful fruit set.

Pummelo.—Nine budlings of two varieties of pummelo, viz., Pink fleshed and White-fleshed, raised on rough lemon rootstock and planted in 1947 attained bearing in 1951. A small crop of 12 fruits from two White fleshed trees and 41 fruits from the seven Pink-fleshed variety was harvested in March 1954. The Pink-fleshed variety was superior in eating quality.

Howaiian Citron.—Forty-five fruits from a single tree planted in 1947 were available for harvest as against 69 fruits harvested in the previous year. The growth of the plant was satisfactory.

Aegle marmelos.—Eight seedlings obtained from the College Orchard, Coimbatore, were set out in the field in December 1953.

(iv) *Mangosteen.*—The growth of the seedlings planted in 1947 continued to be slow in their pre-bearing life.

(v) *Avocado pear.*—Two of the six seedlings of the variety Round planted in 1947 flowered during the year but failed to set successful crop. Seven more seedlings of the 'Long' and 'Round' varieties were planted in 1949, and eight in 1950. They were making satisfactory growth. Nineteen grafts almer and seedlings of Fuerte, Peradeniya Purple Hybrid and Pollock planted in Janury 1953 were growing satisfactorily, The most vigorous among these were the seedlings of the Peradeniya Purple Hybrid and the grafts of the variety Pollock.

(vi) *Durian.*—The growth of nine surviving plants out of 28 seedlings planted in 1950 continued to be poor, having grown hardly to a height of two feet.

(vii) *Litchi.*—Six litchi plants planted in 1947 have made satisfactory growth. But none of them have flowered yet

(viii) *Langsat.*—Growth was very poor during this year also.

(ix) *Annonas.*—The growth progress of *Annona reticulata* was far from satisfactory, while *Annona cherimolia* and *Annona squamosa* made satisfactory growth. *Annona sqyamosa* matured a few fruits during the year.

(x) *Queensland nut.*—The growth of eight seedlings planted in June 1950 was poor. None of the plants has attained bearing.

(xi) *Singapore jack.*—This jack has failed to establish.

(xii) *Passion fruit.*—*Passion fruit* (*var. Purple*).—The seedlings planted in June 1952, commenced yielding the first crop from October 1953 onwards. The mean yield per vine worked out to 31 fruits. The vines were vigorous and fairly free from major diseases or pests.

Passion fruit (*var Yellow*).—Twenty-five yellow passion fruit seedlings obtained from the Kallar Fruit Station, were planted in June 1954.

(xiii) *Rose apple.*—Five seedlings planted in June 1947 have yielded 610 fruits weighing 25½ lb. as against a crop of 154 fruits weighing 7 lb. obtained in the previous season.

(xiv) *Bread fruit*—Out of ten bread fruit (seedless) rooted cuttings, planted in June 1948, only a single plant was survived which is recording a very slow growth.

(xv) *Banana.*—The following banana varieties were planted during the year to extend the area under this crop:—

	SUCKERS.
Chenkadali	180
Mannan	250
Atu Nendran	500
Gros Michel	110

(xvi) *Tree-tomato.*—Thirty-seven fruits weighing 2½lb. were harvested from 13 plants which were planted in June 1953. The growth of the plants was moderate.

(xvii) *Carambola* (*sweet*).—Two hundred and forty fruits weighing 46¾ lb. were harvested from three seedlings planted in June 1948.

(xviii) *Mango.*—During the year the harvest of mango fruits was fair as may be seen from the data recorded below.—

TABLE XLI.—*Showing performance of mango varieties planted in* 1947.

Serial number and name of variety	Number of trees	Total number of fruits harvested.	Weight of fruits harvested. LB. OZ.
1 Banganapalle	3	125	52 8
2 Neelum	4	72	42 0
3 Olour	2	21	10 8

The eating quality of the fruits in all the three varieties, however, was poor.

D. *Nursery work.*—Hundred pineapple suckers obtained from stem slices and planted out in the previous year failed to show satisfactory growth. A further lot of 500 suckers raised from stem slices was planted in a compact area in April 1954.

Propagation of fruit and other economic plants.

The following fruit and other economic plants were raised during the year for distribution :—

Coffee seedling	16,000
Malta lemon (rooted cuttings)	2,640
Seville lemon (rooted cuttings)	100
Mandarin orange seedlings	1,000
Mandarin orange budlings	473
Rough lemon seedlings	20,000
Sour orange seedlings	800
Kichili seedlings	300
Passion fruit seedlings	500
Silver oak seedlings	5,000
Rose apple seedlings	500
Pineapple suckers	2,000
Drumstick seedlings	600
Sathgudi seedlings	7,000
Sathgudi budlings	288
Gliricidia seedlings	1,000
Indigofera teysmani seedlings	1,000
Annona squamosa seedlings	100
Pummelo budlings	26

IV. *Tree spices.*—The growth performance of nutmeg and clove was satisfactory under shaded culture. But continued drought accounted for a few casualties. Cinnamon and all spice showed a better growth performance than the former two spices, under Wynaad conditions.

V. *Beverage crops-Cacao.*—Out of twenty-two budlings of Criollo cacao planted in June 1952, and only one developed a stray blossom but failed to mature fruits. The growth of the plants was slow.

Kolanut seedlings, also planted in 1952, were showing slow vegetative growth.

VI. *Other seasonal crops*—(*a*) *Ginger.*—The following observation trials initiated in 1951, on seed rate, use of preserved seed and on the effect of application of ammonium sulphate on the yield were continued.

(1) *Seed rate.*—Two different sizes of planting material, viz., rhizome pieces weighing 3 lb. per 100 pieces and 2 lb. per 100 pieces respectively were dibbled in beds measuring 20′ × 3′ which were laid out in the A B B A method replicated six times. The seed rate under the two treatments worked out to 1,350 lb. and 900 lb. of rhizome per acre respectively The yield particulars from the treatments are presented in the table below :—

TABLE XIV.—*Showing the comparative yield of ginger under two seed rates.*
Seed material preserved in pit.

Treatments seed rate per acre.	Mean yield per acre in lb,		
	1951-52.	1952-53.	1953-54.
100 pieces weighing 2 lb. (900 lb. per acre) ..	8,955	9,167	1,832
100 pieces weighing 3 lb. (1,350 lb. per acre) ..	12,496	11,012	6,685

From the above data the heavier seed rate has been recording consistently larger yields in all the three seasons. The results bring out the need for using larger rhizome pieces for planting.

(ii) *Storage of seed material.*—Observations on the crops obtained from the pit preserved seed and the field preserved seed were recorded as detailed in the table below :—

TABLE XV.—*Showing comparative crop size of ginger from two kinds of preserved seed.*

Kind of seed material.	Mean yield per acre in lb.			Remarks.
	1951-52.	1952-53.	1953-54.	
Preserved in pit treated with 0·1 per cent mercuric chloride.	8,163	10,132	6,688	In either treatment, the seed-rate was 1,350 lb. per acre of large bit.
Preserved in field under mulch without harvesting the crip.	9,000	19,269	6,0454	

It would be apparent from the above data that the yields obtained were not uniform in all the three seasons and the results were conflicting.

During the year under report, a total area of 1·31 acres was brought under ginger. The mean yield per acre worked out to 4,106 lb. of rhizome as compared to 8,247 lb. in the previous year. The crop was therefore much below normal due to the impact of severe drought conditions which prevailed during the maturing period of the rhizomes.

(*b*) *Chilli.*—The culture 398 received from the Paddy Specialist, Coimbatore, and a local variety were raised for assessing their comparative performance on 30-cent plots each in May 1953. The yields obtained from the two varieties are presented in Table XVI below :—

TABLE XVI.—*Showing comparative yields of chilli varieties.*

Name of variety.	Area in cents.	Yield in lb. per acre.		Remarks.
		1953-54.	1953-54.	
Culture No. 398	80	1,306	481	The poor yields in 1953 season are attributed to adverse seasonal conditions.
Diecel	80	1,267	170	

The culture has given better yields in both seasons and was preferred in the market to the local variety in view of its longer fruit size.

(*c*) *Pulse crops—Perennial mung.*—The crop progressed satisfactorily in the initial stages but was adversely affected in the latter stages due to the prevailing drought conditions.

China mung 49.—A crop of China mung 49 was raised again this year but this strain proved a failure over successive seasons.

Cowpea.—New Era cowpea and C. 57 were raised in dry and wet land conditions. On an acre scale the profit from New Era worked out to about Rs. 80 in the dry lands and about Rs. 100 in the wet lands.

VII. *Root crops.—Sweet potato.*—Four varieties, viz., V-61-B, 1-B-4304 USA and I-B-23 were obtained from the Paddy Specialist and planted. They recorded an acre yield of 1,840 lb., 2,405 lb. and 3,113 lb. respectively as against 2,550 lb. of the local variety.

Tapicca.—A bulkcrop of 77 cents was raised. Harvest of the roots was in progress at the time of this report.

Potato.—Three varieties President, Arran Scout and Up-to-date were grown for trial in October 1953. The yields worked out to 4,000 lb., 3,000 lb. and 3,032 lb. per acre respectively.

Turmeric.—Eleven cents of turmeric crop recorded an acre yield of 2.463 lb. of rhizomes.

VIII. *Miscellaneous crops—Ragi.*—The local ragi was raised over an area of five cents yielding 196 lb. of grain per acre.

Moco cotton.—Over 110 seedlings raised in baskets were transplanted along side the wet land borders in August 1953. The seedlings have grown up well but the crop was yet to mature.

Sugarcane.—Three varieties of sugarcane, viz., Co. 419, Co. 449 and Co. 527 were raised on an area of 39 cents in dry and wet lands. Co. 419 was promising with a cane yield of 14,600 lb. per acre. The area under this variety was further extended to 84 cents.

Clovers and grasses.—Seeds of nineteen different kinds of grasses, clovers and other legumes supplied by the Systematic Botanist and Professor of Botany were sown in beds towards the end of August 1953. Due to unfavourable seasonal conditions and drought germination was poor and the crops failed to establish.

Oysternut (Telfairia pedata).—The vines were growing very vigorously. Two vines flowered seven months after planting but were found to be pure staminate plants and as such failed to set fruit.

Tung oil.—Over 200 tung oil seedlings were planted in June 1953. They were growing satisfactorily.

Essential oil—(*Ocimum kilimanjaricum*, and *Cinnamonum camphora* were maintaining satisfactory progress during the year. The Khus roots obtained from eight different treatments were sent to the Oil Technologist, Kozhikode, for an assay.

The assay of the Oil Technologist, indicated that the percentage of oil yield from the crop of this station was higher than from other sources. The maximum recovery of the oil worked out to 0 99 per cent, which was obtained from the crop which was harvested 15 months after planting.

Other economic plants—Eucalyptus citriodora.—Eucalyptus citriodora continued to grow vigorously as in the previous year.

Coconut.—Coconut trees planted along tank bund in 1947 continued to grow satisfactorily. Though three of them threw inflorescence, they failed to set fruit.

Arecanut.—The seedlings planted along the channel course in 1951 were making slow progress

3. Pests and Diseases.

Paddy.—Piricularia and *Helminthosporium* were the two major diseases during the year. The damage was not considerable. Effective preventive and control measures were adopted as soon as the diseases were observed. Attack by case worm and borers were attended to and their spread was controlled in time.

Mandarin orange.—Timely pruning measures of borer infected shoots and the collection of grubs and destruction were carried out.

4. Livestock.

Cattle.—Nine cows were in milk during the year. A total quantity of 14,857 lb. of milk was obtained and disposed of as against a total of 11,095 lb. of milk from seven cows in the previous year.

Eight work animals which had become old and uneconomical to be maintained were disposed off in auction. Two cross bred cows and two calves were also disposed off. One heifer-calf and a bull-calf died during the year due to pericarditis and the impaction of rumen.

Two pairs of he-buffaloes were purchased for work during the year. One Scindhi breeding bull which was brought from the District Livestock Farm, Thiruvazhamkunnu, was returned to the District Livestock Farm, as it was found to be unfit for stud.

The total number of animals maintained at the close of the year was one Scindhi stud bull, nine cows, two pairs of bullocks, two pairs of he-buffaloes and seventeen young stock totalling 35 in all.

Poultry.—A total number of 20 chicks were hatched out during the year. Four Rhode Island Red birds consisting of one cock and three pullets and eight White Leghorn birds consisting of one cock and seven pullets were brought from the Poultry Farm, Chovva. Four White Leghorn cocks were sold being surplus in stock besides 91 hatching eggs as against 16 hatching eggs in the previous year. The total stock of birds at the close of the year was one cock, three pullets, two hens and one chick in Rhode Island Red breed, one cock, eight pullets and two hens and two chicks of White Leghorn breed and five country birds totalling 25 in all.

Apiculture.—Two bee colonies were introduced from Coonoor. One more was hived from one of the established colonies. All the three colonies were working satisfactorily towards the close of the year. A pound of honey was extracted from one of the working colonies.

AGRICULTURAL RESEARCH STATION,
WYNAAD COLONIZATION SCHEME,
AMBALAVAYAL, WYNAAD,
Dated 22nd December 1954.

K. FAZLULLAH KHAN,
Superintendent, Wynaad Colonization Scheme.

Statement of seeds, plants, vegetalls, etc., sold and transferred.

Particulars.	Sales.	Transfers.
	LB. OZ.	LB. OZ.
Seed and plants—		
Paddy seeds	7,186 8	18,032 8
Miscellaneous other seeds—		
Vegetable seeds	75 4	146 4
Oil seeds	1 8	..
Millets	42 0	..
Green manure seeds	26 0	15 0
Pulses	3 0	..
Grass seeds	..	53 0
Fruit seeds	..	2 8
	147 12	216 12
(c) Fruit plants and miscellaneous seedlings—	Nos.	Nos.
Fruit plants	3,193	6,182
Vegetable seedlings	1,960	..
Spices seedlings	5	..
Coffee seedlings	6,325	..
Green manure seedlings	25	..
Silver Oak seedlings	9,764	300
Other economic plants	1,878	2
	23,150	6,484
Farm produce—	LB. OZ.	
(a) Fruits and vegetables—		
Fruits	16,225 0	..
Vegetables	7,387 6	..
Jaggery	320 4	..
Redgram	211 0	..
Chillies, dried	137 4	..
Ginger dried	634 0	..
Groundnut pods	213 8	..
Gingelly	10 0	..
Cashew nut	66 8	..
Ginger, green	1,604 4	..
Sugarcane	125 0	..
	26,934 2	..
	Nos.	Nos.
(b) Citrus fruits, etc.	5,666	34
Poultry produce—		
(a) Eggs for table	316	..
(b) Eggs for hatching	91	..
Dairy products—	LB.OZ	LB.OZ
(a) Milk	11,051 0	..
(b) Butter	3 6	..
(c) Curd	62 4	..
(d) Khoa	..	32 0
Manures and chemicals—		
Ammonium sulphate	2,235 0	..
Superphosphate	2 0	..
Hexidle	706 8	..
Mercuric chloride	3 9	..
Zinc phosphide	16 3	..
Warfarin	2 7	..
Agrosan G. N.	0 12	..
	2,966 7	..
Fruit products—	LB. OZ.	LB. OZ.
Jam	340 4	76 0
Squashes	1,147 5	51 0
Tomato juice	5 4	..

APPENDIX I.

EXPENDITURE DURING THE PERIOD 1ST JULY 1953 TO 30TH JUNE 1954.

Pay and allowances.

	Rs.	A.	P.
Pay of Officers	4,741	8	0
Pay of establishments	16,025	4	0
Dearness allowance	5,960	1	0
Travelling allowance	2,735	9	0
Fixed travelling allowance (other compensatory allowances).	1,268	7	0
Total	30,730	13	0

Other charges.

Capital outlay	1,797	9	9
Other contingencies	962	10	9
Dearness allowance to menials	933	2	0
Petty construction and repairs	2,638	14	3
Working expenses	30,589	7	6
Station wagon	6,047	11	9
Total	42,969	9	0
Grand total	73,700	6	0

Receipts.

Revenue remitted	15,816	13	3
Value of transfers	6,763	8	2
Value of stock (for sale) as on 30th June 1954	5,332	12	3
	27,913	1	8

APPENDIX II.

SHOWING COST OF PRODUCTION OF MAJOR CROPS IN THE AGRICULTURAL RESEARCH STATION, AMBALAVAYAL WYNAD COLONIZATION SCHEME, 1953-54.

Serial number and name of crop.	Area in acres.	Preparatory cultivation.	Manures and manuring.	Seeds and sowing.	After cultivation.	Irrigation.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
Wet land.						
1 Paddy, I crop ..	16·83	1,363 10 9	10,61 14 5	497 2 3	238 5 6	124 2 4
2 Paddy II crop ..	4,59	287 8 8	212 4 6	190 0 4	94 13 3	120 5 4
3 Sugarcane	0·14	15 6 0	23 1 6	4 12 0	13 7 6	..
4 Groundnut	0·10	3 6 9	1 9 0	7 8 0	..	..
5 Cowpea	0·62	4 10 0	..	24 12 0	1 8 0	..
Dry lands.						
6 Paddy	0·40	15 2 6	43 8 0	11 3 0	5 10 0	..
7 Ragi	0·25	6 1 0	..	1 8 9	1 12 0	..
8 Sugarcane	0·25	26 4 6	29 2 0	47 2 0	16 8 0	..
9 Chillies	0 60	32 1 6	74 9 4	91 14 0	21 11 9	..
10 Ginger	1·51	98 3 3	142 7 3	298 4 6	6,248 0 6	..
11 Yam	0·20	20 9 0	71 11 0	84 0 0	20 14 0	..
12 Tapioca	0·77	65 1 0	..	11 15 6	32 5 6	..
13 Cowpea (new era) ..	0·30	6 7 9	..	14 8 0	1 9 0	..

Serial number and name of crop.	Total expenditure.		Acre.	Yield in lb.	
	Harvesting, etc.	Plot.		Plot.	
				Grain.	Straw.
(1)	(8)	(9)	(10)	(11)	(12)
	Rs. A. P.	Rs. A. P.	Rs. A. P.		
Wet lands.					
1 Paddy, I crop ..	719 10 6	3,984 15 9	236 11 0	43,330	..
2 Paddy, II crop ..	151 5 3	1,055 5 4	229 14 0	7,119	..
3 Sugarcane	19 4 0	75 15 0	542 7 0	* 188	..
				† 2,058	..
4 Groundnut	3 2 0	15 9 9	59 9 0	150	..
5 Cowpea	3 9 6	34 7 6	156 1 6	‡ 45	..
				§ 58	..
Dry lands.					
6 Paddy	17 4 6	92 12 0	231 14 0	530	1,067
7 Ragi	1 4 0	10 9 9	42 7 0	49	1,000
8 Sugarcane	6 0 0	124 15 0	499 12 0	* 142	* 114
				‖ 100,000	
9 Chillies	14 13 6	235 2 1	391 14 2	‖ 8,189	..
10 Ginger	37 8 0	894 8 9	279 2 1	801½	..
11 Yam	7 8 0	204 10 0	1,923 2 0	2,841	..
12 Tapioca	(The crop has not been harvested completely.)				
13 Cowpea (new era) ..	3 7 6	26 0 3	86 11 6	‡ 25	..
				§ 62	

Serial number and name of crop.	Yield in lb. Acre		Value of yield.		Profit yield + plus, loss (—) per acre.
	Grain.	Straw.	Per plot.	Per acre.	
(1)	(13)	(14)	(15)	(16)	(17)
			Rs. A. P.	Rs. A. P.	Rs. A. P.
Wet lands.					
1 Paddy, I crop ..	2,575	..	10,832 8 0	643 12 0	+ 407 1 0
2 Paddy, II crop ..	1,551	..	1,779 12 0	387 12 0	+ 157 14 0
3 Sugarcane	* 1343	..	58 12 0	419 11 0	— 122 12 0
	† 14,630				
4 Groundnut	1,500	..	18 12 0	187 8 0	+ 80 6 0
5 Cowpea	‡ 72	..	93 10 0	149 13 0	+ 90 4 0
	§ 93				
Dry lands.					
6 Paddy	1,325	2,668	126 9 0	316 8 4	+ 84 10 0
7 Ragi	198	1,000	14 9 6	58 6 0	+ 15 15 0
8 Sugarcane	* 588	† 458	146 12 0	587 0 0	+ 88 4 0
	‖ 40,000	..		..	
9 Chillies	1,333	..	150 3 3	250 1 3	— 141 12 0
10 Ginger	4,105	..	1,393 14 0	929 4 0	+ 350 1 11
11 Yam	14,210	..	177 10 0	888 2 0	— 135 0 0
					79 11 10
12 Tapioca	The crop has not been harvested completely.				
13 Cowpea (new era) ..	***76½	..	40 15 0	166 7 4	
	***230				

* Jaggery. † Canes.
‡ Seed. § Vegetables.
‖ Setts.

STEPS TAKEN TO INCREASE THE REVENUE OF THE STATION.

Augmenting the supply of irrigation water.—A 10/12 h.p. Diesel oil pump set with a four-inch discharge was set up as a result of which irrigation facilities were made available over an additional area of five acres, apart from the wet land area. Certain pipe connections and the construction of cisterns were yet to be completed.

Cultivation of short-term crops.—This was another effective step which tially contributed towards the increase in the farm receipts. The area under ginger which has proved to be a very paying crop in the existing conditions was increased to 4½ acres from 1½ acres in the previous year. Another short term crop which expended in its area was banana. The present area under the more paying varieties such as Gros Michel, Mysurioius and Nendra, was 6 acres which was roughly 16 times that of the previous year's extent.

Cover cropping—Calapagonium mucouodes and *Peuraria phaseoloides* were raised as cover crops over 16 acres in the alleys of the orchard and plantation crops. The full spread of these cover crops was yet to be realised, when the weed growth is expected to be curbed to an appreciable extent leading to a substantial reduction in the weeding charges.

Second crop paddy.—Cultivation of paddy as a second crop was found to be not only successful but could be reckoned as a substantial source of augmenting the revenue from the wet area. Over five acres of rice fallows were cropped to second crop paddy. The full result of these measures, however was not apparent due to the unusual failure of a number of crops as a result of adverse weather conditions. A marked reduction on the expenditure side was achieved. From a total expenditure of Rs. 39,137 on the maintenance of the farm in the course of 1952-53, a reduction of Rs. 1,547 could be recorded by observing the following measures :—

(*a*) Reducing weed cost by resorting to cover cropping in the plantation section.

(*b*) Reducing the cost on manures by augmenting the production of farm made compost.

(*c*) Observing economy in the engagement of labour.

ANNUAL REPORT OF THE RICE RESEARCH STATION, AMBASAMUDRAM, FOR 1953–54 (FASLI 1363).

1. This is the 17th annual report of the Rice Research Station, **Ambasamudram**, relating to the fasli year 1363 (1953–54).

SEASON.

2. The season was on the whole definitely favourable for paddy in the Tambiraparni delta as elsewhere in the southern districts. Not only the total rainfall of 48·11 inches in 64 rainy days was distinctly an increase over last year's record of 19·02 inches (in 46 rainy days) by 153 per cent and of the preceding ten-year average of 38·52 inches by 124·8 per cent, but its general distribution also in the main season, viz., north-east monsoon was particularly satisfactory. The south-west monsoon recorded 4·36 inches of rain on 12 rainy days which was perceptibly higher than the ten-year average of 2·85 inches. The north-east monsoon, the normal contribution of which as well as its proper distribution are of vital importance to the second crop of paddy *Pishanam* in the whole Tambiraparni belt was highly in surplus having recorded 33·02 inches in 39 rainy days as against the previous ten-year average of 25·48 inches. In spite of adequate rains, the *Pishanam* crops could not in general fare well due to severe incidence of insect pests as stemborer and jassids. Again, the unusually heavy showers received in April were, though primarily responsible for taking up the hot weather record to 10·73 inches (13 rainy days) as against 10·19 inches during the preceding ten-year period, however proved to be unseasonal. The absence of adequate and well-distributed summer showers in May–June gave a severe set back to the green manure crops in the rice fallows. The general distribution of rainfall during the year is given below:—

Rainfall statement.

Month.	Week.	1953–54. Rain in inches.	1953–54. Rainy days.	1952–53. Rain in inches.	1952–53. Rainy days.	Average of past ten years. Rain in inches.	Average of past ten years. Rainy days.
		(South-west monsoon)					
June	7–13	..	..	..	..	0·54	1·3
	14–20	0·34	1	..	..	0·15	0·4
	21–27	..	..	0·33	1	0·29	0·8
June—July	28– 4	0·60	2	0·05	..	0·20	0·5
	5–11	2·43	4	..	..	0·18	0·5
	12–18	..	..	..	..	0·07	0·1
	19–25	0·10	1	..	..	0·18	1·2
July—August	26– 1	0·41	2	0·18	1	0·11	0·6
	2– 8	..	..	..	..	0·18	0·4
	9–15	..	..	..	..	0·05	0·2
	16–22	0·07	..	..	..	0·08	0·2
	23–29	..	..	..	..	0·05	0·2
August—September	30– 5	0·29	1	..	..	0·13	0·3
	6–12	0·12	1	..	..	0·11	0·5
	13–19	..	..	..	..	0·23	0·5
	20–26	..	..	..	..	0·35	0·6
Total ..		4·36	12	0·56	2	2·85	6·6
		(North-East Monsoon.)					
September—October	27– 3	..	..	1·08	2	0·91	1·1
	4–10	0·56	3	2·39	4	0·63	1·5
	11–17	6·72	6	..	..	1·66	2·0
	18–24	1·91	5	..	..	1·54	1·1
	25–31	..	..	0·43	1	2·25	3·5
November	1– 7	1·64	1	0·72	2	1·28	2·1
	8–14	1·09	1	0·18	1	3·68	3·6
	15–21	5·77	4	0·45	1	3·27	3·7
	22–28	2·15	2	1·59	2	1·82	2·7
November—December	29– 5	1·19	2	0·08	..	1·93	2·4
	6–12	..	..	0·05	1	1·04	1·5
	13–19	2·40	3	0·67	2	2·21	2·2
	20–26	0·34	1	0·18	..	0·93	0·9
December—January	27– 3	1·56	3	..	..	0·35	0·9
	4–10	3·56	3	0·33		0·68	1·1
	11–17	4·13	3	0·58	2	0·78	1·1
	18–24	.	.	0·58	2	0·25	0·3
	25–31	..	..	0·03	..	0·77	1·0
Total ..		33·02	39	10·24	25	25·48	33·1

Rainfall statement.

Month.	Week.	1953–54. Rain in inches.	1953–54. Rainy days.	1952–53. Rain in inches.	1952–53. Rainy days.	Average of past ten years. Rain in inches.	Average of past ten years. Rainy days.
		(Hot weather rains.)					
February	1– 7	0·93	1	..	..	0·21	0·3
	8–14	..	..	..	..	0·01	0·2
	15–21	..	..	1·50	1	0·85	0·8
	22–28	..	..	0·61	2	0·66	1·3
March	1– 7	..	..	0·86	2	0·34	0·7
	8–14	3·91	2	..	..	0·10	0·2
	15–21	1·99	4	0·84	2	0·76	1·2
	22–28	2·54	3	..	..	0·52	0·7
March—April	29– 4	0·11	..	0·44	2	1·25	1·4
	5–11	..	..	0·03	..	0·64	1·2
	12–18	..	..	1·41	3	2·26	2·2
	19–25	0·98	3	0·75	2	0·25	1·1
April—May	26– 2	..	..	1·20	2	0·19	0·6
	3– 9	0·04	..	..	..	0·36	0·6
	10–16	0·11	1	0·21	1	0·38	0·6
	17–23	0·07	..	..	..	0 22	0·4
	24–30	..	..	0·37	1	0·66	0·9
May—June	31– 6	..	..	..	..	0·52	1·1
Total ..		10·73	13	8·22	19	10·19	15·9
Total for the year ..		48·11	64	19·02	46	38·52	58·0

3. *Temperature records.*—The record of temperature was maintained during the year. The maximum temperature ranged from 75·00°F and 105·00°F. and the minimum between 85·50°F. and 64·50°F, May showing the highest and February showing the lowest temperatures.

CROPS.

4. *Paddy.—Kar (first crop).*—The *Kar* nursery plots in Field numbers 15 east and 16 were given repeated dry ploughings with the advent of the summer showers in May 1953 and kept ready in a good condition with a basal dressing of cattle manure at 10,000 lb. per acre. The nurseries were given a top dressing with ammonium sulphate at the rate of 50 lb. per acre, about ten days before the seedlings were lifted. The sowings which commenced on 6th June 1953 continued till 20th July 1953. The *Kar* transplant fields, after letting in water, received two courses of ploughing with Cooper No. 11 plough followed by two ploughings with country plough. Green manure at 4,000 lb. per acre was incorporated into the puddle by working a *trampler*. In addition to the green leaf, all the fields received superphospate at the rate of 100 lb. per acre at planting and ammonium sulphate (sweepings) at the rate of 150 lb. per acre, in two equal doses as top dressing about 20 and 35 days after planting. The transplantation of *Kar* paddy which commenced on 4th July 1953 came to a close on 7th August 1953. Of the total *Kar* area of 12·54 acres planted, 3·13 acres were under different experiments, while the rest (9·41 acres) came under bulk for seed multiplication and distribution of improved strains to "Primary Seed Farms."

The average yields recorded by the *Kar* strains during the year are given below :—

Acre yield from bulk crops (Kar).

Strains.	Area planted in acres.	Acre yield in pounds. Average.	Acre yield in pounds. Maximum.
ASD. 1	5·38	3,805	4,139
ASD. 2	0·81	3,259	3,471
ASD. 3	0·40	3,065	3,065
ASD. 7	0·57	3,684	3,684
ASD. 8	0·36	3,453	3,453
ASD. 9	0·66	2,542	2,542
Co. 13	0·66	3,064	3,182

5. *Improvement of local varieties by pureline selection*—(i) *Maikuruvai.*—Based on the performance of the 31 selections which were under study during the year 20 were fixed for further work in 1954–55 in this short duration, red riced, coarse, first crop variety of Tirunelvely district.

(ii) *Seenganni.*—Out of the 97 selections of this red riced, coarse, first crop variety of Tirunelveli district which were under observation, 77 were discarded and the rest (20) were chosen for further work during next year.

(iii) *Banku.*—On the basis of the performance of 116 single plant cultures of this medium duration, drought resistant, fine riced variety of Ramanathapuram district put under observation blocks 50 were selected for further work during the ensuing year.

6. *Hybridisation for crop improvement*—(i) *Comparative yield trial of the hybrid extracts of ASD. 1. X other short duration varieties.*—After gradually eliminating the obviously inferior progenies of the multiple crosses in the previous years it was found that though none was better than ASD 1, in respect of yield two however were shorter in duration. These two cultures were subjected to comparative yield test during 1953–54 against ASD. 7. (*Kar samba red*) and the data gathered are furnished below :—

Field Number—8
Manured at—4,000 lb of leaf (plus) 100 lb of super phosphate (plus) 150 lb. Ammonium Sulphate per acre
Sown—12th June 1953.
Planted—17th July 1953.
Flowered—*
Harvested—13th October 1953.
Number of Variants.
Layout—Randomised blocks 3 × 9.
Size of plot—16′ × 5″
Planting—6″ × 6″, two seedlings per h

Summary of results.

Culture number.	Acre yield in pounds.	Yield expressed as Percentage on standard.	Yield expressed as Percentage on general mean.	* Date of flowering.
9,886	3,977	115·3	106·2	31 8 53
10,700	3,796	107·5	101·4	28 8 53
ASD. 7 (Std.).	3,462	100·0	92·4	28 8 53
Mean	3,746	108·1	100·0	..
"Z" test	..	..	Satisfied.	..
Standard error	68·3	1·97	1·8	..
C.D. (P=0·05.)	282·3	8·15	7·5	..

Conclusion:— 9,886,10700, ASD. 7.

The object of evolving a strain which would prove to be better than ASD.1. having failed and the prospect of replacing ASD. 7. within its duration being also not very bright either, the trial was concluded and reported accordingly in the annual and the final progress reports on the three-year programme of work of the station for the period 1950–53.

(ii) *Comparative yield trial of the hybrid progenies of ASD, 1. X ASD. 3.*—Fourteen selections from among these hybrid progenies were under comparative yield test with ASD. 1. and ASD.3. as standards in order to find out if any of them could replace ASD.1. in respect of yield combined with non-shedding habit for which the cross was primarily effected. In addition to yield, their shedding nature was also therefore determined. The data gathered in these respects are furnished below :—

Field Number—7
Manured at—4,000 lb of leaf plus 100 lb. of Super phosphate and 100 lb. of Ammonium Sulphate per acre.
Sown—12th June 1953.
Planted—15th and 16th July 1953.
Flowered—*
Harvested—16th October 1953.
Number of Variants—19
Layout—Randomised blocks—16 × 5.
Size of plots—16′ × 5′
Planting—6″ × 6″, two seedlings per hole.

Summary of results.

	Culture number.	Acre yield in pounds.	Yield expressed as: Percentage on ASD. 1.	Percentage on ASD. 3.	Percentage on General mean.	* Date of flowering.
A.	7639	3,115	78·52	90·59	89·5	1st Sep. 1953.
B.	7796	3,775	95·15	109·70	108·5	3rd Sep. 1953.
C.	7802	2,844	71·69	82·69	81·8	5th Sep. 1953.
D.	7815	2,796	70·49	81·29	80·4	30th Aug. 1953.
E.	7826	3,600	90·76	104·70	103·5	25th Aug. 1953.
F.	7863	3 193	80·50	92·85	91·8	5th Sep. 1953.
G.	7867	3,613	91·09	105·10	103·9	3rd Sep. 1953.
H.	7871	3,889	98·05	113·10	111·8	28th Aug. 1953.
I.	7906	3,805	95·94	110·70	109·3	1st Sep. 1953.
J.	7914	3,138	79·11	91·24	90·2	30th Aug. 1953.
K.	7929	4,081	102·09	118·70	117·3	1st Sep. 1953.
L.	10804	3,468	87·44	100·90	99·7	5th Sep. 1953.
M.	10965	3,228	81·39	93 89	92·8	1 t Sep. 1 53.
N.	10981	3,715	93·67	108 00	106·8	28th Aug. 1953.
O.	ASD. 1	3,967	100·00	115·30	114·0	30th Aug. 1953.
P.	ASD. 3	3,439	86·70	100·00	98·8	18th Sep. 1953.
	General mean	3,479	87·70	101·20	100·0	..
	'Z' test		Satisfied.			
	Standard error ..	145·00	3·66	4·21	4·2	..
	CD (P=0·05) ...	410·2	10·34	11·93	11·8	..

Conclusion :—K, O, H, I, B, N, G, E, L, P, M, F, J, A, C, D.

Summary of results of shedding test.

	Culture number.	Mean shedding percentage.			'Z' test.	Standard error.	Critical difference.
A.	ASD. 1	10·45	+	0·225			
B.	ASD. 3	8·79	—	0·195			
C.	7639	10·29	..	0·266			
D.	7796	11·33	..	0·257			
E.	7802	15·50	..	0·374			
F.	7815	7·82	..	0·233			
G.	7826	10·79	..	0·307			
H.	7863	8·93	..	0·223	Satisfied.	0·75	1·47
I.	7867	7·11	..	0·203			
J.	7871	10·34	..	0·248			
K	7906	7·28	..	0·210			
L.	7914	5·95	..	0·196			
M.	7929	7·25	..	0·229			
N.	10804	10·48	..	0·289			
O.	10965	11·82	..	0·265			
P.	10981	10.05	..	0·270			

Conclusion : —L, I, M, K, F, B, H, P, C, J, A, N, G, D, O, E.

Based on the yield and non-shedding habit eight cultures have been chosen fo further trial next year.

(iii) *Observation trial of the two hybrid cultures* (3798, *and* 3800) *received from Coimbatore.*—Being the extracts of multiple crosses effected for improving the defective filling noticed in ASD. 1, the two hybrids, 3798, and 3800 received from the Paddy Specialist, Coimbatore, were compared with ASD. 1, for the third time to find out if they show less of unsetting than the latter (ASD. 1.) and consequently more yield. The hybrids are from the following multiple crosses.

(1055 × 1205) × (1872 × 1055)	1055—Kar samba red.
(1055 × 2104) × (1946 × 1055)	1205 Do. early.
	1872 Kar samba white.
	1946 Do.
	2104 Kattisamba.

The results recorded are given below :—

Field number.—5.
Manured at—4,000 lb. of leaf plus 100 lb. of superphosphate plus 100 lb. of ammonium sulphate per acre.

Sown.—12th June 1953.
Planted.—18th July 1953.
Flowered on.—*
Number of variants—3.
Lay out.—Observation blocks.
Size of plot.—22 feet × 10 feet.
Planting.—6 inches × 6 inches, two seedlings per hole.

Summary of results.

Culture number.	Acre yield in pounds.	Yield expressed as Percentage on ASD. 1.	Yield expressed as Percentage on general mean.	Date of flowering.*
3798	3,895	98·37	98·6	3rd September 1953.
3800	3,998	166·20	101·2	1st September 1953.
ASD. 1	3,959	100·00	100·2	1st September 1953.
General mean	3,952	114·9	100·0	
'Z' test		Not satisfied.		
Standard error	92·9	2·34	2·4	
C.D. (P = 0·05)				

The treatment differences were not statistically significant. However, as the unsetting quality has been noticed to be slightly less than in ASD.1 and the trend of yield also slightly higher, it has been decided to send culture 3,800 for district trial again.

7. *Improvement of paddy varieties by introduction.*—(i) In order to find out if the stiff stemed, non-lodging exotic varieties of China (CH.2, CH. 42, CH. 62 and CH. 635 could be profitably introduced in the tract in the place of the popular local straing) viz., ASD.1, ASD.2 and ASD.3, a comparative yield trial was arranged includins, the varieties and strains referred to above. The yield data gathered are given below :—

Field number.—8.
Manured at—4,000 lb. of leaf plus 100 lb. of superphosphate and 150 lb. of ammonium sulphate per acre.

Sown.—12th June 1953.
Planted.—17th July 1953.
Flowered.—*
Harvested.—20th October 1953.
Number of variants,—7.
Lay out.—Randomised blocks 7 × 8.
Size of plot.—16^1 × 5^1.
Planting.—6″ × 6″, two seedlings per hole.

Summary of results.

Varieties and strains.	Acre yield in pounds.	Percentage on ASD. 1.	Percentage on ASD.2.	Percentage on ASD.3.	Percentage On general mean.	Date of flowering.*
C.H. 2	1,429	38·61	43·66	46·58	52·6	17th August 1953.
C.H. 42	2,145	57·95	65·54	69·92	78·9	19th August 1953.
C.H. 62	2,523	68·17	77·09	82·24	92·8	1st September 1953.
C.H. 63	2,867	77·49	87·62	93·48	106·2	5th September 1953
ASD. 1	3,701	100·00	113·1	120·6	136·1	31st August 1953.
ASD. 2	3,273	88·43	100·0	106·7	120·4	28th August 1953.
ASD. 3	3,068	82·88	93·74	100·0	112·8	20th September 1953.
General mean	2,718	73·45	83·07	88·61	100·0	
'Z' test			Satisfied.			
Standard error	121·0	3·27	3·69	3·94	4·5	
C.D. (P = 0·05)	345·7	9·34	10·56	11·27	12·7	

Conclusion :—ASD. 1. ASD.2. ASD. 3. C.H. 63 C.H. 62. C.H. 42. CH. 2.

Though the exotic varieties were comparatively shorter in duration with the additional desirable character of stiff straw, they were far below than t he local strains in respect of their performance on the balance. The non-lodging character being inheritable it has been decided to use the exotic varieties as one of the parents for inducing non-lodging habit in the most popular short duration strain, ASD.1.

8. *Manurial experiments*—(i) *Trial on Japanese* versus *Farm method.*—The experiment was laid out for the first time at the instance of the Paddy Specialist, Coimbatore, in order to compare the relative merits of the Japanese as well as the Farm methods of rice cultivation from all aspects as manuring, interculture and economy. The details of the experiment together with the data gathered are given below :—

Field numbers.—13 and 14.
Manuring.—As per treatments.
Sown.—6th and 8th June 1953.
Planted.—4th and 5th July 1953.
Flowered.—*
Harvested.—28th September 1953.
Lay out.—Split plot design 2 × 2 × 8.
Size of plots.—$40^1 \times 22^1$ for major treatments.
$40^1 \times 11^1$ for minor treatments.

Major treatments.

1. Japanese method and
2. Farm method.

Farm method.	Japanese method.
Nursery.	
1 Semi dry.	1 Dry.
2 Beds with bunds alround.	2 Beds with channels alround.
3 Manured with— 10,000 lb. of cattle manure and 50 lb. of ammonium sulphate per acre.	3 Manured with— 40,000 lb. of cattle manure, 2,000 lb. of sieved compost. 2,000 lb. of ash. 150 lb. of superphosphate and 150 lb. of ammonium sulphate per acre.
4 Seeds were not put in salt solution for the separation of heavier seeds from lighter seeds.	4 Seeds were put in salt solution to separate heavier seeds from lighter seeds and heavier seeds alone were sown.
5 Seed rates : 3 lb. per cent and treated with agrosan, G.N.	5 Seed rates : 1½ lb. per cent and treated with agrosan, G.N.
Transplanted field.	
6 Spacing.—4″ × 4″.	6 Spacing.—10″ × 6″.
7 Number of seedlings per hole.—Two.	7 Number of seedlings per hole—Three.
8 Manured with— 5,000 lb. of green leaf. 30 lb. of phosphric acid and 30 lb. of nitrogen per acre.	8 Manured with— 20,000 lb. (20 cart loads) of cattle-manure, 60 lb. of phosphoric acid and 60 lb. of nitrogen per acre.
9 Two weedings only.	9 Two weedings and one raking.

NOTE.—For the " Farm method ", green leaf and 30 lb. of phosphoric acid were applied as basal dressing and 30 lb. of nitrogen as top dressing, for the "Japanese method ", cattle manure, 30 lb. of phosphoric acid and 30 lb. of nitrogen were applied as basal dressing and 30 lb. of phosphoric acid and 30 lb. nitrogen were applied as top dressing in two equal doses. Phosphoric acid was in the form of superphosphate and nitrogen was in the form of ammonium sulphate.

Minor treatments : 1. ASD 1. 2. ASD· 2.

Summary of results.

Grain and straw yield.

	Acre yield in pounds.		*Percentage of acre yield in pounds.*	
	Grain.	*Straw.*	*Grain.*	*Straw.*
Japanese method	4,134	5,202	103·6	97·0
Farm method	3,845	5,475	96·4	102·1
General mean	3,990	5,362	100·0	100·0
"Z" test		Satisfied.		
Standard error	69·0	71·1	1·7	1·5
C.D. (P = 0·05)	276·4	284·4	6·9	5·3
Conclusion : Japanese, Farm.				
Varieties.				
ASD. 1	4,147	5,654	103·9	105 4
ASD. 2	3,832	5,067	96·1	94·5
General mean	3,990	5,362	100·0	100·0
"Z" test		Satisfied.		
Standard error	69·0	71·1	1·7	1·3
C.D. (P = 0·05)	276·4	284·4	6·9	5·3

Conclusion : ASD 1. ASD. 2.

Inter-action.

					Date of flowering.
Japanese method ASD. 1 ..	4,356	5,593	109·1	104·3	27—8—53.
Japanese method ASD. 2 ..	8,913	4,900	98·1	91·4	20—8—53.
Farm method ASD. 1 ..	3,939	5,716	98·7	106·6	25—8—53.
Farm method ASD. 2 ..	3,744	5,234	93·8	97·6	20—8—53
General mean	3,990	3,362	100·0	100·0	
"Z" test		Not satisfied.			
Standard error	97.6	100·5	2·4	1·8	

Economics.

	ASD. 1.		*ASD. 2.*	
	Japanese method.	*Farm method.*	*Japanese method.*	*Farm method.*
	LB.	LB.	LB.	LB.
Yield of grain per acre	4,356	3,939	3,913	3,714
Yield of straw per acre	5,593	5,716	4,900	5,234
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
Cost of cultivation per acre	366 11 0	206 8 8	366 11 0	206 8 8
Value of produce per acre	805 14 4	738 2 0	722 2 8	698 12 4
Profit per acre	439 3 4	531 9 4	355 7 8	402 3 8

Even though the possibilities of increasing the production have been definitely indicated in the Japanese method of cultivation, the cost at which such an increase is effected has been found to be prohibitive. The trial will be continued for two more years to arrive at a definite conclusion.

9. *Cultural experiments—Summer ploughing experiment.*—The experiment was started to test the soundness of the local practice of giving a number of dry ploughings to the paddy fields after the *Pishnam* paddy in the months of April-May as preparation for next *Kar* crop and the data obtained are furnised below:—

Field numbers—21 to 25.

Manured—As per treatments.

Sown—15th June 1953.

Planted—11th to 14th July 1953.

Flowered—*

Harvested—29th September to 2nd October 1953.

Lay out—Randomised blocks 5×4.

Size of plot—Ten cents (net).

Planting—6″ × 6″ bulk planting with two to three seedlings per hole.

Variety—ASD. 1.

Treatments—

1. No summer ploughing.

2. Summer ploughing (with 5,000 lb. of cattle manure plus 112 lb. of superphosphate and 100 lb. of ammonium sulphate per acre).

3. Summer ploughing with 4,000 lb. of green leaf from outside and 112 lb. superphosphate and 100 lb. of ammonium sulphate per acre.

4. No summer ploughing with 4,000 lb. of green leaf from outside and 112 lb. of superphosphate and 100 lb. of ammonium sulphate per acre.

5. No summer ploughing with 4,000 lb. of green leaf *in situ* and 112 lb. of superphosphate and 100 lb. of ammonium sulphate per acre.

Summary of results.

Treatments.	Grain. Acre yield in lb.	Grain. Percent on control.	Grain. Percent on General mean.	Straw. Acre yield in lb.	Straw. Percent on control.	Straw. Percent on general mean.	Date of flowering.*
1 Control ..	3,643	100·00	104·7	4,250	100·0	94·1	11—9—53
2 ..	3,293	90·38	94·7	4,015	94·43	88·9	8—9—53
3 ..	3,468	95·19	99·7	5,217	122·70	116·7	8—9—53
4 ..	3,410	93·61	98 1	4,488	105·60	99·4	8—9—53
5 ..	3,575	98·13	102·8	4,555	107·20	100·9	8—9—53
General mean ..	3,478	95·45	100·0	4,515	106·30	100·0	8—9—53
"Z" test ..		Not satisfied.			Not satisfied.		
Standard error	165·6	4·55	4·76	45·1	1·06	9·9	

Since the trial on summer ploughing did not fetch the requisite confirmation about its superiority over the ordinary puddling method as already revealed in other Research Centres, the experiment was ordered to be concluded by the Director of Agriculture.

10. *Pishnam*—(*Second crop*).—The *Pishanam* nurseries received a basal dressing of green leaves at the rate of 6,000 lb. per acre immediately after the removal of the *Kar* nurseries and the puddle was maintained till the time of sowing in September. The sowings commenced on 16th September 1953 were completed on 4th December 1953. After *Kar* harvests, the transplant fields were ploughed twice with Cooper No. 11 plough which were followed by two ploughings with country plough. Four thousand pounds of green leaf (*Sesbania* and *Glyricidia* or miscellaneous leaves) and 100 lb .of superphosphate were applied as basal dressing and 150 lb. of ammonium sulphate (sweepings) as top dressings in two equal doses 20 and 50 days after planting. Transplantation was started on 26th Octobar 1953 and finished on 29th December 1953. Of the total *Pishanam* area of 13.60 acres planted, 3·24 acres were under experiments and the rest (10·36 acres) under bulk for seed-multiplication and distribution of improved strains to " Primary Seed Farms."

The average yields recorded by the *Pishanam* strains during the year are given below :

Acre yield from bulk crops (Pishanam).

Strains.	Area planted in acres.	Acre yield in pounds. Average.	Acre yield in pounds. Maximum.
ASD. 5	3·75	1,764	2,034
ASD. 6	0·81	1,983	2,475
ASD. 10	0·43	1,970	1,970
Co. 12	0·77	3,029	3,384
Co· 25	1·02	3,318	3,480
GEB. 4	0·36	2,578	2,578

N.B.—It deserves special mention here that, but for the incidence of stem borer, jassids and false smut in a severe form in most of the fields irrespsctive of varieties, the total production of *Pishanam* would have been considerably higher.

11. *Improvement of local varieties by pureline selection.*—(i) *Pulithipirati.*—On the basis of the performance of 53 single plant cultures in this drought resistant, medium duration, coarse, red riced variety of Tirunelveli district put under observation, 40 were selected for further work during the next year.

(ii) *Varigarudan samba.*—Out of 220 selections which were under study in this medium duration, tank-fed variety of Ramanathapuram district, 120 were discarded and the rest (100) chosen for further work next year.

(iii) *Sembuli.*—Based on the performance of 200 selections which were under study in this medium duration, tank-fed variety of Tirunelveli district, 100 were fixed up for further work during 1954-55.

(iv) *Comparative yield test of the pureline cultures of Arikiravi.*—Seven selections of this popular red riced, medium duration tank-fed variety of Nanguneri taluk, were under yield trial with the unselected bulk and selection 4,960 (an earlier selection from the same variety made at Coimbatore) as the standards, The yield data are furnished below :—

Field number—5.

Manured at 4,000 lb. of leaf, 100 lb, superphosphates plus 150 lb. of ammonium sulphate per acre.

Sown—2nd October 1953.

Planted—10th November 1953.

Flowered—*

Harvested—2nd April 1953.

Number of variants—8.

Law out—Randomised blocks 8×6.

Size of plot—20'×4'.

Planting—6″×6″, Two seedlings per hole.

Summary of results.

Selection number.	*Acre yield in pounds.*	*Percentage on Standard.*	*Percentage of general mean.*	*Date of flowering.*
11077	2,952	100·0	96·2	26–1–54
4960	3,032	102·7	98·9	28–1–54
8679	3,192	108·1	104·1	3–2–54
8689	3,192	108·1	104·1	3–2–54
11209	2,872	97·29	93·6	1–2–54
8748	3,352	113·6	109·3	28–1–54
11112	3,032	102·7	98·9	23–1–54
Arikiravi Std.	2,952	100·0	96·3	26–1–54
General mean	3,067	133·9	100·0	
"Z" test		Satisfied.		
Std. error	70·1	2·37	2·3	
CD. (P=0·05)	273·0	9·25	3·9	

Conclusion : 8798, 8689, 8679, 24960, 11112, 11077, AKV,11209.

Three of the selections which have been found to be promising successively have been selected for further work) ,

12. *Hybridisation for Crop improvement*—(i) *Comparative yield test of the hybrid progenies of Co.* 14×*Co.* 8.—Six progenies in this group were under yield trial with A S.D. 6, as standard in order to find out if any of them could replace the latter. Culture 5,474 a very promissing Kavuinginpoothala × GEB. 24. natural cross progency of ASD.6. duration was also included in this group as one of the variants. The results recorded are given below :—

Field number—5.

Manured at 4,000 lb. of green leaf, 100 lb. of superphosphate and 150 lb. of ammonium sulphate per acre.

Sown—2nd October 1953.

Planted—10th November 1953.

Flowered—*

Harvested—3rd April 1953.

Number of variants—7.

Lay out—Randomised blocks 7×6.

Size of plot—20'×4'.

Planting—6″×6″, Two seedlings per hole.

Summary of results.

Culturenumber.	Acre yield in pounds.	Percentage on ASD. 6.	Percentage on General mean.	Date of flowering.
5474	3,431	145·70	129·5	3–2–54
8791	2,195	93·26	82·8	5–2–54
8844	2,195	93·26	82·8	13–2–54
8761	2,593	110·20	97·8	11–2–54
8769	2,952	125·40	111·4	7–2–54
8822	2,832	120·30	106·9	13–2–54
ASD. 6.	2,354	100·00	88·8	5–2–54
General mean	2,650	112·60	100·0	
"Z" test		Satisfied.		
Std. error	230·5	9·79	8·7	
C.D. (P. — 0·05)	893·1	37·94	33·7	

Conclusion : 5474, 8769, 8822, 8761, ASD. 6, 8791, 8844.

Of the six progenies, four would appear to be promising and these have been fixed up for fruther work.

(ii) *Natural cross progenies of Kavunginpoothala* × *GEB.* 24.—Of the two natural cross progenies of Kavunginpoothala × GEB. 24 spotted out at the station in the year 1938, culture 5108, the one with duration similar to that of ASD. 5. was sent for trial in the district with ASD. 5. and the other (5474) with duration similar to that of ASD. 6, was clubbed with the progenies of Co. 14 × Co. 8. as indicated in item (1) above. The trend of results in obeservation trials in the district also revealed the superiority of culture 5108 though the results were vitiated in five out of seven centres as given below. The trial will be repeated in the district again next year.

Name of centre.	Acre yield in pounds. 5108.	Acre yield in pounds. ASD. 5.	Percentage of increase over ASD 5.	Remarks.
(1)	(2)	(3)	(4)	(5)
Srivaikuntam	..	..	..	Affected by breach and floods.
Kadayanallur	2,600	2,500	4·0	Both crops affected by jassids and ear head bugs.
Munnirpallam	2,875	2,625	10·0	
Karundgadu	3,340	2,440	37·0	
Thachanallur	3,375	3,500	..	Severe attack by jassids and bugs.
Mannarkoil	3,913	1,656	1270	Large scale incidence of mealy bug and bore in ASD. 5.
Govindaperi	1,690	1,187	35·0	Do.

13. *Manurial experiments.*— (i) *Trial on Japanese versus Farm method.*—In order that the relative merits of the Japanese as well as the Farm methods of rice cultivation could be compared, the experiment was laid out at the instance of the Paddy Specialist, Coimbatore, for the first time in the *Pishanam* season. The results are given below :—

Field number—12,
Manures—As per treatments.
Sown—25th September 1953.
Planted—4th and 6th November 1953.
Flowered—*
Harvested—29th March 1954.
Lay out—Split plot design 2×2×8.
Size of plots—Main treatments 40′ ×22′
Sub-treatments 40′ × 11′
Main treatments—1. Japanese method
2. Farm method.

Farm method.	*Japanese method.*
1 Wet nursery.	1 Wet nursery.
2 Beds with bunds and channels alround.	2 Beds with channels alround.
3 Manured with : 5,000 lb. of green leaf and 50 lb. of ammonium sulphate per acre.	3 Manured with : 40,000 lb. of cattle manure, 2,000 lb. of sieved compost 2,000 lb. of ash, 150 lb. of superphosphate and 150 lb. of ammonium sulphate per acre.
4 Seeds were not put in salt solution for the separation of heavier seeds from lighter seeds.	4 Seeds were put in salt solution to separate, heavier seeds from lighter seeds and heavier seeds alone were sown.
5 Seed rate—3 lb. per cent.	5 Seed rate—1½ lb. per cent.
Transplant field.	
6 Spacing : 6″ × 6″	6 Spacing : 10″ × 10″.
7 Number of seedlings per hole—two to three.	7 Number of seedlings per hole—three.
8 Manured with : 5,000 lb. of green leaf. 30 lb. of phosphoric acid and 30 lb. of nitrogen per acre.	8 Manured with : 20,000 lb. (20 cart-loads, of cattle manure). 60 lb. of phosphoric acid and 60 lb. of nitrogen per acre.
9 Two weedings only.	9 Two weedings and one raking.

NOTE.—For the " Farm method ", green leaf and 30 lb. of phosphoric acid were applied as basal dressing, and 30 lb. of nitrogen as top dressing, for the " Japanese method ", cattle manure, 30 lb. of phosphoric acid and 30 lb. of nitrogen were applied as basal dressing and 30 lb. of phosphoric acid and 30 lb. of nitrogen as top dressing in two equal doses. Phosphoric acid was in the form of super phosphate and nitrogen was in the form of ammonium sulphate.

Minor treatments : 1. Co. 19. 2. Co. 25.

Summary of results.

Grain and straw yield.

	Acre yield in lb.		*Percentage of acre yield.*	
	Grain.	*Straw.*	*Grain.*	*Straw.*
Japanese method	2,943	5,769	106·2	103·9
Farm method	2,593	5,331	93·7	96·1
General mean	2,768	5,550	100·0	100·0
" Z " test	Satisfied.	Not satisfied.	Satisfied.	Not satisfied.
Std. error	77·5	19·4	2·8	0·4
C.D. (P = 0.05)	224·3	..	8·1	

Varieties.

	Acre yield in lb.		*Percentage of acre yield.*	
	Grain.	*Straw.*	*Grain.*	*Straw.*
Co. 19	2,780	6,064	100·4	109·3
Co. 25	2,757	5,036	99.6	90·8
General mean	2,769	5,550	100.0	100·0
" Z " test	Not satisfied.	Satisfied.	Not satisfied.	Satisfied.
Std. error	182·7	19·4	6·6	0·3
C.D. (P = 0·05)	728·1	77·7	26·3	1·4

Interaction.

					Date of flowering.
Japanese method Co. 19 ..	2,933	6,207	105·9	111·8	5–2–54
Japanese method Co. 25 ..	2,953	5,332	106·6	95·9	1–2–54
Farm method Co. 19 ..	2,626	5,921	94·9	106·7	5–2–54
Farm method Co. 25 ..	2,561	4,740	92·5	85·3	1–2–54
General mean	2,768	5,550	100·0	100·0	
" Z " test		Not satisfied.			
Std. error	107·9	194·3	3·9	3·5	
C.D. (P = 0·05)	431·8	777·6	15·6	14·0	

differences were significant for the main treatments only. The trend of the results and the economic aspect of the methods would however appear to corroborate the earlier findings in the *Kar*, viz., the increased yield obtained in the Japanese method of cultivation could not commensurate with the margin of profit as compared with that of the Farm method.

Economics.

	Co. 19		Co. 25.	
	Japanese method.	*Farm method.*	*Japanese method.*	*Farm method.*
	LB.	LB.	LB.	LB.
Yield of grain per acre	2,933	2,626	2,953	2,561
Yield of straw per acre	6,207	5,921	5,332	4,740
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
Total value of produce per acre	434 5 7	394 1 3	424 3 3	369 8 9
Cost of cultivation per acre	382 6 3	251 15 2	382 6 3	251 15 2
Balance profit per acre	51 15 4	142 2 1	41 13 0	117 9 7

N.B.—Both the varieties lodged badly due to heavy rains unusually received in March 1954 and the harvest itself had to be done in 9 inches of standing water in the field.

14. *Pests and diseases.*—Incidence of stem borer (*Schoenobius incertillus*) was particularly severe this year on paddy at the station as elsewhere in the State while that of jassids was fairly severe on the station, both of which were chiefly responsible for the low yield of the *Pishanam* crops. False smut (*Ustilaginoidea virens*) was also in evidence in most of the strains though it was found to be more pronounced in Co. 25. Damage by rats was comparatively lesser than in previous years and the rodent-pest was kept under check by using poison baits (viz., zinc phosphide), bow and pot traps.

15. *Miscellaneous crops.*—A consolidated statement of seeds and seedlings, etc., distributed during the year is given in item D below.

A. *Green manure crops.*—(i) *Sesbania speciosa.*—Planted along field margins of the entire paddy area of this Station, this remarkable green manure crop made a magnificent growth and gave an average yield of 3,800 lb. of green manure per acre, which practically solved the erstwhile knotty problem of providing green manure for the second crop paddy, besides yielding 480 lb. of seed for raising pure crop in the rice fallows. A total area of 4·0 acres of rice fallows was put under pure crop using a heavy seed rate of 50 lb. per acre. Despite ill-distributed summer showers an average acre yield of 12,616 lb. of green matter was obtained, sufficient to give adequate basal dressing at 4,000 lb. per acre for seven acres of the succeeding *Kar* paddy crop besides preparing nearly 10 tons of compost.

(ii) *Daincha.*—This crop raised in a small area of 0·51 acre of the rice fallows using a meagre quantity of 5 lb. of good seed gave a tonnage of 8,225 lb. per acre in spite of adverse seasonal conditions.

The goal of self sufficiency in green manure having been achieved, there has been a considerable saving in the manure bill since a total quantity of nearly 5,600 lb. of groundnut cake valued at Rs. 630 which would have been otherwise used has now been completely eschewed.

B. *Trial of ground nut in rice fallows.*—In order to find out if growing a commercially important third crop as groundnut in the wet lands is a tenable proposition, a small area of 25 cents in Field No. 9. was ploughed thrice with the advent of a few showers, brought to a fine tilth and groundnut (A.H. 3490) was sown behind country plough on 12th March 1954 and covered. Unfortunately due to very heavy rains (about 9 inches) received immediately after sowing in the successive days, the germination of the kernals was affected to a very great extent and in about 15 cents there was practically no germination with the result there were only some stray plants here and there—33 in all.

In 10 cents in the northern side however which is on a slightly higher level, the germination was fairly satisfactory though protracted. The rains received there after were both inadequate and ill distributed. There being no supplementary irrigation facility at the station, no watering could be given either. With one weeding done 35 days after sowing, the after cultivation was concluded. When the crop completed 108 days' duration, a few pods showed a distinct tendency to germinate due to the see page moisture from the adjoining fields which were under preparatory cultivation for the next *Kar* plantings. The 10 cent plot was marked out and the plants lifted. The crop in the 10 cents yielded 37 lb. of pods on harvest, thus registering 370 lb. per acre. A total quantity of 72 lb. of haulms (or 7,250 lb. per acre) was also obtained which was used as green manure for the succeeding crop of paddy. Provided there is scope for supplementary irrigation, the prospect of introducing groundnut in the rice fallows would appear to be a feasible proposition in the tract. The trail will be repeated during the next year.

C. *Vegetables.*—As in previous years, cow pea (Newera) was grown on some of the big field bunds and a total quantity of 18 lb. of seed was collected for distribution.

D. *Seed distribution.*—The following quantities of seeds and seed materials were distributed from the Rice Research Station, Ambasamudram, during the fasli year under report :—

Paddy seeds.	LB.	*Paddy seeds.*	LB.
ASD 1	14,053	Co. 13	2,132
ASD 2	1,659	Co. 23	651
ASD 3	1,919	Co. 25	890
ASD 4	567	PTB 15	630
ASD 5	18,278	GEB 24	800
ASD 6	2,220	Basumathi	320
ASD 7	1,396	Miscellaneous	420
ASD 8	1,036		
ASD 9	1,402	Total ..	49,990
ASD 10	134		
Co. 12	1,483		

Vegetables—

	Seeds.	*Seedlings.*	*Green.*
	LB.	NOS.	LB.
Cowpea	16 0	..	..
Sword bean	1 0	..	..
Bendai	1 9	..	..
Potato tubers	..	..	26
Tapioca	..	..	120
Ceylonese spinach	..	..	165
Curry leaf seedlings	..	27	..
Total ..	18 9	27	311

Green manures—

Sesbania speciosa	..	24,000	..
Crotalaria striata	74	..	..
Glyricidia cuttings	..	4;000	..
Ipomea cuttings	..	200	..
Total ..	74	28,200	..

	Seed. LB.	*Seedling.* NOS.	*Green.* LB.
Miscellaneous—			
Mango seedlings	..	16	..
Prosopis juliflora	7	..	..
Water grass slips	..	3,700	..
Guinea grass slips	..	10,000	..
Total ..	7	13,716	..

16. *Miscellaneous—Livestock.*—Of the three pairs of work animals, one pair was auctioned due to old age at the shandy at Mukkudal. All the pairsas well as the Scindhi bull at stud maintained good health in general. The total number of pairs at work during the year was 372½ and the number of services done by the breeding bull was 76.

RICE RESEARCH STATION, AMBASAMUDRAM,
28th December 1954.

S. T. SRINIVASAN,
Senior Science Assistant in-charge.

MADURAI,
10th February 1955.

T. S. FRANCIS,
Deputy Director of Agriculture.

APPENDIX I.

STATEMENT OF RECEIPTS AND CHARGES FOR THE YEAR 1953-54 (FASLI 1363).

Receipts.

	RS. A. P.
XXIX. Agriculture—Agricultural Receipts—	
Agricultural Stations	3,262 14 9
Miscellaneous..	370 6 6
Recovery of over payment	18 0 0
Total, Receipts ..	3,651 5 3
Value of seeds transferred to district staff	7,380 15 3
Value of seeds held on stock at the end of the year	5,190 0 0

Charges.

40. Agriculture—(c) Agriculture—Experimental Farms—A. Agricultural Research Station—	
Pay of Establishment—	
Permanent	3,781 4 0
Temporary..	1,811 12 0
Travelling allowance	136 12 0
House-rent allowance	217 1 0
Dearness allowance	1,844 5 0
Total, pay and allowance ..	7,791 2 0

	RS.	A.	P.
2. Contingencies—			
Office contingencies	463	8	3
3. Other charges—			
Petty construction and repairs	15	10	0
Capital outlay—Purchase of live and dead stock and cost of land	1,021	14	9
Working expenses..	* 20,132	5	8
Dearness allowance to menials	† 926	8	0
Total, Contingencies ..	22,559	14	8
Grand total of expenditure ..	30,351	0	8

* Increase is due to the cost of 18 tons of ammonium sulphate sweepings stored at the station this year and the prevailing high market rate of nearly Rs. 600 per acre paid for the lease paddy.

† Increase is due to the additional appointment of one watchman to the station.

APPENDIX 2.

PROFIT AND LOSS ACCOUNT OF THE BULK AREA.

Table I.

Serial number and Details of crops.	Area in acres.	Seed. Yield in pounds.	Seed. Value. RS.	A.	P.	Grain. Yield in pounds.	Grain. Value. RS.	A.	P.	Straw. Yield in pounds.	Straw. Value. RS.	A.	P.
1 Paddy	20·02	55,398	10,227	8	0	6,226	755	13	9	50,907	727	8	11

Total receipt for three years.

1953–54. RS.	A.	P.	1952–53. RS.	A.	P.	1951–52. RS.	A.	P.
11,710	9	8	10,885	13	1	5,880	14	9
370	0	0	280	13	0	240	0	0
12,080	9	8	11,166	10	1	6,120	14	9

Table 2.

	Seed. Quantity. LB.	Seed. Value. RS.	A.	P.	Grain. Quantity. LB.	Grain. Value. RS.	A.	P.	Straw. Quantity. LB.	Straw. Value. RS.	A.	P.	Total. RS.	A.	P.
Paddy—															
1953–54 ..	55,398	10,227	8	0	17,605	2,515	0	0	67,451	963	9	4	13,706	1	4
1952–53 ..	62,129	13,590	11	6	13,628	1,460	2	3	72,837	1,040	8	5	16,091	6	2
1951–52 ..	48,212	6,026	8	0	13,241	1,418	10	0	62,060	620	9	7	8,065	11	7
1950–51 ..	52,515	6,504	6	0	15,486	1,659	3	5	72,269	963	9	5	9,187	2	10

As during last year, the production figures together with the values thereof have been taken into account without going into the details as to the mode of disposal or the time of disposal of the produce as the purpose of the statement is better served here. Hence the form of the table has been slightly charged as was done last year with the best of intensions, which may kindly be approved of.

Table 3.

	1953–54.	1952–53.	1951–52.
	RS. A. P.	RS. A. P.	RS. A. P.
1 Pay and allowances of staff ½ of the second assistant and the maistry.	690 6 8	667 4 0	669 1 0
2 Miscellaneous cultivation expenses (⅓ of the actuals)	247 6 9	409 7 0	333 5 0
3 Working expenses (actuals)	* 7,493 14 6	2,939 4 7	2,767 8 11
4 Purchase of live and dead stock (1/10)	102 3 1	6 13 0	199 14 0
5 Proportionate rent of lands	† 6,468 14 0	3,583 7 0	3,100 14 3
6 Unforeseen contingencies	404 14 4	..	..
Total ..	15,407 11 4	7,606 3 7	7,070 11 2
If instead of the actual rent paid for the lands, 15 times the assessment is taken into account, the figures against 5 will be	2,428 2 0	2,097 14 5	1,881 12 9
Total in that case ..	11,366 15 4	6,120 11 0	5,851 9 8

N.B.—* The increase in expenditure is due to the payment of Rs. 4,072–8–0 for 18 tons of ammonium sulphate sweepings stored at the station this year.

† The payment of high rent for the wet lands at an average of Rs. 600 per acre based on the prevailing local market rate of paddy and the additional compensation of Rs. 404–14–4 paid to two lessers as decreed by the court for the year 1952–53.

Table 4.

Statement of abstract expenditure and receipts.

	1953–54.	1952–53.	1951–52.
	RS. A. P.	RS. A. P.	RS. A. P.
Expenditure if the actual amount paid as lease is taken into account	*15,407 11 4	7,606 3 7	7,070 11 2
Expenditure if 15 times the assessment of the land is taken into account in lieu of the amount actually paid as lease.	*11,366 15 4	6,120 11 0	5,851 9 8
Revenue	11,032 6 6	11,166 10 1	6,120 14 9
Value of produce held on stock	5,190 0 0	1,611 3 10	2,271 2 8

N.B.—* The increase in expenditure is due to the payment of Rs. 4,072–8–0 for 18 tons of ammonium sulphate sweepings stored at the station, payment of high rent for the wet lands at an average of Rs. 600 per acre based on the prevailing local market rate of paddy and the payment of additional compensation of Rs. 404–14–4 paid to two lessers as decreed by the court for the year 1952–53.

APPENDIX 3.

STATEMENT OF COST OF CULTIVATION OF PADDY (NON-EXPERIMENTAL AREA), 1953–54. —

Expenditure.

	Kar of first crop. (4·81 *acres.*)	*Pishanam or second crop.* (4·14 *acres.*)
	RS. A. P.	RS. A. P.
1 Preparatory cultivation	57 0 0	72 0 0
2 Manures and manuring	233 4 0	140 1 6
3 Seeds and sowings	164 6 9	71 15 1
4 Planting	50 8 0	43 6 0
5 After cultivation	72 13 6	85 5 10
6 Irrigiation	23 2 0	18 9 0
7 Harvesting, threshing, cleaning, etc.	199 12 0	92 11 6
Total expenditure	800 14 3	524 0 11
Total expenditure per acre ..	166 8 1	126 9 4

Receipts (value).

Produce.	*Kar or first crop.*	RS. A. P.	*Pishanam or second crop.*	RS. A. P.
Grain	16,323 lb. at 6½ lb. per rupee	2,511 3 8	10,195 lb. at 6½ lb. per rupee	1,568 7 5
Straw	12,328 lb. at Re. 1 per 70 lb.	176 1 10	12,161 lb. at Re. 1 per 70 lb.	173 11 8
	Total receipts ..	2,687 5 6		1,742 3 1
	Receipts per acre ..	559 12 4		420 14 1

Profit and loss account.

	Kar or first crop. RS. A. P.	*Pishanam or second crop.* RS. A. P.
Total value of produce	2,687 5 6	1,742 3 1
Less expenses	800 14 3	524 0 11
Balance profit ..	1,886 7 3	1,218 2 2
Profit per acre	393 4 3	294 4 9

APPENDIX 4.

STEPS TAKEN TO INCREASE THE INCOME OF THE STATION.

The possibilities of bringing more area under plough and extending the single crop wet lands into double-crop lands having been practically ruled out due to the absence of any cultivable waste and single-crop lands respectively at the station, concerted efforts to step up the income from the existing lands under cultivation by greater outturn and reduction of working expenses within manageble limits without impairing the efficiency would appear to be the only solution to achieve the declared objective. Again, the station being a temporary one, run on leased lands, the question of permanent improvements as sinking of wells, etc., to provide irrigation facilities for summer cropping in the rice fallows could not be taken up immediately now.

Increasing the production from the existing area.—The table given below presents the production figures in respect of the various more important items during the year under report as well as in the two preceding years. Due to the prevalence of heavy incidence of stem borer and jassids on paddy as elsewhere in the tract, the total production of paddy on the station was affected by nearly 15 per cent in the previous year's record. The fall in the production of cattle manure during the year is due to shortage of one pair of work animals, for nearly 4 months. The figures in respect of almost all the other major items show a slight upward trend, indicative of an improvement over the previous relative production.

Items.	1951–52.	1952–53.	1953–54.	*Remarks.*
Paddy (in pounds)	69,731	85,234	73,003	
Straw (in pounds)	62,060	72,837	67,451	
Vegetable seeds lb.	41	17¾	19	
Green manure seeds lb.	538	922	529	
Green leaf lb.	78,179	97,445	122,450	
Compost manure lb.	18,250	38,140	54,590	
Cattle manure lb.	35,350	45,788	36,939	Shortage of one pair for 4 months.
Prosopis juliflora pods lb.	116	135	115	
Green grass lb.	1,308	1,330	4,290	
Guinea grass slips Nos.	17,400	31,900	10,300	Production limited to demand.
Water grass slips Nos.	4,100	2,000	3,700	
Glyricidia cuttings Nos.	100	..	4,000	
Ipomea Cornea cuttings Nos. ..	..	175	200	
Ceylonese Spinach (in lb.)	..	1	165	

Reduction in the expenditure.—The items of expenditure during the period under review and the two corresponding previous periods are given below. The expenditure under all items except the heads "Mazdoor labour" and "Manures and chemicals" shows a definite downward trend.

The increase in expenditure in the former is due to the additional appointment of a watchman for the station and clearing a small vacant site for trial on vegetable cultivation. The increase under manures and chemicals is due to the cost adjusted towards the storing of nearly 18 tons of ammonium sulphate sweepings at the station as per instructions of the Director of Agriculture, Madras. Since the station's requirement does not exceed 2 tons a year, the rest of the quantity is being arranged for transfer to the Agricultural Demonstrator, Ambasamudram. Again, the lease amount paid this year was on the basis of the prevailing high market rate as against the comparatively lower rates paid in the previous years. The above three items were inevitable pay ments over which no curtailment was possible.

Expenditure.

	1951–52.	1952–53.	1953–54.
	RS. A. P.	RS. A. P.	RS. A. P.
Repairs and upkeep	1,081 2 6	903 1 0	723 11 0
Maintenance of cattle	1,011 4 6	840 14 0	923 7 6
Mazdoor labour (dearness allowance to menials)	2,804 7 6	2,664 2 9	* 3,565 10 0
Miscellaneous cultivation expenses ..	1,429 5 0	1,564 2 9	1,217 12 3
Manures and chemicals	1,334 14 4	1,278 14 0	†i 4,950 6 6
Seeds and plants	195 11 0	355 0 3	264 8 6
Sundries	134 10 0	9 2 0	3 12 6
	7,991 6 10	7,416 0 9	11,649 4 6
Lease amount paid	5,569 9 0	5,773 5 2	‡ 9,409 9 2
Grand total ..	13,560 15 10	13,189 5 11	21,058 13 8

N.B.—* The increase isdue to the additional appointment of a mazdoor for the station during the year.

†The payment of Rs. 4,072–8–0 towards the cost of 18 tons of ammonium sulphate sweepings.

‡The payment of high rent for the wet lands at an average rate of Rs. 600 per acre based on the prevailing local market rate of paddy and the payment of Rs. 404–14–4 being the additional compensation amount to the two lessers of the station as decreed by the Court for the year 1952–53.

The possibility of raising a commercial crop like groundnut in the rice fallows during the summer months of March to May as a rainfed crop under the existing conditions having been indicated as a fairly successful proposition, the area under groundnut could be increased to the maximum extent possible from next year.

In intensifying the production of organic matter to make the station self sufficient in this respect, efforts were made to augment the supply of leaf-compost as well as green manure by growing "*Sesbania speciosa* along the field margins of all the *Kar* crops and *Glyricidia maculata* on all the channel bunds, road margins and vacant sites. By the above methods, nearly Rs. 630 worth of groundnut cake which would have been purchased otherwise, were saved in the manure bill.

Raising of live fence.—The prosopis fence raised during the last two years on the eastern and the southern boundaries of the station are being pruned to a height of 4 feet to serve as an effective fence. Wide gaps are resown with fresh seeds.

Receipts.

	1951–52.	1952–53.	1953–54.
	RS. A. P.	RS. A. P.	RS. A. P.
Agricultural stations	1,150 14 2	3,268 10 6	3,262 14 9
Miscellaneous	321 3 0	305 7 0	370 0 6
Recovery ot over payment	..	1 0 0	18 0 0
Free transfer and book adjustment ..	5,346 8 10	12,350 8 7	7,380 15 3
Stationery and printing	..	..	0 8 0
Value of produce held on stock	2,271 2 8	1,611 3 10	5,190 0 0
Total ..	9,089 12 8	17,536 13 11	16,222 6 6

ANNUAL REPORT OF THE BURLIAR FRUIT STATION FOR THE YEAR 1953-54 (FASLI 1363).

Season and rainfall.—The Summary of the weekly rainfall distribution for the year is furnished in Table I.

TABLE I.—*Weekly rainfall statement for the year* 1953-54 *of the Burliar Fruit Station.*

Month.	Week.	1953-54. Quantity in inches.	1953-54. Number of rainy days.	1952-53. Quantity in inches.	1952-53. Number of rainy days.	Average rainfall for the past ten years. Quantity in inches.	Average rainfall for the past ten years. Number of rainy days.	Average rainfall for the past forty-one years. Quantity in inches.	Average rainfall for the past forty-one years. Number of rainy days.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
South-west monsoon.									
June	7—13	0·38	1	..	..	0·48	1·1	0·34	1·58
	14—20	0·20	1	0·47	2	0·47	2·2	0·51	2·23
	21—27	0·52	2	..	..	0·24	1·2	0·41	1·11
June-July	28— 4	1·00	3	..	..	0·23	1·4	0·45	1·78
	5—11	1·63	3	0·17	1	0·53	2·5	0·44	2·05
	12—18	0·38	1	1·04	2	0·50	2·2	0·68	2·31
	19—25	0·41	2	..	..	0·73	1·7	0·72	2·35
July-August	26— 1	0·93	4	..	..	0·63	2·1	0·58	2·14
	2— 8	0·18	1	0·22	1	0·54	2·6	0·69	2·51
	9—15	0·17	1	0·18	1	0·65	2·0	0·71	2·31
	16—22	0·10	1	0·25	1	0·73	1·6	1·12	2·27
	23—29	0·86	2	0·29	1	1·09	2·7	0·79	2·43
August-September ..	30— 5	..	..	0·49	2	0·56	2·0	0·61	2·26
	6—12	1·72	2	..	..	0·47	1·8	0·48	1·63
	13—19	0·41	1	..	..	0·85	1·9	1·21	2·42
	20—26	0·11	1	1·13	3	0·83	3·0	0·95	2·80
Total		9·00	26	4·24	14	9·53	32·0	10·69	34·18
North-east monsoon.									
September-October.	27— 3	0·05	..	1·46	4	1·23	3·0	1·13	2·78
	4—10	1·37	4	3·03	4	1·73	2·8	1·50	3·27
	11—17	5·91	5	0·46	2	2·72	3·6	2·79	3·32
	18—24	5·32	4	..	..	2·19	3·2	3·84	3·83
	25—31	0·93	3	0·40	2	2·18	2·5	4·59	3·80
November	1— 7	..	..	1·89	1	2·32	3·3	2·97	3·85
	8—14	0·36	2	..	..	4·71	4·4	3·50	3·41
	15—21	1·35	4	..	..	2·84	3·7	2·25	2·56
	22—28	0·63	2	1·16	2	2·79	2·7	1·91	2·58
November-December.	29— 5	..	..	3·43	3	3·09	3·0	1·63	2·64
	6—12	..	..	4·35	4	0·91	1·3	1·32	1·55
	13—19	0·47	2	4·32	2	0·89	1·7	1·42	1·78
	20—26	0·17	1	..	..	0·56	1·1	1·48	1·05
December-January	27— 3	2·23	2	..	..	0·60	1·0	1·71	1·43
	4—10	4·05	4	1·22	2	0·43	1·0	1·09	1·00
	11—17	4·02	3	0·26	1	0·42	0·5	0·67	0·92
	18—24	..	..	7·06	3	1·16	0·9	0·94	1·17
	25—31	..	..	1·96	1	0·65	0·9	0·89	1·10
Total		26·86	36	31·00	31	31·42	40·6	35·63	42·04
Hot Weather.									
February	1— 7	0·66	1	..	..	0·38	0·6	1·82	1·27
	8—14	..	..	..	..	0·37	0·6	0·87	0·91
	15—21	..	..	..	..	1·08	1·4	0·74	0·20
	22—28 or 29.	2·50	1	3·43	2	2·15	1·4	1·06	0·32
March	1— 7	..	..	2·06	1	0·66	0·5	0·61	0·40
	8—14	0·40	1	..	..	0·27	0·3	0·34	0·86
	15—21	2·16	5	..	..	0·94	0·7	0·75	0·92
	22—28	1·56	3	..	..	0·63	1·3	0·53	0·91
March-April ..	29— 4	0·92	1	1·28	1	0·78	1·5	0·35	1·20
	5—11	..	..	0·74	2	0·74	2·0	0·27	1·52
	12—18	0·82	2	0·13	1	2·63	2·7	0·79	1·62
	19—25	3·17	2	1·18	4	0·68	1·9	0·62	1·60
April-May	26— 2	0·48	3	0·60	1	0·34	0·9	0·26	1·59
	3— 9	0·85	2	0·57	1	0·45	1·5	0·97	2·14
	10—16	2·77	3	..	..	0·52	1·5	1·01	1·85
	17—23	1·89	3	0·77	2	0·88	2·1	0·65	2·2
	24—30	0·8	1	0·20	1	0·37	1·1	0·76	1·56
May-June	31— 6	0·27	1	2·10	3	0·54	2·1	0·55	1·76
Total		18·83	29	13·06	19	14·41	24·1	12·95	22·37
Grand total		54·69	91	48·30	64	55·36	96·7	59·25	98·68

The total precipitation during the year amounted to 54·69 inches in 91 rainy days as against 48·30 inches in 64 rainy days of the previous year. There was a marked increase in the number of rainy days by 27 and in the total rainfall by 6·39 inches over the previous year's record. They were, however, less than the averages for the past 41-year period and for the past 10-year period. The main contribution for the increase in the total rainfall was in the hot weather months. The north-east monsoon showers, however, were comparatively poorer than those of the previous year by nearly five inches.

The better distribution of rain during the hot weather period has benefited only a few crops such as clove, nutmeg, cacao and arecanut. But on the whole the more important fruit crops, as judged from their yields have not derived any benefit from the years' rainfall.

I. ORCHARD.

A. New plantings and sowings.—The area under the short-term remunerative crops was further extended during the year by planting 100 seedlings, budlings and inarches of cacao, 602 banana suckers of two varieties, 34 rooted cuttings of vanilla, 260 suckers of Malabar cardamom and 800 *Derris elliptica* layers. About a thousand plants of roses, crotons and cannas were planted out along the paths and beds to establish a large source for future multiplication and distribution of each of these.

In the nursery over 3,100 seeds of cacao (Var: Criollo), 950 seeds of nutmeg, 5,000 seeds of purple passion fruit, 500 of giant granadilla, 300 of jack, 495 of *Myristica Malabarica*, 30 of *M. beddomei*, 500 *Cullenia excelsa* and 6½ lb. of pummelo, carambola, clove and cinnamon seeds were sown. From these sowings 2,450 cacao seedlings, 700 of nutmeg, 3,000 of purple passion fruit, 350 of giant, granadilla, 650 of pummelo, 500 of carambola, 250 of clove and 180 of cinnamon were ultimately realised.

The new plantings made during the year comprised five seedlings of African oil palm received from Malaya, two grafts of olive from Italy, three plants of tree-onion obtained from United States of America, and 50 seedlings of cardamom from the Horticulturist, Bombay, reported to be mosaic resistant. These apart, 1,850 Cardamom suckers representing seven selections and nine varieties and 82 hybrid seedlings of six parental combinations were obtained from the Cardamom Specialist, Singamputti on the eve of the closure of the Cardamom Scheme for maintenance at the station.

Seven new green manure crops, viz., *Stizolobium sp.*, *Crotalaria brownei*, *Crotalaria anagyroides*, *Crotalaria usaramoensis*, *Phaseolus semierectus* and *Cassia leschenaultiana* were brought newly under trial.

B. Harvest of orchard produce.—The harvests made during the year of the important crops are presented in Table II.

TABLE II.—*Summary of harvests* in 1952–53 and 1953–54.

Serial number and name of produce.	1952–53.		1953–54.	
	Number of trees yielded.	Yield.	Number of trees yielded.	Yield.
(1)	(2)	(3)	(4)	(5)
1 Mangosteen	17	2,988 Nos.	36	2,776 Nos.
2 Pummelo	8	248·0 lb.	8	279 „
3 Litchi	3	87·8 lb.	2	17½ lb.
4 Durian	1	259·8 lb.	6	444·0 lb.
5 Avocado	1	13·0 lb.	..	..
6 Carambola (sweet)	1	416·4 lb.	2	309·0 lb.
7 Langsat	1	83·0 lb.	2	36½ lb.
8 Breadfruit	3	98·0 lb.	1	2·0 lb.
9 Grapefruit	7	247·8 lb.	2	62·0 lb.
10 Jack	20	5,180·0 lb.	15	5493·0 lb.
11 Clove { Green ..	3	2·12 lb.	4	20·1 lb.
11 Clove { Dry ..	..	3·10 lb.	..	58 lb.

Serial number and name of produce.	1952-53. Number of trees yielded.	1952-53. Yield.	1953-54. Number of trees yielded.	1953-54. Yield.
(1)	(2)	(3)	(4)	(5)
12 Bull's heart	5	266·0 lb.	4	203·0 lb.
13 *Garcinia tinctoria*	1	449·0 lb.	1	8·12 lb.
14 Cardamom	..	..	20	0 8 lb.
15 Coconut	4	32 Nos.	4	47 Nos.
16 Cacao (pods)	4	103 Nos.	4	119 Nos.
17 Tree Tomato	2	6·0 lb.	..	..
18 Nutmeg fruits.	11	508 Nos.	3	503 Nos.
19 Nutmeg mace		1.7 lb.	..	1·1 lb.
20 Nutmeg dry	..	6.0 lb.	..	1·3 lb.
21 Arecanut	220	61,075 Nos.	220	68,875 Nos.

The year appears to have been very unfavourable for most of the crops including the mangosteen which has particularly suffered badly both in the monsoon and summer cropping seasons. The better yields in the case of clove, nutmeg and arecanut, the three crops which flower during the summer months. are attributed to the receipt of better summer showers.

II. Fruit Crops and Nursery.

1. *Mangosteen—Side grafting* —The solitary side-graft of mangosteen planted in July 1949 recorded a height of 2′ 4″ and had developed nine pairs of leaves on two laterals at the time of this report. Out of 150 seedlings planted in 1949 for side-grafting purpose *in situ*, only 47 seedlings ultimately established. These had not attained graftable size.

2. *Jack—(a) Propagation by cincturing of shoots.*—Cincturing of shoots with the aid of the plastic film "alkathene" and the banana sheath was continued over a period of twelve months commencing from October 1952, at the rate of 20 shoots every month. In none of the batches. however, was there any sign of rooting in either treatment. Hence, this method of propagation was given up as unsuitable for jack.

(*b*) *Hybridization studies,*—Out of 72 hybrid seedlings obtained from three crosses of Velipala jack ♀ x Singapore jack ♂ in 1953, nine were found to have ultimately established. The seedlings were showing very poor growth progress. Three more crosses were effected during 1954 season between Velipala ♀ and Singapore ♂ jack and one of these yielded 145 seeds, while the other two were yet to be harvested.

(*c*) *Progeny trial* —During the year under report, one more selection from Cuddalore was made and the only available graft of this selection was set out in November 1953. Clonal progenies of three selections made in the Nilgiris representing different altitudes were raised. Table III summarises the growth performance of each of the eighteen progenies set out for field study.

Table III.—*Jack Progeny trial.*

Growth measurements of progenies planted in August 1950 and November 1951.

Serial number and name of selection.	Mean of the cumulative measurements recorded in three year period from 1951 to 1954. Stock girth in inches	Scion girth in inches.	Height in inches.	Spread in inches.
(1)	(2)	(3)	(4)	(5)
1 Thyagarayanagar graft	2·7	2·4	73·2	23·9
2 Velipela seedling	1·3	..	24·2	15·4
3 Taliparamba seedling	2·0	..	40·5	25·0
4 Burliar No. I Estate graft	2·8	2·5	40·7	24·7
5 Coimbatore College Orchard graft ..	1·6	1·1	19·9	10·9
6 Virudachalam seedling	2·9	..	43·1	34·6
7 Olavakkot seedling	2·1	..	56·9	40.

Serial number and name of selection.	Mean of the cumulative measurements recorded in three year period from 1951 to 1954.			
	Stock girth in inches.	Scion girth in inches.	Height in inches.	Spread in inches.
(1)	(2)	(3)	(4)	(5)
8 Puthur seedling	2·2	..	22 9	19·7
9 Guddalore seedling	1·4	..	25·5	8·8
10 Burliar Fruit Station ordinary seedling	2·0	..	27·5	12·9
11 Burliar Station ordinary grafts ..	3·6	3·1	57·3	29·0
12 Burliar Estate selection No. II seedling	0·7	..	17·2	6·8
13 Burliar Estate selection No. III seedling.	1·3	..	25·6	7·8
14 Lower Tiger Rock Estate seedling ..	1·3	..	25·6	7·8
15 Singapore jack seedling	1·3	..	21·8	9·5
16 Benhope Estate selection seedling	8·8	..	12·4	4·4
17 Abdullah garden selection seedling ..	1·3	..	24·5	10·0
18 Cuddalore jack graft	1·2	1·0	16·0	14·0

According to the growth data for the period 1951–54, the Thyagarayanagar graft made the maximum growth in height, followed by the Burliar Estate No. II selection. In stock and scion girth measurements, the Burliar Estate selection No. II maintained the lead followed by the selection No. I of the same estate. In tree spread, the Olavakkot seedling was the most vigorous of all.

3. *Durian.—Propagation trial.*—As under jack, cincturing operations of shoots with the aid of 'alkathene' wrapper and banana sheath was maintained over a period of one year but without any success in rooting by either treatment. This method of propagation was therefore abandoned.

4. *Clove—Propagation trial—(a) Inarching.*—Seedlings of *Eugenia smithii E. calophyllifolia* and *E. arnottiana,* which were introduced for testing as rootstocks, were growing very slowly in the nursery and were yet to attain the graftable size.

(*b*) *Cincturing.*—As in the ease of jack and Durian, the propagation with the aid of 'alkathene' wrapper and banana sheath, as enclosures for the cinctured shoots ended in failure.

5. *Nutmeg—Propagation trial—(a) Inarching.*—Monthly inarching operations were carried out at the rate of five every month on three different stocks, viz., *Myristica fragrans, M. Malabarica* and *M. beddomei.* The trial was initiated in the month of April, 1953 and was concluded in March 1954. The summary of the monthly 'take' on each of the three stocks is presented in Table IV below :—

TABLE IV.

Month of operation.	Percentage of 'take' on		
	Myristica Malabarica.	*Myristica beddomei.*	*Myristica fragrans.*
April	1	1	..
May	5	4	4
June	3	4	3
July	3	3	3
August	2	2	2
September	2	1	2
October	1	2	2
November	1	3	2
December	were yet to be separated.		
January			
February			
March			

From the data, it is observed that the optimum months for the propagation of nutmeg were May and June which recorded a 'take' of 80 to 100 per cent. Having determined the optimum period for the propagation for each of the stocks a trial was laid out to assess the most compatible stocks. Four grafts raised on

each of the three rootstocks were set out in January 1954 at Kallar, with a view to determine the potentialities of each.

(*b*) *Cincturing.*—With nutmeg again, vegetative propagation by the process of cincturing with the aid of 'alkathene' wrapper and banana sheath proved futile.

6. *Cacao—Propagation trial.*—A monthly trial of propagation of cacao employing five different methods of propagation, viz., inarching, patch budding, whip and tongue grafting, side-grafting and shield budding (with and without wood) was initiated in December 1952 and concluded in November 1953.

Out of the five methods employed, side-grafting and whip and tongue grafting proved useless. Inarching recorded a maximum 'take' of 100 per cent in all the months excepting in January and April to June. But in the latter months a percentage 'take' ranging from 50 to 75 was obtained. The patch budding operations also led to 100 per cent 'take' in the months of December to March and September, while the June, July, August, October and November operations recorded 25 to 50 per cent 'take'. Shield buds of only one month, viz., December registered a 50 per cent 'take', while the operations in all other months ended in failure.

7. *Litchi—Propagation by cincturing.*—In the twelve batches of cinctures raised from October 1952 to September 1953 by the use of 'alkathene' wrapper and banana sheath, the shoots treated by the banana sheath process alone registered a 40 per cent rooting in the October made cinctures. The rest of the cinctures neither rooted nor showed any signs of root primordia development. It was therefore apparent that the synthetic wrapper material 'alkathene' conferred no special advantages in rooting over the normal method of propagation.

8. (*a*) *Pummelo (pink fleshed)—Selfing trial.*—Out of 2,000 seeds realized from 31 selfed fruits of three selected trees at the station 257 seedling progenies were obtained and set out in the field in June 1954 at the Kallar Fruit Station for field study.

(*b*) *Progeny test.*—The inarches and seedlings of the five pummelo selections were awaiting planting as a trial of progenies.

III. Miscellaneous.

1. *New introductions*—(*a*) *Yellow passion fruit (Passiflora ligularis).*—The vines planted on 23rd December 1951 again flowered for the second season, early in 1954. But the yield of fruit continued to be poor when compared with its cropping at Kallar.

(*b*) *Talinum triangulare.*—Twenty-five rooted cuttings of this leafy vegetable were obtained from the College Orchard, Coimbatore and planted on 11th June 1953. The growth performance was not quite satisfactory when compared to its growth in the lower elevations such as in the College Orchard, indicating that Talinum was less suited for cultivation on higher elevations.

(*c*) *Giant granadilla (Passioflora quadrangularis).*—The vines of *Passiflora quadrangularis* flowered nearly nine months after planting. Fruit set, however, was achieved only under controlled pollination. It was found that the stigma was receptive from 7 a.m. in the morning to 12 noon. Hand pollination of flowers during this period with its own pollen led to over 95 per cent fruit set.

It was also interesting to observe that the vines exhibited flowering over a period of eight months distributed in four distinct phases, at intervals of about 75 days in the months of February-March, June-July, October and December.

(*d*) *Ceylon avocadoes.*—Clones and seedlings of three varieties of Ceylon avocadoes, viz., Pollock, Fuerte, and Peradeniya Purple Hybrid were obtained from Kallar and planted in September 1953. They had established and were growing satisfactorily.

(*e*) *Persimmon.*—Four grafts of persimmon variety Dai Dai Maru raised on *Diospyros lotus* stock from Coonoor were planted in November 1952. The plants were making vigorous growth and recorded mean height of 2½ feet at the time of this report. They had not yet flowered.

(*f*) *Oysternut* (*Telfairia pedata*).—Out of four vines of this oil yielding plant planted in April 1953, only two established ultimately. They were growing very vigorously and had attained a mean height of 45 feet, but had not yet flowered.

(*g*) *Musa Banksii.*—The two suckers planted in March 1952 flowered nearly 14 months after planting. The species was being utilized for inter-specific crossing in banana breeding work. The species exhibited a very poor suckering habit.

(*h*) *Olive grafts* (*Olea Europea*).—Two olive grafts were received from Genoa and planted on 28th September 1953 at Burliar Fruit Station for trial. The grafts were observed to make better vegetative growth than at Coonoor and Kallar.

(*i*) *Tree-onion* (*Allium cepa* Var. *Aggregatum*).—Three sets of tree-onion bulbs were received from United States of America and planted for trial on 31st January 1954. The plants were growing rather slowly.

(*j*) *African oil palm.*—Five seedlings of this palm received from South Africa were planted out for a trial in July 1953. All the seedlings established well and were growing satisfactorily.

2. *Other crops—Green manure and cover crops*—(*a*) *Peuraria phaseoloides.*—The area under this promising cover crop was extended over all the terraces and the alley spaces of the station, covering roughly four acres in all. Efforts were under way to further extend the area under this crop, with a view to augment the production of green leaf and to provide an effective soil cover.

(*b*) *Calapogonium muconoides.*—This green manure was newly introduced for trial. The initial growth of the plants however, was indicative that it was not as vigorous as *Peuraria phaseoloides.*

(*c*) *Indigofera teysmanii.*—This quick growing green manure crop was brought under trial in 1952. The seedlings grew very vigorously and attained a mean height of 25 feet within a year. They attained bearing in the first year itself yielding a small crop of seeds. Considering the quick pace of vegetative growth and the large quantity of seeds, the performance of *Indigofera teysmanii* compared favourably with *Gliricidia maculata.*

(*d*) The following green manure seeds were newly received from the Director of Agriculture, Madras, for trial at the station towards the close of the period under review :—

(1) *Crotalaria usaramoensis* ; (2) *C. anagyroides*, (3) *C. brownei*, (4) *Tephrosia Candida* and (5) *Stizolobium sp.*

The germination of the seeds was in progress.

3. *Ornamental plants.*—Extensive multiplication of the ornamental plants was maintained. Three canna varieties, two varieties of roses and six different varieties of crotons were added to the existing collections besides four different annuals. The area under ornamental crops was extended further by planting 720 cinctures and 500 cuttings of seven different kinds of cannas and roses. Over 900 briar roses were planted for rooting for budding superior roses.

4. *Bee-keeping.*—Out of the seven bee colonies originally introduced from Coonoor in 1952 two colonies ultimately established. The bees appeared to require acclimati-

sation to the new situation. The ravages caused by the wax moth and red ants were being brought under control by the staff of the Government Entomologist.

V. Supply of Plants and Seeds.

Plant and seed materials supplied during the years are listed in Table V.

TABLE V.—*List of plants and plant materials supplied from Burliar Fruit Station, during* 1953-54 (*1st July* 1953 *to 30th June* 1954).

Serial number and kind or variety of plant.	Grant or budded plant.	Seedlings.	Layers cuttings and suckers.	Seed. LB.	Seed. OZ.
1 Avocado	..	5	..	..	
2 Allspice	..	20	..	..	
3 Arecanut	..	26	..	..	
4 Bull's heart	..	3	..	..	
5 Carambola (sweet)	13	65	..	..	
6 Carambola (sour)	..	..	..	..	
7 Cinnamom	..	63	1	..	
8 Cacao	15	2,026	..	..	
9 Durian	5	95	..	..	
10 *Garcinia tinctoria*	..	2	..	..	
11 Jack	44	784	..	2	8
12 Kolanut	..	10	..	..	
13 Malayan apple	..	1	..	..	
14 Nutmeg	30	476	..	..	
15 Pomegranate	..	34	..	..	
16 Rose apple	..	7	..	..	
17 Surinam cherry	..	12	..	..	
18 Vanilla	..	..	6	..	
19 Tree-tomato	..	20	..	..	
20 Mangosteen	..	227	..	..	
21 Guava	..	..	1	..	
22 Litchi	..	10	..	..	
23 Giant granadilla	..	..	1	..	
24 Breadfruit	..	3	44	..	
25 Singapore jack	4	12	..	..	
26 Langsat	..	12	..	..	
27 Pummelo	83	268	..	..	
28 Rose	..	..	61	..	
29 Clove	..	323	..	1	0
30 Cardamom	..	..	42	..	
31 Bilimbi	..	4	..	..	
32 Pepper	..	..	50	..	
33 Crotons	..	..	95	..	
34 Sapota	..	1	..	..	
35 Yellow passion fruit	..	..	19	..	
36 Other miscellaneous	..	2	..	..	
37 *Indigofera teysmanii*	..	..	..	4	13
38 Sesbania	..	..	..	61	6
39 Calapogonium	..	..	..		0
40 Peuraria	..	..	..	1	2

COONOOR,
22nd July 1954.

K. FAZLULLAH KHAN,
Assistant Fruit Specialist.

COIMBATORE,
26th August 1954.

U. NARASINGA RAO,
Horticulturist and Professor of Horticulture.

APPENDIX I.

STATEMENT OF CHARGES AND RECEIPTS OF BURLIAR FRUIT STATION (FROM JULY 1953 TO JUNE 1954).

		Rs.	A.	P.
Charges—				
Pay of establishment—Permanent		667	0	0
Other compensatory allowances (house rent allowance)		36	0	0
Dearness allowance		264	0	0
Travelling allowance		432	0	0
	Total	1,399	0	0
Contingencies—				
Petty construction and repairs		31	4	0
Purchase of deadstock		1	4	0
Working expenses		4,123	0	0
Other contingencies		2	13	6
Dearness allowance to menials		461	13	0
	Total	4,620	2	9
Receipts—				
XXIX. A. Agricultural receipts—				
Agricultural Stations		1,821	12	9
Miscellaneous		4	1	6
XLV. Stationery and Printing		9	0	0
III. O.R. P.W.D.		23	0	0
XIII. Other taxes and duties		0	7	6
Value of free transfers		2,258	8	2
	Total	4,116	13	11

APPENDIX II.

TOTAL QUANTITY OF HONEY YIELDED IN THE LAST THREE YEARS.

1951-52.	1952-53.	1953-54.
Nil	½ lb. per hive.	10 lb. 15 oz. per hive.

Total number of hives in the station—Two.

ANNUAL REPORT OF CENTRAL FARM AND COLLEGE DAIRY FOR THE YEAR 1953–54 (FASLI 1363).

1. *The extent of the farm.*—The total area of the farm excluding the areas cultivated by the Specialists and paddock is 199·84 acres comprising of 42·35 acres of wet lands ; 93·94 acres of garden lands and 63·55 acres of dry lands. The garden lands include an area of 26·47 acres acquired during the year on the eastern side of the estate.

Apart from the assignment of area to the different Crop Specialists, facilities were also afforded to the Government Agricultural Chemist, the Entomologist, the Mycologist and the Plant Physiologist to conduct their experiments in the Central farm lands.

By resorting to intensive cultivation a total area of 225·89 acres was cropped during the year as against a total area of 169·99 acres cropped in 1952–53 and 173·8 acres in 1951–52 (Table I).

TABLE I.—*Showing the total area cropped during* 1951–52, 1952–53 *and* 1953–54.

	Area in acres.		
	1951–52.	1952–53.	1953–54.
Dry lands	52·65	70·64	74·03
Garden lands	77·32	76·94	97·72
Wet lands	43·88	22·41	54·14
Total ..	173·85	169·99	225·89

2. *Season.*—A total rainfall of 30·99 inches spread over 61 rainy days was received during the year as against 23·13 inches received in 36 days during the previous year. The rainfall during the year was much above the normal and was equitably distributed throughout the year and hence mainly responsible for the larger are cropped during the year. The rainfall apart from benefiting all the crops helped in raising the water-level in all the wells.

South-west monsoon.—A rainfall of 8·71 inches spread over 25 rainy days were received during the period as against a scanty rainfall of 2·34 inches spread over 6 rainy days during the corresponding period of the previous year. The rainfall was adequate and helped in the successful raising of the dry land crops. The rains brought with it adequate supply of channel water to the wet lands and facilitated all the operations in that area.

North-east monsoon.—The rainfall of 14·21 inches received in 20 rainy days was again above the normal for the past ten years. The rainfall during the corresponding season of the previous year was 8·13 inches spread over 16 rainy days. The rains helped in raising the water-level in the wells still further. The rains were highly beneficial to all the dry land crops. However the continuous rainfall received in October had its own drawback as it prevented timely weeding operation due to the wet condition of the fields and this to a certain extent adversely affected the crop and enhanced weeding charges.

Hot weather.—The rainfall during this period was again adequate and a total rainfall of 8·07 inches spread over 16 rainy days was recorded. Though very much above the normal for the past ten years it was less than that received during the same period of the previous years when an unprecedented rainfall of 12·66 inches spread over the 14 rainy days was recorded. The rains helped in maintaining the water-level in the wells. These rains helped in the preparatory cultivation in general. The rains slightly interfered with the harvest of the second crop of paddy especially

Co. 18 in C block of wet lands and resulted in much shedding of grain. However the rains were highly beneficial to the green manure crops in wet lands.

The rainfall statement is furnished in Table II.

TABLE II.—*Rainfall statement.*

Period.	Week.	1953–54. Rainfall in inches.	1953–54. Number of rainy days.	1952–53. Rainfall in inches.	1952–53. Number of rainy days.	1951–52. Rainfall in inches.	1951–52. Number of rainy days.	Average rainfall for the past ten years.	Number of rainy days.	Average rainfall for the past 46 years.	Average number of rainy days.
				South-west monsoon.							
June ..	7—13	0·14	1	..	..	0·48	2	0·20	0·7	0·38	0·72
	14—20	0 70	2	0 07	..	..	..	0·17	0·5	0·35	0·87
	21—27	0 93	3	0·03	..	0·02	..	0·34	0 9	0·28	0·87
June-July ..	28— 4	0 76	3	..	..	..	..	0·24	0·8	0 31	0·85
	5—11	2·79	3	0 47	3	0·01	..	0 69	1 7	0 45	1·35
	12—18	..	..	0·65	2	0·03	..	0·41	1·1	0·51	1 09
	19—25	0·14	1	0 03	..	1 96	4	0 42	1·3	0·59	1·48
July-August ..	26— 1	1·08	4	0·15	..	0 03	..	0·38	1·2	0·31	1 02
	2— 8	0·11	1	..	..	..	..	0 41	0 8	0·34	0·76
	9—15	0 56	1	..	..	0·10	1	0 24	0·8	0·29	0 81
	16—22	..	..	0·01	..	..	..	0 28	0·5	0 34	0·69
	23—29	0·25	2	0 88	1	0·09	..	0 24	0 7	0 24	0 66
August-September.	30— 5	..	..	0·01	..	..	..	0 05	0·1	0·23	0·66
	6—12	0 90	2	..	..	..	..	0 18	0 3	0·23	0 52
	13—19	0 19	1	..	..	1·26	3	0·35	0 8	0·42	0·91
	20—26	0·16	1	0·04	..	0·56	2	0·40	0·9	0 46	0·87
	Total ..	8·71	25	2·34	6	4·54	12	5·00	13·1	5·73	14·13
				North-east monsoon.							
September-October.	27— 3	0·91	1	2·44	3	0 34	2	1·14	1·4	0 87	1·46
	4—10	1·24	1	0 58	1	2 53	2	0 90	1·3	0 96	1·62
	11—17	4 06	4	0·38	2	0 04	..	1·78	2·5	1·47	2·33
	18—24	2 05	3	..	..	1 03	2	1·39	2·4	1·45	2 11
	25—31	0·22	1	2 09	3	0 07	..	1 34	1·7	1·75	2 15
November ..	1—7	..	..	0 18	1	2 50	3	1 08	1·5	1·41	2 20
	8—14	..	..	0·19	1	2 18	4	1 54	2·3	1 22	1 80
	15—21	1·21	2	..	..	0 64	3	0 92	1·8	0 96	1 30
	22—28	0 36	1	0·05	..	0·01	..	0 75	0·9	0 64	1 00
	29— 5	..	..	0 92	1	0·87	2	0·70	1·2	0 69	1 05
November-December.	6—12	..	..	0·79	3	..	..	0 31	0·8	0 48	0 81
	13—19	0·53	1	0·43	1	0·05	..	0 34	0 5	0 21	0 39
	20—26	..	..	..	..	..	..	0·13	0 3	0 09	0 35
December-January.	27— 3	0 21	1	..	..	0 01	..	0 03	0·1	0·16	0 44
	4—10	2·84	3	0·80	..	0 02	..	0 31	0·4	0 21	0·44
	11—17	0·58	2	..	..	..	..	0·06	0 1	0·12	0 26
	18—24	..	..	..	..	..	..	0 14	0·3	0 14	0 15
	25—31	..	..	..	..	0 05	..	0 02	0·2	0·12	0·24
	Total ..	14·21	20	8·13	16	10 34	18	12·88	19·7	12·95	20·10
				Hot weather season.							
February ..	1—7	0·02	..	..	..	..	..	..	..	0·20	0·17
	8—14	..	..	..	..	..	..	0·02	0·1	0·08	0·11
	15—21	..	..	..	..	0·04	..	0 09	0·1	0·03	0·04
	22—28	..	..	0·04	..	0·64	3	0 10	0·5	0 09	0 15
..	1—7	..	..	..	..	..	..	0·02	0·1	0 04	0·20
	8—14	..	..	..	..	..	..	..	..	0·03	0·07
	15—21	0·18	1	..	..	0·34	1	0·05	0·1	0·21	0·30
	22—28	0 62	1	0·01	..	..	..	0 17	0·5	0·12	0 33
March-April ..	29— 4	0·11	1	0 26	1	..	..	0·23	0·7	0·32	0 66
	5—11	0·22	1	3·20	2	0·47	1	0·67	1·4	0·45	0 74
	12—18	0·46	1	2·75	2	0·09	..	1·08	1·4	0·57	0 93
	19—25	1·47	2	2·75	3	..	..	0·64	1·1	0·60	1 00
April-May ..	26— 2	1·68	2	0 02	..	..	..	0·52	0·9	0·48	0·85
	3—9	..	..	2·19	2	..	..	0·59	0 9	0·66	1·13
	10—16	0 93	2	..	..	..	..	0 38	0 8	0·59	0 98
	17—23	1·27	3	0·38	1	0·05	..	0 34	0·9	0·60	1·13
	24—30	0 53	1	0·28	1	..	..	0 42	0·8	0·41	0 81
·/-June ..	31— 6	0 58	1	0·84	2	0·70	..	0·31	0·8	0·42	0·96
	Total ..	8·07	16	12·66	14	1·70	5	5·63	11·1	5·90	10·56
Grand total ..		30·99	51	23·13	36	16·58	35	23·51	43·9	24·58	44 80

3. *Experiments.*—No experiments were programmed for Central Farm in the three-year programme of research for the year 1953–56. However the " placement of fertilizer experiment " on paddy programmed for 1950–53 was conducted during

the 1953–54 main season as the same could not be conducted in previous years for want of irrigational facilities. The results are tabulated below :—

Placement of fertilizers experiment, viz., superphosphate and ammonium sulphate.

A. *Experiment No.* 1—
Treatments—3.
Replications—6.
Size of plots—1 cent (62½ links × 16 links).

Treatments.—A basal dressing of 5,000 lb. of green manure per acre (i.e., at 50 lb. per plot) is common to all plots.

A. No manure.

B. Ammonium sulphate 150 lb. per acre or 1·5 lb. per plot applied broadcast at the time of planting and 75 lb. per acre or 0·75 lb. per plot broadcasted four weeks after planting.

C. Same quantity of fertilisers as in 'B' but applied as pellets with clay and placed three inches below the soil in two doses as in B.

TABLE III.—*Mean yield in lb.*

Treatments.	A		B		C		Significant or not.	Critical difference.
	Yield per plot.	Yield per acre.	Yield per plot.	Yield per acre.	Yield per plot.	Yield per acre.		
Grain	37·33	3,733	36·37	3,637	37·75	3,775	Not significant.	..
Straw	64·58	6,458	77·00	7,700	85·58	8,558	Significant at 5 per cent level.	9·49 at 5 per cent level.

Ranking for straw yield at 5 per cent level: C B A

Conclusions—

(1) The straw yield is improved by the application of ammonium sulphate, but the method of applying it has no significant effect upon straw yield.

(2) There is no effect by either fertilizer or its method of application on grain yield.

B. *Experiment No.* 2—
Treatments—3.
Replications—6.
Size of plots—1 cent.

Treatments.—A basal dressing of 1·5 lb. of ammonium sulphate per plot at the time of planting and 0·75 lb. of ammonium sulphate per plot four weeks after planting is common to all treatments.

A. *Control.*—600 lb. of cow dung per acre or (6 lb. per plot) applied before last ploughing.

B. Same as 'A' plus superphosphate at 150 lb. per acre i.e., 1·5 lb. per plot applied broadcast.

C. 150 lb. of superphosphate per acre (or 1·5 lb. per plot) mixed with 6 lb. of cowdung per plot and made into pellets and placed three inches below the soil at planting time.

TABLE IV.—*Main plot yield in lb.*

Treatments.	A.	B.	C.	
Grain	32·70	30·58	29·46	Difference not significant.
Straw	77·83	77·67	77·83	Do.

Conclusions—

By the use of superphosphate no significant change has occured either in grain yield or in the straw yield.

2. The method of applying the fertilizer has no effect upon the yield of either grain or straw.

4. *Bulk crops.*—During the year an area of 225·89 acres were cropped. Table V gives a comparative statement showing the area cropped under different crops in dry, garden and wet lands during the three years 1951–52, 1952–53 and 1953–54. It will be seen from the accompanying graphs that the area cropped during the year under review is considerably greater than that of the previous years. This was made possible by the improvement of the existing wells and by judicious use of the water from these wells.

TABLE V.—*Showing the area cropped under different corps in dry, garden and wet lands during the years* 1951–52, 1952–53 and 1953–54.

Serial number and name of crops.	Area in acres.		
	1951–52.	1952–53.	1953–54.
Dry lands—			
1 Cholam	30·55	40·64	44·94
2 Cotton K5	8·76	15·00	11·09
3 Bengalgram	9·20	10·30	9·73
4 Cumbu	4·14	4·70	7·50 (for fodder
Total ..	52·56	70·64	74·08

Serial number and name of crops.	Area in acres. 1951–52.	1952–53.	1953–54.
Garden lands—			
1 Ragi	13·26	14·20	22·85
2 Cotton MU 1.	13·21	20·41	32·45
3 Cholam	20·79	16·91	20·49
4 Maize	6·00	4·20	7·89
5 Cumbu	2·50	2·00	2·00
6 Grasses	7·49	7·44	7·44
7 Lucerne	1·64	1·88	0·80
8 Vegetables	1·00	1·50	2 00
9 Wheat	1·50	1·50	1·80
10 Sunnhemp	9·94	1·90	..
11 Tenai	..	5·00	..
Total	77·32	76·94	97·72
Wet lands—			
1 Paddy (I)	34·21	14·84	36·65
2 Paddy (II)	2·37	1·56	10·49
3 Sugarcane	3·55	2·40	2·50
4 Bananas	2 95	2·80	3 60
5 Cotton rice fallow	0·80	0·80	0·80
Total	43·88	22·41	54·14

A. *Wet lands.*—The area of the wet land block is 42·35 acres. The area cultivated under the different crop is given in Table V. Unlike in previous years during the year more area was brought under the second crop of paddy and the total area cropped during the year was 54·14 acres as against a total area of 22·41 acres cropped in 1952–53 and 43·88 acres cropped during 1951–52.

5. *Paddy.*—The cropping scheme of the wet lands was drawn up in consultation with the Paddy Specialist, taking into consideration the requirements of nucleous seed required by the District staff for further multiplication.

6. *Manuring of paddy crop—Green manuring.*—Taking advantage of the rains an area of 31·26 acres were sown with green manure and this produced more than sufficient green stuff to manure the bulk paddy area at 5,000 lb. per acre. The green leaf manure obtained from the trees and shrubs of wet lands were mostly utilized for composting.

TABLE VI.—*Yield of green manure crops.*

Name of crop.	Area cropped in acres.	Total yield for the plot in lb.	Yeield per acre in lb.
1 Seabania	13·46	389,214	28,916
2 Sunnhemp	7·00	154·500	22,071
3 Pillipesara	4·75	85,250	17,950
4 Daincha	4·95	83,655	16,900
5 Sunflower	1·10	13,750	12,500

7. *Application of fertilizers.*—The following quantities of fertilizers were applied to the areas noted against each ;

TABLE VII.—*Quantity of fertilizers applied.*

Name of block.	Name of crop.	Area in acres.	Name and quantity of artificial manure applied.
A	Paddy GEB. 24	2·00	Superphosphate 400 lb. Ammonium sulphate 220 lb.
B	Co. 18	2·00	Ammonium sulphate 152 lb.
	Co. 3	3,00	Super phosphate 410 lb. Ammonium sulphate 243 lb.
C	Co. 16 Co. 25	0·80	Ammonium sulphate 100 lb.
C	Co. 25	0·80	Super phosphate 54 lb. Ammonium sulphate 27 lb.
D	Co. 25	0·86	Super phosphate 196 lb.
E	Co. 19 Co. 2	2·46	....
F	Co. 2	4·95	Super phosphate 600 lb. Ammonium sulphate 750 lb.
H	Co. 7	1·00	Super phosphate 150 lb.
J	GEB. 24	4·00	Super phosphate 400 lb. Ammonium sulphate 644 lb.
L	MTU. 19 GEB. 24 Co. 14	3·50	Super phosphate 1,410 lb. Ammonium sulphate 442 lb.
L	Paddy Co. 13	3·50	Ammonium sulphate 250 lb.
[illegible]	Co. 13	0·50	Ammonium sulphate 25 lb.
M	ASD. 5	3·34	Super phosphate 200 lb. Ammonium sulphate 345 lb.

8. *Paddy nursery.*—The following nurseries were sown in accordance with the Cropping scheme :—

TABLE VIII.

Name of block.	Strain.	Extent in acres.	Quantity of seed used. LB.
	I Crop.		
A	.. Paddy GEB 24	0·33	100
	Co. 3	0·32	100
C	.. Paddy Co. 25	0·33	100
	Co. 16	0·07	20
E	.. Paddy Co. 19	0·22	65
	Co. 14	0·13	40
	Co. 2	0·55	165
L	.. Paddy GEB. 24	0·37	110
	MTU. 19	0·23	70
M	.. Paddy Co. 1	0·17	50
	Co. 7	0·13	35
N	.. Paddy ASD. 5	0·30	100
	Total under I crop ..	3·15	955
	II Crop.		
A	.. Paddy Co. 18	0·65	200
C	.. Paddy Co. 13	0·50	145
M	.. Paddy Co. 13	0·30	100
	Total under II crop ..	1·45	455

9.—*First-crop paddy.*—The above 3·15 acres of paddy nursery was utilized for planting a total area of 36·65 acres. The yield of the first crop of paddy varied from 904 lb. to 4,076 lb. of grain per acre. Co. 19 gave the highest yield of grain closely followed by Co. 2. The lowest yield was from ASD 5. The yield of grain and straw from the different strains grown is given in the following table.

TABLE IX.—*Yield of paddy grain and straw—I Crop.*

Block.	Strain of paddy grown.	Area in acres.	Actual yield for the blocks. Grain in lb.	Actual yield for the blocks. Straw in lb.	Yield per acre. Grain in lb.	Yield per acre. Straw in lb.
A	Paddy GEB.24	2·00	2,774	3,020	1,387	1,510
	(GAC) GEB. 24	1·00	2,106	2,096	2,106	2,096
B	Co. 3	3·00	3,380	11,532	1,127	3,295
	GEB. 24	0·50	1,540		3,080	
C	(P. Ph.) GEB. 24	0 40	1,504	3,684	3,760	9,210
	(Meteorology) Co. 16	0·40	1,440	8,824	3 600	11,030
	Co. 25	0·40	1,235		3,090	
	Farm Co. 25	0 80	2,825	5 941	3,531	7,426
	Col 1	1 20	3,230	5,941	2,700	4,950
D	Co. 25	0·86	3,409	8,560	3,964	9,953
	(GAC)	2 00	4,450	10,960	2,225	5,480
E	Farm Co. 19	2·00	8,152	17,312	4,076	7,037
	Co. 2	0·46	1,855		4,032	
F	Co. 2	4·95	11,280	26,604	2,280	5,375
G	Co. 25	0·20	600	9,428	3 000	11,784
	Co. 7	0·60	2,030		3,386	
H	Co. 7	1·00	2,372	9,184	2,372	9,184
J	GEB. 24	4·00	6,180	23,088	1,545	5,772
L	GEB. 24	0·60	2,106	17,220	3,510	4,920
	MTU. 19	1·80	7,148		3,971	
	Co. 14	1·10	3,610		3,281	
M	Paddy Co. 1	0·25	625	4,489	2,500	8,470
	Co 16	0·28	560		2,000	
	Co. 25	0·80	1,503	6,785	1,879	8,470
N	ASD. 5	3·34	3 020	5,196	904	1,556
O	Co. 25	1·10	3,022	8,626	2,747	7,841
	Total ..					

10. *Second-crop paddy.*—By judicious use of the water from the wells and proper planning an area of 10·49 acres were brought under the second crop of paddy. Never in the annals of the Central Farm was such a venture attempted. The area under

second crop never exceeded 2 to 3 acres in previous years due to the precarious water-supply in the wells. The yield obtained is tabulated below :—

TABLE X.—*Yield of second-crop paddy.*

Name or Block.	Strain of paddy grown.	Area in acres.	Actual yield for the block.		Yield per acre.	
			Grain in lb.	Straw in lb.	Grain in lb.	Straw in lb.
A	Paddy Co. 18	2·00	2,860	3,804	1,430	1,902
B	Co. 13	0·50	356	1,536	712	3,072
C	Co. 18	1·60	3,068	2,896	1,918	1,810
	Co. 13	0·60	1,180	3,028	1,967	5,046
F	Co. 13	0·45	644	2,344	1,431	5,210
H	Co. 18	1·00	1,326	4,240	1,326	4,240
.. .. ..	Co. 13	3·50	3,480	5,992	944	1,712
M	Co. 13	0·56	1,036	3,524	1,943	6,300
O	Co. 13	0·28	710	3,090	2,535	12,360
	Total ..	10·49	14,712			

11. *Sugarcane.*—An area of 2·60 acres was under this crop during the year. Out of this 2 acres were under the " borer trial experiment " conducted by the Government Entomologist and only 0·60 acre was under bulk crop. An average yield of 45·560 lb. of cane was obtained. Considering the fact that more than 40 per cent of the crop under the Borer trial experiment has been removed in stages at intervals of three weeks for taking counts of borers during the course of the year, the yield can be considered quite good. The varieties cultivated were Co. 413, Co. 419 and Co. 421. The intensity of the attack of the sugarcane-borer on the three varieties with reference to the day-to-day weather conditions was studied by the Government Entomologist.

12. *Bananas.*—A total area of 3·60 acres was under Bananas during the year. The varietal collections of the then Fruit Specialist in M block occupying an area of 2 acres was abandoned by the Horticulturist and Professor of Horticulture during the year. However, the crop was retained for the collection of suckers for future plantings. An area of 0·80 acre was freshly planted in M block under the Mycologist's Banana Wilt Experiment. An acre yield of 5,333 lb. of bananas and 1,410 numbers of leaves were obtained during the year. It is too early to draw any conclusion regarding the Banana Wilt Experiment.

13. *Cotton.*—The rice fallow cotton experiments was laid out in J block by the Cotton Specialist in an area of 0·80 acre. The crop was quite good. The produce was taken by the Cotton Section and the results of the trials are furnished in the report of the Cotton Breeding station. P. 216-F planted 1½ feet between the rows and 4½ inches in the line was found the best.

14. *Glyricidia, Indigofera, Teysmanii and Sesbania.*—Glyricidia was planted in all available and suitable spaces in the Estate ; seedlings of Indigofera Teysmanii were carefully raised and potted in the Central Farm nursery and during the year more than 2,500 seedlings were planted in places where irrigation was possible during the dry period throughout the Estate. The growth of this new green manure plant is being carefully watched. So far it has not given any indication to show that it is superior to Glyricidia. Besides sowing of Sesbania in the field for green manure after the harvest of paddy, it was also raised along either side of field bunds for the purpose of collecting seed and during the year 1,172 lb. of Sesbania seeds and 140 lb. of Glyricidia seeds were collected.

15. A. *Paddy seed distribution.*—During the year under review the Central Farm produced 81,745 lb. of pure paddy seeds of different strains and out of this 64,481 lb. of seeds were distributed to the districts as below :—

TABLE XI.—*Distribution of paddy seeds.*

Serial number and strains.	Produce.	Transfers.
	LB.	LB.
1 GEB. 24	17,295	16,440
2 Co. 1	3,185	1,660
3 MTU. 19	7,148	6,250
4 CO. 10	844	724
5 CO. 13	1,880	960
6 CO. 19	8,152	8,152
7 CO. 18	1,942	1,788
8 CO. 7	4,160	1,440
9 CO. 14	3,610	2,880
10 CO. 16	1,440	364
11 CO. 2	13,135	7,413
12 CO. 3	3,200	3,096
13 ASD. 5	1,540	..
14 CO. 25	14,214	13,314
Total ..	81,745	64,481

B. *Garden lands.*—The important crops grown under garden conditions were (1) Irrigated cotton, (2) Irrigated cholam and (3) Irrigated ragi. The total area cropped is 97·72 acres as against 76·94 acres cropped in 1952–53.

16. *Cotton.*—With a view to increase the revenue of the Farm the area under irrigated cotton was still further increased and during the year an area of 32·45 acre was brought under cotton variety MCU. 1. The area under cotton during 1951–52 and 1952–53 were 13·20 acres and 20·41 acres respectively. The yield of MCU. 1 Cotton varied from 162 lb. (dry conditions) to 1,203 lb. of Kapas per acre. The average yield worked out to 686 lb. of Kapas per acre. During the year only MCU. 1 cotton was cultivated as approved by the Cotton Specialist for multiplication of the seed and distribution to districts. The blockwise yields of cotton are tabulated below :—

TABLE XII.

F. No.	Name of crop.	Area in acres.	Yield of kapas per plot in lb.	Yield of kapas per acre in lb.	
42	Cotton MCU. 1	1·70	981	577	
43-A	,, ...	1·90	926	487	Nucleus plot of the Cotton Specialist.
48	,, ...	1·61	1,001	622	
49	,, ...	1·24	1,492	1,203	
50	,, ...	1·26	796	692	
51	,, ...	2·59	2,551	985	
54	,, ...	4·72	4,552	964	
67-A	,, ...	1·50	1,478	919	
67-B	,, ...	1·20	926	772	
68	,, ...	3·00	1,890	630	
69	,, ...	0·65	396	610	
71	,, ...	1·83	409	224	Plant Physiologist's Experiments. Sown as dry but later on irrigated whenever possible.
72	,, ...	4·50	728	162	
74	,, ...	2·50	1,835	734	
75	,, ...	2·25	2,296	1,020	
	Total ..	32·45	22,257	686	

17. *Cholam.*—Cholam occupied an area of 20·49 acres as against 16·91 acres during 1952–53. The cropping programme of the irrigated cholam was drawn up

in consultation with the Millet Specialist and as many as 18 strains were sown in multiplication plots. The yields are tabulated below. Co. 6 gave the maximum yield of 2,130 lb. per acre.

TABLE XIII.—*Yield of cholam.*

F. No.	Variety.	Area in acres.	Actual yield per plot in lb.		Yield per acre in lb.	
			Grain.	Straw.	Grain.	Straw.
39	Cholam Co. 18	1·71	3,060	8,056	1,789	4,711
40	,, Co. 4	2·44	3,470	8,904	1,422	3,650
43-B ..	,, Co. 5	0·50	356		712	
	,, Co. 8	0·50	926		1,852	
	,, 7441	0·25	120	6,056	480	2,700
	,, 7562	0·50	430		960	
	,, 7589	0·50	351		702	
59-A ..	,, Co. 6	0·78	1,661	6,584	2,130	4,200
	,, Co. 13	0·78	1,338		1,715	
59-B ..	,, Co 7	1·46	2,500	6,788	1,712	4,650
59-B, 69, 76.	,, Co. 9	2·80	2,355	13,576	841	4,848
71, 75 ..	,, Co. 11	2·00	1,700	9,640	850	4,820
69, 71 ..	,, Co. 12	3·45	1,394	18,662	404	5,409
73	,, Co. 14	1·00	1,020		1,020	
	,, Co. 15	1·00	840		840	
	,, Co. 16	1·00	720	14,128	720	2,983
	,, Co. 17	0·77	390		506	
	,, As. 8388	1·00	960		960	
	Total ..	22·44	23,591	92,394	1,051	4,117

18. *Ragi.*—The total area under ragi during the year was 22·85 acres as against 14·20 acres during the previous year. The different strains grown with their respective yields are given in Table XIV.

TABLE XIV.—*Yield of ragi.*

F. No.	Strain grown.	Area in acres.	Actual yield for plot in lb.		Yield per acre in lb.	
			Grain.	Straw.	Grain.	Straw.
39, 42, 50.	Ragi Co. 1	4·66	6,915	31,514	1,484	6,763
40, 43-B, 45, 69, 71.	Co. 2	11·60	14,727	79,091	1,270	6,818
75, 76 ..	Ragi Co. 3	2·05	3,088	17,968	1,506	8,765
40	4310	0·44	498	2,107	1,132	4,790
49, 68 ..	4601	2·90	5,719	17,480	1,972	6,027
76	4573	1·20	1,700	6,304	1,416	5,253
	Total ..	22·85	32,647	1,54,464	1,429	6,759

19. *Wheat.*—During the year 1·80 acres were grown with wheat. It gave an average acre yield of 329 lb. of grain.

20. *Vegetables.*—The two acres of vegetables both indigenous and exotic type raised in Field No. 44 gave an acre yield of 3,923 lb. of vegetables.

21. *Cumbu.*—Cumbu 411 and 422 were raised on an area of one acre each. Four hundred and twenty-two gave an acre yield of 1,400 lb. of grain while the yield of 411 was poorer and gave only 618 lb. per acre.

22. *Maize for seed.*—An area of 0·50 acre was sown with maize for seed and an acre yield of 1,600 lb. of seed was obtained.

23. *Fodder crops—Maize for fodder.*—7·39 acres were grown under maize for fodder in different stages. An average acre yield of 10,200 lb. of green fodder was obtained. The maximum yield of 31,000 lb. was obtained in Field No. 68.

24. *Lucerne.*—The area under this crop was only 0·80 acre. The quantity of green fodder obtained worked out to 21,588 lb. per acre. In addition, 138 lb. Lucerne seed was also collected during the year.

25. *Perennial grasses.*—An area of 7·44 acres was under Perennial grasses during the year. The sullage from the estate was the main source of irrigation for the grass plots. The copious rains received during the year highly benefited the crop and it gave an acre yield of 49,585 lb. of green fodder, besides giving 53,150 numbers of slips.

TABLE XV.—*Yield of grasses.*

Name of grass.	Area cropped in acres.	Quantity of grass received in lb.	Yield per acre in lb.
1 Guinea grass	5·04	229,492	45,534
2 Water grass	2·00	93,801	46,900
3 Cumbu × Napier grass	0·30	34,203	1,11,410
4 Napier grass	0·10	11,416	1,14,160
Total ..	7·44	368,912	49,586

Quantity of grass slips supplied.

	Nos.
1 Guinea grass slips	31,500
2 Water grass slips	7,500
3 Cumbu × Napier grass slips	5,800
4 Napier grass slips	8,350
Total .	53,150

26. *Sesbania.*—Sesbania was planted along the sides of water channels in both western and eastern blocks.

27. *Sunnhemp.*—During the year a bumper crop of sunnhemp was raised in the new area on an area of 8·50 acres. It gave an average estimated acre yield of 20,000 lb. of green stuff per acre.

C. *Dry lands.*—Cholam, Cotton, Bengalgram and Cumbu and Sunnhemp grown as a mixture for fodder were the main crops grown during the year. The total area cropped during the year was 74·03 acres as against 70·64 acres in 1952–53 and 52·65 acres in 1951–52.

28. *Cholam.*—Co. 1, Co. 3, 7081, 7657, 8001, 8008 and 8112 were the strains grown in the dry lands on an area of 44·90 acres. The average yield worked out to 490 lb. of grain and 5,433 lb. of straw per acre. The strains were sown for multiplication, as per the desire of the Millets and Pulses Specialist.

29. *Cotton.*—K. 5 occupied an area of 11·90 acres during the year. An average yield of 184 lb. of kapas was obtained. There was heavy shedding of flowers and this was responsible for the low yield. The heavy shedding of flowers was probably due to the heavy rains of 3·42 inches in five days received during the first half of January 1954.

30. *Bengalgram.*—Bengalgram was sown on an area of 9·73 acres in F. No. 36-A and tank bed. It gave an average acre yield of 180 lb. of grain. The crop was very badly affected by pod bores and in spite of adopting timely control measures only a portion of the crop was saved from complete failure.

31. *Cumbu.*—In an area of 7·50 acres in Field Nos. 72, 75 and 78 was sown mixed with sunnhemp for fodder. It gave an acre yield of 2,225 lb. of green fodder.

32. *Livestock.*—The year started with 35 pairs of which 2½ pairs were calves transferred from Dairy. Eight and a half pairs were disposed of by auction during the year as they had become too old. One animal died in hospital. Three breeding bulls were transferred during the year from the Dairy and one bullock was received on transfer from the Paddy Breeding Station. At the close of the year the Farm had 26 pairs of work animals, four breeding bulls and five calves including two buffaloes received from Taliparamba.

33. *Miscellaneous—Organic manures.*—By careful preservation of the dung and urine obtained from the Farm animals and by composting the waste litter, the surplus green leaves, the organic waste like sugarcane trash, the tea fluff received from Messrs. Brooke Bond, Limited, with cattle dung and urine, the Central Farm was able to produce sufficient farmyard manure not only for manuring its own lands but for meeting all the demands from the specialists and in addition to build up a reserve of 500 to 600 tons.

The Central Farm was also self-sufficient with regard to its requirements of green leaf manure. Wet lands produced sufficient green manure for manuring the paddy crop at the rate of 5,000 lb. per acre and the nursery area of about 5 acres at 10,000 lb. per acre. The *Glyricidia* in wet lands was left unpruned (except the side shoots) for the collection of seeds and during the year 140 lb. of *Glyricidia* seeds were obtained.

34. *Self-sufficiency in fodder.*—The close of the year found the Central Farm with a surplus of nearly 100 tons of Cholam fodder. The rains received during the year was partly responsible for this as it not only helped in the growth of all the fodder crops but also produced rank growth of grass especially in wet lands, which was cut and fed to cattle.

35. *Estate planting.*—During the year more attention was paid to estate planting than ever before and the Research Institute and surroundings were beautified with new lawns and hedges. The southern side of the Freeman building was levelled and planted with ornamental shrubs and crotons. The output of economic and flowering plant seedlings from the nursery was increased and the Central Farm is now in a position to meet the demand of the farmers in respect of all important seedlings of economic value. Every effort was made to increase and maintain the beauty and greenness of the open spaces and the surroundings of the Agricultural College and Research Institute.

36. *Prosopis Juliflora.*—Seeds were sown for forming hedges around field boundaries abutting roads and gaps were filled up in the existing Prosopis hedges and they were kept trim by systematic pruning.

37. *Vanamahotsava.*—A large number of tree seedlings were distributed to ryots and institutions during the period. Besides, seedlings were planted in all the available space in the College Estate.

38. *Refresher Course in Agriculture.*—Short refresher course for young farmers was conducted for six months from 1st July to 31st December 1953. Sri P. N. Muthuswamy was in charge of the course as Agricultural Instructor. Fifteen trainees joined the course and four of them discontinued in the middle. Due to the abolition of the course at Taliparamba, two of the trainees from West Coast joined the course at Coimbatore.

During the course the trainee students studied various crops in dry, garden and wet lands in all their aspects including practical demonstration.

ANNUAL REPORT FOR THE YEAR 1ST JULY 1953 TO 30TH JUNE 1954 OF THE AGRICULTURAL COLLEGE DAIRY.

The Dairy attached to the Central Farm is intended to give practical instructions to the B.Sc. (Ag.) students. Accounts on the commercial aspect are however maintained and submitted to the Government every year.

Staff.—Sri V. Natarajan was in charge as Dairy Manager and Sri M. Aravindaksha Menon joined as Additional Dairy Manager *vice* Sri C. N. Venkataraman, the Additional Dairy Manager, transferred to the Chemistry section in the first week of July 1953. Sri Syed Basheeruddin continued to act as the Dairy clerk.

Cattle.—The strength of the cattle at the commencement of the year was 46. Eighteen calves were added to the herd by birth. Three buffalo heifers and two buffalo bull calves were received by transfer from Taliparamba. One Scindhi stud bull was received from Livestock Research Station, Hosur, by transfer. One old Murrah buffalo with calf, an old cow, and one bull calf were auctioned as they were uneconomical to maintain. Two Murrah buffalo calves and one Scindhi bull calf died due to gastro-enteritis and pyaemia. Two Murrah buffalo bull calves, one Murrah buffalo stud bull and two Scindhi stud bulls were transferred to Central Farm, four Scindhi bull claves were transferred to Livestock Research Station, Hosur, one Scindhi stud bull were transferred to District Veterinary Officer, Coimbatore and one Scindhi bull calf was transferred to District Livestock Farm, Malabar. Thus the closing balance is 52.

Opening balance	46		
Receipt by birth	18	Sales	4
Receipt by transfer	6	Death	13
		Transfer	11
	70		18

Closing balance 52.

Goats.—Opening balance for the year was 6. We received five goatlings by birth and two were sold by auction. Thus closing balance is 9.

Opening balance	6		
Receipt by birth	5	Sales	
	11		

Closing balance 9.

Services.—The Scindhi breeding bull No. 644 served three outside cows, Stud Murrah buffalo No. 20 served 53 outside she-buffaloes and Stud goat No. 2 served 48 outside she goats.

Poultry.—The poultry opened with a balance of 225 birds. Three hundred and six birds were added by hatching and 14 by transfer from Hosur. Two hundred and seventy-two birds were sold, 18 birds transferred to Project Executive Officer, Palghat, and 7 birds to Central Jail, Coimbatore, and 98 birds died during this year.

Opening balance	225	Sales	272
Receipt by hatching	306	Death	98
Receipt by transfer	14	Transfer	25
	545		395
B.C.O.	150		

Egg Production—

Opening balance	6	Sales	5,389
Receipts	6,242	Incubated	864
Receipt by transfer	98	Fed to stock	67
	6,346		6,317

Closing balance 29.

Varieties of eggs incubated and number.				Varieties hatched out and number.			
R.I.R.	W.L.	B.M.	L.S.	R.I.R.	W.L.	B.M.	L.S.
Incubation details—							
241	387	110	126	107	142	27	30
		Total ..	864			Total ..	306

Practical classes for the final-year students.—Practical lessons in milk separation butter making, fat estimation, ghee making, khoa-making, ice cream making, management of dairy and poultry, score card, etc., were given to the students.

The appended statements give the out turn and disposal statement of the Dairy produce for the year under review.

CENTRAL FARM, COIMBATORE,
14th September 1954.

K. RAMASWAMI,
Superintendent.

GOVERNMENT OF MADRAS
1962

ANNUAL REPORT OF THE COTTON BREEDING STATION, COIMBATORE, FOR THE YEAR ENDING 30TH JUNE 1954 (FASLI 1363).

1. *Season.*—(i) The total amount of rainfall recorded at the Cotton Breeding Station during the season 1953–54 (7th June 1953 to 6th June 1954) was 30·75″ distributed over 62 rainy days, as compared to the decennial average of 24·04″ in 45·2 rainy days and the average of 26·68″ in 55·8 rainy days for the past 31 years (*vide* Table I). Despite the total amount being above normal, the distribution was not altogether favourable for cotton. For *Cholam* and horse-gram crops raised during the South-West monsoon period, the season was conducive. The South-West monsoon set in on the 2nd of June and after being slightly active for three or four days, it subsided to revive only on the 17th of June, whereafter it continued to be active till the 8th July. The amount of rainfall received during this period was almost twice normal, as also the number of rainy days. The timely receipt of monsoon rains enabled the sowing of P.M. Cholam to be done in the proper season. The North-East monsoon set in on the last day of September and was active between the 7th and 22nd of October. The total rainfall received was slightly above normal. But the uneven distribution upset the normal growth and development of the cotton crop resulting in sub-normal yields. Sowing of the irrigated cottons extended over a period of one month from the 7th of September to 10th of October, while the rainfed *desi* cotton was sown about the third week of September. As during the previous season, unusually good rains amounting to 8·17″ were received during the hot weather period, which proved very conducive for the green manure crops raised during the summer months. Incidence of boll-worm and will attack was prevalent in the irrigated cottons, while only a mild attack by boll-worm was noticed in Karunganni cotton.

TABLE I.—*Rainfall statement for the year* 1953–54.

Month.	Week.	1953–54.		1952–53.		Average for the past 10 years.		Average for the past 31 years.	
		Rainfall in inches.	Number of rainy days.	Rainfall in inches.	Number of rainy days.	Rainfall in inches	Number of rainy days.	Rainfall in inches.	Number of rainy days.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
June	7—13	0·11	1	..	..	0·18	0·7	0·41	1·0
	14—20	0·65	3	..	..	0·20	1·1	0·33	1·4
	21—27	0·71	3	0·01	..	0·31	0·9	0·22	1·0
June-July	28—4	0·80	3	..	..	0·24	0·9	0·32	1·5
	5—11	2·89	3	0·64	3	0·72	1·5	0·52	1·8
	12—18	..	..	0·81	1	0·44	1·0	0·59	1·7
	19—25	0·03	..	..	..	0·48	1·2	0·46	1·4
July-August	26— 1	1·18	3	0·13	..	0·42	1·0	0·30	1·0
	2— 8	0·14	1	..	..	0·38	0·8	0·35	1·1
	9—15	0·44	1	..	..	0·19	0·7	0·32	1·1
	16—22	..	..	..	..	0·29	0·5	0·37	1·2
	23—29	0·65	2	1·33	1	0·35	0·9	0·28	0·8
August-September ..	30— 5	..	..	..	..	0·04	0·1	0·16	0·5
	6—12	1·04	2	..	..	0·22	0·5	0·29	0·9
	13—19	0·41	1	..	..	0·42	0·9	0·29	0·8
	20—26	0·26	1	0·06	..	0·40	0·8	0·56	1·1
Total ..		9·31	24	2·98	5	5·28	13·5	5 77	18·8

Month.	Week.	1953-54.		1952-53.		Average for the past 10 years.		Average for the past 31 years.	
		Rainfall in inches.	Number of rainy days.	Rainfall in inches.	Number of rainy days.	Rainfall in inches.	Number of rainy days.	Rainfall in inches.	Number of rainy days.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
September-October ..	27—3	0·79	2	2·36	4	1·08	1·6	0·93	1·9
	4—10	1·08	1	1·00	2	0·87	1·4	0·90	1·8
	11—17	3·26	4	0·64	2	1·84	2·7	1·43	2·8
	18—24	3·32	5	..	..	1·41	2·5	1.44	2·7
	25—31	0·22	1	1·89	3	1·44	1·7	1·83	2·5
November	1— 7	..	..	0 15	1	1·21	1·5	1·87	2·9
	8—14	..	..	0·21	1	1.58	2·5	1·36	2·5
	15—21	1·15	2	..	..	1·08	1·8	0·84	1·5
	22—28	0·31	2	..	2	0·62	1·0	0·40	0·9
November-December.	29— 5	..	..	1·05	3	0 68	1·2	0·57	1·3
	6—12	..	..	1·14	1	0·36	0·7	0·62	1·1
	13—19	0 30	1	0·21	..	0·31	0·5	0·27	0·6
	20—26	..	..	..	..	0·12	0·3	0·12	0·4
December-January ..	27—3	0·16	1	..	..	0·03	0·1	0·90	0·4
	4—10	2.20	3	0·07	..	0·24	0·4	0·27	0·5
	11—17	0·48	1	..	..	0·15	0·1	0·79	0·1
	18—24	..	..	..	..	0.18	0·2	0·06	0·1
	25—31	..	..	..	..	0.04	0·1	0·14	0·3
Total ..		13·27	23	8·72	19	13.14	20·3	14·74	24·3
February	1—7	..	..	..	..	..	..	0·04	0·2
	8—14	..	..	..	..	..	..	0·11	0·2
	15—21	..	..	..	..	0·10	0·1	0·04	0·1
	22—28/29	..	..	0·20	1	0·21	0·6	0·16	0·3
March	1—7	..	..	..	..	0·05	0·2	0·05	0·1
	8—14	0·08	..	..	..	0.01	..	0·05	0·1
	15—21	0·08	..	..	..	0·06	0·1	0·28	0·4
	22—28	0·60	1	..	..	0·16	0.5	0·13	0·3
March-April	29—4	0·21	1	0·19	1	0·25	0·8	0·39	0·9
	5—11	0·44	1	2.21	2	0·62	1.4	0·58	1·3
	12—18	0·33	1	1·62	2	0·95	1·2	0·66	1·2
	19—25	1·93	2	2·38	3	0·73	1·2	0·56	1·0
April-May	26—2	1·96	3	..	..	0·65	1·0	0·60	1·2
	3—9	..	..	1·90	2	0·48	1·1	0·60	1·5
	10—16	0·47	2	..	..	0·31	0·8	0·52	1·1
	17—23	1·67	3	0·36	2	0·32	0·8	0·67	1·4
	24—30	..	..	0·15	1	0·45	0·8	0·39	0·9
May-June	31—6	0·40	1	0·52	2	0·27	0·8	0 34	1·0
Total ..		8·17	15	9·53	16	5·62	11·4	6·17	13·2
Grand total ..		30·75	62	21.23	40	24·04	45·2	26·68	55.8

(ii) The availability of water in the only well on the station was too inadequate to meet the demands of the irrigated cotton area of 8 acres which was only 63 per cent of the average area grown to irrigated cotton during the last 5 years. The meagre supply of water not only resulted in protracted sowings of irrigated cotton but also precluded the possibility of raising *chithrai cholam* during summer The irrigated cottons considerably suffered from deficiency of moisture. Little or no rains were received during the months of November and December, when the crop should have grown rapidly and squared profusely. In addition, the early sown crops were severely damaged by boll-worm (*Earias* sp) resulting in profuse shedding of floral forms, and tender bolls which was only aggravated by the unusual heavy rains during January and March. Wilt was also much in evidence, especially in the late sown crops. The total effect of all these was the considerable reduction in yield which averaged only 650 lb. of *kapas* per acre. Though the rainfed cottons made satisfactory progress till squaring' heavy and almost continuous precipitation during January, when the crop was in full bloom and in the initial bolling phase, caused considerable shedding in floral forms. Minor boll-worm attack still further increased the shedding of bolls. Consequently, only very low yields were obtained. The average yield of 216 lb. of *kapas* obtained per acre was only 57 per cent of the normal yield. The timely receipt and favourable distribution of the South-West monsoon showers helped to reap a bumper crop of P.M. Cholam. Its average yield of 942 lb. of grain and 6350 lb. of fodder per acre was one of the highest records obtained on the station. However, the pulse crops raised as mixture with cholam did not give any yield at all. Horse-gram raised on a small area also progressed well and a good yield of 753 lb. of grain and

2,208 lb. of *bhusa* per acre was obtained. Likewise, the growth of the green manure crops was accelerated by the summer rains and very good yields were recorded. Thus, the season on the whole proved to be not very favourable for cotton, while it was conducive for the cholam and horse-gram crops.

2. *Cotton breeding.*—(i) *Irrigated Combodia.*—The breeding work for the improvement of Combodia cotton in yield, quality, resistance to pests diseases and adverse seasonal conditions with adaptability to varying environments was continued as part of the Scheme work for the improvement of American cotton in the winter season for central districts. The trials included the testing of (i) three improved cultures in one set of bulk yield trials; (ii) ten improved cultures in another set of bulk yield trials with Co. 2 and Madras Combodia Uganda I, the standards for vigour and quality respectively: and (iii) sixteen cultures in small bulk trials at Coimbatore. It was also arranged to test the purity of these cultures in compact family blocks by testing six sibs in each culture for yield, halo-length and ginning. In addition, 352 cultures were tested in replicated progeny rows. The culture tested in non-replicated progeny rows due to paucity of seeds numbered 158. For synthesising yield, quality and resistance to *blackarm* second and first generation hybrids were also raised and studied.

(*a*) *Yield trials.*—In the bulk yield tests of three advanced generation cultures, viz., 9030, 0734 and 9995 along with control strains Co. 2 and Madras Combodia Uganda 1, all the cultures were on a par with control, in yield of kapas, the difference not being significant [*vide* Table II (*a*)]. The yield trials of these cultures had been duplicated at the sub-stations at Avnashi and Tiruchengode also and the data furnished in Table II (*b*) would show that culture '9030' has fared significantly better than Co. 2 in both the locations, while being equal in yield to Madras Combodia Uganda 1 (control).

TABLE II (*a*)—*Irrigated Combodia—Bulk yield trials*, 1953–54.

1. Locality—Cotton Breeding Station, Coimbatore.
2. Number of variants—Five.
3. Lay-out—Randomised block, replicated four times.
4. Area of each plot—Gross 1·45 cents, Net 0·90 cent.
5. Date of sowing—19th September 1953.
6. Period of harvest—8th March to 12th April 1954.
7. Number of Irrigations—Nine with an interval of two weeks.
8. Manure applied—A basal dose of Farm Yard manure at 2 tons per acre and 40 lb. N as Ammonium Sulphates top dressing.

Serial number and variety. (1)	Mean yield of kapas in lb. per acre. (2)	Percentage on control M.C.U 1. (3)
1. 9030	804	102
2. 0734	758	96
3. 9995	770	98
4. Co. 2	538	68
5. M.C.U. 1	787	100

Whether significant by "F" test—No.

TABLE II (*b*)—*Irrigated Cambodia—Bulk yield trials at Sub-stations* 1953–54.

Serial number and variety. (1)	Yield of kapas in pound per acre. Avanasi (2)	Percentage on control. M.C.U.-1 (3)	Tiruchengode. (4)	Percentage on control M.U.C. 1 (5)
1. 9030	1462	92	1342	93
2. 0734	1599	100	1283	89
3. 9995	1502	94	1306	90
4. Co. 2	1314	82	1101	76
5. M.C.U. 1 (Control)	1593	100	1443	100
Whether significant by "F" test	Yes	..	Yes	
Critical difference (P : 0·05)	140	..	114	..

Conclusions— 25814 51324

A review of the performance of these three cultures, during the last five seasons at Coimbatore revealed '9030' to be the best, with a mean increase in yield of kapas by 10 per cent. above Madras Cambodia, Uganda 1, over seasons. The relevant data are furnished in Table III-A. At the sub-stations Avanashi and Tiruchengode also, culture 9030 proved to be only slightly better than Madras Combodia, Uganda 1 in yield of kapas (Table III-B).

TABLE III.—*Irrigated Combodia—Summary of performance of cultures in Table II during the past 5 years* (1949–50 to 1953–54).

A. Coimbatore.

Serial number and variety.	Yield of kapas in lb.	
	Per acre.	As percentage on control
(1)	(2)	(3)
1 9030	800	110
2 .0734	761	105
3. 9995	776	107
Co. 2	599	82
M.C.U. 1 (Control)	727	100

B. Sub-stations.

Serial number and variety.	Yield of kapas in lb. per acre.			
	Avanashi.	Percentage on control.	Tiruchengode.	Percentage on control.
(1)	(2)	(3)	(4)	(5)
1 .9030	1,558	103	1,123	104
2. 0734	1,526	101	1,175	109
3. 9995	1,572	104	1,099	102
Co. 2	1,392	92	1,004	93
5. M.C.U. 1 (Control)	1,514	100	1,076	100

However, by virture of its higher ginning percentage of 36·6 as against 35·7 for Madras Combodia Uganda 1 and with the average of 5 per cent increase in yield of kapas over seasons and locations, a mean increase of 30 lb. lint per acre has been recorded by 9030. In spinning value, '9030' is just equal to Madras Combodia Uganda 1 with 42's H.S.W.C., in spite of consistently longer and finer fibres. The value of 30 lb. of increased lint per acre recorded by 9030 is estimated at Rs. 40.

In another set of bulk yield trials, ten long stapled cultures were studied at Coimbatore as also at the regional stations, Avanashi and Tiruchengode. The purity of these cultures for the economic attributes was also tested in family block trials at Coimbatore. The data are furnished in Table IV.

TABLE IV.—*Bulk yield trails set II (Irrigated Cambodia).*

1. Locality—Cotton Breeding Station, Coimbatore.
2. Lay out—Random sed blocks, Replicated four times.
3. Number of variants—Twelve.
4. Area of each plot—Gross 0·48 cent, Net 0·36 cent.
5. Date of sowing—16th September 1953.
6. Period of harvest—8th February to 15th April 1954.
7. Number of irrigations—Nine.
8. Rainfall during growing period—14·85 inches.
9. Manure applied—Basal dose of 2 tons of cattle manure and top dressing with Ammonium sulphate at 4 lb. Nitrogen level per acre.
10. Previous crop—Sunhemp for green manure.

Serial number and culture number.	Small Bulk trail. Mean yield of kapas in lb. per acre. Coimbatore	Percentage on control.	Mean yield of lint.	Performance in family block. Yield as percentage on control.	Ginning per cent.	Fibre length in inches.	Fibre weight per 10-6 g.m. x c.m.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1. 01545-B	927	130	476	100	35·5	0·92	1·48
2. 0 545-A	796	111	471	102	35·5	0·93*	1·49
3. 8843	840	118	447	115	35·8*	0·93	1 69
4. 01541-A	767	107	456	131	35·3	0·93	1·55
5. 036	823	115	419	103*	35·0	0·93	1·34
6. 8842	708	99	425	91*	37·3	0·90*	1·44
7. 01315	704	99	433	85	34·8	0·92	1·48
8. 0777	705	99	425	88	36·3	0·93	1·29
9. 0744	743	104	408	107	34·3	0·92*	1·29
10. 01580	626	88	399	86	35·8	0·95	1·16
11. Co. 2	580	81	NA	80	NA.	...	...
12. M.C.U. 1 (Control)	714	100	412	100	34·8	0·90	1·43
Whether significant by "F" test	Yes.	..	..	No.	Yes.	Yes.	..
Standard error mean per cent	6·0	..	..	..	7·4	0·8	..
Critical difference (P-0·05)	128	..	..	..	21	6·8	..

Conclusions.— Yield (Small bulk trail)—1 3 5 2 4 9 12 6 8 7 10 11

Yield (family Block)—4 3 9 5 2 1 12 6 8 10 7 11

Ginning per cent (family Block)—6 8 3 10 1 2 4 5 7 12 9

N.B.—* Impure for the attributes; ——— Cultures better than central, N.A.—Not analysed.

It would be seen that only two culture 01545-B was significantly better than control in yield of kapas in the bulk yield trial. This has also been found to be pure for all three attributes in the family block tests. Culture 01541-A was the best in yield in the family block tests and this has also been found to be pure for all the three attributes. Culture 8842 which recorded significantly higher value for ginning per cent in the family block test was however found to be impure for yield and length. It is also noteworthy that Culture No. 01580 recorded significantly higher value for ginning per cent and fibre length and possessed low fibre weight, although the yield level was only on a par with control. This culture was also found to be pure for all the characters. Sib 01580-A, found to be earlier than Madras Combodia Uganda 1 has been arranged to be tested for its suitability to summer conditions also.

A group of sixteen long staple culture in which sufficient seeds were not available for inclusion in the bulk yield trials was tested in small bulk trials and compact family block. The results are furnished in Table V.

TABLE V—*Small Bulk Trials* (1953—54 *Irrigated Combodia*).

1. Locality — Cotton Breeding Station, Coimbatore.
2. Lay-out — Randomised blocks, replicated four times.
3. No. of variants — Eighteen.
4. Area of each plot — Gross 0.24 cent. Net 0·18 cent.
5. Date of sowing:—18th September 1953.
6. Period of harvest:—1st March to 5th April 1954.
7. Number of irrigations :—Nine.
8. Rainfall during growing period :—14.85 inches.
9. Manures applied — Basal dose 2 of tons of cattle: manure and top dressing of Ammonium sulphate to give 40 lb. nitrogen per acre.
10. Previous crop :—Sunnhemp for green manure.

Srial number and Culture number.	Mean yield of kapas in lb/acre.	Percentage on control.	Performance in Family Block. Yield as percent on control.	Ginning percent.	Mean length.	Fibre weight.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1. 01545—D	958	137	129	35·5*	0·95	1·45
2. 01545—C	8[illegible]5	124	146	35·0	0·96	1·43
3. 0752	851	122	129	34·8*	0.96	1·38
4. 01917	810	116	110*	35·8*	..	..
5. 01712	782	112	124	34·8*	0·98	1·28
6. 0811	779	111	124	34·8	0·96*	1·23
7. 01853	758	108	140	35·3	0·99	1·23
8. 01541—B	751	107	118	38·3	0·93*	1·37
9. 01980	730	104	135	32·8	NA	1·55
10. 0958	678	97	1[illegible]2	34·0*	0·93	1·27
11. 8850	709	101	107	N.A.	—	—
12. 01914	681	97	77	,,	—	—
13. 9708	675	96	106	,,	—	—
14. 0872	661	94	127	,,	—	—
15. 01543	647	93	122	,,	—	—
16. 0775	623	89	122	,,	—	—
17. Co. 2	744	106	101	,,	—	—
18. M.C.U. 1 (Control)	699	100	100	33·0	0·92	1·38
Whether significant by "F" test.	Yes.	..	Yes.	Yes.	..	..
Standard error mean per cent.	1·2	..	8·3	0·9	..	..
Critical difference (P : 0·05)	44 lb.	..	28	0·9	..	..

NOTE.—NA = Not analysed.
* = Impure for the attributes.
—— Significantly better values than control.

Conclusions—

(a) *Small bul trial—*

(i) *Mean yield of kapas—*

1 2 3 4 5 6 7 8 17 9 11 18 12 10 3 14 15 16

(b) *Compact family block—*

(i) *Yield of kapas—*

2 7 9 10 1 3 14 5 6 15 16 8 4 11 13 17 18 12

(ii) *Ginning per cent—*

4 1 7 2 8 5 6 10 18 9

It would be seen that only two cultures, viz., 01545-C and 01853 are pure for yield, length and ginning in the family block test and they are significantly better than control in all these attributes.

A Summary of the performance of the sixteen best cultures tested in yield trials and compact family blocks is furnished in Table VI along with the results of micro-spinning tests conducted on these samples.

TABLE VI—*Summary of the performance of desirable cultures arranged in order of merit* 1953—54.

Serial number and cultures number.		Nature of cross	Generation number.	Family Block.				Lee strength corrected to nominal 40's. @	Count strength product. @
				Yield as percentage on control.	Mean Fibre: Length in inches.	Mean Fibre: Weight per cm x 10.6 gms.	Ginning per cent.		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	01853	0813 x M.C.U. 2	5	140	0·99	1·37	35·3	NT	NT
2	01712	0811 x M.C.U. 2	5	124	0·98	1·28	34·8	45·6/41·3	1777/1663 (1)
3	0811	(7733 x M.C.U. 2) x 7727	10	124	0·96	1·23	34·8	48·0/44·0*	——
4	0752	(x 108 x 7625) x 7733	10	129	0·96	1·38	34·8	41·2/42·1	1652/1718
5	01580	M.C.U. 2 x M.A. II	6	86	0·95	1·16	35·8	NT	NT
6	036	7727 x 7733	11	103	0·93	1·34	35·0	40·4/42·3	1600/1677
7	0958	7727 x Buss. 069/38	9	132	0·93	1 27	34·0	42 7/42·1	1689/1718
8	0777	7733 x M.C U. 2	10	88	0·93	1·29	36·3	44·0/ 1·3	1783/1663
9	0744	(VIII 100 x 7625) x M.C. . 4 x 7733	10	107	0·92	1·29	34·3	50/44*/49·7/41·3	2028/1663
10	01545—C	M.C.U 2 x 0744	6	146	0·96	1·43	35·0	39·5/41·3	1598/1663
11	—D	do.	6	129	0·95	1·45	35·5	41·0/41·3	1687/1663
12	—A	do.	6	102	0·93	1·49	35·5	41·0/41·3	1687/1663
13	—B	do.	6	100	0·92	1·48	35·5	39·1/41·3	1550/1663
14	01315	Co. 3 x M.C.U. 2	7	85	0·92	1·48	34·8	43·2/41·3	1738/1663
15	8842	X 82 x 7625	11	91	0·90	1·44	37·3	42·3/41·3	1695/1663
16	01541	M C.U. 2 x 0744	6	131	0·93	1·55	35·3	44·6/41·3	1784/1663
17	8843	X 82 x 7625	11	115	0·93	1·69	35·8	41·5/41·3	1636/1663
M.C.U. 1 Control		S t III Set V		100	0·90	1·43	34·8		
					0·92	1·38	33·0		

NOTE.—@ Microspinning values in 1952—53 and previous year.

NT = Not tested.

(1) Denominator represents values for control, Madras Combodia Uganda-1.

* = Full spinning test.

—— Values significantly better than control M.C.U. 1 are underlined.

It would be seen that cultures 0811 and 0744 are the best in spinning with 48's and 50's H.S.W C. respectively as against 44's for control. Culture 01853 is the best in yield while being significantly better than control in mean fibre length also. The spinning performance of this culture will be assessed during the next season.

Studies were undertaken to putify culture 9030 for pollen colour and the results of this test during the year are furnished in Table VII.

TABLE VII—*Purity Studies of* 9030 *in Family Block.*

Serial number and Family number.		Mean yield of kapas in lb. per acre.	Percent on control.	Mean yield of lint in lb. per acre.	Mean ginning per cent.	Mean Fibre: Length in inches.	Mean Fibre: Weight per cm x 10—6 gm.	Purity For: Pollen colour.	Purity For: Yield.	Purity For: Ginning.	Purity For: Length.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	9030—A	802	141	287	35·8	0·95	1·23	P	P	NP	P
2	—G	781	137	281	36·0	0·94	1·27	P	P	P	P
3	—H	766	134	278	36·3	0·97	1·21	P	P	NP	P
4	—I	719	126	272	37·8	0·97	1·24	P	NP	NP	NP
5	—D	697	122	239	34·3	0·94	1·27	P	P	P	P
6	M.C.U. 1 (Control)	570	100	190	33·3	0·93	1·50	P	P	P	P

Whether significant by "F" test.	Yes	Yes
Standard error mean per cent.	7·8	2·7
Critical difference (P: 0·05)	154	0·8

Conclusion—

Mean yield of kapas in lb. per acre—1 2 3 4 5 6

Mean ginning per unit—4 3 2 1 5 6

N.B.—Values significantly better than control M.C.U. 1 are underlined.

P.—Pure.

NP.—Not pure.

It will be observed that derivative 'G' is pure for pollen colour as well as all the economic attributes. This will be multiplied to build sufficient stock of pure seeds for trial in the districts, while sibs A, H and I will be further purified as these show to a desirable extent, combination for length ginning.

(*b*) *Minor yield trials*—From a total of 352 cultures tested in replicated progeny rows 291 were harvested after field examination for vigour and productivity. Of these, 39 cultures had significantly better yield than control, the rest being equal. A total of 29 cultures were arranged to be examined for mean fibre length, selecting 21 from higher yielders and eight from equal yielders. The examination is under progress. Due to unfavourable environment caused by inadequate irrigation and high incidence or *jassids*, and flower shedding, the yield levels were very low. Hence, it may be necessary to continue the progeny row tests for one more season under better environment.

From a total of 180 plots of second generation hybrids including back crosses tested, 52 single plants possessing desirable combination for length and ginning from 17 crosses were selected for further study. Similarly, from a total of 330 plots of first generation hybrids including back crosses, 62 single plants from 41 crosses were selected for further study. All these plants have to be raised in non-replicated rows due to paucity of seeds caused by severe adverse environment During the year, a total of 1,669 fresh crosses were effected and 260 crossed bolls were collected.

(ii) *Unirrigated Nadam.*—A limited amount of work with the object of replacing the coarse perennial Nadam cotton with a short duration annual was continued utilising the breeding material on hand. Two of the best cultures were arranged to be tested in observation plots against local Nadam cotton at the Government Farm at Satyamangalam. Replicated seed nucleus plots of these cultures were raised at Coimbatore for maintenance of purity. In addition, fifteen selections were compared with the most promising culture B 32·48 in a progeny row trial and second generatiod hybrids of improved Karunganni cultures with an early type from Hyderabad were studied in replicated plots.

(*a*) *Progeny row trial.*—Though the yield differences were significant, none of the fifteen selections tested outyielded the culture, B 32·48. Basing the selection on yield and earliness nine progenies were examined for halo length and ginning percent (*vide* Table VIII). Of these, four selections combined these two attributes while in individual tracts eight had better halo length and five better ginning.

TABLE VIII—*Unirrigate Nadam-Progeny Row trials* 1953–54

1 Locality—Cotton Breeding Station, Coimbatore.
2 Variants—Sixteen of which ten were analysed.
3 Lay-out—Randomised and replicated six times.
4 Area of each plot—0·017 cent (net).
5 Date of sowing—1st October 1953.
6 Period of harvest—22nd February to 10th May 1954.
7 Previous crop—Horsegram as a rainfed crop.

Serial number and cultures.	Yield of seed cotton.		Halo length in m.m.	Ginning per cent.
	In lb. per area.	As per cent on control.		
(1)	(2)	(3)	(4)	(5)
1 23/52-1-1	445	138	23·8	29·7
2 23/52-1-2	324	100	22·7	33·4
3 23/52-1-3	408	126	22·4	32·9
4 23/52-5-1	324	100	23·2	32.7
5 23/52-5-2	489	151	22·6	29·2
6 9570-5-2	416	128	22·5	29·1
7 7358-1-2	474	147	23·9	31·4
8 7422-1	338	104	22·3	31·7
9 7422-2	430	133	21·5	33·7
10 B-32-48	324	100	21·1	29·9
Whether significant by "F" Test.	Yes.	Yes.		Yes.
Critical difference (P : 0.05) ..	191 lb.	0·6		1·5
S.E.M. per cent	21	1·0		1·7

Conclusions.—

Halo length—7 1 4 2 5 6 3 8 9 10

Ginning per cent—9 2 3 4 8 7 10 1 5 6

(*b*) *Second generation hybrids.*—Among the second generation hybrids, derivatives of cross, K. 2X43—276, were found to be earlier than the best culture on hand. Five crosses were observed to be significantly better than the standard in yield while three were promising with regard to halo length. Appreciable increase in ginning percentage was however found to be wanting in the material.

(iii) *Unirrigated Karunganni.*—The three items of breeding work on the improvement of Karunganni cotton pursued during the year consisted of (1) a small bulk trial and corresponding family block with four cultures for test of yield and purity (2) a progeny row trail consisting of 43 selections derived from multiple hybrids and (3) a replicated nucleus plot with two derivatives of the best Culture 5341.

(1) *Small bulk trial and compact family block.*—Of the four cultures tested, one viz., 7417 proved to be homozygous for the economic characters while it also excelled the control K. 5 in yield, halo length and ginning per cent in the small bulk trail. This culture was noted to yield stronger yarns than K. 5 in the micro-spinning tests. This will therefore be advanced to bulk yield trail. Of the other two cultures, one was better in halo length alone while the other was an improvement over K. 5 for both halo length and ginning per cent. The results are presented in Table IX.

TABLE IX—*Unirrigated Karunganni—Comparative performance of the cultures in small Bulk Trials and compact Family Block* 1953–54.

1 Locality—Cotton Breeding Station, Coimbatore.

2 Variants—Five.

3 Lay-out—Randomised and replicated 4 times in small bulk trial and 6 times in compact family block.

4 Area of each plot—Small bulk trial—Gross—0·28 and net—0·25 cent. Compact Family Block—0·102 (net).

5 Date of sowing—Small bulk trial on 13th September and compact Family block on 1st October 1953.

6 Period of harvest—Small bulk trial—8th February to 26th April 1954. Compact Family block—22nd February to 10th May 1954.

7 Previous crop—Bengal gram as a rainfed crop.

Serial number and cultures.	Yield of seed cotton.				Halo Length in mm.		Ginning per cent.		Lint yield in lb. per acre.		Purity-sib difference.		
	Small bulk trial.		Compact family block.										
	In lb. acre.	As per cent on control.	In lb. per acre.	As per cent on control.	Small Bulk Trial.	Compact family block.	Small Bulk Trial	Compact Family Block.	Small Bulk Trial.	Compact family block	Yield.	Halo length.	Ginning per cent.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1 7417	474	162	311	123	24·2	24·1	34·3	34 1	161	106	N	N	N
2 5341	452	154	268	106	23·4	23·6	32·3	32·7	145	88			
3 7394	301	103	237	94	23·6	23·8	33·5	32·1	102	76	Not examined.		
4 7401	233	80	252	100	24·9	24·3	30·3	31·1	70	78			
5 K. 5	293	100	252	100	21·7	22·1	30·8	30 0	91	75			
Whether significant by "F" Test.	Yes.	..	No.	..	Yes.	Yes.	Yes	Yes.	..	..			
Critical difference (P : 0·05)	57 lb.	..	..	..	0·7	0·6	1·4	1.1	..	..			
S.E.M. per cent	5·7	..	..	..	1·0	0·9	1·6	1·0	..	..			

conclusions—

Small Bulk trial—

Yield 1 2 3 5 4

Halo length 4 1 3 2 5

Ginning per cent 1 3 2 5 4

Compact Family Block—

Halo length 4 1 3 2 5

Ginning per cent 1 2 3 4 5

N.=Not significant.

—— Values significantly better than control K. 5 are underlined

(2) *Progeny row trial.*—Out of the 43 selections tested, only fifteen were subjected to detailed examination, based on the yield performance. Among these fifteen selections, six were found to combine all the characters viz. yield, halo length and ginning while fourteen were noted to be good combinations for h length and ginning per cent alone. The performance of the 15 selections is furnished in table X.

TABLE X.—*Progeny Row trials* 1953–54—*Unirrigated Karunganni.*

1 Locality—Cotton Breeding Station, Coimbatore.
2 Variants—Fortyfive of which 17 were analysed.
3 Lay-out—Randomised and replicated 6 times.
4 Area of each plot—0·017 (net)'
5 Date of showing—1st October 1953.
6 Period of harvest—22nd February 1954 to 10th May 1954.
7 Previous crop—Bengal gram as a rainfed crop.

Serial number and cultures.	Yield of seed cotton. In lb. per area.	Yield of seed cotton. As per cent on control.	Halo length in m.m.	Ginning per cent.
(1)	(2)	(3)	(4)	(5)
1 7302-1	429	127	24·2	36.0
2 -3	429	127	24·8	34·6
3 7303-2	552	164	24·2	34 6
4 7392-2	521	155	25·1	31.3
5 7404-1	644	191	24·5	35·0
6 -2	570	169	24·3	34·5
7 7405-3	570	169	24·3	35·9.
8 7409-1	478	142	25·2	32·1
9 7410-1	447	132	24·8	32·1
10 7412-3	447	132	26·1	30·1
11 3258-2	631	187	24·3	33·0
12 -4	631	187	23·3	33·1
13 -5	644	191	21·9	32 9
14 -7	447	132	23·6	33·0
15 3298-2	469	139	24·2	33·4
16 5341	398	117	22·8	33·8
17 K. 5	337	100	21·3	30·1
Whether significant by "F' Test.	Yes.	..	Yes.	Yes.
Critical difference (P: 0·05) ..	214 lb.	..	0·7	1·4
S.E.M. per cent..	22·0	..	1·0	1·7

Conclusions—

Yield—5 13 11 12 6 7 3 4 8 15 9 10 14 1 2 16 17

Halo length—10 8 4 2 9 5 6 7 11 1 3 15 14 12 16 13 17

Ginning—1 7 5 2 3 6 16 15 12 11 14 13 8 9 4 10 17

—— Values significantly better than control K5, are under lined.

(3) *Replicated seed nucleus plot.*—Of the two derivatives of the best culture 5341 maintained in this study, one viz. 5341-D was found to be homozygous for all the economic characters. The yield performance of this sib will be tested during the next season in a bulk yield trial.

Apart from these studies, materials from the Karunganni Scheme were also tested at Coimbatore.

In addition to the four long linted cultures, viz. 6186, 6188, 6874 and 6312 mentioned in the previous report six others were tested in a bulk yield trial. It was found that four of them (*vide* table XI), viz. 8012, 7510, 7225 and 8076 were significantly better than K. 5 in the matter of yield, halo length and ginning per cent. Results from replicated seed uncleus plots maintained simultaneously for all these cultures revealed all the cultures except 7225 to be homozygous.

TABLE XI.—*Karunganni Scheme—Bulk Yield trial I* (1953-54).

1 Locality—Cotton Breeding Station, Coimbatore.
2 Variants—10+2 Controls.
3 Lay-out—Randomised and Replicated 4 times.
4 Area of each plot—Gross 2·19 cents.
Net—1·72 cents.
5 Date of sowing—13th and 14th September 1953.
6 Period of harvest—21st January 1954 to 29 April 1954.
7 Previous crop—Bengal gram (*Cicer arietinum*).

Serial number and culture.	Yield of kapas in lb. acre.	Lint yield in lb. per acre.	Percentage on control K. 2.	Halo length in m.m.	Ginning per cent.	Fibre length in inches.	Fibre weight per c.m. × 10·6—g.m.	H.S.W.C.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1 8012	498	173	163	24·2	34·8	0·96	2·13	..
2 7510	468	157	148	24·4	33 5	0·94	2·10	..
3 7225	454	151	142	24·1	33·3	0,92	1·97	30's
4 6186-9	443	145	137	24·3	32·8	0 98	1·88	32's
5 6188-8	429	139	131	25·0	32·5	0·95	1·87	32's
6 8076	413	138	130	24·0	33·5	0·94	1·95	..
7 8014	387	133	125	24·2	34·3	0·94	2·26	..
8 6874	366	118	111	23·9	32·3	0·97	1·89	33's
9 6312-4	339	111	105	24·8	32·8	0 94	1·74	33's
10 7907	318	109	103	24,1	34·3	0·96	1·85	..
11 K. 2	333	106	100	22·5	31·8	0 86	2·08	26's
12 K. 5	299	93	88	22·5	31·0	0·90	2·29	23's
whether significant by "F" Test.	Yes.			Yes.	Yes.			
Critical difference (P : 0·05)	72			0·8	1·2			
S.E.M. per cent	6·3			0·8	1·3			

Conclusions.—

Yield—1 2 3 4 5 6 7 8 9 (11) 10 12

Halo length—5 9 2 4 1 7 3 10 6 8 (11) 12

Ginning per cent—1 7 10 2 6 3 4 9 5 8 (11) 12

— = Values significantly better than K. 2 control are underlined.

In the small bulk trial, eighteen cultures were studied in 2 sets. For combination of all the three economic characters, only one culture viz. 6383-1-A was outstanding (*vide* table XII), culture 7070-3/51 was significantly better than K. 2 for all the characters except halo length while culture 8005-A was better in yield and halo length. Test of fibre properties of all these 18 cultures have shown all of them except one to be improvements over the standards K. 2 and K. 5.

TABLE XII (*a*)—*Small Bulk trial Set-I* 1953-54.—*Karunganni Scheme.*

1 Locality—Cotton Breeding Station, Coimbatore.
2 Variants—10+2 controls.
3 Lay-out—Randomised and replicated four times.
Previous crop—Bengalgram (*Civer arietinum*).
4 Area of each plot—Gross 1.03 cents—Net—0·7₁ cent
5 Date of sowing—14th September 1953.
6 Period of harvest—22nd January 1954 to 30th April 1954.

Serial number and Culture.	Yield of kapas in lb/acre.	Lint yield in lb. per acre.	Percentage on control. K. 2·	Halo length in m.m.	Ginning percent.	Fibre length in inches.	Fire weight per cm × 10·6 grams.	H.S.W.C
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1 6383-1-A ..	504	180	151	23·6	35·8	..	..	24's
2 7070-3/51 ..	476	163	137	23 0	34·3	0·93	1·99	..
3 6323-3-B ..	445	145	122	24·0	32·5	0·93	1·75	..
4 7865 ..	444	150	126	23 4	33·8	0·96	1·90	..
5 6381-3-A ..	439	147	124	24·1	33·5	..	..	..
6 7910 ..	436	145	122	23·4	33·3	..	..	..
7 8080 ..	429	156	131	23·9	36·3	0·93	2·33	..
8 6434-4-D ..	403	139	117	23·5	34·5	0·94	2·00	..
9 7905 ..	396	134	113	24·1	33·8	0·91	1·96	..
0 7936 ..	358	124	104	23 1	34·5	..	..	..
9 K.2 ..	375	119	100	22·4	31·8	0·86	2·08	..
A.5 ..	301	96	81	22·5	31·8	0·90	2·29	..

Whether significant by "F" test.	Yes	Yes.	Yes.
Critical difference (P : 0·05).	98	0·7	1·3
S.E.M.%	8·1	1·0	1·3

Conclusions—

Yield—1 2 3 4 5 6 7 8 9 (11) 10 12

Halo length—5 9 3 7 1 8 4 6 10 2 12 (11)

Ginning percent—7 1 8 10 2 4 9 5 6 3 (11) 12

— = Values significantly better than K. 2 control are underlined.

TABLE XII (*b*)—*Karunganni Scheme—Small Bulk Trial-Set II*—1953-54.

1 Locality—Cotton Breeding Station, Coimbatore.
2 Variants—8+2 controls.
3 Lay-out—Randomised and replicated 4 times.
4 Area of each plot—Gross 1·02 cents—Net 0·72 cents.
5 Date of sowing—14th September 1953.
6 Period of harvest—22nd January to 30th April 1954.

Previous crop—Bengal gram (*Cicer arietinum*).

Serial number and culture.	Yield of kapas in lb/acre.	Lint yield in lb. per acre.	Percentage on control K. 2.	Halo length in m.m.	Ginning per cent.	Fibre length inches.	Fibre weight per cm x 10·6 grms.	H.S.W.C
(1)	(2	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1 7704 ..	557	169	121	24·2	30·3	0·94	1·69	..
2 8005-A	528	165	118	23 3	31·3	0·97	1·73	..
3 7331-C	474	152	109	23·1	32·0	0·96	1·84	..
4 5341-1/4	470	150	107	23·1	32·0	Not tested.		..
5 6517-3-D ..	462	152	109	23·2	32·8	0·94	1·90	..
6 7152-E	429	141	101	23·4	32.8	0·89	1·94	..
7 8193	393	133	95	24·5	33·8	0·91	2·06	..
8 8378	349	113	81	23·9	32·5	0·93	1·90	..
9 K. 2	446	140	100	22·0	31·5	0·86	2·08	26's
10 K. 5	362	110	79	21·9	30·5	0·90	2·29	23's
Whether significant by "F" test.	Yes			Yes	Yes			
Critical difference (P : 0·05).	74			0·8	2·1			
.E.M.%	5·7			1·3	2·2			

Conclusions—

Yield—1 2 3 4 5 (9) 6 7 10 8

Halo length—7 1 8 6 2 5 4 3 (9) 10

Ginning per cent—7 5 6 8 4 3 (9) 2 10 1

— = Values significantly better than K. 2 control are underlined.

(iv) *Perennial cottons.*—With the object of isolating the most suitable perennial cotton type fit for cultivation in waste lands, back yards of houses, water courses etc. the breeding work was continued on this item. The comparative study of the perennials, Moco and Caramura on different Agricultural Stations indicated that Moco was more adaptable to varied climatic and soil conditions than Caramura. The stock of Moco was, however found to be variable and its purification was undertaken. Among the pure, type selections isolated, two viz. Moco P. 5 and P. 24 have been observed to be outstanding. In addition another Brazilian type, Serido has also shown promise with regard to yield. The performance of these types is set forth in table XIII. One other promising type was received from the Director of Agriculture, Madras. It was found to posses a staple of $1\frac{1}{4}$" combined with a ginning per cent of 34. Progeny of this plant has been raised for further observation and study. During the year, 38 lb. of Moco seeds were supplied to 40 interested parties.

TABLE XIII.—*Perennial Cottons—Data from the best types.*
(1953-54)

Serial number and name of type.	Number of B lls per plant.	Yield in grams per plant.	Halo length in m.m.	Ginning per cent.
(1)	(2)	(3)	(4)	(5)
1 Moco P. 5	33	73·3	32	24
2 Moco P. 24	27	43·3	28	31
3 Serido	30	56·6	27	23

(v) *Maintenance of purity of improved strains.*—Strains Madras Cambodia Uganda 1, Co 2., and K. 5 were maintained in seed nucleus plots during the year. The plots were rogued clean, of off-types and the flowers were selfed. Strain Madras Cambodia Uganda 1 was raised on an area of 1·90 acres in Fd. 43 of the Central Farm and from this area a total of 412 lb. of selfed *kapas* was collected, the acre yield obtained b ing 505 lb. of *kapas* including n turally fertilised *kapas*. The reason for the low yield of selfed *kapas* was the heavy shedding of buds and bolls in the peak productive phase, due to untimely rains and boll worm attack. The *kapas* has been ginned and a total quantity of 270 lb. of self fertilised seeds has been obtained.

Strain Cambodia 2 was maintained on an area of 1 acre in Fd. 42 of Central Farm and the flowers were selfed after removal of off-types. The crop yielded 725 lb. of *kapas* per acre. The total quantity of selfed kapas obtained was 242 lb. only, due to heavy shedding. One hundred and fifty-eight lb. of self fertilised seeds have been obtained from the crop.

Strain K. 5 was raised over an area of 5·50 acres in two fields of the red soil block of the Cotton Breeding Station and about 2 acres in this was treated as nucleus area for selfing of flowers. The entire area of the crop was examined for purity and the rogue plants removed. Unfortunately in this crop, practically all the flowers that were selfed during the peak flowering phase shed d e to untimely heavy rains and only as little as 8 lb. of self fertilised seeds have been obtained. The acre yield of *kapas* was also low being 176 lb. in one field (10d) and 216 lb. in the other (10 e). A total quantity of 530 lb. of pure seeds from the rogued area has been obtained for multiplication.

(vi) *Wild cotton hybrids.*—The study of selections derived from crosses involving wild cotton types like *darwinii*, *taitense* and *raimondii* was continued. The basic hybrids, viz. Hexaploid (4463 × *raimondii* colchicine doubled) and *darwinii* x *taitense* had been crossed with cultivated *hirsutum* types like Madras Cambodia Uganda 1 and 2, 4463, H. 19 and 1908. During the year, fifty-two promising single plants from twenty selections were tested in a progeny row trial. Delayed sowings, paucity of water and severe *jassid* attack affected the normal growth of the crop. In spite of these adverse environmental factors, three selections (vide table XIV) have been found to outyield the control Madras Cambodia Uganda 1 and Madras Cambodia Uganda 2. In halo length, nine selections were found to be improvements over Madras Cambodia Uganda 1. But in ginning outturn, none of the selections has excelled Madras Cambodia Uganda 1.

TABLE XIV.—*Wild Cotton Hybrids—Progeny Row Trial* (1953-54).

1 Locality—Cotton Breeding Station, Coimbatore.
2 Variants—54 in two sets of which 14 were analysed.
3 Lay-out—Randomised and replicated 6 times.
4 Area of each plot—0·029 cent.
5 Date of sowing—2nd October 1953.
6 Period of harvest—4th February to 10th April 1954.
7 Previous crop—Sunnhemp.

Nature of cross and selection number.	Yield in lb/acre.	Percentage on control M.C.U-I.	Halo length in m.m.	Ginning per cent.
(1)	(2)	(3) Set I.	(4)	(5)
4463 (darwinii X taitense)—				
9-8-1-1	218	200	25·9	35·7
9-8-2-1	163	150	25·4	31·7
9-8-2-3	131	120	24·6	35·0
4463 (darwinii X taitense) M.C.U.-2—				
1737-37-1-3	196	180	24·8	36·3
1737-48-1-2	163	150	24·9	34·7

Nature of crose and selection number.	yield in lb. acre.	Percentage on control M.C.U.I.	Halo length in m.m.	Ginning per cent.
(1)	(2)	(3)	(4)	(5)
(Hexaploid X M.C.U.-2) M.C.U.-2—				
1318-6-1-2	185	170	25·2	36·0
1318-6-1-4	218	200	27·9	35·0
1318-28-2-2	152	139	24·7	35·0
1318-28-2-3	152	139	25·7	34·3
M.C.U-1 (Control) ..	109	100	23·9	34·7
Whether significant by "F" test.	No	..	Yes	No
Critical difference (P : 0·05).	..	..	0·7	..
	SET : II.			
M.C.U-1 [4463 (*darwinii X taitense*)—				
1774—1—2—2	*309*	*190*	23·6	33·7
1774—1—2—3	*526*	*323*	24·2	34·2
(*Hexaploid X M.C.U.*-2) *M.C.U*-2—				
1318—18—3—1	*345*	*212*	25·7	34·3
M.C.U.-1 (Control)	163	100	24·3	35·2
Whether significant by "F" Test	Yes		No	No
Critical difference (P : 0·05)	129		..	..

—Values significantly better than M.C.U.I. control are underlined.

(vii) *Studies for black-arm resistance*—(*a*) *Breeding.*—The studies for *black-arm* resistance were continued during the year, by testing second generation hybrids under artificial inoculation of the *bacterium* under field conditions. Five derivatives of Hexapaoid × Madras Cambodia Uganda 2 and 35 derivatives of hybrids between resistant types like 2196, RA8, RA18 and adapted types like Madras Cambodia Uganda 1, 9030, 8850 and Montserrat which had registered resistance in the first generation during last season's trials, were tested in two sets of replicated trials. The season was considered favourable to the organism. The results of grading and analysis reveal that three of hexaploid crosses and three amongst the derivatives of crosses between resistant and adapted types were equal to the resistant control for *black-arm* resistance. In quality and ginning per cent they were inferior to the control, viz., Madras Cambodia Uganda 1. The summary of performance of the resistant materials is furnished below :—

Black-arm resistance studies.

GROUP I.

culture number.	Nature of cross.	Mean infection.	Percentage of plants infected.	Mean halo length in m.m.	Mean ginning percentage.	Remarks.
1—21—6—3—1/5	Hexaploid × M. C. U. 2	1·4	41·5	(26)	(31)	
1—21—6—2—3/1	do	1·1	48·8	(25)	34	
1—22—10—1—4/3	do	1·3	37·5	(24)	34	
2196	Dhar Am. (1027 ALF × Dhar American)	0·8	45·0	(24)	(32)	Control for black-arm.
M.C.U. 1.				27	35	Control for quality.
Wheter significant by "F" test.		Yes.	Yes.	Yes.	Yes.	
Critical difference (P. 0·05)		0·9	30·3	0·1	1·9	

GROUP II.

5263 2/4	M.C.U. 1 x RA8	0·7	15·3	(23)	(25)	
5011 1/5	8850 x RA 23	0·9	18·1	(24)	(25)	
5019 1/4	9030 x RA 18	0·8	30·0	(24)	(29)	
2196	Dhar Am x (1027 x 0 Dharwar American)		0	(24)	(32)	
	M.C.U. 1	1·8	90·0	26	34	
Whether Significant by 'F' test		Yes.	Yes.	Yes.	Yes.	
Critical Difference (P=0·05)		0·8	21·0	1·8	0·8	

N.B.—The analysis for percentage of affected plants was worked with percentages transformed to Sins

Though resistance is observed in a few plots, the quality, viz., length and ginning require to be further improved.

(*b*) *Pretreatment of seeds with chemicals against primary infection of blackarm.*—During the year, an experiment was laid out in collaboration with the Goverenment Mycologist to study the effect of pretreatment of cotton seeds with the three synthetic preparations, Agrosan, perenox and Y. F. 2776 against primary infection of *black-arm* and to assess the effect of the treatments on the performance of the crop. The experiment altogether consisted of 30 treatments. The seed dressing agents used were (1) Agrosan G. N. (2) perenox, (3) perenox with cowdung and (4) Y. F. 2776. Each of these was sed in two concentrations, viz., one in 150 and one in 300 and each was treated both under dry and slurry conditions, except in the case of perenox with cowdung which could be treated as slurry only. All the treatments except the one with perenox and cowdung where carried out on fuzzy as well as delinted seeds. Four controls using fuzzy and delinted seeds as dry and slurry with no seed dressing completed the thirty treatments All the seed treatments were done in collaboration with the Government Mycologist. The experiment was laid out (i) with the Madras Cambodia Uganda 1 under irrigated conditions in Fd. No. 68 of the Central Farm, (ii) with K. 5 under dry conditions in the blacksoil block of the Cotton Breeding Station and (iii) with K. 5 under dry conditions in the red soil block of the Cotton Breeding Station. The experiment in each locality was randomised and replicated four times.

In germination, no differential effect was manifest due to the seed treatments. In general, delinted seeds gave better and quicker germination uniformly in all the variants. Measurement of plant height to study the effect of the treatments on growth did not reveal any difference due to seed treatment. However, in the early phase, pretreatment in delinted seeds tended to record slightly better height. The field observations for the primary infection of *blackarm*, were recorded by the Government Mycologist. In the experiment with Madras Cambodia Ugandia 1 secondary infection of *blackarm* was noted and was observed to be uniformly spread in all the plots, the treated as well as the control ones. The final yield data obtained in all the three sets of experiments disclosed that there was no favourable significant effect on yield due to the pretreatment of the seeds with the three chemicals tested.

3. *Fundamental studies*—(i) *Genetic types*—A total of 46 genetic types covering anthocyanin pigmentation, plant habit, leaf shape, boll dehiscence, lint characters and meristic variation was maintained and studied. All the types were observed to breed true.

(ii) In order to study the inheritance of fibre fineness, Northerns 14, a fine linted *arboreum* type was crossed with three coarse types of cotton, viz., *sanguineum*, *cernuum* and Podupathi and the F.1's were raised during the previous season. In the F.1's longer halo length, which is more or less correlated with fineness was found to be dominant. The F.1's were backcrossed to both the coarse and fine linted parents. During the current season, backcross F.1's and F.2's were raised. Fineness as indicated by fibre weight is yet to be determined. Determination of halo length indicated the inheritance to be typically quantitative involving more than one gene.

(iii) It was sought to study the relationship of the meristic variant with two other mutants in Asiatic cotton, viz., 'Pistillate' and 'Green-stem-ghost-spot', But studies could not be completed since homozygous plants were not obtained in the first mentioned parent. Pure plants have now been selected in the field and fresh crosses have been effected.

(iv) Two dwarf mutants, one broad leaved and the other narrow leaved were received from Koilpatti. In order to study their relationship with the other dwarf mutants and normal types, crosses have been effected between them. A total of 109 crossed bolls have been secured.

Studies on heterosis (*a*) *Annual cottons.*—One interspecific cross between Co. 2 a hardy vigorous, medium quality *hirsutum* type and S.I.V. 135, the longest and finest cotton of the world from the West Indies belonging to G. *barbadense* group was studied during the previous season for manifestation of heterosis. The cross exhibited hybrid vigour in plant height, flower production, yield of seed cotton and seed index. The studies were pursued during the year with the object of exploring ways of harnessing the hybrid vigour in the subsequent season. This was sought to be achieved (1) by ratooning the hybrids and treating them as perennials and (2) by attempting vegetative propagation of the hybrid stem cuttings. When the F.1's were 14 months old, they were ratooned a foot above the ground level. From these, cuttings, each six nodes in length were prepared and planted in a rooting medium made up of two parts of red soil and one of sand. Later, they were transplanted in the field alongside the ratoon. A small crop was raised in the adjoining area from hybrid seeds for the sake of comparision. The average yield obtained per plant in the first year crop and the ratoon are furnished in table XV, along with the other characters studied. The data disclosed that the ratoon was even more prolific than the first year crop, indicating the feasibility of treating the F.1's as a ratoon. Though a slight reduction is apparent in halo length and seed index in the ratooned crop, it is to be ascribed to seasonal effects since the seed sown crop also was found to register more or less the same values, the data of which are presented in table XV.

TABLE XV.—*Heterosis studies—Performance of the ratoon* (1953–54).

(1)	Yield per plant in g.m. (2)	Halo length in m.m. (3)	Ginning per cent. (4)	Lint index in g.m. (5)	Seed index in g.m. (6)
F.1 First year crop ..	20·3 ± 1·4	34·1 ± 0·3	23·2 ± 0·2	4·27 ± 0·07	14·07 ± 0·1
F.1 ratoon ..	32·2 ± 2·9	31·9 ± 0·2	23·7 ± 0·1	3·79 ± 0·04	12·30 ± 0·04
Heterosis studies—Performance of crop raised from cuttings (1953–54).					
F.1 raised from cuttings ..	6·4 ± 0·2	31·6 ± 0·8	23·0 ± 0·12	3·9 ± 0·15	13·3 ± 0·50
F.1 raised from seeds ..	6·2 ± 0·8	31·1 ± 0·3	23·7 ± 0·4	3·9 ± 0·08	12·4 ± 0·02

Out of the total number of 82 cuttings planted, only nine reached the productive phase. Though all the cuttings showed signs of survival, due to inadequate water-supply in the early phase, a majority of them got dried up. Though the final population was small, the data obtained from the crop raised from cutting and a small crop raised from hybrid seeds (table XV) indicate that the F.1's raised from cuttings have maintained all the characters of the original hybrid. The establishment of the cuttings was however low during the season due to acute water scarcity and lack of irrigation.

(*b*) *Hybrid perennial cottons.*—The advantage in the perennial cotton crosses is the small quantity of seeds required for multiplication. If heterosis is manifested by any perennial hybrid, its multiplication would be easier, and the benefits could be derived for longer periods.

The second year performance of two intra-species and four interspecific hybrids involving G. *hirstum* and G. *barbadense* raised in a randomised replicated experiment was studied. The data are presented in table XVI. It will be observed that heterosis in growth has been exhibited by two interspecific crossess Moco × Quebradhinho and Moco × S. I. V. 135. The only cross that can be reckoned to have shown heterotic effect in yield is Moco ×Quebradinho, though this cross also just failed to register increase over the higher parent at the significant level. It gave 77.6 per cent more yield than that of the higher parent. In halo length, all the crosses except Moco ×Quebradinho failed to exhibit heterosis. The F.1 values were however of a high order and transgression was evident in all interspecific crosses though

the increases were not significant. In ginning per cent Moco × Quebradinho again exhibited heterosis. One other cross, viz. Moco × Caramura also exhibited hybrid vigour for this attribute. In lint and seed indices, none of the crosses studied, manifested heterosis. Of the several crosses studied Moco × Quebradinho appeared to be the best from the point of view of yield and quality. Its calculated yield of 1,904 lb. of kapas per acre can be considered phenomenal under rainfed conditions.

TABLE XVI.—*Heterosis in perennial cotton hybrids* (1953–54).

Nature of cross.	F. 1 hybrid.	Ovule parent.	Pollen parent.	Difference of F.I. from higher parent (a).	Difference of F.I. from Average of parents (b).	Critical difference. P=0·05	Significance for heterosis +values of (a)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Plant height in c.m.							
Intra Species—							
Moco × Caramura	139·5	115·5	73·5	+ 24·0	+ 45·0	57·2	No
Quebradinho × S.I.V. 135	88·0	132·0	47·0	− 44·0	− 1·5	do.	No
Inter Specific—							
Moco × Quebradinho	251·5	115·5	132·0	+119·5	+127·7	do.	Yes
Moco × S.I.V. 135	181·3	115·5	47·0	+ 65·8	+100·0	do.	Yes
Caramura × S.I.V. 135	127·8	73·5	47·0	+ 54·3	+ 67·5	do.	No
Caramura × Quebradinho	135·3	73·5	132·0	+ 3·3	+ 32·5	do.	No
Yield in Oz. per plot.							
Intra Species—							
Moco × Caramura	39·6	35·6	40·6	− 1·0	+ 1·5	27·9	No
Quebradinho × S.I.V. 135	8·3	9·4	0·2	− 1·1	+ 3·5	do.	No
nter Specific.—							
Moco × Quebradinho	63·2	35·6	9·4	+ 27·6	+ 40·7	do.	No
Moco × S.I.V. 135	27·2	35·6	0·2	− 8·4	+ 4·3	do.	No
Caramura × S.I.V. 135	19·1	40·6	0·2	− 21·5	− 1·3	do.	No
Caramura × Quebradinho	28·2	40·6	9·4	− 12·4	+ 3·2	do.	No
Halo length in m.m.							
ntra Species—							
Moco × Caramura	28·1	25·0	28·9	− 0·8	+ 1·1	2·3	No
Quebradinho × S.I.V. 135	30·6	21·6	32·1	− 1·5	+ 3·7	,,	No
nter Specific—							
Moco × Quebradinho	28·1	25·0	21·6	+ 3·1	+ 4·8	,,	Yes
Moco × S.I.V. 135	32·8	25·0	32·1	+ 0·7	+ 4·2	,,	No
Caramura × S.I.V. 135	34·0	28·9	32·1	+ 1·9	+ 3·5	,,	No
Caramura × Quebradinho	30·2	28·9	21·6	+ 1·3	+ 4·9	,,	No
Ginning per cent.							
ntra Species—							
Moco × Caramura	28·5	26·0	26·8	+ 1·7	+ 2·1	1·6	Yes
Quebradinho × S.I.V. 135	24·5	29·8	25·0	− 5·3	− 2·9	,,	No
I nter Specific—							
Moco × Quebradinho	32·0	26·0	29·8	+ 2·2	+ 4·1	,,	Yes
Moco × S.I.V. 135	23·5	26·0	25·0	− 2·5	− 2·0	,,	No
Caramura × S.I.V. 135	22·5	26·8	25·0	− 4·3	− 3·4	,,	No
Caramura × Quebradinho	30·3	26·8	29·8	+ 0·5	+ 2·0	,,	No
Lint Index in g.m.							
ntra Species.—							
Moco × Caramura	2·5	2·3	2·8	− 0·3	− 0·1	0·3	No.
Quebradinho × S.I.V. 135	3·3	4·5	2·2	− 1·2	− 0·1	,,	No.
nter Specific—							
Moco × Quebradinho	3·9	2·3	4·5	− 0·6	+ 0·5	,,	No.
Moco × S.I.V. 135	2·5	2·3	2·2	+ 0·2	+ 0·2	,,	No.
Caramura × S.I.V. 135	2·5	2·8	2·2	− 0·3	−	,,	No.
Caramura × Quebradinho	3·9	2·8	4·5	− 0·6	+ 0·2	,,	No.
Seed index in g.m.							
I ntra Species—							
Moco × Caramura	6·2	5·9	7·6	− 1·4	− 0·6	0.8	No.
Quebradinho × S.I.V. 135	[10·2	10·7	8·6	− 0·5	+ 0·5	,,	No.
Inter Specific—							
Moco × Quebradinho	8·3	5·9	10·7	− 2·4	−	,,	No.
Moco × S.I.V. 135	8·1	5·9	8·6	− 0·5	+ 0·8	,,	No.
Caramura × S.I.V. 135	8·7	7·6	8·6	+ 0·1	+ 0·6	,,	No.
Caramura × Quebradinho	8·9	7.6	10·7	− 1·8	− 0·3	,,	No.

4. *Utilization of rice fallows.*—During the year, the trial of early American varieties and study of other cognate agronomical aspects were carried out at Coimbatore (Central Farm). Aduthurai and Palur. The trials consisted of co-ordinated yield tests of varieties, spacing experiments and trials for assessing the residual effect of growing cotton in rice fallows on succeeding paddy crop at the three centres, in addition to breeding work at Aduthurai. The results are being reported separately.

5. *Other crops*—(i) *Periamanjal cholam.—Periamanjal cholam* was grown on an area of 39·52 acres primarily as a fodder source. The sowings were done in the proper season and the subsequent growth and development were satisfactory. The crops were, however, severely infested with *striga* and as much as 650 lb. of green *striga* plants were removed on an average per acre. A total quantity of 10,939 lb. of grain and 71,513 lb. of fodder were harvested from the cholam crop working out to an average of 942 lb. of grain, 6,350 lb. of fodder per acre, which should be considered high yields. The net income per acre from this crop was Rs. 175.

(ii) *Pulse crops.*—As a measure of enhancing the income of the farm, the three course rotation followed hitherto, viz., cotton first year, *cholam* second year and pulse crop third year, was modified during the current season by deleting the pulse crop. The recuperative effect of the pulse crop was sought to be achieved by sowing one line of pulse, lab lab or cowpea for every five lines of cholam. No pure pulse crop was therefore raised during the year excepting a small area of 60 cents of horse-gram. This crop put forth luxuriant growth and gave a bumper yield of 753 lb. of grain and 2,208 lb. of *bhusa* per acre. Lab lab and Cowpea raised as mixtures with *cholam* did not come up well to give any yield. They were harvested along with the *cholam* crop.

(iii) *Green manure crops.*—(*a*) Daincha, Sunnhemp and *Sesbania* were raised during summer months in fallow fields over an area of 21·13 acres. The unusually heavy summer showers amounting to 8·17 inches helped the crop to come up and to yield a good tonnage. The total quantity of green matter produced from these crops was estimated at 90 tons.

(*b*) *Gliricidia and Sesbania on field bunds.*—Fresh plantings of about 2,000 Gliricidia seedlings were done during the year. The total number of Gliricidia plants standing in field bunds in the Cotton Breeding Station at the end of the year was 7,040 as against 5,250 at the end of the previous year. A further batch of 940 seedlings have been raised in pots to be transplanted with the receipt of monsoon rains. From a large number of Sesbania plants raised in field bunds, 33 lb. of seeds were collected.

(*c*) *Other green manure plants.*—A total of 362 seedlings of *Indigofera teysmanii* obtained from Aduthurai, Pattambi and Central Farm were planted from time to time during the year. Of these, 226 are surviving. A few seedlings in each of *Cassia lechenauliana* and *Phaseolus semi erectus* have been raised.

(iv) *Ramie.*—Seventeen cuttings of Ramie were received from Bombay. These were planted on prepared ridges and seven of them have established well. The plants, however, are making slow progress.

(v) *Pepper.*—Twenty rooted cuttings of Pepper received from the Pepper Specialist, Taliparamba, were planted during the year. In spite of careful nurturing with hand watering and providing shade, the plants did not seem to take kindly to the new environment. Only three plants are surviving without any perceptible growth.

(vi) *Potato.*—Seventy pounds of potato seeds of the variety 'President' were received from the Agricultural Demonstrator, Coonoor. These were planted in the last week of October 1953. The tubers were harvested in February 1954 and 80 lb. of tubers were only obtained. Germination was poor, the growth tardy, the yield uneconomieal and the quality bad.

(vii) *Bastard sago.*—Eleven seedlings of Bastard sago, out of the 12 received and planted at the Cotton Breeding Station are making satisfactory progress.

(viii) *Fruit plants.*—From the Malta Lemon and Nepal Lemon plants on the Station, which came to bearing only at the end of last year, a total of 70 lb. of fruits were harvested and sold. The Sathugudi Orange and acid lime plants are making satisfactory progress and are yet to come to bearing. The Guava plants have grown well and are in full bearing. Only 8 lb. of fruits have been harvested so far and the rest are tender as yet. Sixty pounds of Papaya fruits were gathered and sold during the year.

6. *Manures.*—During the year 1953, a total quantity of 107 tons of cattle manure and 174 tons of organic compost were produced on the station compared to the total quantities of 105 tons and 96·5 tons respectively during the year 1952. The quantities of cotton stalks from the irrigated and rainfed crops were estimated at 3,000 lb. and 2,500 lb. per acre respectively. Only a portion of these cotton stalks was composted, the rest being ploughed *in situ* with disc ploughs hitched to the tractor. The Gliricidia plants on the field bunds were pruned thrice during the year and an aggregate quantity of 8·9 tons of leaves and tender branches were obtained for composting.

7. *Livestock.*—The strength of Animals work at present is seven pairs. All the animals except one which was declared by the Lecturer in Animal Husbandry to be unfit for farm work maintained satisfactory condition. Steps have been taken to dispose off this animal. All the animals were inoculated against rinderpest.

8. *Petty construction and repairs.*—The annual repairs during the year were confined only to very essential items like repairs to floors and roofs and white washing.

The well boring work in progress in field No. C. 4. at the end of the previous year was completed. Of the five bores drilled, two, viz., those in fields 14 and C·4 are successful and deep well pumps remain to be installed in them.

COIMBATORE,
27th August 1954.

S. M. KALYANARAMAN,
Cotton Specialist.

STATEMENT OF RECEIPTS AND EXPENDITURE OF THE COTTON BREEDING STATION, COIMBATORE, FOR THE YEAR ENDING 30TH JUNE 1954.

Expenditure.

	Rs.	A.	P.
A. Research Institute, Cotton Section—			
Pay of officers	10,142	4	0
Pay of establishment	26,215	13	0
Dearness allowance	11,191	12	0
Travelling allowance and other compensatory allowances	6,517	2	0
B. Apparatus and materials and capital outlay—			
Apparatus and materials	502	13	3
Dead stock	202	13	0
Livestock	....		
C. Working expenses—			
Repairs and upkeep	966	6	3
Maintenance of cattle	1,351	9	3
Mazdoor labour	3,410	1	0
Miscellaneous cultivation expenses	1,933	6	0
Other miscellaneous charges	1,429	1	9
Dearness allowance to menials	2,290	0	0
D. Office contingencies—			
Other contingencies	1,564	4	6
Petty construction and repairs	2,621	5	8
Total	70,338	11	3

Receipts.

	Rs.	A.	P.
XXIX. Agriculture—			
By sale of farm produce and miscellaneous including adjustments.	13,543	11	9

Review of steps taken to increase the income of the Cotton Breeding Station, Coimbatore (1953–54).

I. *Improvement of irrigation facilities.*—The only source of irrigation at the Cotton Breeding Station is the Farm Yard well at present and the supply of water from this source was gradually deteriorating and reached its worst phase in 1953–54 season. Consequently, the area under irrigated cottons was restricted to 8 acres and even then due to scanty watering a very poor crop could only be raised.

The boring operations conducted last year resulted in two successful, bore wells, viz., one in field 14 and another in C.4. The water-supply from both the bore wells is estimated at about 5,000 gallons per hour. The installation of submersible pumps to lift water from these bore wells has been taken on hand and it is expected to install a Beresford type in Fd. 14 bore by September 1954. For the other bore in Fd. C.4 a Garvens type of pump is proposed to be installed.

With the installation of these pumps, the water-supply position will improve considerably and it is expected that a total area of about 20 acres can be raised under irrigated crops in the Station from 1955–56 season onwards. With the increase in area under irrigated crops, viz., Cambodia in winter and *cholam* and groundnut in summer, the revenues of the farm are expected to appreciate commendably.

II. *Revision of cropping scheme.*—A significant change was made in the cropping programme of the station during 1953–54. The three course rotation followed hitherto, viz., Cotton-cholam-pulse was changed into a two course one, deleting the pulse as a pure crop. Instead, pulses were mixed with *cholam* in suitable proportions and raised after cotton. Thus the area under *desi* cotton and *Periamanjal cholam* increased during the year. This change had a good augury during 1953–54 and bumber crops of *Periamanjal cholam* were realised, due to timely sowings and favourable rains. The statements showing the cost of production of bulk crops raised at the Cotton Breeding Station during 1952–53 and 1953–54 given below would reveal that the net profit from an acre of bulk crop during 1953–54 was Rs. 112–5–2 as compared to Rs. 47–15–2 during 1952–53. This increase is entirely due to the revision of the cropping scheme and favourable season for *Periamanjal cholam*.

Statement (A).

Cotton Breeding Station, Coimbatore, Bulk crops, 1952–53.

Field number.	Area.	Cost of production.			Total value.			Net profit.		
		Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.
				Cholam-grain.						
1	0·92	71	13	0	123	8	5	51	11	5
C3	2·06	95	14	6	167	13	7	71	15	1
Total	2·98	167	11	6	291	6	0	123	10	6
Mean/acre		56	4	9	97	7	5	41	2	8
				Cholam-fodder.						
4E	1·00	22	11	0	74	11	7	52	0	7
A1	3·00	94	14	0	141	4	11	46	6	11
A2	3·29	98	2	0	143	3	7	45	1	7
C1 C2	5·93	110	12	0	551	0	11	440	4	11
14	1·84	63	10	0	213	7	7	149	13	7
20	4·85	142	7	4	621	12	5	479	5	1
37M	7·50	93	8	0	614	6	0	520	14	0
Total	27·41	626	0	4	2,359	15	0	1,733	14	8
Mean/acre		22	12	9	86	0	0	63	3	3

STATEMENT (A)—*cont.*

Cotton Breeding Station, Coimbatore Bulk crops 1952-53—cont.

Field number.	Area.	Cost of production. Rs.	A.	P.	Total value Rs.	A.	P.	Net profit. Rs.	A.	P.
				Horse-gram.						
10b	2·63	83	0	0	131	6	0	48	6	0
10c	2·75	65	12	0	192	6	0	126	10	0
10d	2·75	45	8	0	157	10	0	112	2	0
Total	8·13	194	4	0	481	6	0	287	2	0
Mean/acre		23	13	10	59	2	11	35	5	1
				Karunganni.						
8	2·36	71	2	0	187	12	0	110	10	0
Mean/acre		31	8	0	78	6	0	46	14	0
				Cambodia.						
17	2·33	63	4	0	77	0	0	13	12	0
Mean/acre		27	1	6	33	0	10	5	14	4
				Cumbu.						
10E	2·75	47	15	0	66	6	0	18	7	0
Mean/acre		17	7	8	24	3	8	6	12	0
				Bengal-Gram.						
37E	5·0	189	0	0	345	4	6	156	4	6
Average		37	12	9	69	0	10	31	4	1
Grand total	50·96	1,359	4	10	3,804	1	6	2,443	12	8

Net profit per acre Rs. 47 15 2

STATEMENT (B).

Cotton Breeding Station, Coimbatore, Bulk crops 1953-54.

Field Number.	Area.	Bulk crop.	Cost of production. RS.	A.	P.	Total value. RS.	A.	P.	Net profit or loss. RS.	A.	P.
(1)	(2)	(3)	(4)			(5)			(6)		
3	2·86	P.M. Cholam.	164	13	5	833	0	3	668	2	10
5	3·69	Do.	217	12	8	1,025	3	1	807	6	5
6	1·68	Do.	92	0	1	512	13	9	420	13	8
7	1·99	Do.	104	2	6	593	12	1	489	9	7
8	2·36	Do.	92	5	8	565	5	2	472	15	6
9	2·72	Do.	134	6	3	613	11	1	479	4	10
14	1·84	Do.	83	14	1	330	15	1	247	1	0
15	4·40	Do.	125	14	1	850	12	7	724	14	6
17	2·33	Do.	106	12	9	605	0	5	498	3	8
37	10·02	Do.	483	6	0	1,249	14	4	766	9	4
A1	2·80	Do.	88	10	10	689	13	1	601	2	3
A2	3·19	Do.	136	14	4	883	4	7	746	3	3
Total	39·52		1,831	0	8	8,753	10	6	6,922	9	10
Average newl ine per acre.			46	5	4	221	6	4	175	1	0
C1 C2	5·93	Cotton-Karunganni 5	358	5	9	479	13	0	121	7	3
C3	3·06	Do.	164	1	0	210	10	6	46	9	6
4	4·00	Do.	257	6	3	555	3	0	297	12	9
18	3·00	Do.	169	1	0	234	12	0	65	11	0
19	1·12	Do.	89	0	6	129	12	0	40	11	6
10B	2·73	Do.	108	15	0	168	6	0	59	7	0
10C	2·00	Do.	70	9	0	147	3	0	76	10	0
37E	5·04	Do.	198	7	6	256	5	0	57	13	6
Total	26·88		1,415	14	0	2,182	0	6	766	2	6
Mean/acre			54	9	9	81	3	8	26	9	1
20	4·85	Cotton-Cambodia MCU1	287	11	9	602	0	0	314	4	3
Average per acre.			59	4	9	124	14	4	65	9	7
Grand total	71·25		3,534	10	5	11,537	11	0	8,003	0	7

Net profit per acre, Rs. 112—5—2.

The figures relating to details of the cost of cultivation of bulk crops during 1953-54 are furnished in statements (*c*) and (*d*)—

STATEMENT (C).

Average cost of cultivation of bulk crops at the Cotton Breeding Station for the year 1953-54.

Serial number and Crop.	Area in acres.	Cost of Cultivation per Acre.														Yield per Acre.		Gross income per acre.		
		Preparatory cultivation.			Manures and manuring.			Seeds and sowing.			After cultivation.			Irrigation.	Harvest.			Total.			Grain or kapas in lb.	Fodder lb.			
(1)	(2)	(3)			(4)			(5)			(6)			(7)	(8)			(9)			(10)	(11)	(12)		
		Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.		Rs.	A.	P.	Rs.	A.	P.			Rs.	A.	P.
1 P. M. Cholam ..	39·52	9	10	1	8	9	10	5	7	1	5	2	10	..	17	7	7	46	5	5	942	6,350	221	8	0
2 K. 5 cotton ..	26·88	18	1	0	14	9	0	2	3	1	9	2	11	..	8	10	10	52	10	10	216	..	81	3	8
3 M·C.U. 1 cotton ..	4·85	15	11	2	26	9	1	1	12	10	5	10	2	..	9	10	2	59	5	5	248	..	124	2	0
4 Horsegram	0·60	12	15	0	..			8	12	0	..			..	17	9	0	39	4	0	753	2,208	105	10	0

STATEMENT (D).

Statement showing cost of cultivation of bulk crops at the Cotton Breeding Station during 1953-54.

Serial number and Name of crop.	Total area in acres.	Average per acre.						Net income.			Remark
		Expenditure.			Gross income.						
(1)	(2)	(3)			(4)			(5)			(6)
		Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.	
1 P. M. Cholam	39·52	46	5	5	221	8	0	175	2	7	Grain valued at Rs. 350 per ton and straw at Rs. 32 per ton.
2 K. 5 cotton	26·88	52	10	10	81	3	8	28	8	10	Kapas valued at Rs. 0-6-0 per lb.
3 M.C.U. 1 cotton	4·85	59	5	5	124	2	0	64	12	7	Kapas valued at Rs. 0-8-0 per lb.
4 Horsegram	0·60	39	4	0	105	10	0	66	6	0	Grain valued at 8 lb. per rupee and bhu 192 lb. per rupee.

III. *Self-sufficiency in organic manures.*—The organic manure requirements of the station are about 350 tons per year and leaving out of which 100 tons of cattle manure produced on the farm, 250 tons are required to be produced from green manure crops or green leaf manure plants. During 1952, 96·5 tons of compost manure was produced and in 1953, this was increased to 174 tons. In 1954, about 90 tons of green manure crops, were raised in addition and ploughed in situ as detailed in statement (E). It would thus be seen that in 1953–54, the farm has also attained self-sufficiency in organic manures. Fresh plantings of 2,000 Gliricidia seedlings have been made during the year and when these grow up, the organic manure recources of the farm will improve further.

STATEMENT (E).

Green manure raised in fallows during 1954 *Summer season.*

Field number.	Area.	Crop.	Estimate yield green manure per lb. per acre.	Estimated total yield from the field.	Remarks.
(1)	(2)	(3)	(4)	(5)	(6)
			LB.		
1	0·92	Sunhemp	16,000	14,720	Ploughed in Situ.
2	2·54	,,	3,700	9,398	Do.
3	2·86	,,	16,800	48,048	Do.
5A & 5	3·69	,,	16,600	61,254	Do.
6	1·68	Sesbania	8,000	13,440	To be ploughed in.
R1 & R2	5·14	,,	10,000	51,400	Do.
A1	2·80	Daincha	..	..	Very poor germination, crop ploughed in seedling stage.
A2	3·19	Daincha	2,000	3,000	Very poor germination. Portion of the crop ploughed in during seedling stage.
	1·50				

Total yield. 2,01,260 or 89·85 tons.

IV. *Raising of live fence.*—As has already been reported the Cotton Breeding Station is protected on all borders with *pucca* barbed wire fence. In addition to the protection afforded by this fence, it was also arranged to plant Prosophis and Gliricidia along fence borders. Raising of live hedge with Dodonya around the office as well as stack yard also formed part of the programme of raising live fence on the Station.

V. *Statement of receipts and expenditure in the prescribed pro forma.*—The statements relating to income from bulk crops and expenditure apportioned as per instructions issued in Director of Agriculture's D. Dis. No. 1023/52, dated 8th May 1953 are appended in the prescribed pro forma.

The details of cost of cultivation according to major items of operations as followed in the first page of the cultivation sheet have also been given for each bulk crop.

S. M. KALYANARAMAN,
Cotton Specialist.

Coimbatore, 27th August 1954.

TABLE I-A.

Pro forma prescribed in Director of Agriculture's D. Dis. X. 1023/52, dated 8th May 1953.

Serial number and Details of crops, etc.	Area in acres.	Seed. Yield in lb.	Seed. Value.	Grain or kapas. Yield in lb.	Grain or kapas. Value.	Straw. Yield in lb.	Straw. Value.	Total receipts for the year.	Total receipts three years. 1951–52.	1952–53.	1953–54.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
					RS. A. P.		RS. A. P.	RS.	RS.	RS.	RS.
I. *Crops*.—											
1 P.M. Cholam ..	39·52	..	..	34,768	5,356 0 0	2,37,882	3,3 98 0 0	8,754	4,294	2,693	8,754
2 Pulses (Horsegram and Bengal gram.	0·60	..	..	452	56 8 0	883	7 8 0	64	1,035	1,035	64
3 Cotton (K. 5 & M.C.U. 1).	31.73	..	..	7,025	2,784 0 0	..	..	2,784	..	..	2,784
II. *Miscellaneous*:—											
4 Miscellaneous receipts including sale of lint seed, etc. from experimental area.	..	..	..	..	..	..	..	1,942	..	2,877	1,942
							Total	13,544	5,329	6,605	13,544

TABLE I-B.

Crop.	Seed. Retained on Station. Quantity (lb.).	Seed. Retained on Station. Value.	Grain or kapas. Retained on Station. Quantity.	Grain or kapas. Retained on Station. Value.	Grain or kapas. Transferred or sold. Quantity.	Grain or kapas. Transferred or sold. Value.	Straw. Retained on station. Quantity.	Straw. Retained on station. Value.	Straw. Transferred or sold. Quantity.	Straw. Transferred or sold. Value.	Total Value.	Total receipts for three years. 1951-52.	1952-53.	1953-54.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	lb.	RS. A. P.		RS. A. P.		RS. A. P.		RS. A. P.	RS.	RS.	RS.	RS.	RS.	RS.
P. M. Cholam ..	620	107 10 0	1,748	185 9 0*	32,400	5,062 8 0	1,11,322	1,590 5 0	1,26,560	1,808	8,754	4,294	2,693	8,754
Cotton	..	..	7,025	2,784 0 0	..	..	..	..	..	..	2,784	..	..	2,784
Horsegram ..	..	..	..	..	452	56 8 0	883	7 8 0	..	..	64	1,035	1,035	64

*Price estimated low since the grains are broken.

TABLE II.

Cost of cultivation for bulk crops.

Serial number and details of expenditure. (1)	Actual expenditure for the three years. 1951-52 (2)	1952-53. (3)	1953-54. (4)
	RS.	RS.	RS.
1 Pay and allowances of the staff (1/3 of actuals) Farm Manager and Maistry ..	785 3 8	805 7 8	881 5 0
2 Miscellaneous cultivation expenses (1/3 of actuals)	799 14 9	754 2 4	644 7 4
3 Working expenses (actuals)	12,404 15 8	9,223 12 3	9,447 2 3
4 1/10 of expenditure on live and dead stock	317 7 9	0 11 3	20 4 6
5 Proportionate rent for the land (the normal rental of the tract subject to 15 times the land assessment per acre).	1,216 14 0	1,028 7 0	1,583 7 0
6 Unforeseen contingencies, if any	..	..	..
Total ..	15,515 7 10	11,812 8 6	12,576 10 1

TABLE III.

Statement of abstract of expenditure and receipt.

Serial number and Particulars.	1951—52.	1952—53.	1953—54.
(1)	(2)	(3	(4)
	RS.	RS.	RS.
1 Expenditure	15,515	11,813	12,576
2 Revenue	5,329	6,605	13,544

ANNUAL REPORT OF THE MILLETS AND PULSES BREEDING STATION, COIMBATORE, SCHEME FOR THE PRODUCTION OF HYBRIDS IN CUMBU AND SCHEME FOR THE EVOLUTION OF IMPROVED STRAINS OF MILLETS AND PULSES FOR THE YEAR 1953–54 (FASLI 1363).

SECTION I.—MILLETS BREEDING STATION, COIMBATORE.

This is the twenty-eighth Annual Report of the work done at the Millets Breeding Station, Coimbatore. A brief note giving the particulars concerning the Millets and Pulses Breeding Station is given in Appendix I.

2. *Season and rainfall.*—A statement of the rainfall received during the year giving weekly totals, with similar figures for the previous year as well as the average for the past ten years and also the past 30 years since the inception of the station is given in Table I below.

TABLE I.—*Statement of Rainfall.*

Month.	Week.	1952–53.		1953–54.		Average for the past ten fasli years.		Average for the past 30 years (since the inception of the station).	
		Quantity of rain in inches.	Number of rainy days.	Quantity of rain in inches.	Number of rainy days.	Quantity of rain in inches	Number of rainy days.	Quantity of rain in inches.	Number of rainy days.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
				South-west monsoon.					
June	7—13	..	..	0·09	..	0·16	0·7	0·34	0·89
	14—20	0·05	..	0·60	3	0·16	0·7	0·24	1·06
	21—27	0·03	..	0·60	2	0·26	0·8	0·18	0·91
June-July ..	28—4	..	..	0·63	3	0·20	1·2	0·25	1·53
	5—11	0·68	3	2·83	3	0·66	1·7	0·35	1·53
	12—18	0·62	1	..	..	0·39	0·9	0·46	1·26
	19—25	0·01	..	0·05	..	0·46	1·5	0·37	1·32
July-August.	26—1	..	..	1·13	2	0·41	0·9	0·22	0·99
	2—8	..	..	0·11	1	0·39	0·8	0·30	0'93
	9—15	..	..	0·32	1	0·17	0·9	0·23	0·99
	16—22	..	..	..	..	0·28	0·8	0·32	1·21
	23—29	0·85	2	0·69	2	0·30	1·3	0·22	0·91
August-September.	30—5	..	..	..	..	0·03	0·2	0·15	0·54
	6—12	..	..	0·92	2	0·18	0·6	0·23	0·94
	13—19	..	..	0·30	1	0·46	0·9	0·26	0·74
	20—26	0·05	..	0·24	1	0·40	1·2	0·52	1·19
Total ..		2·29	6	8·51	21	4·91	15·1	4.64	16·85
				North-east monsoon.					
September-October	27—3	2·53	3	0·71	1	0·81	1·3	0·74	1·58
	4—10	0·93	2	0·78	1	0·86	1·6	0·75	1·74
	11—17	0·61	1	2·64	4	1·77	2·8	1·23	2·49
	18—24	..	..	3·21	5	1·78	2·7	1·23	2·40
	25—31	1·28	3	0·18	1	1·36	2·0	1·55	2·28
November ..	1—7	0·13	1	..	..	1·20	1·6	1·55	2·28
	8—14	0·04	..	..	..	1·48	2·8	1·16	2·25
	15—21	..	..	0·80	2	1·08	2·2	0·71	1·44
	22—28	..	..	0·18	1	0·47	1·9	0·33	0·73
November-December.	29—5	1·05	2	..	..	0·66	1·2	0·49	1·09
	6—12	1·25	3	..	..	0·37	0·8	0·52	0·99
	13—19	0·29	1	0·21	1	0·27	0·6	0·20	0·62
	20—26	..	..	..	..	0·11	0·3	0·09	0'37
December-	27—3	0·08	..	0·23	2	0·04	0·2	0·08	0·41

TABLE I.—*Statement of Rainfall*—cont.

North-east monsoon—*cont.*

Month.	Week	1952-53. Quantity of rain in inches.	1952-53. Number of rainy days.	1953-54. Quantity of rain in inches.	1953-54. Number of rainy days.	Average for the past ten fasli years. Quantity of rain in inches.	Average for the past ten fasli years. Number of rainy days.	Average for the past 30 years (since the inception of the station). Quantity of rain in inches.	Average for the past 30 years (since the inception of the station). Number of rainy days.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
January.	4—10	6·07	..	1·87	3	0·21	0·4	0·22	0·50
	11—17		..	0·35	1	0·04	0·1	0·07	0·15
	18—24	..	..		..	0·15	0·3	0·05	0.09
	25—31	..	..	..	..	0·03	0·2	0·12	0·28
	Total ..	8·26	16	11·16	22	12·69	23·0	11·09	21·67
				Hot weather.					
February ..	1—7	..	..	..	..	..	..	0·03	0·2
	8—14	..	..	..	..	..	..	0·08	0·16
	15—21	..	..	..	..	0·09	0·1	0·03	0·06
	22—28	0·23	1	..	..	0·23	0·6	0·14	0·28
March ..	1—7	..	..	..	..	0·05	0·2	0·05	0·12
	8—14	..	..	..	..	..	..	0·04	0·16
	15 21	..	..	0·07	..	0·04	0·2	0·23	0·41
	22—28	0·07	..	0·32	1	0·12	0·4	0·08	0·28
March-April.	29—4	0·08	..	0·36	1	0·25	0·7	0·25	0·61
	5—11	2·00	2	0·35	1	0·58	1·5	0·49	1·20
	12—18	1·39	2	0·35	2	0·83	1·5	0·53	1·05
	19—25	2·20	3	1·91	2	0·64	1·3	0·46	0·97
April-May ..	26—2	0·03	..	1·80	4	0·59	0·9	0·52	1·02
	3—9	1·75	2	0·16	1	0·45	1·3	0·50	1·29
	10—16	..	..	0·23	2	0·28	0·9	0·45	1·07
	17—23	0·33	2	1·93	3	0·33	0·9	0·51	1·26
	24—30	0·14	1	..	..	0·35	0·7	0·32	1·01
May-June ..	31—6	0·35	2	..	..	0·19	0·9	0·21	0·81
	Total ..	8·57	15	7·57	17	5·02	12·1	4·92	11·99
	Grand Total ..	19·15	37	27·24	60	22·62	50·2	20·65	50·51

Though the total rainfall received during the year was above normal, its distribution was not quite favourable. As against the normal rainfall of 22·6 inches on 50 rainy days, the precipitation was 27·2 inches in 60 days, the excess of 4·62 inches of rainfall having been received mostly in the south-west monsoon period. These rains were not enough to counteract the effects of the prolonged drought during the previous six to seven years, and the water supply in the east and west wells of the station continued to be nil, as the wells dried up completely. The west bore well worked fairly satisfactorily with an average discharge of 45 gallons of water per minute and the total area that could be irrigated was about five acres. The east bore well in field No. 1, divined by Sri M. S. Sivaraman, I.C.S., Director of Agriculture, though completed, could not be utilized for irrigation purposes, as the pumpset sanctioned for it has not yet been installed. Arrangements are in progress for the installation of a Beresford deep well pumpset.

The south-west monsoon started early and the sowings of all the dry-land millets and pulses were taken up in the usual seasons. But the later rains were defective and hence the late sown crops were more or less damaged. This was particularly the case with most of the pulses such as redgram, greengram and blackgram. The rainfed crop of cumbu also failed to give the normal grain yield as a result of the excessive rainfall of 6 inches received during the middle of October. This millet was also damaged by a new insect pest (*Tetrastychus* Sp. belonging to *Chalcidae*) at the seed setting time, which resulted in very poor grain yields. The irrigated crops in general came up well and recorded normal grain yields.

3. *Millets*—(*a*) *Cholam* (*Sorghum Sp.*).—Cholam is the most important millet cultivated in the Madras State. It is grown over an area of a little over 17 lakhs of acres and the annual production is six lakhs tons of grain. More than 80 per cent of the area under this millet is dependent entirely on rain, while the rest is raised in garden lands with irrigation from wells. The main rainfed varieties are Periamanjal cholam, Talaivirichan cholam, Makkattai cholams and Irungu, each of these being confined to particular regions. The important irrigated varieties are Vellai cholams, Chinnamanjal cholam and Sen cholam. From the Millets Breeding Station, 16 improved strains of Cholam have so far been released. They are under spread in the districts. The demand for the seeds of these strains continued to be heavy and 20,000 lb. of seeds were distributed for running seed farms and trial plots. The evolution of strains superior to those already released and to local varieties in yield and quality of grain and straw, was continued. The suitability of the strains to new areas was also under study through trials arranged in the fields of the farmers. The studies on the control of the root parasite, Striga, a problem which was under investigation in a scheme partly financed by the Indian Council of Agricultural Research continued to receive attention at the Millets Breeding Station, when this scheme came to a close consequent on the formation of the Andhra State from 1st October 1953.

Two crops of cholam were raised during the year, one in the monsoon season in an area of about 25 acres and the other under irrigation in an area of 3·5 acres. In the monsoon season, 336 selections were sown in an area of 6 acres while in the summer season, 318 selections were raised in an area of 3·5 acres for isolation of pure types, yield investigations, etc. The season in general was normal for both the crops and the seed setting was satisfactory. A brief account of the work done and the results achieved is given in the following paragraphs :—

(i) *Maintenance of types.*—Pure lines of the major botanical species and varieties of Cholam continued to be under study. They are maintained to serve as standards for the different groups and as parents in hybridization work. Representative types of both cultivated and wild species grown in the world, totalling 510 in number, are maintained. They are grown in alternate years in head-to-row plots and pure seed is collected.

(ii) *Periamanjal cholam.*—Periamanjal cholam is the best dry-land variety grown in the Coimbatore district. Cholam Co. 1, the strain of this variety, released from the station, is under spread. The straw of Co. 1 is blackish in colour and pithy. Reddish colour and juiciness of stalks are valuable attributes of a fodder variety. Therefore, to evolve a strain better than Co. 1 in grain yield and quality of fodder, crosses were effected between the two promising selections isolated from previous work, A.S. 8002 (red straw and pithy stalks) and A.S. 8112 (Blackish straw and juicy stalks). From the 12 hybrids of these crosses studied in the monsoon season, 23 selections were advanced for purification. With the same object in view, ten crosses were effected between Co. 11 and A.S. 8112 and four crosses between Co. 11 and A S. 8002. Seventeen promising selections isolated from pure lines were tested in preliminary yield trials but none of them was superior to the standard Co. 1, though two selections recorded 46 per cent and 20 per cent increased yields of grain. To isolate types suitable for sowing in September—late season sowings—a trial with 23 selections of short duration (six with white grain and 17 with yellow grain) was laid out. The trial was a failure due to the receipt of too much rain at the flowering stage.

(iii) *Talaivirichan cholam.*—Two improved strains of Talaivirichan cholam, Co. 2 and Co. 3 evolved at the station are under spread. A new selection of this variety, A.S. 8008, with bolder grains and giving higher yield than Co. 2 and Co. 3 and which completed trials at the station and in the districts was given station number as Co. 19. It is estimated that this strain is capable of spreading over 30,000 acres and giving about 1,300 tons of additional grain yield valued at Rupees four lakhs. With the object of evolving a strain yielding higher than the existing strains, 79 pure line selections (65 with chalky grain and 14 with pearly grain) isolated from the collections made from the major tracts where this variety is grown, were tested in seven groups of preliminary yield trials and three groups of compact family blocks. Only three of the white chalky selections tested with Co. 2 as standard

were superior to it in grain yield. In the pearly group, none was superior to Co. 3. The straw of Talaivirichan cholam is pithy and coarse and as such has very little value as fodder. To improve the fodder quality of this variety, hybridization with juicy types was taken up and a juicy selection, A.S. 7657 was isolated. In a previous trial, this selection was superior to both Co. 2 and Co. 3 in grain yield. It was tested again in 1953 monsoon season in yield trials in comparison with Co. 3. The juicy selection was inferior to the standard both in grain and straw yields. The results of the trial are given in Table II.

TABLE II.—*Talaivirichan cholam—yield trials*—1953—*Main—Fodder improvemont.*

Field No. 4-B.
Previous crop—Cumbu.
Manure—Cattle manure, 5 tons per acre.
Sown—8th July 1953.
Harvested—15th December 1953.

Variants—Four.
Layout—Randomised blocks.
Replications—Five.
Size of plot—Gross 2 cents; nett 1·2 cents.

Particulars.	A.S. 7657.	Co. 19.	Co. 2.	Co. 3.	Standard error.	Whether differences are significant or not by 'Z' test. P = 0·05.	Critical difference.
Grain—							
Yield per acre in lb.	2,177	2,840	2,537	2,932	100·7	Yes.	306
Percentage of the standard ..	74·2	96·9	86·5	100·0	3·4	„	10·4
Straw—							
Yield per acre in lb.	5,167	6,250	6,317	6,600	191·4	Yes.	594
Percentage of the standard ..	78·3	94·7	95·7	100·0	2·9	„	9·0

Conclusion—
Grain—Co. 3, Co. 19, Co. 2, A.S. 7657.
Straw—Co. 3, Co. 2, Co. 19, A.S. 7657.

Results of previous year's trials—yield per acre in lb.

Year.	A.S. 7657.	Co. 19.	Co. 2.	Co. 3.	Critical difference.
1950—					
Grain	817	718	722	620	100·0
Straw	2,292	2,189	2,156	2,243	..
1951	Trial was a failure due to unfavourable season.				
1952—					
Grain	709	987	927	809	..
Straw	3,774	3,786	4,250	4,202	..

Talaivirichan cholam has the smallest grain among the cultivated Sorghums. Bolder grains are preferred as they fetch higher price. To evolve strains with bold grains, strains Co. 2 and Co. 3 had been crossed with bold grain types of *Sorghum conspicuum* and five out of the seven isolated from the progenies of these crosses were tested in yield trials. Though the grain yield differences were not significant, four of the selections tested were significantly superior to Co. 3 in straw yield. The results are presented in Table III.

TABLE III.—*Yield trials*—1953—*Main—Improvement of grain size.*

Field No. 4-B.
Previous crop—Cumbu.
Manure—Cattle manure, 5 tons per acre.
Sown—8th July 1953.
Harvested—28th December 1953.

Variants—Six.
Layout—Randomised blocks.
Replications—Four.
Size of plot—Gross 2 cents; nett 1·2 cents.

Particulars.	A.S. 8407.	A.S. 8408.	A.S. 8409.	A.S. 8410.	A.S. 8411.	Co. 3.	Standard error.	Whether differences are significant or not by 'z' test. P = 0·05.	Critical difference
Grain—									
Yield per acre in lb. ..	2,142	2,354	2,429	2,329	2,150	2,477	114	No.	..
Percentage of the standard.	86·5	95·0	98·1	94·0	86·8	100·0	4·6	„	..
Straw—									
Yield per acre in lb. ..	6,229	6,146	6,313	7,583	6,646	5,146	345	Yes.	1045
Percentage of the standard.	121·2	119·4	122·7	147·4	129·1	100·0	6·7	„	20·3

Conclusion—
Straw—A.S. 8410, A.S. 8411, A.S. 8409, A.S. 8407, A.S. 8408, Co. 3.

Results of previous year's trials—yield per acre in lb.

Year.	Co. 3.	A.S. 8407.	A.S. 8408.	A.S. 8409.	A.S. 8410.	A.S. 8411.	Critical difference.
1951—							
Grain	186	278	372	200	379	357	..
1952	Trial was a failure.						

From the F-1, F-2 and F-3 progenies of the crosses made to combine high yield with juiciness and bold grain, 103 selections were taken for further study.

(iv) *Irungu cholam.*—This variety is generally raised as a fodder crop in Tirunelveli and parts of Ramanathapuram, Madurai and Tiruchirappalli districts. Its grain is brown or white in colour and completely enclosed by the glumes. In parts of Madurai, Ramanathapuram and Tiruchirappalli districts, it is grown as a grain crop also. The selection A.S. 7081, isolated from a cross between Periamanjal cholam and Irungu gave encouraging results in district trials and is gradually spreading. This selection has partially exposed yellow grains and pithy stalks. There is preference for high yielding white grained types with juicy stalks. Work is in progress for the evolution of strains with the above mentioned qualities. Twenty promising progenies from the crosses effected between high yielding selections of Irungu cholam and Peria Vellai cholam of Coimbatore were tested along with one selection advanced from pure lines in preliminary yield trials with A.S. 7081 as standard. Six selections were superior to the standard. Four selections from the F. 6 progenies of high yielding Irungu selections and A.S. 7081 were tested in observation plots and six were advanced to preliminary yield trials.

To improve the fodder quality by inducing juiciness, A.S. 7081 was crossed with juicy selections of Periamanjal cholam and 20 F. 6 progenies were tested in preliminary yield trials in comparison with A.S. 7081. Seven selections were superior to the standard in grain yield, while eight were superior in straw yield. From the 29 F. 2 progenies of the same set of crosses studied in observation plots, 208 selections from 12 families were taken for further study and purification.

(v) *Sen cholam (irrigated).*—Co. 4 is the strain of this variety released from the station. It is under spread in parts of Tiruchirappalli, Salem and Coimbatore districts. Bolder grain types and those with juicy stalks are preferred. Five bold grain selections were compared with Co. 4 in a preliminary yield trial and only one selection, A.S. 7589 was on a par with Co. 4 and has been advanced to yield trials.

To evolve a Sen Cholam strain with juicy stalk, crosses had been made with juicy selections and from the progenies two selections with juicy stalks were tested for the third year in yield trials along with A.S. 7589 advanced from preliminary yield trials. The two juicy selections A.S. 8206 and A.S. 8345 recorded significantly higher yields of straw, the increase being 22·9 and 18·0 per cent respectively. But they gave low grain yields. The results are presented in Table IV.

TABLE IV.—*Sen cholam—yield trials,* 1953—*Summer fodder improvement.*

Field No. 4-A.
Previous crop—Cumbu.
Manure—Cattle manure, 10 tons per acre—Ammonium sulphate, 100 lb. per acre.
Sown—13th March 1953.
Harvested—15th June 1953.
Variants—Four.
Layout—Randomised blocks.
Replications—Six.
Size of plot—Gross 0·715 cent; nett 0·44 cent.

Particulars.	Co. 4.	A.S. 7589.	A.S. 8206.	A.S. 8345.	Standard error.	Whether differences are significant or not by 'Z' test P = 0·05.	Critical difference.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	
Grain—							
Yield per acre in lb.	1,168	973	701	522	52·6	Yes.	161
Percentage of the standard ..	100·0	80·3	60·0	44·7	4·5	Do.	13·8
Straw—							
Yield per acre in lb.	2,655	2,468	3,260	3,130	34·5	Yes.	104
Percentage of the standard ..	100·0	93·0	122·9	118·0	1·3	Do.	3·9

Conclusion—
Grain—Co. 4, A.S. 7589, A.S. 8206, A.S. 8345.
Straw—A.S. 8206, A.S. 8345, Co. 4, A.S. 7589.

Results of previous year's trials—Grain and straw yield per acre in lb.

Year.	Co. 4.	A.S. 7589.	A.S. 8206.	A.S. 8345.	Critical difference.
1950	Trial was a failure.				
1951—					
Grain	2,159	..	1,767	2,147	85·9
Straw	5,374	..	9,907	8,907	381·6
1952—					
Grain	3,258	2,495	2,685	2,924	250·8
Straw	3,611	3,225	5,111	3,986	252·8

To evolve strains yielding better than Co. 4, collections were made from Gobichettipalayam, Namakkal and Erode and three selections which recorded higher yields were advanced to yield trials. In 1954 summer season, these selections along with the two juicy types and the bold grained selection, A.S. 7589 mentioned above were compared with Co. 4 in yield trial plots. The crop has not yet been harvested.

With the object of evolving juicy stalked selections of Sen cholam with bold grains, A.S. 7589 was crossed with a juicy type and ten F-2 families of this cross were sown and studied in summer 1954.

(vi) *Chinnamanjal cholam.*—Co. 5, the strain of this variety is popular in parts of Coimbatore district. The stalk of this strain is pithy. To improve its fodder quality, Co. 5 had been crossed with Co. 11, the short duration fodder strain and three juicy selections were tested in yield trials along with Co. 11 in comparison with Co. 5. But the grain yield was comparatively low due to adverse season and severe Calocoris attack. In straw yield, one selection A.S. 8746 was significantly superior to all the rest. The results are given in Table V.

TABLE V.—*Chinnamanjal cholam—yield trials, 1953 summer—Fodder improvement.*

Field No. 4A.
Previous crop—Cumbu.
Manure—Cattle manure—10 tons per acre.
Ammonium sulphate—100 lb. per acre.
Sown—19th March 1953.
Harvested—29th June 1953.

Variants—Five.
Layout—Randomised blocks.
Replications—Five.
Size of plot—
Gross 0.715 cent.
Nett—0·44. cent.

Particulars.	A.S. 8746.	A.S. 8747.	A.S. 8748.	Co. 11.	Co. 5.	Standard error.	Whether differences are significant or not by 'Z' test P=0·05.	Critical difference.
Grain—								
Yield per acre in lb.	198	291	212	329	199	52·3	No.	..
Percentage of the standard ..	99·6	146·0	106·5	165·3	100·0	26·2	No.	..
Straw—								
Yield per acre in lb.	6,465	4,889	5,576	5,859	4,687	169·4	Yes.	534
Percentage of the standard ..	141·6	102·7	122·1	128·3	100·0	3·7	Yes.	11·4

Conclusion—

Straw—A.S. 8746, Co.11, A.S. 8748, A.S.8747. Co. 5

Results of previous year's trials—yield per acre in lb.

Year.	Co. 5	Co. 11	A.S. 8746	A.S. 8747	A.S. 8748	(Critical difference.)
1951—						
Grain	1,729	1,375	1,959	1,875	1,937	..
Straw	5,875	8,354	6,396	9,083	8,726	987·0
1952—						
Grain	3,337	3,508	3,700	3,317	3,600	..
Straw	5,408	5,887	7,312	6,137	6,550	455·0

With the object of evolving bold grained strains of Chinnamanjal, four bold grain progenies of crosses between Co. 5 and A.S. 3790 (Sufra from Sudan with bold grain) were tested in preliminary yield trials. But no conclusive results could be obtained from this experiment also. In summer 1954, the three juicy selections and the four bold grained selections have been sown in an yield trial in comparison with Co. 5. The crop has not been harvested. From the progenies of crosses between Co. 5 and A.S. 8338, a juicy type of Chinnamanjal Cholam, 28 promising juicy selections were taken. Ten of these were sown in a preliminary yield trial and 18 in two row plots for further study.

(vii) *Vellai cholam.*—Nine high yielding strains of the main irrigated varieties of Vellai cholam are under spread; Co. 9 and Co. 12 are the most popular. Two selections A.S. 8155, Kattai Vellai cholam, Madurai and A.S. 8159, as juicy Vellai cholam selection recorded encouraging results at the station and in the districts and were given station numbers as Co. 17 and Co. 18 respectively. These two strains are capable of being cultivated over an area of 40,000 acres and giving an additional yield of 6,250 tons of grain valued at Rs. 21 lakhs.

The grain of Co. 9 has a reddish tint which is responsible for lowering the market value of its grain. With the object of evolving strains of Vellai cholam with pure white grains and yielding higher than Co. 9. six pure line selections from Gobichettipalayam, Avanashi, Palayakottai and Koilpatti along with A.S. 8159 (Co. 18) were tested in a yield trial with Co. 9 as the standard. None of the selections was superior to Co. 18, while three selections two from Avanashi and one from Koilpatti gave higher yield than Co. 9. Selections A.S. 8405 and K.S. 288 were significantly superior to Co. 9 in grain yield. In straw yield, selection A.S. 8159 did not give encouraging results. The results are presented in Table VI.

TABLE VI.—*Kesarivellai cholam—yield trials*—1953 *summer.*

Field No 3.
Previous crop—Cumbu.
Manure—Cattle manure—10 tons per acre.
Ammonium sulphate—100 lb. per acre.
Sown—5th March 1953.
Harvested—8th June 1953.

Variants—Eight.
Layout—Randomised blcoks.
Replications—4.
Size of plot—
Gross—0·866 cent.
Nett—0.576 cent.

Particulars.	Co. 9.	A.S. 8159 (Co. 18).	A.S. 8399.	A.S. 8400.	A.S. 8405.	A.S. 8406.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Grain—						
Yield per acre in lb.	2,552	3,313	2,717	2,430	3,304	2,943
Percentage of the standard ..	100·0	129·8	106·5	95·2	129·5	115·3
Straw—						
Yield per acre in lb.	4,696	3,904	4,957	5,552	4,791	5·148
Percentage of the standard ..	100·0	83·1	105·6	118·2	100·2	109·6

	A.S. 8591.	K.S. 288.	Standard error.	Whether differences are significant or not by 'Z' test P = 0·05.	Critical difference.
	(8)	(9)	(10)	(11)	(12)
Grain—					
Yield per acre in lb.	2,300	3,226	150·5	Yes.	439
Percentage of the standard ..	90·1	126·4	5·9	„	17·2
Straw—		7			
Yield per acre in lb.	4,539	5478	254	„	751
Percentage of the standard ..	96,7	116·7	5·4	„	16·0

Conclusions—

Grain—A.S. 8159, A.S. 8405, K.S. 288, A.S. 8406, A.S. 8399, Co. 9, A.S. 8400, A.S. 8591.

Straw—A.S. 8400, K.S. 288, A.S. 8406, A.S. 8399, A.S. 8405, Co. 9, A.S. 8591, A.S. 8159.

Results of previous years' trial—yield per acre in lb.

Year.	Co. 9	K.S. 288	A.S. 8399	A.S. 8400	A.S. 8405	A.S. 8406	A.S. 8159 (Co. 18).	Critical difference
1952—								
Grain	3,265	2,869	2,881	2,945	2,989	3,041	2,756	..
Straw	3,450	3,582	3,133	3,425	4,135	3,582	3,321	893

The three selections (A.S. 8405, A.S. 8406 and K.S. 288) were compared once again in an yield trial with Co. 18 as standard in summer 1954. The crop has not been harvested. Four selections from Gobichettipalayam along with selection A.S. 8159 were compared with Co. 9 in preliminary yield trials for the evolution of a strain yielding higher than Co. 9. The grain yield differences were not significant. However, the trial was repeated in 1954 summer season for confirmation of results.

Among the irrigated cholam strains, Co. 12 has the shortest duration, i.e., 85 days. The value of this strain in areas where the irrigation facilities are inadequate is obvious. With the object of evolving a strain yielding higher than Co. 12, four pure lines from the collections from Gobichettipalayam, Satayamangalam, Bhavani and Srivilliputtur respectively were compared in yield trial plots with Co. 12 as standard. One selection A.S. 8388 was significantly superior to the standard

in grain yield. The yield differences in the case of straw were not significant The results are presented in Table VII.

TABLE VII.—*Mottai vellai cholam—yield trials*—1953 *summer.*

Field No 3.
Previous crop—Cumbu.
Manure—Cattle manure—10 tons per acre.
Ammonium suphlate—100 lb. per acre.
Sown—6th March 1933.
Harvested—5th June 1953.

Variants—Five.
Layout—Randomised blocks.
Replications—Six.
Size of plot—
Gross—0·866 cent.
Nett—0.576 cent.

Particulars.	Co. 12.	A.S. 8388.	A.S. 8393.	A.S. 8586.	A.S. 8592.	Standard error.	Whether differences are significant or not by 'Z' test P=0·05.	Critical difference.
Grain (1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Yield per acre in lb.	3,009	3,297	2,817	3,003	2,369	75·2	Yes.	220
Percentage of the standard.	100·0	109·6	93·7	99·8	78·7	2·5	,,	7·3
Straw—								
Yield per acre in lb. ..	4,326	4,397	4,554	4,283	4,049	168	No.	..
Percentage of the standard.	100·0	101·1	105·3	99·0	93·6	3·9	,,	..

Conclusion—
Grain—A.S. 8388, Co. 12, A.S. 8586, A.S. 8393, A.S. 8592.

Results of previous year's trial—Grain yield per acre in lb.

Year.	Co. 12.	K. 2.	A.S. 8388.	A.S. 8393.	Critical difference.
1952	2,944	3,085	3,157	2,769	145·9

The trial was repeated in summer 1954. The crop is yet on the field. To combine juiciness, high yield and short duration Co. 18 (Juicy strain) was crossed with Co. 12 and other high yielding Vellai Cholam selections. Thirty-four selections representing F-1, F-2 and F-3 progenies were sown for study in 1954 summer season.

(viii) *Striga—Evolution of resistant strains.*—Striga is a serious phanerogamic root parasite on cholam. In years of poor rainfall, the damage caused by this parasite is very heavy. Breeding of resistant types by selection and hybridization was in progress.

From the collection of apparently resistant Periamanjal cholam plants obtained from the fields of cultivators where there was heavy infestation of Striga and tested in replicated row trials, four selections were advanced to preliminary yield trials and 17 selections for repetition in replicated row trials.

From the progenies of crosses effected between Co. 1, the susceptible Periamanjal cholam strain and A.S. 4003 (Bonganhilo) the type reputed for its resistance to this parasite and backcrossed to Co. 1, nine selections found to be high yielding and also tolerant to the parasite in preliminary yield trials, were put in yield trials in comparison with Co. 1 and A.S. 4003 in a Striga infested field. Seven of the selections recorded significantly higher yield of grain while eight selections gave significantly higher yield of straw than strain Co. 1 and all the nine selections were on a par with A.S. 4003 in their resistance to the parasite. The results are presented in Table VIII.

TABLE VIII.—*Periamanjal cholam—Selections tolerant striga—Yield trials* 1953—*Main striga infested field.*

Field No. 7.
Previous crop—Cholam.
Manure—Cattle manure —5 tons per acre.
Sown—9th July 1953.
Harvested—20th December 1953.

Variants—Eleven.
Layout—Randomised blocks.
Replications—Four. size of plot—
Gross } 0·5 cents.
Nett }

Particulars.	Co. 1.	A.S. 4003	A.S. 7866	A.S. 7866	A.S. 7867	A.S. 7867	A.S. 7868
			1	3	3	5	2
Striga incidence—							
Average number of Striga plants per plot	370	13	25	33	10	12	17
Percentage of the standard ..	100·0	3·5	6·6	8·9	2·7	3·3	4·5
Grain—							
Yield per acre in lb..	1,160	580	1,355	1,590	1,585	1,230	1,785
Percentage of the standard ..	100.0	50·0	117·2	137·9	136·2	106·9	153·4
Straw—							
Yield per acre in lb· ..	3·960	4,440	6.570	6·135	6·930	5·750	6.845
Percentage of the standard ..	100·0	11.50	118·7	169·8	179·5	248·0	177

Particulars.	A.S. 7868 / 5	A.S. 7872 / 2	A.S. 7872 / 3	A.S. 7872 / 5	Standard error.	Whether differences are significant or not by 'Z' test P — 0·05.	Critical difference.
Striga incidence—							
Average number of striga plants per plot.	18	29	26	28	..	..	..
Percentage of the standard ..	4·9	7·8	7·0	7·6	4·1	Yes.	11·7
Grain—							
Yield per acre in lb.	1,550	1,590	1,570	1,520	112·5	Do	324
Percentage of the standarad ..	134·5	137·9	136·2	131·0	9·7	Do.	27·9
Straw—							
Yield per acre in lb.	7,490	5,710	6,665	6,510	386	Do.	1,108
Percentage of the standard ..	194·0	148·0	172·7	168·7	10·0	Do.	28·7

Conclusion—

Striga incidence—Co 1, A.S. 7866/3, A.S. 7872/2, A.S. 7872/5, A.S., 7872/3, A.S. 7866/1, A.S. 7868/5, A.S. 7868/2, A.S. 4003, A.S. 7867/5, A.S. 7867/3,.

Grain—A.S. 7868/2, A.S. 7866/3, A.S. 7872/2, A.S. 7867/3, A.S. 7872/3, A.S. 7868/5 A.S. 7872/5, A.S. 7866/1 A.S. 7867/5, Co. 1, A.S. 4003.

Straw—A.S. 7868/5, A.S. 7867/0, A.S. 7868/2, A.S. 7872/3, A.S. 7872/5, A.S. 7866/3, A.S. 7867/5, A.S. 7872/2 A.S. 7866/1, A.S. 4003, Co. 1.

These selections were also tested in a Striga free-field to assess their performance under uninfested conditions. The grain yield differences were not significant though five selections recorded increased yields ranging from 6 to 25 per cent over Co. 1, while two of them were superior to it in straw yield. The results are given in Table IX.

TABLE IX.—*Periamanjal Cholam—Selections tolerant to Striga Yield trial* 1953—*Main—Striga free field.*

Field No. 11.
Previous crop—Cholam.
Manure—Cattle manure—5 tons per acre.
Sown—10th July 1953.
Harvested—20th December 1953.

Variants—Ten.
Layout—Randomised blocks.
Replications—Four.
Size of plot.
Gross } 0·8 cent.
Nett }

Particulars.	Co. 1.	A.S. 7866 / 1	A.S. 7866 / 3	A.S. 7867 / 3	A.S. 7867 / 5	A.S. 7868 / 2	A.S. 7868 / 5
Grain—							
Yield per acre in lb.	1,097	12,44	1,084	1,378	1,156	1,094	1,216
Percentage of the standard ..	100·0	113·6	98·9	125·0	105·7	100·0	110·3
Straw—							
Yield per acre in lb.	5,497	5,731	5.950	6.819	6,166	6,391	5,406
Percentage of the standard ..	100·0	104·8	108·2	124·0	112·2	116·3	98·4

	A.S. 7872 / 2	A.S. 7872 / 3	A.S. 7872 / 5	Standard error.	Whether differences are significant or not by 'Z' test P — 0·05.	Critical difference.
Grain—						
Yield per acre in lb.	1,228	1,050	1,028	107·5	No.	..
Percentage of the standard ..	111·3	95·5	93·2	9·8	Do.	..
Straw—						
Yield per acre in lb.	6,147	5,325	6,044	296·8	Yes.	869
Percentage of the standard ..	111·8	96·9	109·9	5·4	Do.	15·8

Conclusion—

Straw—A.S. 7867/3, A.S. 7868/2, A.S. 7867/5, A.S. 7872/2, A.S. 7872/5, A.S. 7866/3, A.S. 7866/1, Co. 1, A.S. 7868/5 A.S. 7872/3,

Of the 59 selections of Periamanjal Cholam with red coloured straw (progenies of crosses and backcrosses of A.S. 60, Periamanjal Cholam with red coloured straw and A.S. 4003) sown and studied in replicated row trials, 16 selections highly tolerant to the parasite were taken for further work. From the F.4 progenies of crosses between A.S. 4003 and Co. 2 and Co. 3 (Talaivirichan Cholam strains), 87 selections which were promising were taken for further study and purification. Similarly from the F. 2 progenies of crosses between A.S. 4003 and A.S. 681 and A.S. 5414 (dry land Sen Cholam selections), 39 selections were advanced for further study. Nine hybrids of crosses effected between Co. 11 and Co. 1 were taken for raising the F. 2 generation. Co. 11 was found to be tolerant to the parasite.

Results of previous years' trial—Grain yield in lb. per acre.

Year.	Co .2	E.C. 4601.	Critical difference.
1951	2,357	2,722	613
1952	1,339	1,872	123

In the earlier trials also, E.C. 4601 was superior to Co. 2. This selection was released for distribution as ragi Co. 7. Twelve selections of short duration (90–95 days) were compared with A.K.P. 2 and eight of them are promising.

(iii) *Evolution of high yielding strains suited to the West Coast and the Nilgiris.*—Ragi samples collected from the West Coast and the Nilgiris were studied. Thirty promising selections were isolated for yield tests. It has since been decided that this work should be taken up at the farms in the West Coast, maintaining a nucleus set of collections at Coimbatore also.

(iv) *Evolution of high yielding strains resistant to blast (Piricularia).*—*Piricularia* is a serious fungus disease of ragi and the yield of the infected crop is considerably reduced. Hence isolation of strains tolerant to the disease is essential and work was in progress in this direction. Nine types which were less susceptible in earlier trials along with thirty new types were put to infection tests. The work was conducted in collaboration with the Agricultural Mycologist and Professor of Mycology. The disease was induced by spraying the plants with *Piricularia* spore suspension. The incidence of disease was heavy and the infection ranged from 47 to 88 per cent. The correlation between heavy infection and high yield was not significant. The types that had been reckoned as less susceptible also showed over 60 per cent infection. The crosses made in the previous year to induce disease resistance in high yielding types were grown and selections taken for further study.

(v) *Fundamental studies—Inheritance of reniform grain shape.*—The shape of Ragi grain is usually round or globular. A new type of Ragi with reniform grain received from Africa was crossed with the globular type, and the F. 1 s of the crosses were raised. The reniform grain shape in the F. 1s indicated that it is dominant to the usual globular shape. Seed materials were taken for purusing this character.

(iv) *Study on the effect of zinc sulphate on the yield of Ragi.*—Trials with zinc sulphate as fertilizer in small quantities were continued. The treatments were application of zinc sulphate at 5 lb. per acre and no zinc sulphate over a bassal dressing of 10 tons of cattle manure or 1 ton of cattle manure and 3 cwt. of groundnut cake per acre. The results are given in Table XI.

TABLE XI.—*Ragi yield trials—Zinc sulphate experiments* 1954—*Summer.*

Field No.—5-A.
Previous crop—Cumbu.
Manure—As scheduled under treatments.
Sown—18th January 1954.
Harvested—6th May 1954.
Strain No. Ragi Co. 2.

Variants—Four.
Layout—Randomised blocks.
Replications—Six.
Size of plot—Gross—0·972 cent.
Nett—0·612 cent.
Treatments—
A.—10 tons of farm-yard manure per acre.
B.—Treatment A+5 lb. zinc sulphate per acre.
C.—1 ton farm-yard manure + 3 cwt.of groundnut cake per acre.
D.—Treatment C + 5 lb. zinc sulphate per acre.

Particulars.	Treatments. A.	B.	C.	D.	Standard error.	Whether differences are significant or not by 'Z' test. P=0·05.	Critical difference.
Grain—							
Yield per acre in lb.	4,542	4,510	4,477	4,690	153	No.	..
Percentage of the standard ..	100·0	99·3	98·6	103·3	3·4	„	..
Straw—							
Yield per aecre in lb.	22,059	22,467	22,631	22,794	1,356	„	..
Percentage of the standard ..	100·0	101·9	102·5	103·3	6·0	„	..

Results of previous year's trial—Grain yield in lb. per acre.

Year.	A.	B.	C.	D.	Critical difference.
1952	1,857	1,788	1,839	1,911	..

As in the previous year, the differences in yield between the treatments were not significant. In this experiment, all the plots gave high yield of grain and straw, the plots which received 1 ton of farm yard manure, 3 cwt. of groundnut

cake and 5 lb. of zinc sulphate giving as much as 4,690 lb. of grain and 22,794 lb. of fresh straw per acre. This indicates that adequate manuring definitely improves the yield. This experiment was discontinued, as a comprehensive experiment was proposed to be started by the Plant Physiologist.

(vii) *Trial of strains and improved selections in the districts.*—This is an important step necessary for the transmission of the results of research to the farmers. The trial of ragi strains Co. 1, Co. 2 and Co. 3 was continued in new areas. The *Karumsuruttai* Ragi strain Co. 5, short duration ragi Co. 7, and ragi Co. 6, having white grain were also under trial in the districts. Ragi Co. 5 was reported to have yielded 15 per cent grain over the local types in Coimbatore, 45 per cent in South Kanara and 40 per cent in Salem districts. Ragi Co. 7 gave 28, 12 and 22 per cent more yield than the local types in the districts of Coimbatore, South Arcot and South Kanara respectively. It was also reported to be earlier than the local by about 10–15 days. The results of the trials of ragi Co. 6 in the districts have not yet been received.

(c) *Tenai* (Setaria italica).—This millet is grown only to the extent of about 65,000 acres in this State and is therefore of minor importance. A portion of it is under irrigation in garden lands, the crop coming in between cotton and other crops in rotation. In the dry lands, it is grown in poor soils. As a result of previous work, three high yielding strains have already been released and they are under spread. The demand for their seeds continued to be heavy and 1,336 lb. of nucleus seeds were supplied from the station. As high yielding selections with shorter duration are in demand, further work was in progress in this direction. Investigations were also continued to isolate types resistant to rust, which is a serious disease of this crop.

(i) *Short duration strains (80 days) for dry lands.*—To evolve higher yielding strains with short duration, hybridization among short duration selections with desirable qualities was taken up and one selection S.I. 4,894, maturing in about 85 days was given out for trials in the districts this year. Results are awaited. Out of nine promising selections isolated from previous tests in preliminary yield trials and advanced to comparative yield trial in 1953 main season with S.I. 4894 as the standard, seven selections recorded increased yields ranging up to 65 per cent. But the yield differences were not significant. In straw yield, four selections recorded increased yields ranging from 21 to 42 per cent over the standard and one of them was significantly superior to S.I. 4894. The results are presented in Table XII.

TABLE IX.—*Tenai—Yield trials—Short duration selections—1953—Main.*

Field No. 9.
Previous crop—Unirrigated cholam.
Manure—Cattle manure at 3 tons per acre.
Sown—13th September 1953.
Harvested—2nd to 11th December 1953.

Variants—Ten.
Layout—Randomised blocks.
Replications—Four.
Size of plot—Gross—0·84 cent.
Nett—0·8 cent.

Particulars.	Selections.						
	S.I. 4894 standard.	S.I. 4951	S.I. 4959	S.I. 4961	S.I. 4962	S.I. 4964	S.I. 4984
Grain—							
Yield per acre in lb.	111	121	100	107	127	112	141
Percentage of the standard	100·0	108·4	89·5	96·5	113·7	100·9	126·3
Straw—							
Yield per acre in lb.	497	703	378	338	384	397	416
Percentage of the standard	100·0	141·5	76·1	67·9	77·4	79·9	83·7
Duration in days	79	81	79	79	78	79	78

Particulars.	Selections—*cont.*			Standard error.	Whether differences are significant or not by 'Z' test. P=0·05.	Critical difference.
	S.I. 5026	S.I. 5031	S.I. 5032			
Grain—						
Yield per acre in lb.	137	184	142	19	No.	..
Percentage of the standard	122·8	164·9	127·2	17·8	,,	..
Straw—				..	.. .. ..	
Yield per acre in lb.	603	766	691	74	Yes.	215
Percentage of the standard	121·4	154·1	139·0	14·8		
Duration in days	81	86	86	42·9	,,	

Conclusion—

Straw—I.S. 5031 5951, 5032, 5026, 4894, (Standard), 4984, 4964, 4962, 4959, 4961.

Two selections from the preliminary yield trials of 1953 main season have been advanced to further tests.

(ii) *Evolution of strains better than Co.* 1.—To evolve strains higher yielding than Co. 1 without increasing the duration, seven selections isolated from collections brought to final trial at the station were compared with Co. 1 in 1953 main season. Six selections gave higher yields, the increases ranging from 26 to 64 per cent. But the yield differences were not significant. The results are presented in Table XIII.

TABLE XIII.—*Tenai-yield trials- strain better than Co.* 1—1953—*Main.*

Field No. 9.
Previous crop—Unirrigated cholam.
Manure—Cattle manure at 3 tons per acre.
Sown—14th September 1953.
Harvested—18th December 1953.

Variants—Eight.
Layout—Randomised blocks.
Replications—Four.
Size of plot—Gross—0·84 cent.
Nett—0·8 cent.

Particulars.	Selections.					
	Tenai Co. 1 standard.	S.I. 4966	S.I. 4968	S.I. 4974	S.I. 4976	S.I. 4978
Grain—						
Yield per acre in lb.	104	138	143	170	139	100
Percentage of the standard	100·0	133·0	137·7	164·2	134·0	96·2
Straw—						
Yield per acre in lb.	397	391	353	497	431	369
Percentage of the standard	100·0	98·4	89·0	125·2	108·7	92·9

Particulars.	Selections—*cont.*		Standard error.	Whether differences are significant or not by Z test. (P = 0·05).	Critical difference.
	S.I. 4985	S.I. 4986			
Grain—					
Yield per acre in lb.	130	146	20	Nos.	..
Percentage of the standard	125·5	140·6	19·6	,,	..
Straw—					
Yield per acre in lb.	334	616	86	,,	..
Percentage of the standard	84·3	155·1	21·7	,,	..

Results of previous year's trial—Grain yield per acre in lb.

Year.	Co. 1.	S.I. 4966	S.I. 4968	S.I. 4974	S.I. 4976	S.I. 4978	S.I. 4985	S.I. 4986	Critical difference.
1952	396	556	441	444	462	313	389	508	61

Out of 34 selections tested in a preliminary yield trial, 27 were superior to Co. 1. The selection S.I. 4946, isolated from earlier yield tests is under trial in the districts.

(iii) *Evolution of strains better than Co.* 2.—Strain Co. 2 is very sparse in tillering. A type with good tillering is required for the irrigated areas. Hence crosses were effected between Co. 2 and a tillering type Co. 3. From the progenies studied and purified for tillering, 39 selections combining in them good tillering and high yield have been advanced to preliminary yield trial.

(iv) *Rust resistant studies.*—From the earlier studies to evolve types tolerant to Rust, a high yielding selection S.I. 3,756 which was also tolerant to the disease was given for trial. From the results of district trials received so far, it is observed that it has not only shown lower incidence of rust infection, but also given higher yields than the respective local crops. Out of 57 selections including two selections of German origin, advanced from earlier studies and tested for rust resistance during the period under report, eight obtained from Japan alone were tolerant. Further studies are in progress.

(v) *Trial of strains in the districts.*—The trial of the three strains Co. 1, Co. 2 and Co. 3 in the districts was continued. From the reports received so far, Co. 1 has recorded increased yield ranging from 22 to 24 per cent over the local in Madurai and Coimbatore districts while Co. 2 gave 18 to 120 per cent in Coimbatore and South Arcot districts and Co. 3 recorded 8 per cent in Madurai district.

(*d*) *Minor Millets.*—Varagu, Samai, Panivaragu and Kudiraivali come under this group and they are cultivated in soils of poor fertility and in areas of low and uncertain rainfall. However under favourable conditions of soil and climate, they give

good yields. Because of their long keeping quality and comparative freedom from pest attack they are good famine reserves. The seeds of the strains and selections already released were in demand and 1,375 lb. of seeds were distributed from the Station.

(i) *Varagu* (*Paspalum scrobiculatum*).—This is the most important among the Minor Millets. As a result of earlier studies on Varagu, one strain Co. 1, has been released for distribution and this is declared suitable to the districts of Ramanathapuram, North Arcot, South Arcot, Tiruchirappalli, Chingleput, Madurai and Coimbatore. During the period under report, six selections of Varagu isolated at the Millets Breeding Station along with P. 1 of Palur were compared with Co. 1 in yield trial plots. P. 1 and another selection P. S. 76 gave higher yields than Co. 1. The results are given in Table XIV.

TABLE XIV.—*Varagu-yield trials*—1953—*Main.*

Field No. 12.
Previous crop—Unirrigated cholam.
Manure—Cattle manure at 3 tons per acre.
Sown—10th July 1953.
Harvested—23rd and 24th November 1953.

Variants—Eight.
Layout—Randomised blocks.
Replications—Four.
Size of plot—Gross—0·84 cent.
Nett—0·8 cent.

Particulars.	Selections.					
	Varagu Co. 1 standard.	Varagu P. 1.	P.S. 64	P.S. 68	P.S. 75	P.S. 07
Grain—						
Yield per acre in lb.	1,968	2,313	1,916	1,813	1,650	2,031
Percentage of the standard ..	100·0	117·1	96·8	90·5	83·5	103·2
Straw—						
Yield per acre in lb.	11,719	12,719	4,531	2,813	4,313	8,750
Percentage of the standard ..	100·0	108·5	38·7	24·0	36·8	74.7

Particulars.	Selections—*cont.*		Standard error.	Whether differences are significant or not by Z test (P = 0·05).	Critical difference
	P.S. 79	P.S. 80			
Grain—					
Yield per acre in lb.	1,922	1,922	119	Yes.	353
Percentage of the standard ..	97·5	97·5	6·1	,,	17·9
Straw—					
Yield per acre in lb.	6,000	6,594	445	,,	1,303
Percentage of the standard ..	51·2	56·3	3·8	,,	11.2

Conclusion—

Grain—P.1, P.S. 76, Co. 1, P.S. 79, P.S. 80, P.S. 64, P.S. 68, P.S. 75.

Straw—P.1, Co. 1, P.S. 76, P.S. 80, P.S. 79, P.S. 64, P.S. 75, P.S. 68.

Results of previous year's trials—Grain yield per acre in lb.

Year.	Co. 1.	P.S. 64	P.S. 68	P.S. 75	P.S. 76	Critcal difference.
1951	790	1,031	1,156	990	1,266	..
1952	Crop failed.					

As Varagu is largely cultivated in the Tiruchirappalli tract, further work on this crop has been proposed to be continued at the Regional Millet Station, Ariyalur.

(ii) *Samai* (Panicum Miliare).—Selection P.M. 269, isolated from previous collections was compared with P.M. 4 and though it gave higher yield of grain, the differences were not significant. In straw, P.M. 269 was superior to P.M. 4. The results are presented in Table XV.

TABLE XV.—*Samai-yield trials*—1953—*Main.*

Field No. 12.
Previous crop—Unirrigated cholam.
Manure—Cattle manure at 3 tons per acre.
Sown—9th July 1953.
Harvested—18th November 1953.

Variants—Two.
Layout—Randomised blocks.
Replications—12.
Size of plot—Gross—0·84 cent.
Nett—0·8 cent.

Particulars.	Selections. P.M. 4 Standard.	Selections. P.M. 269	Standard error.	Whether differences are significant or not by Z test (P=0·05).	Critical difference.
Grain—					
Yield per acre in lb.	133	135	13	No.	..
Percentage of the standard ..	100·0	102·0	9·5	„	..
Straw—					
Yield per acre in lb. ..	427	771	54	Yes.	16
Percentage of the standard ..	100 0	180·5	12.6	„	39.1

Conclusion—
Straw—P.M. 269, P.M. 4.

Results of previous year's trial—Grain yield per acre in lb.

	P.M. 4.	P.M. 269.	Critical difference.
1952	297	306	..

In the district trials, P.M. 269 recorded increased yields ranging from 9 to 53 per cent in Malabar, the Nilgiris, South Kanara, Salem, Madurai and Coimbatore. P.M. 4 also recorded its suitability to the above districts with increased yields ranging from 9 to 38 per cent.

(iii) *Panivaragu* (Panicum Miliaceum).—Panivaragu is invariably grown as an irrigated crop in the cold season, though it is also sown in the south-west monsoon period. A promising selection, P.V. 14 completed trial and was given station number as Co. 1 in 1954. It gave increased grain yields of 15 to 50 percent over the local variety in the districts of Madurai and Tirunelveli during the year under report. This strain is capable of spreading over an area of about 1,000 acres and giving about 70 tons of additional production of grain valued at Rs. 18,000. Three other selections, found promising, in the earlier yield trials, were compared with Co. 1 but the yield differences of grain were not significant. In straw, two selections were superior to Co. 1. The results are given in Table XVI.

TABLE XVI.—*Panivaragu-yields*—1953—*Main.*

Field No· 5 (A).
Previous crop—Irrigated Cumbu·
Manure—Pouderette at 2½ tons per acre.
Sown—9th December 1953 and 10th December 1953·
Harvested—8th March 1954.

Variants—Four·
Layout—Randomised blocks.
Replications—Six.
Size of plot—Gross—0·78 cents·
Nett—0·54 cents.

Particulars.	Selections. P.V. 14 (Co. 1 Standard).	Selections. P.V. 324	Selections. P.V. 325	Selections. P.V. 332	Standard error.	Whether differences are significant or not by Z test. (P=0 05).	Critical difference.
Grain—							
Yield per acre in lb.	1,460	1,497	1,401	1,466	·67	No.	..
Percentage of the standard ..	100 0	102·5	96.0	100·4	4·6	„	..
Straw—							
Yield per acre in lb.	3,358	3,935	3,744	3,642	131	Yes.	39.5
Percentage of the Standard ..	100 0	116·3	115·5	108·4	3·9	„	11;8

Conclusion—
Straw—P.V. 324, 325, 332, 14 (Co. 1).

Results of previous year's trial—Grain yield per acre in lb.

Year.	P.V. 14 (Co. 1).	P.V. 324	P.V. 325	P.V. 332	Critical difference.
1951	628	755	695	660	76
1952	807	911	911	729	74

(iv) *Kudiraivali* (*Echinochloak frumentacea.*—Five promising selections advanced from earlier yield trials, were tested for yield and all the five gave higher yields than P.C. 49, the control. Among them, P.C. 389 recorded the highest

yield. But in this case also, the yield differences were not statistically significant. The results are given in Table XVII.

TABLE XVII.—*Kudiraivali-yield trials*—1953—*Main.*

Field No. 12.
Previous Crop—Unirrigated Cholam.
Manure—Cattle manure at 3 tons per acre.
Sown—10th July 1953.
Harvested—21st October 1953 and 22nd October 1953.

Variants—Six.
Layout—Randomised blocks.
Replications—Five.
Size of plot—Gross—0·84 cent.
Nett—0·8 cent.

Particulars.	Selections.						Standard error.	Whether differences are significant or not by Z test (P=0·05).	Critical difference.
	P.C. 49 Standard.	P.C. 383	P.C. 384	P.C. 387	P.C. 389	P.C. 390			
Grain—									
Yield per acre in lb. ..	820	988	1,040	1,028	1,145	1,023	77	Nos.	..
Percentage of the standard.	100·0	120.4	126·2	125·3	139·6	124·4	9·3	,,	..
Straw—									
Yield per acre in lb. ..	2,520	2,400	2,863	2,382	2,102	2,345	169	,,	..
Percentage of the standard.	100·0	95·2	113·2	94·5	83·4	93·1	6·7	,,	..

Results of previous year's trials—Grain yield per acre in lb.

Year.	P.C. 49	P.C. 383	P.C. 384	P.C. 387	P.C. 389	P.C. 390	Critical difference.
1951	692	658	..	..	..	..	..
1952	250	419	391	475	400	450	77

4. *Pulses.*—As in the case of Millets, several distinct crops such as Redgram, Blackgram, Green-gram, Horse gram, Lablab, Cowpea, etc., come under the group name Pulses. These together occupy an area of 12 lakhs of acres in the Madras State. But being mostly rainfed crops and completely dependent on the vagaries of the monsoon, the harvests are never certain and the yields are comparatively low. During the year under report, work on all the above pulses was continued at Coimbatore. But as the season was very adverse particularly for Redgram, Greengram, and Blackgram, neither the seed blocks nor the experimental plots yielded satisfactory results. The demand for the seeds of strains and selections already released continued to be heavy and 1,831 lb. of improved seeds were supplied to District Officers for sowing seed farms and trials. Further work for the evolution of high yielding strains in all the important pulses was continued. Three fresh samples of Redgram, four of Bengalgram, five of Cowpea and one in each of Soyabean, Greengram and Blackgram were added to the collection of types during the year. Of these, one in Redgram and one in Greengram were received from Africa, while the rest were mostly of North Indian origin received through the courtesy of the Indian Council of Agricultural Research. They were grown and studied and selections taken from them. A brief summary of the work done under each crop is given below :—

(*a*) *Redgram.*—From collections kept at Coimbatore, 160 types and varieties were grown and studied. Due to unfavourable season, the crop failed. The balance of seed in each will be multiplied next year. Twenty-four selections from the garden types were sown for further study and maintenance of types under irrigation and seed materials were gathered. All the 24 selections from the second batch of collections were compared with S.A. 1 as standard for yield. The growth of the crop was good. Unfortunately the heavy rains received in October adversely affected the setting of pods and hence no yield was obtained from the yield trial plots. Seven selections of Tenkasi Redgram of short duration (4½ months) advanced from the previous season, were sown under dry conditions with Tenkasi bulk as control in preliminary yield trial plots and two were superior to the control.

(*b*) *Greengram.*—The five promising plants from the second batch of selections were sown for multiplication of seed. Due to the heavy rains in October, only very poor yields were obtained and all the available seeds were collected for trial next season. Seventy-six types and varieties including 26 received from outside the

State and 22 selections from the progenies of crosses between Greengram and Blackgram, originally received from the Annamalai University, were studied and seeds for maintenance of types collected. Mung type I was also grown under irrigation and seed was collected.

(*c*) *Blackgram.*—Ninety-eight types and varieties including 35 obtained from outside the State were grown and studied. As the crop failed, no seed could be collected. Twenty-four selections of the second batch of collections under trial during the previous season were again sown in yield trial plots with selection No. 212 as standard. Though the germination was satisfactory, the subsequent growth was affected by drought and the plants dried up before flowering and hence no results could be recorded.

(*d*) *Horsegram.*—Thirty-three single plant selections and 18 types were grown and studied and seed multiplied. Twenty-four selections of the second batch of collections were compared with selection No. 35 in preliminary yield trial plots. The growth of the crop was fair, but the yield differences were not statistically significant. The trial will be repeated.

(*e*) *Bengalgram.*—The collections on hand consisting of 130 types and varieties were grown and studied and selections made from them.

(*f*) *Lablab.*—Twenty-seven types were grown and studied and selections taken from them. Twenty-four selections having black seed coat and 24 with buff, white and mottled seed coats, which were under trial during the previous season, were again sown in two sets of preliminary yield trials with selection No. 1458 (black seed) and D.L. 231 (buff seed) respectively as standards. The yield was far below the normal, and eight selections only were superior to the standard in the black seed group. The yield differences were not significant in the other series. Six high yielding and good quality vegetable types were grown under irrigation for multiplication of seed and 22 lb. of seed were obtained for distribution in the State. Sixteen other types were also grown for study and maintenance of types. D.L. 1428, a type from a cross between field and vegetable types was also multiplied for distribution of seeds.

(*g*) *Cowpea.*—Thirty types were grown and studied and seed gathered for maintenance of vegetable types. E.C. 455 of Philippine origin and C. 419 of Ganjam were grown under irrigated conditions for seed multiplication. Promising selections (87) advanced from the previous year were compared for yield with C. 57 (early) and C. 521 (late) released in earlier years in two series and 14 in the first (early) and one selection in the second (late) series were superior to the controls. Selections C. 57, C. 422 and C. 521 were multiplied for distribution.

(*h*) *Other pulses*—(i) *Clusterbeans.*—Twenty types of Cluster beans were grown and studied and selections taken. Seeds of selection 78 (short pod) and C.P. 380 (long pod) were multiplied for distribution.

(ii) *Soyabean.*—Seventeen types were grown during the south-west monsoon period. The growth was poor and there was a severe insect (Surul poochi) attack. Hence very little seed could be collected.

(iii) *Other beans.*—Two types of Lima bean, six of Sword bean and one of Velvet bean which were under examination during last season, were again sown for continuation of study. The growth of the crop was poor due to adverse season during flowering time. However enough seeds were gathered for further study.

(*i*) *District trials and seed farms.*—Redgram S.A. 1, Greengram Co. 1, Blackgram 212, Lablab D.L. 231 and D.L. 1458 and Horsegram 35 and D.B. 7 were given out for trial in the districts. Due to adverse season, the crop failed in many places and the results were received only from a few centres as detailed below. Greengram Co. 1 was superior to the local type in two centres in Tiruchirappalli district. Blackgram 212 gave higher yield than the local bulk in Salem and South Arcot districts. Horsegram D.B. 7 was superior to the local in Madurai district. In Lablab, D.L. 231 was superior to the local in Tiruppur and Palladam taluks.

5. *Miscellaneous crops*—(*a*) *Fruit trees.*—Though several kinds of fruit trees have been planted at this station, many of them have failed to establish or bear fruits. This has been specially noted in the case of mango grafts, lemons and grape vine. All the trees were given manure and periodical irrigation and inter-cultivation and only 3 lb. of guava fruits, 2 lb. of grapes, 43 lb. of anonas and 67 lb. of papaya were harvested during the period under report.

Twenty rooted cuttings of pepper received from the Pepper Specialist, Taliparamba, were also planted at the station. In spite of all attention, only six plants have survived and they are in the early stages of growth.

(*b*) *Fodder crops*—(i) *Cholam.*—Cholam fodder was raised to an extent of 40 cents and 11,000 lb. of green fodder per acre was obtained.

(ii) *Fodder grass.*—The trial of Blou Buffel and Kolukkattai grasses was continued during the year under report. One cent of Blou Buffel grass plot yielded 428 lb. of green grass in four cuttings whereas Kolukkattai yielded only 96 lb. of green grass in three cuttings taken during the year. The plots are kept on for further observation.

(*c*) *Green manure crops and plants*—(i) *Sunnhemp.*—Sunnhemp was raised in a plot of 50 cents as green manure crop during the year and when the crop was in the peak of its vegetative growth, it was cut and ploughed in. The yield of the green matter was estimated at 4,225 lb. per acre.

(ii) *Green manure plants Gliricidia maculuta.*—Of the 6,230 seedlings of Gliricidia that were planted in the previous year along the field bunds, about 4,000 have established well. As the instructions of the Director of Agriculture when he visited the station on 19th May 1954 to step up the production of green leaf compost, a vigorous attempt was made to push through the planting of Gliricidia and about 15,000 seedlings were planted afresh in all the bunds and other available sqaces at the Millets Breeding Station. They are being pot-watered and looked after very well.

(iii) *Indigofera teysmanii.*—From the four plants of *Indigofera teysmanii* grown at the station 4¼ lb. of seeds were obtained and supplied to District Agricultural Officers and other Officers of the Department. Fresh plants are being raised in a nursery to be transplanted in field bunds. From 92 Sesbania plants raised on field bunds, 185 lb. of seeds were obtained.

(*d*) *Maize.*—In obedience to the instructions received from the Indian Council of Agricultural Research, hybrid U.S. 13 was compared with the local maize in comparative yield trial plots. In vegetative growth, the hybrid appeared to be better than the local. The crop has been just harvested and the earheads are being dried, and the yield data are not ready for this report.

(*e*) *Potato.*—To study whether the cultivation of potato can be taken up in the plains, a trial was conducted at the station, using variety " President " as seed material. The experiment was confined to an area of five cents. Though the vegetative growth was satisfactory, the yield was quite uneconomic, the acre yield being only 2,760 lb. of tuber against a seed rate of 1,680 lb. per acre. Hence the experiment was discontinued.

6. *Vanamahotsavam.*—As in the last year Vanamahotsavam was celebrated during the first week of July and 600 Gliricidia seedlings, 60 papaya plants and seven ornamental plants were planted. Besides these, 10,000 Gliricidia cuttings and 15 papaya seedlings were supplied to the District Agricultural Officer, Coimbatore, for planting in the district. The seedlings and cuttings planted at the station are being watered regularly and taken good care of.

7. *Works.*—The annual repairs to the non-residential buildings at the Millets Breeding Station were completed at a cost of Rs. 75–8–0. The work of electrification of the Farm Office and Laboratories at the station, started years back, was completed during the year and light was switched on. Provision has also been made to utilize the current for runing the pumpsets to be installed for the two bore wells at the station.

Section II—Scheme for the evolution and distribution of Hybrid Cumbu Seeds.

8. *Cumbu—Introduction.*—After Sorghum, Cumbu stands next in importance among the millets of this State. Improvement of this crop through selection has been successful in the evolution of four high yielding strains of varying durations and suited to different tracts. The high degree of cross-pollination and the hybrid vigour met with in this crop offers greater economic possibilities through the evolution of hybrids. This work was therefore taken up, and the above scheme was sanctioned with partial financial aid from the Indian Council of Agricultural Research for investigating this problem. This scheme was originally sanctioned by the Indian Council of Agricultural Research for two years from 20th March 1950, after which period it was extended for five years from 20th March 1952. This report relates to the work done under this scheme during the year ending 30th June 1954 (fasli 1363). The Officer and staff employed in the scheme during the previous years continued without change in strength. Sri A. Kunhikoran Nambiar, Assistant Millets Specialist was in immediate charge of the scheme and the work was carried on mainly at the Millets Breeding Station under the technical and administrative control of the Millets and Pulses Specialist. One unit of staff consisting of an Assistant and a Fieldman continued to carry on the regional work at the Agricultural Research Station, Koilpatti, under the guidance of the Superintendent. The investigations were based on the technical programme approved by the Indian Council of Agricultural Research, and the progress achieved is briefly reported below :—

During the period under report, two crops of Cumbu were raised, one under irrigated conditions in the summer season and the other under rainfed conditions during September–December. The area under the summer crop had to be limited to about two acres due to limitations in facilities for irrigation. The crop growth was satisfactory and normal yields were obtained from the irrigated crop. In the rainfed season, favourable conditions were received and the crop came up well. But due to heavy rains and consequent lodging at flowering time and also on account of damage caused by a new insect pest, grain setting was not normal and yields were poor.

(i) *Collection of new samples, their study and selection of desirable types.*—During the year under report, 16 new samples of Cumbu, consisting of two from the State, one from Mysore, seven from Bombay and six from Africa, were received and 87 new samples from the collections of the current and previous years were grown and studied in observation plots. High variations in morphological and agronomic characters were met with and 198 new selections were made for inbreeding. These will be raised in the next year and studied further.

(ii) *Inbreeding of selections and study of the progeny.*—Three hundred and seventy-five inbred lines advanced from previous years were raised and studied in observation plots. The inbreds were selected on the basis of vigour and other desirable agronomic characters expressed in successive generations. Including the 198 selections from new samples, 609 inbreds have been advanced from the lines studied for further observations.

Studies on the number of generations of inbreeding necessary for commercial breeding purposes were continued and 12 hybrids were tested after producing the seed by crossing the parents inbred to the S. 6 generation. Nine of them were found to maintain their superiority over both the parents and standard as indicated in the previous tests. The differences in the yield of hybrids produced in the different generations from S.3 to S. 6 are not marked and it is indicated that a great degree of stability in performance of the hybrid is attained in the S. 5 generation and that the performance in S.3 generation is reliably indicative of the combining ability in later generations. Trials of the six medium duration hybrids produced in S.3, S.5 and S.6 generations of inbreeding of their parents, in the same season, have shown that in most cases, the yields of hybrids produced in S.3 and S.6 generations are equal and there is no significant fall from S.3 to S.6. A slight improvement in combining ability is observed from S.3 to S.6, even this being noticed only in rare cases from S.5 to S.6 showing that much stability is attained in S.5.

(iii) *Initial crossing of inbreds.*—Thirty-one new crosses between superior inbreds of early generation were effected during the year. Only 13 of them could be tested for yield and the results are presented under item (iv). The rest will be tested only in the next year. Forty-eight top crosses between inbreds on hand were also effected and tested in row yield trials for their yield. The results are given under item (iv). At the Agricultural Reseach Station, Koilpatti, 50 new crosses were effected.

(iv) *Testing of initial crosses and other crosses in row yield trials.*—Twenty early test crosses between open pollinated plants of new samples and S.1 generation inbreds were tested in row yield trials along with their parents and standard strains. Only three of them were significantly superior to their parents and the standard. The others were superior only to their parents or equal to them and the standard.

Thirteen new crosses between S.3 inbreds made during the year and 15 made during the previous year were also tested as mentioned above. Of these, only eight were found to be significantly higher yielding than their parents and standard Co. 3. The rest were either on a par with the standard or inferior to it.

The 48 top crosses of S.7 and S.3 inbreds were tested in row yield trials along with the tester and parents. The variants were grouped according to the tracts of origin of their parent inbreds and tested in separate sets so as to select representative high combiners from different zones. The yield data indicated wide variation in the top-cross performance of the inbreds which enables selection of superior inbreds with high combining ability. Four of the inbreds gave significantly higher top-cross performances over Co. 3, the tester. The top-cross yields were not directly correlated with the yield of the inbreds themselves, indicating the necessity for studying the combining ability of the inbreds by crossed progeny performance when selection is done.

To observe the relation between diversity in origin of parents and vigour of hybrids, 14 inbreds from four different zones of origin were chosen and crosses effected in different combinations. The yield data indicated that more of the hybrids between parents from diverse sources proved superior to those between parents from the same source, but the diversity in origin of parents was not directly correlated with the yield of hybrids, for in some cases crosses between widely separated parents did not show a greater degree of vigour than that expressed by the hybrids of inbreds from the same or near source ; while in certain cases, hybrids of the latter category have been observed to be outstanding in their yield performance. The studies will be continued for confirmation.

(v) *Interim tests in yield trial plots after crossing the parents in S.5 generation.*—Six hybrids advanced from initial tests of single crosses between vigorous inbreds in S.5 generation were tested in preliminary yield trials under irrigated and rainfed conditions. Three hybrids H.959, H. 907 and H.958 gave significantly higher yields than Co.3, the standard under irrigation, while under rainfed conditions hybrids H.907, H.958 and H.963 in order of merit were superior to the standard Co.3. These will be tested again in the next year after crossing the parents in S.7 generation.

At the Agricultural Research Station, Koilpatti, eight hybrids were tested in preliminary yield trials in the irrigated conditions and four under rainfed conditions. Under irrigation, all the hybrids were superior to the standard K.1 while in the rainfed trials, only one was superior to the standard.

Five hybrids of short duration and eight of medium duration advanced from previous years were also given their interim tests in row yield trials along with their parents and standards. Of the short duration hybrids, only two, viz., H.395 and H.442 were superior to Co.3 while in the medium duration group, three viz., H.794, H.791 and H.775 were superior to the standard Co.1 and both the parents. These five have been advanced for further tests.

(vi) (*a*) *Final tests in yield trial plots.*—Two groups of hybrids, viz., those between varietal inbreds and those between superior varietal inbreds and inbreds from Co.3, advanced after early and interim tests were put for final tests in yield trial plots along with the standard Co.3 in randomised blocks. The parents of all

these hybrids had been inbred to the S.6 generation before crossing and the tests were made both under irrigated and rainfed conditions, the same seed being used in the two seasons. In group I, seven hybrids were under comparsion with Co.3 the standard. In the irrigated season, all the hybrids were significantly superior to the standard Co. 3 in the yield of grain, the increase ranging from 16 to 38 per cent. In the yield of straw, only three hybrids were superior to the standard. In the rainfed trials, only two hybrids H. 874 and H. 863 were significantly superior to Co· 3 and the rest were all on a par with it. The three hybrids H. 866, H. 874 and H 863 were supetior to the standard in the provious trials also H. 866 was the shortest in duration maturing in 75 days while the others took 80-83 days. The results are presented in Tables XVIII and XIX.

TABLE XVIII.—*Comparative Yield Trials—Short-duration Hybrids between short duration high combiner varietal inbreds—(Parents inbred to S. 6 generation)—1953 Summer—Group I.*

1953 Summer.
Field No.—5-B.
Previous crop—Cholam.
Manure—Green manure (Sunnhemp and Sesbania), poughed in.
Soln—12th April 1953.
Harvested—4th and 8th July 1953.

Variants—Eight.
Layout—Randomised blocks.
Replications—Four.
Size of plot—
Gross—13 × 52 links.
Nett—8 × 50 links.

Variants.	Grain yield per acre in lb.	Grain yield as a per cent of the standard.	Straw yield per acre in lb.	Straw yield as a per cent of the standard.	Duration in days.
H. 850	1,543	129·9	3,958	110·3	84
H. 853	1,400	117·9	5,133	143·1	85
H. 854	1,638	137·9	4,188	116·7	83
H. 863	1,390	117·0	2,575	71·8	78
H. 865	1,380	116·2	5,158	143·8	81
H. 866	1,470	123·8	2,700	74·3	76
H. 874	1,438	121·0	3,520	98·1	81
Co. 3 standard	1,189	100·0	3,583	100·0	88
Standard error	48·5	4·1	195	5·4	
Whether differences are significant or not at 5 percent level.	Yes	Yes	Yes	Yes	
Critical difference	140	11·9	552·5	15·4	

Conclusion—

Grain H. 854 H. 850 H. 866 H. 874 H. 853 H. 863 H. 865 Co. 3

Straw: H. 865 H. 853 H. 854 H. 850 Co. 3 H. 874 H. 866 H. 863

Index to crosses—

1. H. 850—P.T. 833/2 Kullan Cumbu, Madurai × P.T. 827/1 Kottapuli Cumbu, Salem.
2. H. 853—P.T. 834/1, Bajri, Niphad Bombay × P.T. 830/2 Arupatham Cumbu, Coimbatore.
3. H. 854—P.T. 834/2 Bajri, Niphad Bombay × P.T. 827/2 Kottapuli Cumbu, Salem.
4. H. 863—P. T. 836/6 Bajri, 207, Nadiad Bombay × P.T. 825/4 Kattu Cumbu, Salem.
5. H. 865—P.T. 834/4 Bajri, Niphad Bombay × P.T. 833/3 Kullan Cumbu, Madurai.
6. H. 866—P.T. 833/5 Kullan Cumbu, Madurai × P.T. 829/3 Arisi Cumbu, Coimbatore.
7. H. 874—P.T. 835/6 Bajri, Niphad Bombay × P.T. 826/4 Kullan Cumbu, Salem.
8. Co. 3—Kottapuli Cumbu, Salem.

Results of previous year's trial—Grain yield in lb. per acre.

Year.	H. 863.	H. 866.	H. 874.	Co. 3.	Critical difference.
1952 (Summer)]	1,930	1,986	1,848	1,570	195

TABLE XIX.—*Comparative yield trials—Short-duration Hybrids—1953—Main—Group I*

1953 Monsoon.
Field No.—1.
Previous crop—Cholam.
Manure—Compost 2½ tons per acre.
Sown—13th September 1953.
Harvested—8th December 1953.

Variants—Eight.
Replications—Four.
Layout—Randomised blocks.
Size of plot—
Gross—12 × 54 links.
Nett—8 × 50 links.

Variants.	Grain yield per acre in lb.	Grain yield as a per cent of the standard.	Straw yield per acre in lb.	Straw yield as a per cent of the standard.
850	375	95·9	1,809	108·0
H.853	387	99·0	1,891	112·9
H. 854	422	107·9	2,183	130·3
H. 863	508	129·9	2,035	121·5
H. 865	446	114·1	1,898	113·3
H. 866	450	115·0	1,545	92·2
H. 874	571	146·0	1,706	101·8
Co. 3 standard	391	100·0	1,675	100·0
Standard error	33	8·4	158·5	9·5
Whether differences are significant or not at 5 per cent level.	Yes	Yes	No.	No
Critical difference	97·3	24·9	..	..

Conclusion—

Grain: H. 874, H. 863, H. 866, H. 865, H. 854, Co. 3, H. 853, H. 850

Results of previous year's trial—Grain yield in lb. per acre.

Year.	H. 863.	H. 866.	H. 874.	Co. 3.	Critical difference.
1952 Summer]	1,930	1,986	1,848	1,570	195

In the second group, five hybrids were tested along with Co. 3. Of the five hybrids, only three, viz., H. 884, H. 885 and H. 881 were superior to Co. 3 in the irrigated season. H. 888 was on a par with Co. 3 and H. 882 was inferior to it. In the rainfed season, only the four promising ones were tested and out of these only two hybrids H. 885 and H. 884 were significantly superior to the standard in the yield of grain. Thus H. 884 and H. 885 were superior to Co. 3 in both trials, while H. 881 appears to be suited for rainfed conditions only. Confirmatory tests are necessary. The results are given in Tables XX and XXI.

TABLE XX.—*Comparative yield trials—Short duration Hybrids (High combiner inbreds × Co. 3) (Parents inbred to S. 6 generation)—1953—Summer—Group II.*

1953 Summer.
Field No.—5-B.
Previous crop—Cholam.
Manure—Green manure ploughed in.
Sown—12th April 1953.
Harvested—2nd and 8th July 1953.

Variants—Six.
Layout—Randomised block.
Replications—Four.
Size of plot—
Gross—13 × 52 links.
Nett—8 × 50 links.

Variants.	Grain yiel per acre in lb.	Grain yield as a per cent of the standard.	Straw yield per acre in lb.	Straw yield as a per cent of the standard.	Duration of crop in days.
H. 884	1,981	131·6	3,991	93·1	73
H. 885	1,946	129·3	4,131	96·4	78
H. 881	1,813	120·5	3,379	78·8	75
H. 888	1,711	113·7	5,861	136·7	82
H. 882	1,051	69·8	5,729	133·7	83
Co. 3 standard	1,505	100·0	4,286	100·0	82
Standard error	80·8	5·4	178·2	4·2	..
Whether differences are significant or not at 5 per cent level.	Yes	Yes	Yes	Yes	
Critical difference	243·4	16·1	537	12·5	

Conclusion—

Grain: H. 884, H. 885, H. 881, H. 888, Co. 3, H. 882

Straw: H. 888, H. 882, Co. 3, H. 885, H. 884, H. 881

Index to crosses—
H. 881—P.T. 835/5 Bajri, Bombay × Co. 3-1.
H. 882—P.T. 820/6 Emari Sajja, Chittoor × Co. 3-2.
H. 884—P.T. 825/2 Kattu Cumbu, Salem × Co. 3-3.
H. 885—P.T. 826/4 Kullan Cumbu, Salem × Co. 3-4.
H. 888—P.T. 829/5 Arisi Cumbu, Coimbatore × Co. 3-5.

Results of previous year's trial—Grain yield in lb. per acre.

Year.	H. 881.	H .882.	H. 884.	H. 885.	H. 888.	Co. 3.	Critical difference
1952 (Summer) ..	2,280	1,654	2,150	2,100	1,963	1,794	161

TABLE XXI.—*Comparative yield trials—Short duration Hybrids—1953—Main—Group II.*

1953 Monsoon.
Field No.—1.
Previous crop—Cholam.
Manure—Compost 2½ tons per acre.
Sown—13th September 1953.
Harvested—11th December 1953.

Variants—Five.
Layout—Randomised blocks.
Replications—Six.
Size of plot—
Gross—12 × 54 links.
Nett—8 × 50 links.

Variants.	Grain yield per acre in lb.	Grain yield as a per cent of the standard.	Straw yield per acre in lb.	Straw yield as a per cent of the standard.	Duration of crop in days.
H. 881	469	116·9	1,723	102·8	77
H. 884	606	151·1	2,123	126·7	78
H. 885	633	157·8	2,133	127·3	79
H. 888	503	125·4	2,100	125·3	80
Co. 3 standard	401	100·0	1,675	100·0	82
Standard error	55·9	13·9	..	..	..
Whether differences are significant or not at 5 per cent level.	Yes	Yes	No	No	..
Critical difference	165	41·1	..	..	..

Conclusion—
Grain: H. 885, H. 884, H. 888, H. 881, Co. 3

Results of previous year's trial—Grain yiled in lb. per acre.

Year.	H. 881.	H. 882.	H. 884.	H. 885.	H. 888.	Co. 3.	Critical difference.
1952 Summer	2,230	1,654	2,150	2,100	1,963	1,794	61

Hybrids of medium duration.—The medium duration hybrids advanced from previous years were given their first large scale yield tests in 1953 monsoon season. They were divided into two groups—five in the first and eight in the second, Co. 1 being used as the standard. In group I, the differences in grain yield in these tests were not significant, though in the yield of straw, four of them were superior to Co. 1 and one was on a par with it. The results are given in Table XXII.

TABLE XXII.—*Comparative yield trials—Medium duration Hybrids—1953—Main—Group I.*

1953 Monsoon.
Field No.—1.
Previous crop—Cholam.
Manure—Compost 2½ tons per acre.
Sown—13th September 1953.
Harvested—16th December 1953.

Variants—Six.
Layout—Randomised blocks.
Replications—Six.
Size of plot—
Gross—12 × 54 links.
Nett—8 × 50 links.

Variants.	Grain yield per acre in lb.	Grain yield as a per cent of the standard.	Straw yield per acre in lb.	Straw yield as a per cent of the standard.
H. 835	709	128·9	2,951	115·0
H. 837	727	132·2	3,113	121·3
H. 840	704	128·0	2,720	106·0
H. 843	662	120·4	3,145	122·6
H. 846	777	141·3	3,578	139·4
Co. 1 (Standard)	550	100·0	2,566	100·0
Standard error	123	22·4	125	4·9
Whether differences are significant or not at 5 per cent level.	No	No	Yes	Yes
Critical difference	..	..	364	14·2

Conclusion—
Straw: H. 846, H. 843, H. 837, H. 835, H. 840, Co. 1

In group II, eight hybrids advanced after initial tests of hybrids between superior inbreds were compared with Co. 1. Three of the hybrids, H. 897, H. 894 and H. 988 are superior to the standard in the yield of grain, while the others are all on a par with it. In the yield of straw, five hybrids are superior to the standard, the rest being on a par with it. These will again be tested in the next year for confirmatory tests. The results are presented in Table XXIII.

TABLE XXIII.—*Comparative yield trials—Medium duration Hybrids (Parents inbred to S. 7 generation)—1953—Main—Group II.*

1953 Monsoon.
Field No.—1.
Previous crop—Cholam.
Manure—Compost 2½ tons per acre.
Sown—13th September 1953.
Harvested—16th December 1953.

Variants—Nine.
Layout—Randomised blocks.
Replications—Four.
Size of plot—
Gross—12 × 54 links.
Nett—8 × 50 links.

Variants.	Grain yield per acre in lb.	Grain yield as a percentage of the standard.	Straw yield per acre in lb.	Straw yield as a percentage of the standard.	Duration in days.
H. 894	760	170·7	2,993	158·8	83
H. 895	650	146·1	2,230	118·3	83
H. 896	675	151·7	2,780	147·5	88
H 897	84	189·9	2,763	146·5	85
H. 898	751	168·8	2,963	157·2	85
H. 899	453	101·8	2,845	150·9	84
H. 901	380	85·4	2,545	135·0	84
H. 902	665	149·4	2,468	130·9	86
Co. 1 (standard)	445	100·0	1,885	100·0	83
Standard error	82·8	18·6	230	12·2	..
Whether differences are significant or not at 5 per cent level.	Yes	Yes	Yes	Yes	..
Critical difference	241·3	54·2	672·5	35·7	..

Conclusion—

Grain: H. 897, H. 894, H. 898, H. 896, H. 902, H. 895, H. 899, Co. 1, H. 901

Straw: H. 894, H. 898, H. 899, H. 896, H. 897, H. 901, H. 902, H. 895, Co. 1

(*b*) *Comparison of the seeds of superior hybrids produced by artificial and natural pollination.*—The seeds of hybrids H. 863, H. 866, H. 874 and H. 881 found uperior to the standard in the yield trials of 1952 summer season, were produced both by artificial pollination and also through natural pollination by raising a mixture of seeds of parents in equal proportions in seed blocks and harvesting the produce in bulk. These were tested in a yield trial in the summer season under irrigated conditions. In the yield of grain, statistically the variants are all on a par indicating that there is no difference between the yields of the crops raised from artificial and natural hybrids. In the yield of straw, though there are significant differences between the variants, the hybrids produced by both the methods are on a par in the different combinations. The results are given in Table XXIV.

TABLE XXIV.—*Comparative yield trials—Short duration Hybrids—Comparison of Artificial and naturally produced Hybrid seed—(Parents inbred to S. 6 generation)—1953—Summer.*

1953 Summer.
Field No.—5-A.
Previous crop—Cholam.
Manure—Green manure ploughed in.
Sown—11th April 1953.
Harvested—8th July 1953.

Variants—Eight.
Layout—Randomised blocks.
Replications—Four.
Size of plot—
Gross—12 × 52 links.
Nett—8 × 50 links.

Variants.	Grain yield per acre in lb.	Grain yield as a per centage of general Mean.	Straw yield per acre in lb.	Straw yield as a per centage of general Mean
H. 863 Art	2,013	100·4	3,420	100·7
H. 863 Nat	1,833	91·4	3,788	111·5
H. 866 Art	2,040	101·7	2,875	84·7
H. 866 Nat	1,915	95·5	2,808	82·7
H. 874 Art	2,053	102·4	3,645	107·4
H. 874 Nat	1,970	98·3	3,820	112·5
H. 881 Art	2,188	109·1	3,225	95·0
H. 881 Nat	2,035	101·5	3,583	105·5
General Mean	2,005	100·0	3,395	100·0
Standard error	69·5	3·5	162·5	4·8
Whether differences are siginficant or not at 5 per cent level.	No	No	Yes	Yes
Critical difference	..	..	472·5	13·9

Conclusion—

Straw :H .874(N) H. 863 (N) H. 874 (A) H. 881(N) H. 863(A) H. 881(A) H. 866(A) H. 866(N)

Index—

A and Art: Hybrid seed produced by artificaial dusting of pollen.
N and Nat: Hybrid seed produced by raising a 1 : 1 mixture of parents and harvesting the bulk produce.

Results of previous year's trial—Grain yield in lb. per acre.

Year.	Co. 3.	H. 854. Artificial.	H. 854. Natural.	Critical difference.
1952 Summer	1,828	,1706	1,688	142·

The results confirm the previous observations. As such the method adopted for large scale production of hybrid seeds by sowing mixed seeds of parents can be considered as quite satisfactory.

(c) *Comparison of F1 and F2 progenies of crosses for reduction of vigour, if any in F2.*—To study whether the vigour and the consequent increased yield of F1 will be partially retained in the F2 and if so, whether the yield will be high enough to make the use of second generation hybrid seed profitable in cultivation, a yield trial was conducted with the F1 and F2 generation, seeds of three hybrids H. 863 H. 866 and H. 874 along with the standard Co. 3.

The second generations of all the hybrids have given yields significantly lower than that of the first generation, but the F2 generation is on a par with Co. 3, the standard. Even the yield of the F2 of the best hybrid tested is not high enough to warrant the use of second generation in the place of F1. It is however, to be mentioned that the parents of the hybrids in these cases are yielding lower than Co. 3. The results are presented in Table XXV.

TABLE XXV.—*Comparative yield trials—Short-duration hybrids F. 1 and F. 2—1953—Summer—Group III.*

1953 Monsoon.
Field No. 1.
Previous crop—Cholam.
Manure—Compost 2½ tons per acre.
Sown—13th September 1953.
Harvested—14th December 1953.

Variants—Seven.
Layout—Randomised blocks.
Replications—Four.
Size of plot—
Gross—12 × 54 links.
Nett—10 × 48 links.

Variants.	Grain yield per acre in lb.	Grain yield as a per centage of the standard.	Straw yield per acre in lb.	Straw yield as a percentage of the standard.
H. 863 F. 1	985	149·7	2,317	94·9
H. 863 F. 2	525	79·8	1,567	64·2
H. 866 F. 1	750	113·9	2,132	87·4
H. 866 F. 2	470	71·4	1,940	79·5
H. 874 F. 1	970	147·4	2,800	114·8
H. 874 F. 2	680	103·3	2,240	91·8
Co. 3 Standard	658	100·0	2,440	100·0
Standard Error	76·8	11·7	220·3	9·0
Whether differences are significant or not at 5 per cent Level.	Yes	Yes	Yes	Yes
Critical difference	227·5	34·6	652·1	26·7

Conclusion—

Grain : H. 863F 1, H. 874F 1, H. 866F1, H. 874 F 2, Co. 3, H. 863F 2, H. 866 F 2

Straw : H. 874F 1, Co. 3, H. 863F 1, H. 874F 2, H. 866F 1, H. 866F 2, H. 863F 2

The tests will be continued for further information.

(vii) *Trial of hybrids in the fields of the cultivatons in the districts.*—The two hybrids X. 1 and X. 2 were sent for repetition of trials in the fields of farmers. From the reports received, the hybrids are found to have given higher yields of grain over the local varieties in East and West Godavari, South Arcot and Tiruchirappalli districts. The increases in yield are 4 per cent and 10 per cent in the case of X. 1 and X. 2 in East Godavari, 41 and 17 per cent for X. 1 and X. 2 in West Godavari, 14 and 10 per cent for X. 1 and X. 2 in South Arcot and 22 and 19 per cent for X 1 and X. 2 in Tiruchirappalli districts. The performances of the hybrids in Rama nathapuram and Tirunelveli districts were not consistent.

An yield test was also laid out with the short duration hybrid H. 866 in the field of a farmer along with the local variety " Arupatham Cumbu." The hybrid was observed to give an increased yield of 29 per cent grain over the local, maturing at the same time.

(viii) *Multiplication of seeds of hybrids, parents and other strains and seed distribution.*—During the year under report, the seeds of parents and strains were raised in isolated blocks in the Central Farm and the fields of the farmers for multiplication. The seeds of hybrids and parents were also produced on a large scale in seed farms in ryots' fields. During the season, about 750 acres of seed farms were raised in Coimbatore district and about 85,000 lb. of seeds of hybrids and parents were procured for distribution. From this, about 40,200 lb. of seeds of hybrids, parents and strains were distributed to cultivators during the year under report.

Section III—Scheme for the evolution of improved strains of Millets and Pulses (Regional Millet Stations).

9. *Introduction.*—The studies carried on at the Millets Breeding Station, Coimbatore for improvement of millets and pulses indicated the need for opening regional centres of work to evolve suitable strains in each of the major varieties grown in the respective areas, as the strains evolved at Coimbatore were found to have limited scope for spread in such regions. To meet this need, the Government were pleased to sanction a scheme for the opening of four stations in the important millet tracts of the undivided State (*vide* G.O. Ms. No. 1,565, Development, dated 24th March 1949). Accordingly, four Regional Millet Stations were opened, at Ariyalur in Tiruchirappalli district, Tirupattur in North Arcot district, Ongole in Guntur district and Narsapatnam in Visakhapatnam district, all under the administrative and technical control of the Millets Specialist. An Assistant Millets Specialist with headquarters at Coimbatore was also sanctioned to be in charge of the Regional Millet Stations. With the formation of the Andhra State on 1st October 1953 the control of the stations Ongole and Narasapatnam was transferred to the Millets Specialist, Guntur of the Andhra State. The post of the Assistant Millets Specialist in the residuary State, was also abolished with effect from 1st November 1953. An extension of this scheme was sanctioned for this State for a further period of five years from 1st April 1954 in G.O. Ms. No. 519, Agriculture, dated 23rd February 1954, after the original sanction came to a close on 31st March 1954. The work carried on at Ariyalur and Tirupattur during the fasli-year 1363 (1953–54) alone is presented in this report.

10. *Ariyalur.*—Research work on the improvement of millets was carried on at Ariyalur, in a block of 9·95 acres of dry land, near the Ariyalur Railway Station. After the five-year lease period expired on 31st March 1954, a new block of land about 10 acres in extent—all in one block in Valajanagaram village of Udayarpalayam taluk and belonging to one farmer was selected and after approval by the Government in G.O. Ms. No. 1923, Agriculture, dated 10th June 1954, the land was taken possession of on 4th June 1954. The old block of land was relinquished on 17th May 1954 and work started at the site in June 1954.

Season and rainfall.—A total rainfall of 31·4 inches was received on 50 rainy days as against the previous ten-year average of 38·6 inches, distributed over 50·4 rainy days. The rainfall was defective not only in its total precipitation. but also in its distribution, it being uneven. The south-west and north-east monsoon rains started in normal time and the seasonal conditions were fair to dry land crops, except rainfed ragi, which was very much affected in its early stages, by the continuous heavy rains received in September.

Crops—(*a*) *Cholam.*—Four varieties of cholam are commonly raised in the dry lands of this tract. They are Makkattai cholam, Vensamarai cholam, Sen cholam and Irungu cholam.

(i) *Makkattai Cholams.*—Of the four main varieties, Makkattai cholam is the most important occupying nearly 50 per cent of the total area. There are two distinct types in this variety, viz., Manjamakkattai, having yellow grains and Vellai? makkattai, having white grains. In Manjamakkattai, four selections isolated at the station were tested in yield trials with strain Co. 1 and the local bulk sample as standards. The grain yield differences were significant and A.Ch. 193 gave the highest grain yield. The results are presented in Table XXVI.

Table XXVI.—*Regional Millet Station, Ariyalur—Manjamakkattai Cholam—Yield Trials—1953—Main.*

Field No.—E.
Previous crop—Paladam Cumbu.
Manure—2½ tons of cattle manure per acre.
Sown—26th July 1953.
Harvested—4th January 1954.

Variants—Six.
Layout—Randomised blocks.
Replications—Six.
Size of plot—
Gross—1·0 cent.
Nett—0·6 cent.

Selecitons A. Ch. 183, A.S. 753 and A. Ch. 290 Recorded increased yield, but the

Particulars	A-Ch. 5	A.Ch. 192	A.Ch. 193	A.Ch. 276	Co. 1	Local	Standard error.	Whether differences are significant or not by 'Z' test P = 0·05	Critical difference.
Grain—									
Yield per acre in lb	886	917	1,189	947	1,064	1,053	51·17	Yes	157·4
Percentage of the standard.	84·2	87·1	113·0	90·0	101·1	100·0	4·86	,,	14·14
Straw—									
Yield per acre in lb.	8,083	6,754	6,694	6,575	7,333	6,938	423·33	No.	..
Percentage of the standard.	116·5	97·5	96·5	94·8	15·7	100·0	5·1	No.	..

Conclusion—

Grain—A.Ch 193, Co·1, Local, A.Ch· 276, A.Ch 192 A. Ch. 5.

Results of previous years trials.

Grain yield per acre in lb.

Year.	A.Ch.5	A·Ch.192	A.Ch91	A.Ch.73	Co 1	Local	Critical difference
1950–51	..	..	..	..	1,384	434	172
1951–52	..	..	..	..	1,887		265
1953–54	628	703	619	..	431	875	225

Form the progenies of 31 single plants and three bulk sample grown and studied, nine single plants were advanced to preliminary yield trials. Four selections of Vellaimakkattai isolated at the station and selections AS 7537 of Coimbatore were tested for yield with the local bulk seed as the standad in yield trial plots differenc were not significant. The reselts are given in Table XXVII.

TABLE XXVII.—*Regional Millet Station Ariyalur—Velliamakkattaich olam—Yield Trials*—1953—*Main*

Field No—F.
Previous crops—Arisl Cumbu
Manure—2½ tons of cattle manure per acre
Sown—25th July 1953.
Harvested—30th December 1958.

Varients—Six.
Layout—Randomised blocks
Replication—Six
Size of polt—
Gross—1·0 cent,
Nett—0·6 cent

Particulars	A.Ch 183	A.Ch 189	A.Ch 283	A.Ch 290	A-S 7537	Local	Standard error.	Whether differences are Significant or not by 'Z' test P —0·05	Critical difference
Grain—									
Yield per acre in lb.	1,494	1,314	1,264	1,347	1,486	1,333	58·33	Yes	169·1
Percentage of the standard	111·9	98·5	94·8	101·0	111·5	100·0	4·47	,,	12·7
Straw—									
Yield per acre in lb.	6,403,	6,220,	6,520,	6,414.	6,211,	5,714,	213.33	No.	
Percetage of the standard.	112·1	108·8	114·2	112·3	108·7	100·0	5·0	--	..

Conclusion—

Grain—A.Ch 183 A.S 7537, A Ch 290, Local. A. Ch 189, A.Ch, 283

Results of previous years trials.

Grain yield per acre in lb.

Year	A.Ch 183	A.Ch 189	A.Ch 283	A.Ch 290	A.S 75 7	Local	Critical difference
1949–50	..	..	..	..	1,141	1,016	..
1950–51	..	..	..	..	1,100	917	172
1951–52	..	..	..	..	2,113	2,747	275
1952–53	881	722	..	..	840	541	147

Of the ten selections tested in preliminary yield trials in comparison with the local, to selections were significantly superior to the local, giving 65 and 35 per cent increased yield. From 41 single plants sown in observation plots, 12 were advanced top reliminary yield trials.

(ii) *Vensamarai cholam.*—This variety is similar to the Talaivirichan Cholam of Coimbatore. Seven selections made up of three received from Coimbatore and four isolated at the station, were tested in preliminary yield trials, with the strain Co. 2 as standard and two were promising. From five bulk samples and 11 single plants studied in observation plots, 22 single plants were taken for further study.

(iii) *Sen cholam.*—This variety is also grown on a large scale in this tract. The dry land Sen cholam selections of Coimbatore did not compare well with the local variety in trials conducted in the previous years at this station. Seventeen selections were tested in preliminary yield trials in comparison with the local. But the grain yield was very poor and analysis of yield data was not taken up. Of the 18 single plants tested in observation plots, ten were promising.

(iv) *Irungu cholam.*—The breeding work on this variety is mainly confined to the grain varieties with partially exposed grains, in both Sevvirungu and Kakairungu Cholams which are important to the tract. Two selections of Kakairungu and one of Sevvirungu isolated at this station, along with selections A.S. 7081 (from Periamanjal × Irungu) and A.S. 660 of Coimbatore were tested in yield trials, in comparison with the local Kakairungu bulk. The yield differences were significant and selection A.S. 7081 was significantly superior to the rest, recording 95 per cent increased yield. Two selections A.Ch. 79 and A.Ch. 121 of the station gave 25 and 10 per cent more yield than the standard and were on a par with it. In straw yield, A.Ch. 121 was superior to the rest. The yield data are presented in Table XXVIII.

TABLE XXVIII.—*Regional Millet Station, Ariyalur—Irungu Cholam—Yield Trials—1953—Main.*

Field No.—G.
Previous crop—Varagu.
Manure—2½ tons of cattle manure per acre.
Sown—30th August 1953.
Harvested—9th January 1954.

Variants—Six.
Layout—Randomised blocks.
Replications—Six.
Size of plot—
Gross—1·0 cent.
Nett—0·6 cent.

Particulars.	A.Ch. 79	A.Ch. 111	A.Ch. 121	A.S. 660	A.S. 7081	Local.	Standard error.	Whether differences are significant or not by 'Z' test P = 0·05	Critical difference
Grain—									
Yield per acre in lb.	408	300	361	239	639	328	28·67	Yes.	83·1
Percentage of the standard.	124·6	94·1	110·2	72·9	194·9	100·0	8·73	,,	25·9
Straw—									
Yield per acre in lb.	4,864	4,914	5,639	3,131	2,600	3,972	336·66	,,	976·3
Percentage of the standard.	121·7	123·7	141·9	78·8	65·5	100·0	8·48	,,	24·7

Conclusion—
Grain—A.S. 7081, A.Ch. 79, 121, Local, A.Ch. 111, A.S. 660.
Straw—A.Ch. 121, A.Ch. 111, 79, Local, A.S. 660, A.S. 7081.

Results of previous years' trials.

Grain yield per acre in lb.

Year.	A.Ch. 79	A.Ch. 111	A.Ch. 121	A.S. 660	A.S. 7081	Local.	Critical difference.
1950–51	..	..	..	1,350	1,217	963	185
1951–52	..	..	..	833	867	717	110
1952–53	1,272	1,217		836	1,464	1,147	..

In the preliminary yield trials, of the two selections of Sevvirungu and seven of Kakairungu tested in comparison with the local Kakairungu bulk, two selections of Kakairungu were superior to the standard.

(*b*) *Cumbu.*—This millet is grown under rainfed conditions in two seasons in the Ariyalur tract. A short duration variety popularly known as Arisi cumbu with a duration of 2½ months is raised from July to September. The long duration variety known as Paladam or Panicumbu with a duration of 3½ months is grown during October to January season.

(i) *Arisi Cumbu.*—Five selections were tested in yield trails in comparison with the local and three were significantly superior to the standard with increases in yield ranging from 19 to 29 per cent. Selection A.C. 30 gave the highest yield of grain and straw. The results are presented in Table XXIX.

TABLE XXIX.—*Regional Millet Station, Ariyalur—Arisi Cumbu—Yield Trials—1953—Main.*

Field No.—D.
Previous crop—Cholam.
Manure—2½ tons of cattle manure per acre.
Sown—20th July 1953.
Harvested—19th October 1953.

Variants—Six.
Layout—Randomised blocks.
Replications—Six.
Size of plot—
Gross—1·0 cent.
Nett—0·6 cent.

Particulars.	A.C. 22	A.C. 30	A.C. 50	A.C. 59	A.C. 150	Local.	Standard error.	Whether differences are significant or not by 'Z' test P = 0·05	Critical difference.
Grain—									
Yield per acre in lb.	597	647	528	597	542	500	32·5	Yes.	84·25
Percentage of the standard.	119·4	129·4	105·6	119·4	108·3	100·0	6·5	,,	18·97
Straw—									
Yield per acre in lb.	861	1,050	886	686	667	872	58·5	,,	169·70
Percentage of the standard.	98·7	120·4	101·6	78·7	76·4	100·0	6·71	,,	19·5

Conclusion—

Grain—A.C. 30, 22, 59, 150, 50, Local.

Straw—A.C. 30, 50, Local, 22, 59, 150.

Results of previous years' trials.

Grain yield per acre in lb.

Year.	A.C. 22	A.C. 30	A.C. 50	A.C. 59	A.C. 150	Local.	Critical difference.
1951–52	..	..	592	..	..	402	80·9
1952–53	Crop failed.						

Of the 17 selections compared in preliminary yield trials, six were significantly superior to the standard, recording 22 to 55 per cent increased grain yields. From the 12 single plants studied in observation plots, five selections were taken from further studies.

(ii) *Paladam Cumbu.*—The selections received from Coimbatore did not compare favourably with the local variety of Palladam Cumbu in trials conducted in the previous seasons. Five selections isolated at the station were compared with local bulk as standard for yield. The yield differences were not significant, though four of the five selections gave 4 to 25 per cent increased yields over the standard. The yield data are presented in Table XXX.

TABLE XXX.—*Regional Millet Station, Ariyalur—Palladam Cumbu—Yield Trials—1953—Main.*

Field No.—E.
Previous crop—Irungu Cholam.
Manure—5 tons of compost manure per acre.
Sown—29th October 1953.
Harvested—12th February 1954.

Variants—Six.
Layout—Randomised blocks.
Replications—Six.
Size of plot—
Gross—1·0 cent.
Nett—0·6 cent.

Particulars.	A.C. 129	A.C. 186	A.C. 187	A.C. 207	A.C. 275	Local.	Standard error.	Whether differences are significant or not by 'Z' test P = 0·05
Grain—								
Yield per acre in lb.	747	661	625	589	667	600	37·00	No.
Percentage of the standard.	124·5	110·2	104·2	98·01	111·1	100·0	6·17	..
Straw—								
Yield per acre in lb.	2,239	1,956	1,714	2,092	1,800	1,903	119·66	..
Percentage of the standard.	117·7	102·8	90·1	109·9	94·6	100·0	6·3	..

Results of previous years' trial.

Grain yield per acre in lb.

Year.	A.C. 129	A.C. 186	A.C. 187	A.C. 207	A.C. 275	Local.	Critical difference.
1952-53		625	628	..	639	622	..

From the study of 22 bulk samples and four single plants in observation plots, eight promising selections were taken for further tests.

(*c*) *Ragi.*—A few selections of unirrigated Ragi were grown at the station. But due to heavy and continuous rains during the early seedlings stages, the crop completely failed and no seed material could be gathered. Fresh seeds will be obtained for study and selection.

(*d*) *Varagu.*—This is the main dry land Millet of the tract and is grown from August to December. In previous trials conducted at the station, strain Co. 1 and selection P.S. 76 of Coimbatore were found to be superior to the local. Three selections of the station along with strain Co. 1 and also selection P.S. 76 of Coimbatore were tested in yield trial plots with the local bulk as standard. All the selections compared were superior to the standard, with 21 to 43 per cent increased yields, selection A.V. 155 recording the highest yield. The straw yield also was significant and four selections gave higher yields than the local bulk. The results are summarised in Table XXXI.

TABLE XXXI.—*Regional Millet Station, Ariyalur—Varagu yield trails—1953—Main.*

Field No.—D.
Previous crop—Cholam.
Manure—Two and a half tons of cattle manure per acre.
Sown—30th August 1953.
Harvested—19th January 1954.
Variants—Six.
Layout—Randomised blocks.
Replications—Six.
Size of plot—Gross—1·0 cent, Nett—0·6 cent.

Particulars.	A.V. 29.	A.V. 101.	A.V. 155.	P.S. 76.	Co. 1.	Local.	Standard error.	Whether differences are significant or not by 'Z' test. P = 0·05.	Critical difference.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Grain—									
Yield per acre in lb.	1,753	1,817	1,983	1,747	1,622	1,339	94·5	Yes.	274·1
Percentage of the standard.	130·9	135·8	142·5	130·5	121·2	100·0	7·1	,,	20·5
Straw—									
Yield per acre in lb.	3,653	4,328	3,994	3,681	3,481	3,014	203·33	,,	9·7
Percentage of the standard.	121·2	143·6	132·5	122·1	115·5	100·0	6·75	,,	19·60

Conclusion—

Grain—A.V 155, 101, 29, P.S. 76, Co. 1, Local.

Straw—A.V. 101, 155, P.S. 76, A.V. 29, Co. 1, Local.

Results of previous years' trials.

Grain yield per acre in lb.

Year.	A.V. 29.	A.V. 101.	A.V. 155.	P.S. 76.	Co. 1.	Local.	Critical difference.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1950-51	..	..	..	..	1,750	1,300	317
1951-52	..	..	..	..	2,625	2,036	278
1952-53	..	..	..	1,294	1,089	956	231

From the bulk samples and single plants studied in observation plots, 14 promising selections were taken for further tests.

(*e*) *Other crops.*—Bengalgram, Horsegram and Coriander were sown in any area of 40 cents each in the north-east monsoon season, in rotation with Arisi Combu Coriander and Bengalgram recorded acre yields of 366 lb. and 120 lb. respectively while Horsegram completely failed. Redgram SA. 1 sown in an area of 40 cents gave an acre yield of 318 lb. of grain. A crop of potato (President varity) was grown in an area of 2 cents as a trial and as the yield recorded was as low as 1,400 lb. of tuber per acre, further trail was discontinued. Sesbania was planted all along the borders of the farm and 18 lb. of seeds were obtained.

(*f*) *Seed distribution.*—During the year, 481 lb. of seeds of improved strains of Millets were supplied to District Officers from this station.

11. *Tirupattur.*—This station is situated a mile to the west of Tirupattur municipality and is located on a block of 19·86 acres of land taken on lease for five years in 1949. With the extension of the scheme, the same block of land has been taken on lease for a further period of five years from 1st April 1954. As already reported last year, the work on Pulses carried on at the Pulses Sub-station, Dharmapuri, was shifted to this station and in addition to the major millets, work on dry land pulses such as Redgram, Lablab and Horsegram has also been taken up at this station. During the year, 525 lb. of seeds of improved strains of Millets and Pulses were distributed from the station.

Season and rainfall.—A total rainfall of 40·9 inches was received in 60 rainy days as against the previous ten-year average of 35·5 inches in 54·1 days. The excess rainfall of 5·4 inches was received both in the south-west and north-east monsoon periods. The sowings of all the dry land Millets and Pulses were taken up at the proper time and all the crops except Horsegram recorded good yields. In the case of Horsegram, the growth was inhibited in the early stages by continuous wet weather during September and October, which resulted in very poor yields.

Crops—(*a*) *Cholam.*—The most common dry land variety of the region is Talaivirichan Cholam. Six selections with pearly grains and four with chalky grains were compared with the local Talaivirichan in two sets of yield trials (pearly and chalky). In the pearly series, strain Co. 19 and selections T.S. 245 and T.S. 200 isolated at the station, were significantly superior to the local, with increases in yield ranging from 42 to 66 per cent. The other three selections were on a par with the local. They also recorded increased yields ranging from 16 to 29 per cent. The results are presented in Table XXXII.

TABLE XXXII—*Regional Millet Station, Tirupattur—Talaivirichan cholam—yield trials*—1953—*Main* (*White pearly group*).

Field No. 3.
Previous crop—Cumbu.
Manure—Five tons of cattle manure per acre.
Sown—6th June 1953.
Harvested—16th December 1953.

Variants—Seven.
Layout—Random sed blocks.
Replications—Four.
Size of plot—
Gross—2 cents : Nett—1·6 cents.

Particulars.	Local (Standard).	Co. 3.	Co. 19.	A.S. 8006.	T.S. 162.
(1)	(2)	(3)	(4)	(5)	(6)
Grain—					
Yield per acre in lb.	773	996	1,281	921	892
Percentage of the standard ..	100·0	128·9	165·9	119·3	115·5
Straw—					
Yield per acre in lb.	6,425	5,644	6,494	6,869	5,594
Percentage of the standard ..	100·0	87·8	101·1	106·9	87·1

Particulars.	T.S. 200.	T.S. 245.	Standard error.	Whether differences are significant or not by 'Z' test P=0·05.	Critical difference.
	(7)	(8)	(9)	(10)	(11)
Grain—					
Yield per acre in lb.	10,97	1,165	92	Yes.	273
Percentage of the standard ..	141·9	150·8	11·9	„	35·3
Straw—					
Yield per acre in lb.	7,594	7,219	763	No.	..
Percentage of the standard ..	118·2	112·4	11·9	„	..

Conclusion—

Co. 19, T.S. 245, T.S. 200, Co. 3, A.S. 8006, T.S. 162, Local.

Resuts of the previous years' trials.
Grain yield per acre in lb.

Year.	Co. 3 (Standard).	Co. 19.	A.S. 8006.	Critical differences.
1951–52	1,118	1,252	1,579	201
1952–53	242	363	389	124

In the chalky series, selections T.S. 181 and T.S. 29 of the station were significantly superior to the local, the increase in yield being 26 and 24 per cent respectively. The results are given in Table XXXIII.

TABLE XXXIII—*Regional Millet Station, Tirupattur—Talaivirichan Cholam Yield trials*—1953—*Main* (*White chalky group*).

Field No. 3.
Previous crop—Cumbu.
Manure—Five tons of cattle manure per acre.
Sown—8th June 1953.
Harvested—16th December 1953.

Variants—Five.
Layout—Randomised blocks.
Replications—Six.
Size of plot—Gross—2·0 cents; Nett—1·6 cents.

Particulars.	Local (standard).	Co. 2.	T.S. 29.	T.S. 181.	T.S. 183.	Standard error.	Whether differences are significant or not by 'Z' test P = 0·05.	Critical difference.
Grain—								
Yield per acre in lb. ..	1,154	1,193	1,432	1,449	1,321	78	Yes.	230
Percentage of the standard	100·0	103·3	124·1	125·6	114·5	6·8	„	19·9
Straw—								
Yield per acre in lb. ..	6,200	7,269	7,119	7,450	7,394	426	No.	..
Percentage of the standard.	100·0	117·2	114·8	120·9	119·2	6·9	„	..

Conclusion—

Grain—T.S. 181, T.S. 29, T.S. 183, Co. 2, Local.

Results of previous year's trials.
Grain yield per acre in lb.

Year.	Co. 3 (Standard).	T.S. 29.	Critical difference.
1952–53	242	247	124

As T.S. 29 has given consistently high yields in two years of yield trials at the station, it was given out for trials in North Arcot and Salem districts. Twenty-one selections evolved at the station were also tested in three groups of preliminary yield trials, in comparison with the local bulk sample and strain Co. 3. The yield differences were not significant, though most of them recorded numerically higher yields than the standard. The trial will be repeated. From the progenies of other selections and bulk samples grown for study, 24 were selected for preliminary yield trials and 40 single plants for further study.

(*b*) *Cumbu.*—Six selections, one from Coimbatore and five isolated at the Station, were compared with the local bulk seed in yield trial plots. The grain yield differences were significant and two selections T.C. 97 of the Station and P.T. 734/1 received from Coimbatore were significantly superior to the local with increases in yield of 19 and 17 per cent respectively. The results are given in Table XXXIV.

TABLE XXXIV.—*Regional Millet Station, Tirupattur—Cumbu yield trials*—1953—*Main.*

Field No. 3.
Previous crop—Horsegram.
Manure—2½ tons of cattle manure per acre.
Sown—8th June 1953.
Harvested—1st September 1953.

Variants—Seven.
Layout—Randomized blocks.
Replications—Four.
Size of plot—Gross—2·0 cents; Nett—1·6 cents.

Particulars.	Local (Standard).	T.C. 97.	T.C. 300.	T.C. 303.	T.C. 330.
(1)	(2)	(3)	(4)	(5)	(6)
Grain—					
Yield per acre in lb.	1,041	1,243	1,033	955	1,138
Percentage of the standard ..	100·0	119·3	99·2	91·7	109·3

	T.C. 357.	P.T. 734/1.	Standard error.	Whether differences significant or not by 'Z' test. P=0·05.	Critical difference.
	(7)	(8)	(9)	(10)	(11)
Grain—					
Yield per acre in lb.	1,022	1,219	39	Yes.	117
Percentage of the standard ..	98·1	117·1	3·8	„	118

Conclusion—

Grain— T.C. 97, T.C. 734/1, T.C. 330, Local, T.C. 300, T.C. 357, T.C. 303.

Results of previous year's trial.
Grain yield per acre in lb.

Year	Local (standard).	T.C. 97.	P.T. 734/1.	Critical difference.
1952-53 Trial 1	204	..	224	..
„ 2	166	160	..	..

Eighteen economic selections were also tested in three groups of preliminary yield trials, in comparison with the local and ten of these were promising. From the progenies of bulk samples and single plant selections under study, 72 single plants and 60 selections were carried forward for further study and preliminary yield trials respectively.

(*c*) *Ragi.*—Unlike other millets, ragi was grown in two seasons, one from June to September in dry land and other from December to March under irrigation. The rainfed crop was a failure due to adverse season. In the irrigated crop, nine selections advanced from the previous study plots and six selections which were tested in preliminary yield trials last year were compared in two sets of preliminary yield trials, with the local seed as the standard. Four of these recorded higher yields and were promising. From the progenies of bulk seeds and single plants grown for study, 25 single plants and 19 economic selections were carried forward for study and preliminary yield trials respectively.

(*d*) *Samai.*—Eight selections consisting of three retained from the preliminary yield trials of last year and five advanced from the study plots of the previous year were tested in preliminary yield trials, with the local bulk as standard. The grain yield differences were not significant, though selection T.S. 2 recorded 26 per cent higher yield than the standard. Twenty single plants were isolated from the 10 bulk samples studied in observation plots at the station.

(*e*) *Varagu.*—Eight selections were tested in preliminary yield trials with the local bulk as standard. All the eight selections recorded increased yields ranging from 5 to 51 per cent, though they were not statistically significant. From the progenies of bulk samples and single plants, 12 single plants were carried forward for further studies and six economic selections for preliminary yield trails

(*f*) *Redgram.*—Nine selections were compared with the local bulk for yield. The yield differences of grain were not significant, though SA. 1 and selections 55 and 63 recorded 4 to 10 per cent increased yields. These have been retained for repetition of test. The results are given in Table XXXV.

TABLE XXXV.—*Regional Millet Station, Tirupattur—Redgram—Yield trials—1953—Main.*

Field No. 2 E.
Previous crop—Cholam .
Manure—2½ tons of cattle manure per acre.
Sown—8th June 1953.
Harvested—5th January 1954.

Variants—Ten.
Layout—Randomised block.
Replications—Six.
Size of plot—Gross—0·96 cent; Nett—0·58 cent.

Particulars.	S.A.1.	55	Local	63	3	159	296
(1)	(2)	(3)	(4)	(5)	(6)	(7)	8)
Grain—							
Yield per acre in lb.	1,731	1,631	1.573	1,554	1,411	1,407	1·37
Percentage of the standard ..	110·0	103·7	100.0	98·8	89·7	89·4	87·0

				Whether differences significant or not by 'Z' test P = 0·05.		
	114	31	21	Standard error.		Critical difference.
	(9)	(10)	(11)	(12)	(13)	(14)
Grain—						
Yield per acre in lb.	1,334	1,319	1,144	148·1	No	..
Percentage of the standard ..	84·8	83·9	72·4	9·4	No	..

(*g*) *Lablab.*—Six selections received from Coimbatore were tested in tow groups of yield trials. In the first group, selections 2381, 2382 and 2386 were

compared with the local bulk as the standard. The results are presented in Table XXXVI.

TABLE XXXVI.—*Regional Millet Station, Tirupattur—Lablab—Yield trials*—1953—*Main (Group I).*

Field No. 2 D.
Previous crop—Cholam.
Manure—2½ tons of cattle manure per acre.
Sown—8th June 1953.
Hoarvested—12th January 1954.

Variants—Four.
Layout—Randomised blocks.
Replications—Six.
Size of plot—Gross—0·19 cent; Nett—0·19 cent.

Particulars.	Local (standard).	2381	2382	2386	Standard error.	Whether differences significant or not by 'Z' test P = 0·05.	Critical difference.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Grain—							
Yield per acre in lb.	719	864	886	750	41	Yes.	123
Percentage of the standard.	100·0	120·1	123·0	104·3	5·7	Do.	17·1

Conlcusion—

Grain 2382, 2381, 2386, Local.

In the second set, selections 2549, 2550 and 2552 were compared with D.L 173 as the standard. The yield differences were significant in the first set and selections 2381 and 2382 were superior to the local with 23 and 20 per cent increased yields respectively. In the second set, all the three selections gave increased yields ranging from 13 to 56 per cent over the standard, though the yield differences were not significant. The results are presented in Table XXXVII.

TABLE XXXVII.—*Regional Millet Station, Tirupattur, Lablab—Yield trials* 1953—*Main.*

Field No. 2 D.
Previous crop—Cholam.
Manure—2½ tons of cattle manure per acre.
Sown—8th June 1953.
Harvested—12th January 1954.

Variants—Four.
Layout—Randomised blocks.
Replications—Six.
Size of plot—Gross—0·19 cent; Nett—0·19 cent.

Particulars.	2550	2552	2549	D.L. 173 (standard).	Standard error.	Whether differences significant or not by 'Z' test P—0·05.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Grain—						
Yield per acre in lb. ..	765	572	555	491	57·4	No
Percentage of the standard.	156·1	116·5	113·2	100·0	11·7	,,

(*h*) *Horsegram.*—Due to adverse seasonal conditions, no conclusive results could be drawn either from the yield trials in which four selections were compared against the local or from the observation plots in which seven selections were studied. The trials will be repeated.

(*i*) *Miscellaneous crops*—(i) *Green manure plants.*—Sixty seedlings of Gliricidia were planted along the irrigation channels and field bunds and 240 cuttings were propagated for planting in suitable places. In the nurseries raised with seeds of Indigofera teysmani, 50 seedlings have established and these await transplanting.

(ii) *Potato.*—The possibility of growing potato was tried at the station, the variety "President" being raised during cold weather months in an area of two cents. It yielded only 2,000 lb. of tuber per acre. Since it was uneconomic, further trials will be discontinued.

(*j*) *Seed distribution.*—A total quantity of 525 lb. of seed of improved strains of millets and pulses was distributed to the District Officers from the Station.

(*k*) *Livestock.*—One pair of work animals had been sanctioned for the station and an Alambadi pair was maintained. But as a measure of economy, the animals were sold in public auction under instructions from the Director of Agriculture.

A. KUNHIKORAN NAMBIAR,
Assistant Millets Specialist incharge of Millets and Pulses Specialist.

MILLETS AND PULSES BREEDING STATION,
COIMBATORE, 31*st August* 1954.

APPENDIX I.

MILLETS AND PULSES BREEDING STATION, COIMBATORE.

The opening of the Millets Section was sanctioned in G.O. No. 612, dated 1st May 1923. Lands to the extent of 57·52 acres were acquired contiguous to the Cotton Breeding Station at Coimbatore. Field Laboratories, farm office, store, cattle and implement sheds, irrigation channels and a few quarters for the staff were built at the station. These and roads and bunds occupy about 6·61 acres. The total cultivated area is 50·91 acres. Later on an area of 17·50 acres of unirrigated land in field number 37 of the Central Farm, was handed over to the Millets Specialist in 1950 for seed multiplication. In addition with the merging of the Pulses Section with the Millets on 1st April 1953, an area of 24 acres of unirrigated land in field No. 62 of the Central Farm, which was under the control of the Pulses Specialist was also added to the station, thus bringing the total cultivable area to 92.4 acres.

The Millets Section was started with the object of improving the Millts of this State by selection, introduction and hybridisation. The primary aim of the station continued to be the evolution of high yielding strains of Milltes till 31st March 1953. From 1st April 1953 onwards the work on Pulses was also added, it being done chiefly by selection from local varieties and by hybridisation and selection.

The following eight crops in each of Millets and Pulses are taken up for work at the station :—

Common name.	Botanical name.	Tamil.	Telugu.	Hindi.
	Millets.			
1 Sorghum	*Sorghum* species	Cholam	Jonna	Jowar.
2 Pearl Millet	*Pennisetum typhoides*, S. & H	Cumbu	Sajja	Bajra or Bajri.
3 Finger Millet	*Eleusine coracana*, *Gaerth*	Ragi	Ragulu	Ragi.
4 Foxtail Millet	*Setaria italica*, Beauv	Tenai	Korralu	Kangoone.
5 Kodo Millet	*Paspalaum scrobiculatum*, *L.*	Varagu	Arikalu	Kodra.
6 Little Millet	*Panicum miliare*, *Lam*	Samai	Samaln	Shavan.
7 Common Millet	*Panicum milaceum*, *L.*	Panivaragu	Varigalu	Barri.
8 Barnyard Millet	*Echinochloa frumentacea*, *Link*	Kudiraivali	Oodalu	Sanwak.
	Pulses.			
9 Redgram or Pigeon Pea	*Cajanus cajan*, *Linn.*	Tuvarai	Kanduln	Tur or Arhar.
10 Bengalgram	*Cicer arietinum*, *Linn.*	Kadalai	Sanagalu	Chena.
11 Blackgram	*Phaseolus mungo*, *Linn.*	Ulundu	Minumulu	Urid.
12 Green gram	*Phaseolus radiatus*, *Linn.*	Patcha payaru.	Pasalu	Mung.
13 Field Bean	*Dolichos lablab var. typnises*, *Roxb.*	Mochai	Anumulu	Sheem
Kitchen garden lablab.	*Dolichose lablab Vartuotypees Roxb.*	Avarai	Chikudu	Sheem.
14 Horsegram	*Dolichose biflorus*, *Linn*	Kollu	Ulavalu	Kulthi.
15 Cowpea	*Vigna unguiculate Walp.*	Karamani	Alasandalu	Lobia.
16 Clusterbean	*Cyamopsis psoroloides*	Kothavarai	Goruchikudu	Gaur.

Fundamental research on the characters of these crop plants is also carried on at the station. The necessary training for carrying on these investigations, both of economic and fundamental nature, is also given to the Research Assistants at this parent station to equip them to be in charge of Millets and Pulses work at the regional stations and the district stations.

APPENDIX II (A).

STATEMENT OF EXPENDITURE AND RECEIPTS FOR THE YEAR 1953-54 (FASLI 1363)—MILLETS AND PULSES BREEDING STATION AND HYBRID CUMBU SCHEME, COIMBATORE.

Expenditure.

Budget head.	40. Agriculture.		Grand total.
	Main Section.	Cumbu Scheme.	
	Rs.	Rs.	Rs.
1 Pay and Allowances—			
Pay of Officers	1,231	5,509	6,740
2 Pay of Establishment	31,682	10,972	42,654
3 Allowances—			
Dearness allowance to Establishment ..	10,185	4,859	15,044
Travelling and other compensatory allowances.	5,842	3,841	9,683
4 Apparatus and Materials—			
Deadstock	429	64	493
Livestock	1,030	..	1,030
Apparatus and Materials	289	716	1,005
5 Working Expenses—			
Repairs and upkeep	837	..	837
Maintenance of cattle	997	..	997
Mazdoor labour	3,439	3,675	7,114
Miscellaneous cultivation expenses	5,563	..	5,563
Other Miscellaneous charges	1,115	17,313	18,428
Dearness allowance	2,550	..	2,550
6 Other contingencies—			
Pay of menials	56	..	56
Dearness allowance to menials	290	..	290
Other contingencies	1,516	949	2,465
7 Petty construction and repairs	50	..	50
Total ..	67,101	47,898	1,14,999

Receipts.

Particulars of receipts.	Main section.	Cumbu scheme.	Total.
	Rs.	Rs.	Rs.
Agricultural Stations	3,358	1,275	4,633
Miscellaneous	1,455	..	1,455
Free transfers and book adjustments	10,375	7,833	18,208
Total ..	15,188	9,108	24,296

APPENDIX II (B).

STATEMENT OF EXPENDITURE AND RECEIPTS FOR THE YEAR 1953–54 (FASLI 1363) OF THE REGIONAL MILLET STATIONS, ARIYALUR AND TIRUPPATTUR.

Expenditure.

Budget head.	Ariyalur.	Tiruppattur.	Total.
	RS.	RS.	RS.
Pay and Allowances—			
Pay of Establishment	2,970	6,154	9,124
Dearness Allowance	1,249	2,103	3,352
House rent Allowance	..	264	264
Travelling Allowance	228	264	492
Apparatus and Materials—			
Dead Stock	6	24	30
Apparatus and Materials	4	32	36
Working Expenses	1,209	1,958	3,167
Rent on buildings	605	420	1,025
Lease of land	526	750	1,276
Petty Construction and repairs	..	25	25
Other contingencies	83	166	249
Total ..	6,880	12,160	19,040

Receipts.

Particulars.	Ariyalur.	Tiruppattur.	Total.
	RS.	RS.	RS.
Agricultural Stations	462	583	1,045
Miscellaneous	4	510	514
Free transfers and Book adjustments	74	571	645
Total ..	540	1,664	2,204

APPENDIX III.

STATEMENT OF RECEIPTS, TRANSFERS AND SALES OF SEEDS DURING FASLI 1363 (1ST JULY 1953 TO 30TH JUNE 1954)—MILLETS AND PULSES BREEDING STATION, COIMBATORE.

Millets.

Particulars.	Purchase.		Receipts.		Free Transfers.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	lb.	RS. A. P.	lb.	RS. A. P.	lb.	RS. A. P.
Cholam	..	..	36,731½	10,330 12 9	22,274	5,980 12 1
Cumbu	85,313	17,062 10 0	7,782¾	1,581 4 5	21,295	6,435 6 2
Ragi	..	..	28,316¼	6,636 11 1	13,338	3,034 6 6
Tenai	..	..	2,850	667 15 6	1,299	313 7 8
Minor Millets	..	..	2,215	519 2 3	1,337	315 5 8
Total ..	85,313	17,062 10 0	77,897¼	19,735 14 0	69,543	16,079 5 5

Particulars.	Sales in the State.		Sales outside the State.	
	Quantity.	Value.	Quantity.	Value.
	(8)	(9)	(10)	(11)
	lb.	RS. A. P.	lb.	RS. A. P.
Cholam	248	75 14 0	91¾	26 13 8
Cumbu	7,011	1,427 11 3	88	81 10 9
Ragi	454	106 9 6	36	8 10 6
Tenai	65	15 3 9	9½	2 7 4
Minor Millets	64	15 0 6	10	2 10 0
Total ..	7,842	1,640 7 0	234½	122 4 3

Pulses.

Particulars.	Purchase.		Receipts.		Free Transfers.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	lb.		lb.	RS. A. P.	lb.	RS. A. P.
Redgram	..	..	560	175 0 0	460	143 12 0
Greengram	..	..	340	122 10 0	87	30 2 0
Blackgram	..	..	..	..	9½	3 8 0
Bengalgram	..	..	731	274 2 0	411	154 2 0
Horsegram	..	..	3,138	784 8 0	90	22 8 0
Cowpea Field variety	..	..	389	121 9 0	225	70 5 0
Cowpea (vegetable variety)	..	..	54½	99 6 0	11½	23 0 0
Lablab (field variety)	..	..	163	93 9 0	48	26 11 0
Lablab (vegetable variety)	..	..	22½	45 4 0	27	40 14 0
Clusterbeans	..	..	12½	24 14 0	¾	1 8 0
Total	..	..	5,410¼	1,740 14 0	1,369¾	516 6 0

Particulars.	Sales in the State.		Sales outside the State.	
	Quantity.	Value.	Quantity.	Value.
	(8)	(9)	(10)	(11)
	lb.	RS. A. P.	lb.	RS. A. P.
Redgram	..	54	20 5 0	7¼	2 5 6
Greengram	..	28	10 0 0	¾	0 15 0
Blackgram	..	..	..	1	0 6 0
Bengalgram	..	39	14 10 0	5¼	2 1 0
Horsegram variety	..	315	78 12 0	..	..
Cowpea Field able variety	..	4	1 4 0	5	1 9 0
Cowpea (vegetable variety)	..	15¼	19 8 0	1	2 0 0
Lablab (field vegetable variety)	..	9	4 14 0	2	0 15 6
Lablab (vegetable variety)	..	2	4 0 0	..	..
Clusterbeans	..	1½	3 2 0	1	2 0 0
Total	..	468¾	156 7 0	26	12 4 0

Green Manure.

Particulars.	Purchase.		Receipts.		Free Transfers.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
			lb. oz.	RS. A. P.	lb. oz.	RS. A. P.
Indigofera teysmanni	..	..	4 4	2 2 0	3 5	1 10 6
Glirisidia seed	..	..	4 4	4 4 0	4 0	4 0 0
Sesbania	..	..	173 0	86 8 0	173 0	86 8 0
Total	..	..	181 8	92 14 0	180 5	92 2 6

APPENDIX IV.

STEPS TAKEN TO STEP UP THE REVENUE OF THE MILLETS AND PULSES BREEDING STATION, COIMBATORE AND REGIONAL MILLET STATIONS, ARIYALUR AND TIRUPPATTUR (NORTH ARCOT DISTRICT).

(1) *Improvement of irrigation facilities,*— There are two wells at the Millets and Pulses Breeding Station acquired along with the lands and both of them have gone completely dry. A bore sunk near the western well is the only source for irrigation now at this station. A bore well has been dug in field No. 1. This bore well with a capacity of water over 70 gallons per minute is expected to irrigate about 7 to 8 acres. A Bereseford deep water pumpset has been sanctioned and is awaited. With its installation and the repiacement of the climax pump of the west bore well with an electric pumpset, it is expected that more than 20 acres can be bought under irrigation and the revenue stepped up considerably. At Ariyalur, neither in the old site nor in the new block taken on lease is there varigation facility and therofore no portiihly of stepping up the revenue by cultivating irrigated crops. The station at Tiruppattur is situated on a block of 20 acres of land (17 acres of dry land and 3 of garden land). In November 1952, one well in this block capable of supplying water was deepened by five feet, and more water was made available. Electricity was obtained to the motor pumpset installed in this well in March 1953. With the fair supply of water thus made available in the well, 0·50 acre of garden land alone was cultivated with irrigated crop of Ragi for grain. The revenue will be gradually stepped up by cultivating irrigated crop of cholam also in the coming years and also extending the area under garden land according to the water supply in the well.

2. *Raising of live fence.*—Seeds of *Prosopis juliflora* were sown on the borders of field Nos. 4-B and 62 at the Millets and Pulses Breeding Station, Coimbatore. Germination was not satisfactory. Planting and maintenance of *Gliricidia maculata* was givin special attention throughout the year. Planting was done along the the boundaries, so that the plants when fully grown will also serve as a good fence besides giving green leaf composting. Of the 6,230 seedlings planted during the previous years, 4,000 had already established well, During the year, 15,000 seedlings were planted afresh in all bunds and other available spaces at the station. These were regularly not watered in the absence of rain, *Sesbania speciosa* was raised on the borders of fields and the collection of seeds was done periodically, *Indigofera teysmanni* planted at the farmsted at the Millets and Pulses Breeding station, put forth luxurient growth and gave more than 4 lb. of seed. This was supplied in small packets to a large number of District Agricultural Officers as well a farms for propagation. A total quantity of 178 lb. of Sesbania and 4½ lb. of Gliricidia seeds were collecte dduring the year. Gliricidia plants were prtned periodically and the green matter was composted along with cattle mannure. A total quantity of 120 tons of compost was produced at the station which included eight tons of grain leaf compost prepared from Gliricidia

At Tiruppatur, live fence of *Agave mexicana* was raised all round the western and eastern boundaries of the farm by planting suckers one foot apart. Seeds *Prosopis juliflora* were sown in a row in the northern boundary of the farm, The germination was not satisfactory. Sixty seedlings and 240 cuttings of *Gliricidia maculata* were successfully propogated for planting on the borders of field bunds.

Sesbania was grown on field bunds at the Ariyalur station and 18 lb. of seeds were collected.

3. *Adjusting cropping programme to reduce the fallow period.*— Sunnhemp and Cowpea were, raised at the Millet and Pulses Breeding Station, Coimbatore, between two crops of millets in the area under irrigation. The green manures were ploughed in at the flowering stage. Due to want of irrigation facilities, more areas could not be sown with green manure crops.

To reduce the fallow period of the dry land and step up the revenue of the station at Tiruppattur, horsegram was grown as a second crop in an area of 1·23 acres, but it yielded only 158 lb. of seed per acre due to excessive rain at the early seedling stages.

At Ariyalur, the entire area of 10·00 acres was devoted for experimental work on millets and a few pulses. The only fallow period left for cultivting other crops on the station is from October to February after the harvest of the early season Arisi Cambu. It is the usual practice of the locality to raise coriander or Bengalgram during this period. Bengalgram and Coriander were sown in an area of 40 cents each after the harvest of Arisi Cambu and they recorded acre yields of 363 lb. and 120 lb. respectively.

4. *Maintenance of cultivation sheets.*—Cultivation sheets were maintained for bulk crops raised at the millets and Pulses Breeding Station Coimbatore and the Regional Millet Station, Tirupattur. At Ariyalur, the entire area was under experiments and hence no cultivation sheet was maintained.

APPENDIX V (A).

STATEMENT SHOWING COST OF CULTIVATION OF BULK CROPS, 1954—RAISED AT THE MILLETS AND PULSES BREEDING STATION (PREPARED IN THE PRO FORMA STATEMENTS COMMUNICATED IN DIRECTOR OF AGRICULTURE'S D. DIS. No. X. 1023/52, DATED 8TH MAY 1953).

Table (i) (*a*).

Details of crops, etc.	Area in acres.	Seed value.		Grain value.	
		LB.	RS.	LB.	RS.
(1)	(2)	(3)	(4)	(5)	(6)
Cholam	15·95	7,393	1,964	2,183	311
Cumbu	6·83	1,259	256	148	3
Tenai	5·44	2,505	587	..	..
Total ..	28·22	11,157	2,807	2,331	314

Details of crops, etc.	Straw value.		Total receipts of the year.	Total receipts for the three years.		
	LB.	RS.		1951–52.	1952–53.	1953–54.
	(7)	(8)	(9)	(10)	(11)	(12)
Cholam	56,197	800	3,075	395	200	3,075
Cumbu	10,459	141	400	623	487	400
Tenai	2,080	28	615	552	738	615
Total ..	68,736	969	4,090	1,570	1,425	4,090

Table (i) (*b*).

	Seed.				Grain.			
	Retained on the station.		Transferred or sold.		Retained on the station.		Transferred or sold.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			lb.	Rs.	lb.	Rs.	lb.	Rs.
Cholam	..	..	7,393	1,964	..	..	2,183	311
Cumbu	..	..	1,259	256	148	3	..	..
Tenai	..	..	2,505	587	..	..	..	..
Total ..	..	..	11,157	2,807	148	3	2,183	311

	Straw.				Total value.	Total receipts for three years.		
	Retained on the station.		Transferred or sold.			1951–52.	1952–53.	1953–54
	Quantity.	Value.	Quantity.	Value.		RS.	RS.	RS.
	lb.	Rs.	lb.	Rs.	Rs.			
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Cholam	56,197	800	..	..	3,075	395	200	3,075
Cumbu	10,459	141	..	..	400	623	487	400
Tenai	2,080	28	..	..	615	552	738	615
Total ..	68,736	969	..	..	4,090	1,570	1,425	4,090

***Table* (ii)—*Cost of cultivation of Bulk Crops*, 1954—*Raised at the Millet and Pulses Breeding Station, Coimbatore*—(*Total area of bulk crops* 28·22 *acres*).**

Details of expenditure.	Actual expenditure for three years.		
	1951–52. Rs.	1952–53. Rs.	1953–54. Rs.
1 Pay and allowance of the staff (½ of the actuals)	828	828	840
2 Miscellaneous cultivation expenses (½ of actuals)	20	15	158
3 Working expenses (actuals)	1,173	589	344
4 1/10 of expenditure on live and deadstock	96	12	43
5 Proportionate rent for the land (The station is Government Farm).	500	382	564
6 Unforeseen contingencies	..	..	..
Total ..	2,617	1,826	1,949

***Table* (iii)—*Statement of abstract—Expenditure and Receipts (Total area under bulk crops* 28·22 *acres*).**

Particulars.	1951–52.	1952–53.	1953–54.
	RS.	RS.	RS.
1 Expenditure	2,617	2,826	1,949
2 Revenue	1,570	1,425	4,000

APPENDIX V (B).

STATEMENT OF COST OF CULTIVATION OF BULK CROPS, 1954—RAISED AT THE REGIONAL MILLET STATION, TIRUPPATTUR (PREPARED IN THE PRO FORMA STATEMENTS COMMUNICATED IN DIRECTOR OF AGRICULTURE'S D. Dis. No. X. 1023/52, DATED 8TH MAY 1953.

Table (i) (*a*).

Details of crops.	Area in acres.	Seed value.		Grain value.	
		LB.	RS.	LB.	RS.
(1)	(2)	(3)	(5)	(6)	(7)
1 Cholam	7·60	1,655	310	..	..
2 Cumbu	2·99	1,087	204	..	..
3 Ragi	0·39	290	54	..	..
4 Vuragu	0·50	310	48	..	..
5 Redgram	0·50	230	43	..	..
6 Horsegram	3·63	690	108	..	..
Total ..	15·6	4,262	767	..	..

Details of the crops.	Straw value.		Total receipts of the year. 1953–54.	Total receipts for the three years.		
	LB.	RS.	Rs.	1950–51.	1951–52.	1952–53
	(8)	(9)	(10)	(11)	(12)	(13)
1 Cholam	24,350	80	390	584	144	331
2 Cumbu	2,100	4	208	51	117	40
3 Ragi	..	..	54	..	..	..
4 Varagu	880	2	50	..	..	..
5 Redgram	750	2	45	..	..	..
6 Horsegram	..	..	108	142	15	16
Total ..	28,080	88	855	777	276	537

Table (i) (*b*).

Details of crops.	Seed.				Grain.			
	Retained on the station.		Transferred or sold.		Retained on the station.		Transferred or sold.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
(1)	(2) lb.	(3) Rs.	(4) lb.	(5) Rs.	(6) lb.	(7) Rs.	(8) lb.	(9) Rs.
1 Cholam	115	21	1,540	289	..	..	..	..
2 Cumbu	30	6	1,057	198	..	..	..	..
3 Ragi	10	2	280	52	..	..	..	..
4 Varagu	30	4	280	44	..	..	..	..
5 Redgram	20	4	210	39	..	..	..	..
6 Horsegram ..	100	16	590	92	..	..	..	..
Total ..	305	53	3,957	714	..	..	..	..

	Straw.				Total value.	Total receipts for three years.		
	Retained on the station.		Transferred or sold.			1951–52.	1952–53.	1953–54.
	Quantity. lb (10)	Value. Rs. (11)	Quantity. lb. (12)	Value. Rs. (13)	RS. (14)	RS. (15)	RS. (16)	RS. (17)
1 Cholam	..	..	24,350	80	390	584	144	331
2 Cumbu	..	..	2,100	4	208	51	117	40
3 Ragi	..	..	..	..	54	..	..	..
4 Varagu	..	..	880	2	50	..	..	..
5 Redgram	..	..	750	2	45	..	..	..
6 Horsegram	..	..	..	..	108	142	15	160
Total ..	..	..	28,080	88	855	777	276	531

Table (ii)—*Cost of cultivation of Bulk Crops*, 1954—*Raised at the Regional Millet Station, (Tiruppattur, total area under Bulk Crops*, 15.61 *acres*).

Details of expenditure.	Actual expenditure for three years.		
	1951-52.	1952-53.	1953-54.
	Rs.	Rs.	Rs.
1 Pay and allowance of the staff (⅛ of the actuals)	280	280	280
2 Miscellaneous cultivation expenses (⅛ of actuals)	..	..	..
3 Working expenses (Actuals for the crop production of bulks only). ..	627	406	735
4 1/10 of expenditure on live and deadstock	..	..	..
5 Proportionate rent for the lease of land (⅛ of actuals) ..	250	250	250
6 Unforeseen contingencies	..	..	..
Total	1,157	936	1,265

Table (iii) *Statement of Abstract—Expenditure and Receipts* (*Total area under bulk crops*, 15·61 *acres*).

Particulars.	1951-52.	1952-53.	1953-54.
	Rs.	Rs.	Rs.
1 Expenditure	1,157	936	1,265
2 Revenue	276	521	855

ANNUAL REPORT OF THE PADDY BREEDING STATION, COIMBATORE, 1953-54 (FASLI 1363).

Season.—After a spell of six years of unfavourable seasonal conditions, the good omen for successful agricultrual operations was signalled by the timely setting of the South west monsoon. The total rainfall for the year was 32·73 inches in 59 days of which 9·16 inches were received in the South-west monsoon period as against the normal of 6·13 inches in the North-east monsoon period, 15 38 inches were received as against the normal of 13·25 inches and 8·19 inches were received in the hot weather period as against the normal of 5·76 inches. Detailed raintall data presented are in Table I.

The main crop nurseries were raised early, depending on the water from the bore-wells. The showers of June-July were beneficial to the nurseries. With the availability or adequate water supply in the channel preliminary cultivation and planting were done in proper time for both the crops. Later showers in the intermediate stage of the crop helped their normal growth.

The cultivators exploited the favourable seasonal conditions to the best advantage. Channel supply of water was also available. In the farm, the scope for large scale paddy cultivation was evident. The bore-wells on the farm were also fully utilised. The whole area of the farm was under first crop and again an area of 3·05 acres was under "Navarai" crop. Table I is presented below.

2. *Cultivation routine.*—The first ploughing was generally done with iron plough. After a cross ploughing with country plough, green manure was applied at the rate of 4,000 lb. per acre and pressed in with a trampler. After a week, super phosphate at the rate of 150 lb. per acre was applied broadcast, country plough worked and levelled with a levelling board. The nursery area received 10,000 lb. of green leaf per acre as basal dressing. The transplanted crop received ammonium sulphate at 150 lb. per acre, a month after planting.

3. *Sowing and transplanting.*—(*a*) *Main crop.*—Nurseries were raised early with the help of water from the bore-wells. Water was received in the channel by 10th July 1953. The supply lasted till 23rd September 1953. Transplanting was started on 7th August 1953 and completed in the last week of November over an area of 26·82 acres.

(*b*) *Second crop.*—Navarai paddy was planted in an area of 3·05 acres comprising yield trials and seed multiplication lots. The sowing was started on 12th January 1954 and the planting by the second week of February.

4. *Growth and harvest.*—Both the crops grew under normal conditions, the water requirement of the crops being fully met by the channel water, supplemented whenever necessary by water from bore-wells.

TABLE I—*Statement of rainfall for the year* 1953-54.

Month.	Week.	1953-54. Quantity in inches.	1953-54. Number of rainy days.	1952-53. Quantity in inches.	1952-53. Number of rainy days.	Average for the last ten years. Quantity in inches.	Average for the last ten years. Number of rainy days.
		South-west monsoon.					
June 1953	7-13	0·03	..	..	..	0·20	0·8
	14-20	0·74	2	0·08	..	0·14	0·6
	21-27	1·26	3	..	..	0·27	0·7
June-July	28-4	1·31	3	..	..	1·14	0.4
	5-11	3·24	3	0.46	2	0·69	1·7
	12-18	..	..	0·72	2	0·66	1·8
	19-25	0·18	1	0·08	..	0·38	1·0

TABLE I—*Statement of rainfall for the year* 1953-54—cont.

Month.	Week.	1953-54 Quantity in inches.	1953-54 Number of rainy days.	1952-53 Quantity in inches.	1952-53 Number of rainy days.	Average for the last ten years. Quantity in inches.	Average for the last ten years. Number of rainy days.
South-west monsoon—*cont.*							
July-August	26-1	0·51	3	0·19	1	0·29	0·6
	2-8	0·14	1	..	..	0·41	0·9
	9-15	0·60	1	..	..	0·17	0·6
	16-22	0·11	..	0·01	..	0·25	0·5
	23-29	0·10	1	0·23	1	0·15	0·6
August-September	30-5	..	..	..	..	0·12	0·3
	6-12	0·86	2	..	..	0·09	0·4
	13-19	0·08	..	..	..	0·30	0·6
	20-26	..	..	..	..	0·36	0·9
Total		9·16	20	1·75	6	4·62	1·22
North-east monsoon.							
September-October	27-3	0·60	1	1·86	3	0·89	1·5
	4-10	1·90	3	0·42	1	0·73	1·8
	11-17	5·81	4	0·26	2	1·1	2·2
	18-24	1·62	3	..	..	1·24	2·1
	25-31	0·25	1	0·94	2	1·37	1·9
November	1-7	0·11	1	0·21	1	0·98	1·5
	8-14	..	..	0·16	1	1·57	2·4
	15-21	1·02	2	..	..	0·79	1·8
	22-28	0·35	1	0·03	..	1·01	1·1
November-December	29-5	..	..	1·26	2	0·67	1·2
	6-12	..	..	1·21	2	0·51	0·7
	13-19	0·22	1	0·35	1	0·23	0·4
	20-26	..	..	0·02	..	0·11	0·3
December-January	27-3	0·17	1	..	..	..	..
	4-10	2·60	3	0·07	..	0·07	0·2
	11-17	0·73	2	..	..	..	..
	18-24	..	2	..	..	0·13	0·3
	25-31	..	..	..	..	0·03	0·1
Total		15·38	23	6·81	15	11·5	19·5
Hot weather.							
February	1-7	..	..	..	..	..	..
	8-14	..	..	..	..	0·105	0·3
	15-21	..	..	0·01	..	..	..
	22-28	..	..	..	..	0·11	0·4
March-April	1-7	..	..	..	..	0·09	0·1
	8-14	..	..	..	..	..	..
	15-21	0·37	1	..	..	0·12	0·3
	22-28	0·21	1	..	..	0·11	0·4
	29-4	0·10	1	0·25	1	0·46	0·1
	5-11	0·25	1	2·72	2	0·74	0·1
	12-18	0·53	1	1·54	2	0·94	0·1
	19-25	1·80	2	2·27	3	0·65	0·9
April-May	26-2	1·79	2	0·02	..	0·33	0·9
	3-9	0·03	..	1·84	2	0·51	0·8
	10-16	1·15	2	..	..	0·37	0·6
	17-23	1·45	3	0·20	1	0·49	0·1
	24-30	0·11	1	0·22	1	0·38	0·1
May-June	31-6	0·40	1	0·82	1	0·28	0·3
Total		8·19	16	9·89	13	5·76	1·07
Grand Total		32·73	59	18·45	34	21·91	48·1

5. Crop improvement by introduction.—This is a method of crop improvement. Varieties grown in countries of similar climatic features and from other States within the country are collected for trial and if any of them prove superior to the local varieties in yield and possess other desirable qualities they are multiplied for large scale cultivation. Similar line of work is in progress and the details are furnished hereunder.

(*a*) *Chinese varieties.*—Six Chinese varieties received from the Director, Central Rice Research Institute, Cuttack were under trial against the popular short duration strain Co 13. Three varieties, viz., CH 41, CH 62 and CH 63 in the first crop season, and two varieties, CH 41 and CH 62 in the second crop season gave significantly higher yields than the control. However, all the varieties except CH 2 were found to be longer in duration than Co. 13 by 2 to 9 days in the first crop season and 5 to 6 days in the second crop season. The data are furnished in Tables II (*a*) and II (*b*).

TABLE II (*a*)—*Comparative yield trial of Chinese Types* (*First crop*).

Field No. : E.6 b c.
Sown on : 10.8.53.
Transplanted on : 14.6.53.
Harvested on : 28.12.53.

Size of plot. : 5' × 20'.
Lay out. : Randomised blocks.
Replications. : 4 times.

Types and standard tested.

Particulars.	CH 2	CH 41	CH 42	CH 45	CH 62	CH 63	Co. 13 Standard.	General mean.	Standard error.	'Z' test satisfied or not (P = 00·5)	Critical Difference (P = 00·5).
Acre yield of grain in lb.	1042	1557	1121	1110	1882	1960	1132	1401	78·68	Yes	283·7
Percentage on standard.	92·08	137·5	99·02	98·04	166·3	173·2	100	123·7	6·95	,,	20·7
Percentage on geneal Mean.	74·4	111·1	80·05	79·3	134·5	139·9	80·81	100	5·62	,,	16·6
Flowering duration.	92	102	97	97	107	104	92	..	..	..	..

Conclusion : CH 63 CH 62 CH 41 Co. 13 CH 42 CH 45 CH 2

TABLE II (*b*)—*Comparative yield trial of Chinese Types* (*Second crop*).

Field No. : B.5 a
Sown on : 13.1.54
Transplanted on : 16.2.54
Harvested on : 6.5.54

Size of strip : 4' × 20'
Lay out : Randomised blocks
Replications : 4 times

Types and standard tested.

Particulars.	CH 2	CH 41	CH 42	CH 45	CH 62	CH 63	Co. 13 Standard.	General mean.	Standard error.	'Z' test satisfied (P = or not 0·05).	Critical Difference (P = 0·05).
Acre yield of grain in lb.	2589	2993	1791	2262	2943	2384	1796	2394	93·05	Yes	276·3
Percentage on standard.	144·1	166·6	99·7	126·4	163·9	132·7	100	133·2	5·18	,,	15.38
Percentage on general Mean.	108·1	125·0	74·82	94·54	122·9	99·63	75·04	100	3·89	,,	11·54
Flowering duration.	83	85	87	79	92	93	87	..	..	..	..

Conclusion : CH 41 CH 62 CH 2 CH63 CH 45 Co. 13 CH 42

(*b*) *Cultures from Maruteru.*—The two cultures 1246 and 4388 received from the Agricultural Research Station, Maruteru were tested against GEB 24. Culture 1246 was significantly poor. But 4388 registered 11 per cent increased yield over GEB 24 though the difference was not statistically significant. The data are furnished in Table III.

TABLE III—*Comparative yield trial of cultures from Maruteru.*

Field No.—F.10-c.
Sown on—29th August 1953.
Transplanted—21st October 1953.

Harvested on—29th January 1954.
Size of plot—4' × 12'
Lay out—Randomised blocks.
Replications—6 times.

Particulars.	1246	4388	Cultures and standard. GEB 24 standard.	General mean.	Standard error.	'Z' test Satisfied. or not (P=0·05).	Critical difference. (P=0·05).
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Acre yield of grain in lb.	18·92	2,621	2,358	2,289	109·0	Yes.	330·4
Percentage on standard	80·11	111·4	100	97·3	4·63	,,	14·04
Percentage on General mean ..	82·69	114·6	102·8	100	4·76	,,	14.4
Flowering duration	114	118	118	..	..	..	..

Conclusion: 4388 GEB 24 1246

(*c*) *Siam varieties.*—Thirteen varieties received from Siam were under comparative yield tests against SR 26 B and Co. 23 as standards. Due to the late planting in November, most of the cultures flowerd very late and setting was poor. The results having been vitiated on account of the above factor the yield data were not statistically analysed.

(*d*) *Varieties from Hyderabad, Madya Pradesh and other States.*—Fifteen varieties and cultures from Hyderabad, Madhya Pradesh and other places were grown in observation plots with ADT 3, Co. 13, Co. 10 and GEB 24 as standards. It was found that RDR 4, HR 38, HR 39, and hybrid culture obtained as a result of a cross between Luchai × Gurmatia × Burma had given higher yields than the standard strains. Ten varieties from the above were tested against Co. 13, Co. 18, Co. 10, Co. 20 and Co. 23 in the second crop season. All of them were found to be of different duration. HR 5 from Hyderabad was alone found to yield better than all the local strains, the range of such increased yields varied from 8·5 per cent over Co. 23 to 51·5 per cent over Co. 18. The yield figures are furnished in Table IV.

(*e*) *Labhandi, Co. 13 and Co. 18.*—The culture Burma × Luchai × Gurmatia received from Labhandi Farm was compared with Co. 13 and Co. 18. It was found that flowering in the case of the new culture was protracted and was slightly longer in duration than the controls though the culture yielded significantly better than both Co. 13 and Co. 18. In the second crop season the culture gave 22·8 per cent higher yield than Co. 13 but was poorer than Co. 18 by 8·4 per cent. The data are presented in Table V (*a*) and V (*b*).

6. *Improvement of local varieties by pureline selection.*—Pure line selection work on the important varieties of this State was continued. After transferring single plant selections made in Barigavadlu of Anantapur District to the Paddy Specialist, Andhra, as per Director of Agriculture's instructions, selection work on Tiruchengode Samba was in progress.

(*a*) *Tiruchengode Samba.*—It is a reputed medium duration variety extensively cultivated in the upper reaches of Kalingarayan Channel of Erode taluk and is favoured for its rice quality. From out of 152 selections, under trial in the Navarai season, 134 promising cultures were carried forward for further trial.

7. *Improvement of local varieties by hybridisation.*—The occurence of more than one variety with particular desirable character is identified and utilized for crop improvement by evolving strains with a desirable combination of characters. Extensive work in this direction is under way and the details are furnished below:—

(*a*) *Economic crosses.*—(i) CH 2 × ADT 3.—This cross was effected to combine the non-lodging and bunchy panicle characters of CH 2 with the earliness of ADT 3. Out of the 59 cultures that were under study 40 cultures were found to be promising and 194 single plants from these were selected for further trials.

Observation plots of varieties from Madyapradesh, Hyderabad, etc.

(Second crop.)

Field No.—B.4 b. Size of plot: 4½′ × 23½′

Sown on—13th January 1954.

Planted on—11th February 1954.

Harvested on—13th May 1954, 21st May 1951, 2nd June 1954 and 12th June 1954.

Variety.	Acre yield in lb.	Yield as per cent on Co. 13.	Yield as per cent on Co. 18.	Yield as per cent on Co. 10.	Yield as per cent on Co. 20.	Yield as per cent on Co. 23.	Flowering duration in days.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
HR 5	3059	119·3	151·5	127·2	112·1	108·5	88
Co. 23	2819	110·4	139·5	117·1	103·3	100·0	102
Co. 20	2729	106·8	135·1	110·9	100·0	970·3	88
HR 12	2671	104·4	132·2	111·0	97·9	94·8	84
Ajan × Luchai	2612	102·2	129·3	108·5	95·7	92·6	102
Co. 13	2555	100·0	126·5	106·2	93·6	90·6	86
HR 8	2535	99·2	125·5	105·4	92·9	89·9	79
HR 19	2509	98·2	124.2	104·2	91·9	88·98	99
HR 33	2484	97·2	122·9	103·2	91·0	88·7	79
Co. 10	2406	94·2	119·1	100·0	88·2	85·4	93
Luchai × Gurmatia × Burma	2310	90·4	114·4	96·0	84·3	81·9	102
Co. 18	2020	79·1	100·0	83·97	740·03	71·7	93
Budiabaku × Luchai ..	1982	77·6	98·1	82·4	72·6	70·3	97
HR 21	1731	67·7	85·7	71·9	63·4	61·4	83
D.S. 1. Cuttack	1628	63·7	80·6	67·7	59·7	57·8	92
Cross No. 1	1533	61·2	77·4	65·0	57·3	55·4	79
D.S. 1. Coimbatore	470	18·4	23·3	19·1	17·2	16·7	66

TABLE V (*a*)—*Comparative yield trial of Labhandi, Co.* 13 *and Co.* 18.

(First crop.)

Field No.—B-2 b. Size of strip—4′ × 20′.

Sown on—11th July 1953. Lay out—Randomised blocks.

Planted on—7th August 1953. Replications—8 times.

Harvested on—12th November 1953.

Cultures and strains tested.

Particulars.	Labhandi.	Co. 13.	Co. 18.	General Mean.	Standard error.	'Z' test satisfied or not (P=0·05).	Critical difference (P=0·05).
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Acre yield of grain in lb. ..	3465	2504	2942	2970	1102	Yes.	334·3
Percentage on Co. 18 standard.	117·5	84·94	100·0	100·9	3·75	Do.	11·4
Percentage on Co. 13 standard.	138·4	100·0	117·7	118·7	4·4	Do.	13·35
Percentage on General Mean ..	116·6	84·3	99·0	100·0	3·71	Do.	11·26
Flowering duration	95	81	90	..	..	..	..

Conclusion: Labhandi > Co. 18 > Co. 13.

TABLE V (*b*)—*Comparative yield trial of Labhandi, Co.* 13 *and Co.* 18.

(Second crop.)

Field No.—B-5 b. Size of plot—4′ × 20′.

Sown on—13th January 1954. Lay out—Randomised blocks.

Planted on—16th February 1954. Replications—8 times.

Harvested on—19th May 1954, 26th May 1954 and 15th June 1954.

Particulars.	Labhandi.	Co. 13	Co. 18	General Mean.	Standard error.	'Z' test satisfied or not (P=0·05).	Critical. difference (P=0·05).
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Acre yield of grain in lb. ..	2084	1697	2302	2028	60·6	Yes.	182·4
Yield as a percentage of Co. 13 standard.	122·8	100·0	135·6	119·5	3·6	,,	10·5
Yield as a percentage of Co. 18 standard.	90·6	73·7	100·0	88·1	2·6	,,	7·9
Yield as a percentage of general mean.	102·8	83·7	113·5	100·0	2·99	,,	9·8
Flowering duration in days ..	107	84	92	..	..	..	..

Conclusion: Co. 18 > Labhandi > Co. 13

(ii) *T.* 2236 × *Co.* 10.—T. 2236 a Japanese type possessing bunchy panicle and non-lodging habit, was crossed with Co. 10 to improve the yield of the latter. Out of the 80 progenies that were studied, 95 single plants were selected for further studies from 36 promising progenies.

(iii) *CH* 2 × *Co.* 13.—For the purpose of transferring the bunchy habit of CH 2 to Co. 13, the cross was effected in 1951–52 season and 77 progenies were under study during the year. Forty of them were promising. From among them 234 single plants were selected.

(iv) *CH* 2 × *Co.* 10.—The object of this cross was to combine the bunchy and non-lodging habit of CH 2 with the high yield of Co. 10. One hundred and two progenies were under study and 243 single plants possessing the desirable characters were selected from 44 promising progenies.

(v) *ADT* 17 × *Co.* 19.—To combine the bunchy habit of ADT 17 with the grain size of Co. 19 the cross was effected. Out of a total number of 240 progenies studied, 112 were found to be promising and 76 single plant selections were effected.

(vi) *PLR* 1 × *Co.* 19.—The object of the cross was again to induce bunchiness in Co. 19. From 62 cultures that were under study, 36 promising cultures were isolated from which 59 single plant selections were made for further trials. Twenty-seven single plant selections were sent to the Rice Research Station, Ambasamudram for trial.

(vii) *T.* 672 × *Co.* 23.—To improve the yield of Co. 23, crosses were effected between Co. 23 and T. 672 and the progenies were under study. Two hundred and twelve promising single plants with desirable characters were selected.

(viii) *Co.* 6 × *Co.* 8.—The cross was effected in order to improve the grain quality of Co. 6. Five cultures derived from this cross were under comparative yield tests with Co. 6 and Co. 8 as standards. It was observed that all the cultures proved equal to the two standards, but the results could not be relied upon since both the standards were affected by Piricularia, whereas the cultures were comparatively free. The data are furnished in Table VI.

TABLE VI—*Comparative yield trial of Co.* 6 × *Co.* 8.

Field No.—F. 9 d.
Sown on—29th August 1953
Planted on—20th October 1953.
Harvested on—24th February 1954.
Size of plot—4' x 12'.
Lay out—Randomised blocks.
Replications—4 times.

Particulars.	Cultures and strains tested. 3395	3400	7585	7588	7589	Co. 6	Co. 8	General mean.	Standard error.	'Z' test satisfied or not. (P=0·05)	Critical difference (P=0·05).
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Acre yield of grain lb.	1,706	1,832	1,918	2,111	1,034	1,537	955·7	1,585	197·0	Yes	584·3
Percentage on standard Co. 6.	111·24	119·3	124·83	137·4	67·32	100	62·20	103·1	12·81	Do	38·01
Percentage on standard Co. 8.	178·4	191·8	200·6	220·9	108·2	160·8	100	165·8	20·6	Do.	60·99
Percentage on general mean.	107·6	115·6	121·0	133·1	65·27	96·94	60·30	100	12·4	Do.	36·8
Flowering duration.	134	134	136	132	132	130	137	..	..	..	..

Conclusion : 7588 7585 3400 3399 Co. 6 7589 Co. 8

(ix) *Co.* 6 × *Co.* 11.—The cross was effected with the same object as mentioned above, namely to improve the grain quality of Co. 6. Two promising cultures from this cross were under comparative yield tests with Co. 6 and Co. 11 as standards. Culture 9163 proved to be superior to both the standards but in this case also the results could not be relied upon as both the standards were badly affected by Piricularia and the cultures were comparatively free. The results are furnished in Table VII.

TABLE VII—*Comparative yield trial of Co. 6 × Co. 11.*

Field No.—F. 9 d.
Sown on—29th August 1953.
Planted on—20th October 1953.
Harvested on—24th February 1954.

Size of plot—4' x 8'.
Lay out—Randomised blocks.
Replication—4 times.

Particulars.	9163	Cultures and strains tested. 9200	Co. 6 std.	Co. 11 Std.	General mean.	Standard error.	'Z' test satisfied or not. (P=0·05)	Critical difference. (P=0·05)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Acre yield of grain in lb.	2,645	1,948	1,316	1,575	1,871	128·0	Yes	384·6
Percentage on Co. 6 standard.	200·9	148·0	100	119·6	131·6	9·73	Do.	29·23
Percentage on Co. 11 standard.	168·3	123·7	83·6	100	118·8	8·13	Do.	24·4
Percentage on general mean.	141·4	104·2	70·37	84·2	100	6·84	Do.	20·6
Flowering duration.	139	129	130	133	..	..	..	..
	Conclusion :	9163		9200	Co. 11	Co. 6		

(x) *ADT 15 × Thuyamalle.*—The object of the cross is to reduce the duration of ADT 15. Thuyamalle is the shortest duration variety available at present. Four cultures of the above cross along with Co. 13 and ADT 15 as standards were under yield trial. In the first crop culture 1657 (late) yielded better than Co. 13 but was on a par with A.D.T. 15, culture 1655 was poor while 1656 and 1657 (early) were on a par with the control. The data are presented in Table VIII (*a*). In the second crop all the cultures were on a par with A.D.T. 15 but superior to Co. 13 [Table VIII (*b*)].

TABLE VIII (*a*)—*Comparative yield trial of ADT 15 × Thuyamalle progenies—(First crop).*

Field No.—B. 3 c.
Sown on—11th July 1953.
Planted on—7th August 1953.
Harvested on—13th November 1953.

Size of plot—4' × 20'.
Lay out—Randomised blocks.
Replications—4 times.

Particulars.	1655	Cultures and strains tested. 1657 early.	1657 late.	1656	ADT 15 std.	Co. 13 std.	General mean.	Standard error.	'Z' test satisfied or not (P=0·05).	Critical difference (P=0·05).
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Acre yield of grain in lb.	2,622	3,054	3,263	3,190	3,168	2,994	3,048	80·85	Yes	243·7
Percentage on Co. 13 standard.	87·56	102·0	109	106·4	105·8	100·0	101·8	9·7	Do.	8·14
Percentage on ADT 15 standard.	82·75	96·38	103·0	100·7	100·0	94·41	196·2	2·55	Do.	7·7
Percentage on general mean.	86·0	100·2	107·1	104·6	103·9	98·2	100	2·65	Do.	7·9
Flowering duration ..	87	76	85	88	83	81	..	..	..	..
Conclusion :		1657 late	1656	ADT 15	1657 early	Co 13 std.	1655			

TABLE VIII (*b*)—*Comparative yield trial of ADT 15 × Thuyamalle progenies—(Second crop).*

Field No.—B. 6 a.
Sown on—3th January 1954.
Transplanted on—17th February 1954.
Harvested on—4th May 1954.

Size of plot—3' × 15'.
Lay out—Randomised blocks.
Replications—4 times.

Particulars.	1655	Cultures and strains tested. 1657 early.	1657 late.	1656	ADT 15 std.	Co. 13 std.	General mean.	Standard error.	'Z' test satisfied or not (P=0·05).	Critical difference (P=0·05).
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Acre yield of grain in lb.	2,208	2,437	2,369	2,434	2,358	1,232	2,190	139·8	Yes	422·2
Percentage on Co. 13 standard.	179·2	197·8	192·3	205·7	191·4	100	177·9	11·35	Do.	34·37
Percentage on ADT 15 standard.	93·6	103·3	100·4	107·4	100	52·3	93·0	5·93	Do.	17·9
Percentage on general mean.	100·7	109·6	108·8	115·6	107·6	50·5	100	6·37	Do.	19.2
Flowering duration ..	82	82	82	87	79	82	..	..	..	..
Conclusion :		1656	1657 early	1657 late	ADT 15	1655	Co. 13			

(xi) *G.E.B.* 24×*T.* 619—*Kolamba.*—T. 619 is a Kolamba fine grained variety with a bunched panicle habit. The cross was effected with the object of combining this bunched panicle with the heavy tillering of G.E.B. 24. None of the cross progenies proved superior to G.E.B. 24. Fresh crosses were effected during 1951–52 and as a result of the study in observation plots of these progenies in the F-3 generation, 457 single plants were selected for further study.

(xii) *Kavunginpoothala*×*G.E.B.* 24.—The study of the cross progenies for combining the tall growth and long earheads of Kavunginpoothala and profuse tillering of G.E.B. 24 resulted in obtaining definite duration groups, which are being compared with popular strains of corresponding duration released from this station. High yielding cultures combining the good qualities of G.E.B. 24 and Kavunginpoothala having Co. 2, Co. 3, Co. 14 and Co. 8 duration will be useful in places where these strains are now cultivated.

(1) *Cultures of Co.* 2 *duration groups.*—Seven cultures were tested against Co. 2. All the cultures were found to be significantly superior to the standa d recording increases ranging from 260 per cent to 447 per cent. However these results cannot be relied since the control (Co. 2) was affected by Piricularia and also damaged by sparrows, this being the only erect crop all others having lodged.

(2) *Co.* 3 *duration group.*—Five cultures were tested under this group with Co. 3 as the standard. The yield differences were not significant. However, all the cultures excepting 6334 recorded numerically higher yields than Co. 3. There was also wide variation in flowering duration ranging from 108 to 130 days.

(3) *Cultures of Co.* 14 *duration group.*—Seven cultures along with Co. 14 as standard were under trial. The cultures in this group were more or less similar to Co. 14 in duration but with regard to yield two cultures, viz., 1355 and 1305 were significantly superior to Co. 14 and three cultures 6362, 6370/3 and 6370/5 were on a par with the standard. The data are presented in Table IX.

TABLE IX—*Comparative yield trial of Kavunginpoothala natural crosses—(Co.* 14 *duration).*

Field No.—F. 5 b.
Sown on—29th August 1953.
Planted on—18th October 1953.
Harvested on—6th March 1954.

Size of plot—5'×10'.
Lay out—Randomised blocks.
Replication—4 times.

Particulars.	Culture and strains tested.							Co. 14 std.	General mean.	Standard error.	'Z' test satisfied or not (P=0·05)	Critical difference (P=0·05)
	6362	6364	6370/3	6370/5	1208	1305	1355					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Acre yield of grain in lb.	2,186	1,214	2,114	2,150	44·7	2,386	2,555	1,944	1,868	123·3	Yes	377·4
Percentage on Co. 14 standard.	112·4	62·6	108·7	108·0	22·7	122·7	131·4	100	96·1	6·6	,,	19·4
Percentage on general mean.	116·9	65·1	113·2	112·4	23·8	127·7	136·6	104·0	100	6·9	,,	20·2
Flowering duration ..	123	108	118	118	120	120	123	118	..	..	..	..

Conclusion: 1355, 1305, 6362, 6370/3, 6370/5, Co 14, 6364, 1208

(4) *Co.* 8 *duration group.*—Two cultures of this longer duration group were tested against Co. 8. The yield figures furnished in Table X reveal that both the cultures are decidedly superior to the standard.

(xiii) *A.D.T.* 9×*Co.* 10.—The object of the cross is to induce bunchiness in Co. 10. Two promising cultures 3011 and 1603 were under yield test against Co. 10 standard and both of them were found to be significantly higher yielding than Co. 10 in both the first and second crop seasons. The duration of the cultures was also similar to that of Co. 10. The data are presented in Tables XI (*a*) and XI (*b*).

TABLE X—*Comparative yield trial of Kavunginpoothala natural crosses (Co. 8 duration).*

Field No.—F. 4 c.
Sown on—29 August 1953.
Transplanted on—18 Oct. 1953.
Harvested on—9 March 1954.

Size of plot—4′ × 10′.
Lay out—Randomised blocks.
Replication—8 times.

Particulars.	culture and strains tested. 2·115	3·725	Co. 8 std.	General mean.	Standard error.	'Z' test satisfied or not. (P=0·05)	Critical difference (P=0·05)
Acre yield of grain in lb.	2,923	3,232	1,076	2,410	8·4	Yes.	237·5
Percentage on standard	270·9	300·7	100	224·2	7·3		22·1
Percentage on general mean	118·2	134·0	44·4	100	3·26		9·85
Flowering duration	138	140	135				

Conclusion 3,725 > 2,115 > Co. 8

TABLE XI (*a*)—*Comparative yield trial of ADT 9 × Co. 10 progenies (First crop).*

Field No.—B. 2 c.
Sown on—10 July 1953.
Planted on—7 August 1953.
Harvested on—17 November 1953.

Size of plot—4′ × 20′.
Lay out—Randomised blocks.
Replications—8 times.

Particulars.	3,011	1,603	Co. 10	General mean.	Standard error.	'Z' test satisfied or not. (P=0·05)	Critical difference (P=0·05)
Acre yield of grain in lb.	3052	2892	2421	2788	106·5	Yes.	322·9
Yield as percentage on standard ..	125·7	119·1	100·6	115·2	4·4	,,	13·3
Yield as percentage on General mean ..	109·5	103·7	86·8	100·0	3·8	,,	11·6
Flowering duration	92	90	92				

Conclusion 3011 1603 Co. 10

TABLE XI (*b*)—*Comparative yield trial of ADT 9 × Co. 10 (second crop).*

Field No.—B. 6 c.
Sown on—13 January 1954.
Planted on—17 February 1954.
Harvested on—12 March 1954.

Size of plot—4′ × 20′.
Lay out—Randomised blocks.
Replication—8 times.

Particulars	cultures and strains tested. 3,011	1,603	Co. 10	General mean.	Standard error.	'Z' test satisfied or not. (P=0·05)	Critical Difference (P=0·05)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Acre yield of grain in lb.	2380	2237	1895	2168	62·2	Yes.	185·7
Yield Percentage on standard	125·4	118·0	100	114·4	3·28		9·95
Percentage on general mean	109·6	103	87·4	100	2·86		8·6
Flowering duration	92	97	92				

Conclusion 3011 1603 Co. 10

8. *Isolation of cosmopolitan strains of different durations by inter-strain crossing.*—The crosses were effected with the intension of isolating strains which might be adaptable to large tracts thereby reducing the number of strains under distribution. But this objective with regard to the needs for short duration strains was not fulfilled.

(i) *Medium duration (Co. 3 × Co. 7).*—Five cultures, from this cross between medium duration strains were under comparative yield trials with Co. 3 standard. All the cultures except culture 9,539 were found to be superior to the standard in addition to their being shorter than the standard in duration by 2 to 5 days. The data are furnished in Table XII.

TABLE XII—*Comparative yield trial of interstrain hybrids of Medium duration (First crop).*

Field No.—A. 7 a.
Sown on—5 September 1953.
Planted on—9 November 1953.
Harvested on—13 March 1954.

Size of plot—3′ × 20′.
Lay out—Randomised block
Replications—4 times.

Particulars.	Cultures and strains tested. 9,591	9,617	9,919	9,992	9,539	Co. 3 std.	General mean.	Standard error.	'Z' test satisfied or not. (P=0·05).	Critical Difference. (P=0·05)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Acre yield of grain in lb. ..	1,807	2,564	2,075	2,126	1,553	1,321	1,908	81·9	Yes.	247·0
Yield as percentage on standard	136·8	194·0	157·1	161·0	117·6	100·0	114·4	6·2		18·7
Yield as percentage on general mean	94·7	134·5	108·8	111·5	81·5	69·2	100·0	4·29		12·9
Flowering duration	140	141	135	139	135	138				

Conclusion 9917 9992 9619 9561 9539 Co. 3

(ii) *Long duration* (*Co.* 14 × *Co.* 6).—Five cultures of the above cross were under yield trials with Co. 6 and Co. 14 as standards. The yield data revealed that while two cultures were better than Co. 6, four were equal to Co. 14 and one inferior to it. The data are presented in Table XIII.

TABLE XIII—*Comparative yield trial of Co.* 14 × *Co.* 6 (*Long duration*).

Field No.—F. 10 d.
Sown on—29th August 1953.
Planted on—21st October 1953.
Harvested on 1st March 1954.

Size of plot—4′ × 12′
Lay out—Randomised blocks.
Replications—4 times.

Particulars.	Cultures and strains. 9,951	9,919	9,896	3,497	3,496
(1)	(2)	(3)	(4)	(5)	(6)
Acre yield of grain in lb.	2,145	2,297	2,000	1,697	1975
Percentage on control on Co. 14.	92·68	99·24	86·42	73·33	85·37
Percentage on standard Co. 6	132·9	142·4	124·0	105·2	122·5
Percentage on General mean ..	106·9	114·5	99·7	88·61	98.49
Flowering duration	128	130	132	132	128

Particulars.	Co. 14 Std.	Co. 6 Std.	General mean.	Standard error.	'z' test satisfied or not (P=0·05).	Critical difference. (P=0·05).
	(7)	(8)	(9)	(10)	(11)	(12)
Acre yield of grain in lb.	2,314	1,613	2,006	1,52·9	Yes	4,82·2
Percentage on control on Co. 14.	100	69·69	86·7	7·04	Do.	20·8
Percentage on standard Co. 6 ..	143·5	100	124·4	10·1	Do.	29·9
Percentage on General mean ..	115·3	80·41	100	8·12	Do.	22·96
Flowering duration	130	126	..	..	..	..

Conclusion—Co. 14, 9,919, 9,951, 9,896, 3,496, 3,497, Co. 6.

(iii) *T.* 1279 × *Co.* 11.—Five cultures of the above cross were under comparative yield test with Co. 11 as the standard. All the cultures recorded increased yields over Co. 11, though only one was significantly better. The data are furnished in Table XIV.

TABLE XIV—*Comparative yield trial of T.* 1279 × Co. 11.

Field No.—F. 10 d.
Sown on—29th August 1953.
Planted on—21st October 1953.
Harvested on—27th February 1954.

Size of plot—4′ × 12′
Lay out—Randomised blocks.
Replications—4 times.

Particulars.	Cultures and strains. 3,528	3,527	3,522	3,521	Co. 11	General mean.	Standard error.	'z' test satisfied	difference Critical. (P=0·05)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Acre yield of grain in lb. ..	2206	2105	2266	2976	1915	2294	153·9	Yes	474·9
Percentage on standard ..	115·2	109·9	116·3	155·4	100·0	119·7	8·04	..	24·8
Percentage on general mean..	96·45	92·04	97·34	130·1	83·75	100	6·7	..	20·71
Flowering duration	128	128	128	128	128	..	..	..	..

Conclusion—3,521 3,522 3,528 3,527 Co. 11

9. *Evolution of non-lodging short duration strains.*—The Burma types T. 285 and T. 301 have thick stalks and well bunched earheads in addition to their non-lodging habit. They were utilized for effecting crosses with local strains to evolve non-lodging short duration strains, since it is found necessary to have non-lodging types in tracts which are benefited by the north-east monsoon rains and where short duration varieties are cultivated in the first crop season. The harvest of the first crop coincides with heavy monsoon rains and the paddy grains germinate in the field itself, if they lodge.

(i) *Co.* 10 × *T.* 301.—Seven promising cultures were under yield trials with Co. 10 and T. 301 as standards in the first crop season. All the cultures yielded better than Co. 10. Cultures 4714 and 4728 would appear to be promising. In the second crop season also the results were as in the first crop season and all the cultures proved superior to the standard. The yield data are furnished in tables XV (*a*) and XV (*b*).

TABLE XV (*a*)—*Comparative yield trial of Co.* 10 × *T.* 301 (*First crop*).

Field No.—B. 4 b.
Sown on—11th July 1953.
Planted on—8th Aug. 1953.
Harvested on—14th Nov. 1953.

Size of the plot—3′ × 15′.
Lay out—Randomised blocks.
Replication—4 times.

Particulars.	Cultures and strains.						
	4651	4655	4714	4728	4734	4739	7282
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Acre yield of grain in lb. ..	3751	3983	4078	4002	3819	3613	3682
Percentage on T. 301 Std. ..	110·4	117·1	119·9	117·7	112·3	106·3	108·2
Percentage on Co. 10 Standard.	154·5	164·1	168·0	164·8	157·3	148·8	151·7
Percentage on general mean ..	103·1	109·5	112·0	110·0	105·0	99·26	101·2
Flowering duration	88	87	88	89	87	89	89

Particulars.	Co. 10 std.	T. 301 Std.	General mean.	Standard error.	'z' test satisfied or not. (P=0·05)	Critical difference. (P=0.05)
	(9)	(10)	(11)	(12)	(13)	(14)
Acre yield of grain in lb. ..	2428	3400	3640	157.8	Yes.	460·6
Percentage on T. 301 Std. ..	71·49	100·0	107·0	4·6	Do.	13.55
Percentage on Co 10 Standard.	100	140.1	149·0	6·5	Do.	18·97
Percentage on general mean ..	66·70	93·42	100·0	4·34	Do.	12·66
Flowering duration	83	81	..	..	..	..

Conclusion—4714 4728 4655 4734 4651 7282 4739 T 301 Co 10

Table XV (*b*)—*Comparative yield trial of Co.* 10 × *T.*—301 (*Second crop*).

Field No.—K 1 a b.
Sown on—18th January 1954.
Planted on—18th February 1954.
Harvested on—25th May 1954.

Size of plot 3 × 20′.
Layout—Randomised blocks.
Replications—4 times.

Particulars.	4651	4655	4714	4728	4734	4739	7282
Acre yield of grain in lb. ..	2706	2498	2587	2703	2668	3229	3218
Percentage on Co 10 control..	185·2	171·1	177·1	185·0	182·6	221·0	220·4
Percentage on T. 301. ..	114·5	105·7	109·4	114·4	112·9	136·7	136·1
Percentage on general mean.	103·0	95·9	99·3	103·8	102·4	124·0	123·6
Flowering duration ..	95	95	94	94	97	99	95

Particulars.	Co 10 Std.	T. 301 Std.	General mean.	Standard error.	'Z' test satisfied or not (P=0·05)	Critical difference (P=0·05).
Acre yield of grain in lb...	1461	2364	2604	223·3	Yes.	666·4
Percentage on Co 10 control.	100·0	161·7	178·2	15·6	..	45·6
Percentage on T. 301 ..	61·8	100·0	110·2	9·6	..	28·2
Percentage or general mean.	56·1	90·8	100·2	8·8	..	25·6
Flowering duration ..	93	86	..	..	..	..

Conclusion 4739 7282 4561 4728 4734 4714 4655 T 301 Co 10.

(*ii*) *Co.* 10×*T.* 285: In the first crop season three cultures were tried with Co. 10 as the standard and all the three cultures had yielded 76 to 82 per cent more grain than the Co. 10 standard. All the three cultures along with the standard Co. 10 were under yield trial in the second crop season also. Though all the three cultures yielded better than Co. 10 two of them, namely 4495 and 4476 may be said to be more promising. The results are furnished in tables XVI (a) and XVI (b).

Table XVI (*a*)—*Comparative yield trial on Co.* 10×*T.* 285 *progenies* (*First crop*).

Field No.—B. 3a.
Sown on—11th July 1953.
Planted on—7th August 1953.
Harvested on—16th November 1953.

Size of plot—4′×20′.
Lay out—Randomised blocks.
Replication—6 times.

Particulars.	Cultures and strains.				General mean.	Standard error.	'Z' test satisfied or not (P=0·05).	Critical difference (P=0·05).
	4476	4495	4504	Co. 10 Std.				
Acre yield of grain in lb.	3174	3203	3034	1768	2795	113·2	Yes.	340·0
Percentage on standard.	113 6	114·7	108.6	63.25	100	4·05	..	12·1
Percentage on general mean.	179·6	181·2	175·6	100	158·1	6·4	..	19·23
Flowering duration.	77	77	84	88	..	..	..	..

Conclusion—4495 4476 4504 Co 10

Table XVI (*b*)—*Comparative yield trial of Co.* 10×*T.* 285 *progenies* (*Second crop*).

Field No —B. 6 b.
Sown on—13th January 1954.
Planted on—17th February 1954.
Harvested on—10th May 1954.

Size of plot—4′×20′.
Lay out—Randomised blocks.
Replications—6 times.

Particulars.	Cultures and strains.				General mean.	Standard error.	'Z' test satisfied or not (P=0·05).
	4476	4495	4504	Co 10 Std.			
Acre yield of grain in lb.	2072	2034	1978	2060	20·36	58·9	No.
Percentage on standard.	100·6	98·7	96·0	100·0	98·8	2·9	
Percentage on general mean.	101·7	99·9	97·2	101·2	100·0	2·8	
Flowering duration.	87	87	102	89	..	..	..

10. *Breeding for saline resistance*:—The existence of saline soils in about two lakh acres in the important paddy growing tracts of this State is a serious problem strongly indicating the need for the evolution of strains to suit these saline pockets. The many varieties now under cultivation in these areas were collected in previous years and after a thorough study in pot culture and lysimeter tests, only two varieties, Tellathoka vadlu (T. 892) a coarse grained variety from Chittoor district and SR. 26 B. an introduced variety from Orissa were found to be more tolerant to salinity than other varieties tested. They were therefore used as parents for effecting crosses with high yielding strains to evolve high yielding saline resistant strains. Out of a total number of 623 single plants that were under study, 359 single plants were selected for further study from 15 sets of crosses.

In the absence of any typical saline patch on this station the selections were made only on the basis of economic characters. In addition, two very promising cultures 10034 and 10022 both progenines of a cross between MTU. 1 and SR. 26 B were sent for district trial.

11. *Breeding for drought resistance.*—The crosses between popular strains and wild rices belonging to *Oryza sativa forma sponianea* which are hardy and drought resistant, where under trial during the season. In addition, fresh crosses, between drought resistant popularly cultivated varieties like TKM. 2 on the one hand and BAM. 3 and MTU. 4 on the other, were effected and 1500 F 2 progenies were under

study. Two hundred and twenty-seven single plants were selected from the F 2 progenies, for further tests. From the crosses with wild paddies referred to above, progenies in F 6 and F 7 numbering 1046 were under observation and 723 cultures with desirable characters where selected.

The Cytogeneticist, Coimbatore who had also a few sets of crosses of wild types with cultivated strains, which were also done for isolation of cultures resistant to drought, transferred the entire hybrid progenies to this section, and 105 single plant selections where made from the same. The different crosses under study are :

Nature of cross.	*Generation.*
Co 13×T. 129	F 7
Co 13×T. 469	F 6
GEB 24×T. 1601	F 6
Co 1×T. 1702	F 6
Co 2×T. 162	F 6
Co 2×T. 1602	F 6
Co 5×T. 113	F 6

In addition to the above, five sets of fresh crosses were also effected between dry paddy varieties and wild rice types with the same object of evolving drought resistant strains.

12. *Breeding for inducing dormancy in short duration varieties* :—The short term varieties now under cultivation are nondormant and sprout in the field itself during harvest stages if there is water stagnation. In Tanjore delta the harvest of the first crop Kuruvai coincides with the North east monsoon period and the crop invariably germinates in the field, thereby reducing the market value of the produce. However, some exotic short duration varieties were found to possess this desirable character, viz., dormancy and were utilised for evolving short duration dormant strains. One hundred and fifty and 1085 single plants, respectively from the second and third generation cross progenies, were selected for economic characters and tested in the laboratory for viability. Four hundred single plants, 90 from three sets of F 2 progenies with T. 568 as the common dormant parent and Co. 13, Co. 18 and ADT. 3 as non-dormant parents and 311 from 9 sets of F 3 progenies with T. 568, T. 962, T. 1653, T. 1815 and T. 1926 as the dormant parents and ADT. 3, Co. 13 Co. 10 and Co. 18 as non-dormant parents were found to be dormant and were carried forward for further study. The tests were made at fortnightly intervals and all the cultures which were found to give less than 5 per cent viability after a period of one month were carried forward.

13. *Deep water cultures* :—(i) Assam and Bengal varieties, reputed to be resistant to floods, are not good yielders. The types from these two places were utilised for crossing with the local strains for the evolution of flood resistant high yielding strains. The materials were studied at Deep water Rice Research Station Pulla in West Godavari District for two seasons. But after the separation of Andhra, trials could not be continued. The progenies are being maintained at Coimbatore without any further selection work for want of typical flooded conditions, on any of the Research Stations in the Residuary Madras State.

(ii) Deep water cultures from Samalkota : Eight cultures from Samalkota reported to be capable of withstanding flood conditions were under comparative yield test against PTB. 15. None of the cultures proved even equal to the standard in respect of yield.

14. *Crosses between geographical races* :—It is said that by crossing different geographical races desirable recombination of genes in the progeny can be achieved which may lead to the evolution of strains suitable for varied conditions. With this object in view, crosses were effected between *Japonica* and some of the

Italian and Belgian Cango varieties on the on hand and some of the short duration popular strains released in this State during 1951–52. In addition crosses effected at the Central Rice Research Institute, Cuttack between reputed *Japonica* types and *Indica* parent, GEB. 24 were also received for study during 1952–53 season.

From the ten sets of crosses studied, 172 single plants selected from the F 2 progenies were grown as F 3 in two sets, one with normal manuring of 100 lb. ammonium sulphate on a basal dressing of 4,000 lb. leaf plus 150 lb. super and the other with heavy manuring, that is 200 lb. ammonium sulphate and 6,000 lb. green leaf *plus* 225 lb. super per acre. The selections grown under heavy manuring showed better vigour. The progenies exhibited varying degrees of segregation for a number of characters like grain size, duration, glume colour, etc. Eight hundred and ten promising single plants with good tillering and bunchiness of panicle of the *Japonica* type were selected. From the 172 single plant selections studied in 1953–54 season, 810 promising single plants with desirable combinations of tillering and attractive panicle habits were carried for further tests.

The thirteen cross combinations with A.D.T. 12 as common parent grown in their F 2 generation and studied for height, number of tillers per plant and other characters were grouped into three classes, *Indica*, intermediate and *Japonica* types with reference to height. The progenies were segregating for height, glume colour, grain size bunchiness of panicle and flowering duration. Sterility in varying degrees was also noticed. Seven hundred and seventy single plant selections were effected for further study.

15. *Agronomic trials—A. Manurial Experiments—(a) Varietal response to manuring*:—The object of the experiment is to find out the difference in the response of varieties to manuring. The experiment was laid out with four levels of nitrogen ,O, 30, 45 and 60 lb. N. per acre as ammonium sulphate and four levels af P 2 o 5, 0, 30, 45 and 60 lb. as super phosphate over a basal dressing of 5,000 lb. of green manure. Two popular strains Co. 25 and Co. 19 were used in this experiment. The plots grown with Co. 19 were completely affected by blast and the results were vitiated. From the yield of Co. 25 broad indications were obtained in that the yield increased with the increase of nitrogen up to 45 lb. but above that dose the yield increase was not proportionate to the increase of nitrogen. With regard to P. 2 o 5, the increase in yield was noted with 30 lb. P. 2 o 5 applied in conjunction with 5,000 lb. green manure but with 45 lb. and 60 lb. the increases were not proportionate. In combination with N, as ammonium sulphate and green leaf, the responses were good with 30 lb. P 205 but in respect of higher doses of P2 05 the increases in yield were not proportionate to the cost of the manure applied. The data obtained are presented in table XVII.

TABLE XVII—*Summary of results of varietal response to manuring—Variety—Co.* 25.

(i) For doses of N. 2 only.

Field No.—F 7 ab. 8 ab. 9 ab. and 10 ab.
Date of sowing—12th September 1953.
Date of planting—24th October 1953.
Date of harvest—18th March 1954.

Plot size—12'x11' gross
11½'x10½' net.
Lay out—Split plot now treated as randomised block.
Replications—Four.

Particulars.	Nitrogen. 0 lb.	30 lb.	45 lb.	60 lb.	General mean.	Standard error.	'F' value satisfied or not (P=0·05)	Critical difference (P=0·05)
Yield of grain in lb. per acre.	3409	3973	4563	4505	4113	78·4	Yes	158·6
Yield as percentage on control.	100·0	116·5	133·9	131·9	120·6	2·3	..	4·7
Conclusion		45	60	30	0			

TABLE XVII. *Summary of results of varietal response to manuring Variety Co. 25.*

Particulars	For doses of P_2O_5 Only. 0 lb.	P_2O_5 30 lb.	45 lb.	60 lb.	General mean.	Standard error.	'F' value Satisfied or not (P=005)	Critical difference (P = 0.05)
Yield of grain in lb per acre	3,910	208	4074	4258	4112	89·9	Yes	182·0
Yield as percentage ..	100·0	107·6	104·2	108·6	105·2	2·6	..	4.6

On Control Conclusion 60 30 45 0

Interaction (N x P 2 O 5)

Particulars N Lb.	0	0	0	0	30	30	30	45	45
P_2O_5 lb	0	30	45	60	0	30	45	60	0	30
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Acre yield of grain in lb.	3245	3538	3156	3697	3583	4013	4125	4170	4327	4751
Yield as percentage on Control.	100·0	109·0	97·2	113·9	110·4	123·6	127·1	129·0	133·3	143·1

Particulars N Lb.	45	60	60	60	60	60	General mean.	Standard error	'F' value satisfid or not (P=0·05)
P_2O_5 lb.	45	60	0	30	45	60			
	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
Acre yield of grain in lb.	4575	4598	4485	4530	4440	4566	4112	191·5	No
Yield as percentage on Control.	140·9	141·7	138·2	139·6	136·8	140·9	126·7	5·9	..

(*b*) *To find out the efficacy of the different doses of phosphates with graded doses of green manure* :—The experiment was designed to fiud out the optimum combination of green leaf and P_2O_5 for obtaining the maximum yield. The experiment was laid out with 16 treatments consisting of four levels of P_2O_5 (0, 30, 45 and 60 lb. per acre) and four levels of green manure (20,000 4,000 and 6,000 lb) per acre). The experiment has been conducted for three seasons, 1950–51, 1951–52 and 1953–54 but the results were not consistent, While in the first year no corresponding increase in yield was obtained due to the application of P_2O_5, 1951–52 results showed that there was a gradual increase in grain yield when applied alone; but in combination with green leaf, the responses were erratic. The data obtained during 1953–54 proved contrary to the results of the previous season in that the increase in yield was in proportion to the increase in the dose of P_2O_5 in conjunction with green manure. The results are furnished in table XVIII.

TABLE XVIII—*Graded doses of phosphate experiment.*

Field No.—E. 9, a, b, c, d, and 10 a,b,c,d.

Sown on—4th September 1953.

Transplanted on—28 and 29th October 1953.

Harvested on—10th March 1954.

Size of plot—'12 × 20' gross. 11½' × 19½ net.

Lay out—Split plot.

Replications—4 times.

Summary of results for main treatments (Green leaf).

Particulars	0 lb.	2,000 lb.	4,000 lb	6,000 lb.	General Mean.	Standard error.	'Z' test Satisfied or not (P =0·05).	Critical difference (P= 0·05)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Acre yield of grain in lb. ..	3,854	3,837	4,052	4,101	3,961	45.2	Yes.	146·5
Yield as percentage on control	100·0	99·5	105·1	106·4	102·7	1·2	,,	3·8

Conclusion— 6000 4000 0 2000

Summary of results for P 205 only.

Particulars.	0 lb.	30 lb.	45 lb.	60 lb.	General mean.	Standard error.	'Z' test satisfied or not (P=0·05)	Critical difference (P=0·05)
Acre yield in lb.	3,709	3,970	3,940	4,225	3,961	1,00·1	Yes.	285·6
Percentage on control	100·0	107·0	106·2	113·9	106·8	2·7	„	7·7

Conclusion— 60 30 45 0

Summary of results for interaction (Green leaf x P_2O_5).

Green leaf lb.	0	0	0	0	2,000	2,000 6,000	2,000 6,000	2,000	4,000	4,000	4,000	4,000	6,000	6,000	General mean.	Standard error.	'Z' test satisfied or not. (P=0·05)
P_2O_5lb	0	30	45	60	0	30	45	60	0	30	45	60	0	30	45	60	..	..	..
Acre yield of grain in lb.	3,835	3,949	3,617	3,975	4,095	3,508	3,825	3,848	4,224	3,727	4,079	4,188	4,248	3,799	4,103	4,139	4,409	203·3	No
Percentage on control.	100·0	102·2	94·3	106·0	91·5	99·1	100·3	110·1	97·2	106·4	109·1	110·8	99·1	107·0	107·9	114·6	103·6	5·3	No

(c) *Deep placement of ammonium sulphate* :—To verify if deep placement of ammonium sulphate will give better yield than the same quantity applied on the surface, the experiment was laid out during 1953-54 season with six treatments as detailed in the table and with two spacings, viz., 6" x 6" and 10" x 10". The results showed that the yield difference were not significant for spacing though the trend was in favour of 6" x 6" spacing. As regards the placement effect over surface application, in 6" x 6" spacing 30 lb. N applied on the surface recorded better yield than 30 lb. N placed whereas 45 lb. N placed was superior to 45 lb. applied broadcast. In the case of 10" x 10" spacing 30 lb. N placed was better than (i) the same quantity applied broadcast, (ii) 45 lb. applied broadcast or placed. The results are furnished in table XIX.

TABLE XIX—*Deep placement of ammonium sulphate experiment.*

Field No.—A 7 c, 8 c, 9 c, 10 c.
Lay out—Split plot design.
size of plot—10' x 20 percent.
sown on—30th September 1953.
Planted on—7 and 8th November 1953
Harvested on—5th April 1954.
Variety—Co. 25.

Treatments.

Placement method.
1. No manure.
2. 5000 lb. green leaf + 45 lb. P5 O5 as super puddled in before planting
3. As treatment 2 + amonium sulphate to supply 20 lb. before planting + 10 lb. N a month after glanting.
4. As treatment 2 + 30 lb. Nitrogen before planting + 15 lb. Nitrogen a month after planting.

Local method.
5. As treatment 2 + ammonium sulphate to supply 30 lb. Nitrogen a month after planting.
6. As treatment 2 + ammonium sulphate to supply 45 lb. Nitrogen a month after planting.

Summary of results for sub-plot treatments (manures).

Particulars	Tr. 1.	Tr. 2.	Tr. 3.	Tr. 4.	Tr. 5.	Tr. 6.	General mean.	Standard error.	'Z' test satisfied or not (P | 0·05)	Critical difference (P=0·05)
Acre yield of grain in lb.	1,640	1,924	2,610	2,543	2,439	2,254	2,235	121·4	Yes.	350·9
Percentage on control	100	117·3	159·2	155·1	148·7	137·5	136·3	7·4	..	21·4
Percentage on General mean.	73·4	86·1	116·8	113·8	109·1	100·9	100	5·4	..	15·7

Deep placement of ammonium sulphate.

Summary of results for main treatments (spacing).

Particulars	6" x 6"	10" x 10"	General mean	Standard error	'z' test satisfied or not (P 0·05)
Acre yield in lb.	2325	1957	2141	166·9	No.
Percentage on general mean.	108·6	91·4	100·0	7·8	No.

Summary of results for interaction (Spacing x Manures)

Particulars	6" x 6"						10" x 10"						General mean.	Standard error.	'z' test satisfied or not (P 0·05)
	1	2	3	4	5	6	1	2	3	4	5	6			
Acre yield of grain in lb.	1,680	1,987	2,600	2,837	2,726	2,349	1,599	1,861	2,620	2,248	2,152	2,159	2,235	51·4	No.
Percentage on General mean	75·2	88·9	115·8	126·9	121·9	105·1	71·1	83·2	117·2	100·3	96·3	196·6	100·0	2·3	

B. Japanese method (as practised at Kora Gramodyog Kendra, Bombay) versus Farm method, as recommended by the department.—To test the efficacy of the "Japanese method of cultivation which involves such factors as high manuring, line planting, interculture in the planted field, heavy manuring of the nursery bed and thin sowing, compared to the Departmental recommendation, an experiment was laid out during this season. The main features of the "Japanese method" are as follows:—

(1) *Nursery.*—The nursery area was manured with 40 cart loads of farm yard manure per acre and brought to a fine tilth. Beds were formed 4 feet wide and 3" high, of a convenient length with a channel space of one foot in between two beds. The seed bed was covered with sieved compost, 1/8" layer and over that ash was spread at the rate of 2,000 lb. per acre. The seed bed was manured with a two pound mixture of ammonium sulphate and super phosphate in equal proportions, for every pound of seed sown, The seed was put in salt water (2 lb. o salt in one gallon of water) and floating seeds removed. The heavy seeds settling at the bottom were air dried. The seeds were again treated with Agrosan and sown at the rate of 11 lb. per cent and covered with fine soil.

(2) *Transplant field.*—The main field was manured at 20 cart leads per acre of farm yard manure, plus 30 lb. N as ammonium sulphate and 30 lb. P_2O_5 as super phosphate. The seedlings were planted in lines 10" x 10", using four seedlings per hole. Thirty days after planting, 15 lb. of N as ammonium sulphate and 15 lb. of P_2O_5 as super phosphate were applied. A third dose of fertilizers was applied at the same rate 60 days after planting. Intercultivation was done at fortnightly intervals commencing 15 days after planting and continued till two weeks before flowering.

On the other hand in the "Farm method" the nursery area was manured with 10,000 lb. green leaf and a seed rate of 3 lb. per cent was adopted. The main field was manured with 5,000 lb. green leaf plus 30 lb. P_2O_5 as super phosphate. Ammonium sulphate to supply 30 lb. N was applied four weeks after planting. The spacing adopted was 6" x 6" with two seedlings per hole. The results showed that the "Japanese method" of cultivation had given higher yields both in respect of grain and straw. The data are presented in table XX.

TABLE XX.—*"Japanese method" versus "Farm method"—variety Co 25 & Co 19 (as practised at Kora Gramodyog Kendra, Bombay).*

Field No.—A 7 b, 8b, 9b, 10b,
Sown on—12th Sep. 1953.
Planted on—2nd Nov. 1953.
Harvested on—12th Mar. 1954.

Size of plot—15' x 20'
Lay out—Split plot
Replications—8 times

Grain.

Summary of conclusion for methods only

Particulars.	Japanese method.	Farm method.	General mean.	Standard error.	'Z' test satisfied or not (P—0·05)	Critical difference. (P=0.05)
Acre yield of grain in lb. ..	3838	3256	3547	63·85	Yes	195·1
Yield as percentage on General mean	105·9	93·9	100·0	1·8	Yes	5·5
	Conclusion	Japanese method >		Farm method		

Summary of conclusion for strains only

Particulars.	Co 19	Co 25	General Mean.	Standard error.	'Z' test satisfied or not (P—0·05)	Critical Difference. (P=0·05)
Acre yield of grain inlb. ..	3277	3407	3342	124·66	Yes	417·8
Yield as percentage on general mean	92·1	107·9	100·0	3·73	..	12·5
	Conclusion :	Co 25 >	Co 19			

Cost of cultivation and economics.

	Japanese method.		Farm method.	
	Co 25	Co 19	Co 25	Co 19
Yield of grain per acre value of produce	4061 lb.	3616 lb.	3574 lb.	2938 lb.
(grain and straw per acre) ..	760–5–11	719–0–0	679–4–0	601–11–6
Cost of cultivation per acre ..	448–8–8	448–8–8	292–7–6	292–7–6
Profit per acre	311–13–3	270–8–0	386–12–6	309–4–0

From the data furnished above it is seen that though the yield per acre is comparatively high in "Japanese method," due to the high cost of cultivation involved, the profit per acre is less than that obtained by the "farm method". The main factors contributing to such a high cost of cultivation are the heavy manuring of the transplant field, the high cost in the preparation and manuring of the nursery beds and the very frequent interculture given to the transplant crop.

C. Confounded factorial experiment.—This experiment designed by the Indian Council of Agricultural Research is also to test the merits of the "Japanese method" in which the six factors, seed rate, seed bed, transplanting rate, method of transplanting, field manuring and intercultivation were tested against the corresponding factors adopted in local practice. The different treatments are detailed below:—

	Local method.	Japansee method.
1 Seed rate	3o lb per acre	20 lb. per acre
2 Seed bed	Wet nursery 10000 lb. green leaf	Dry nursery raised 3″ above ground level and 4′ wide with one foot channel space. For every 32′ sq. ft. of nursery 30 lb. compost ¼ lb. ammonium sulphate, ½ lb. super phosphate, ⅓″ thick sieved compost, a thin layer of ash, 1/8″ fine earth sowing.
3 Transplanting rate	Two seedlings per hole 6″X6′ bulk planting.	Four seedlings per hole 10″X10″ line planting.
4 Method of transplanting.	Slant planting	Erect planting.
5 Field manuring	4,000 lb. green leaf and 150 lb. ammonium sulphate 30 days after planting.	Green leaf 5,000 lb, compost 5 cart loads. Ammonium sulphate 100 lb. super phosphate 100 lb. at planting. Ammonium sulphate 100 lb. Super phosphate 100 lb. 30 days after planting placed.
6 Intercultivation	Weeding 30 days after planting once.	Stirring the soil at fortnightly intervals commencing from 15 days after planting and stopping two weeks before flowering.

The design was confounded and all the combinations of the treatments were tested. The results showed that the Japanese method of field manuring and "Japanese method of transplanting" gave significantly high yields (*vide* table). The cost of cultivation and economics worked out for the various combinations (furnished in table) showed that 15 treatments out of 64 gave a profit of over Rs. 300 and that the plots where all the treatments were local a profit of Rs. 329–0–11 was obtained as against Rs. 173–1–0 obtained from the plots where all the teatments were as per "Japanese method." The data are presented in tables XXI (*a*) and (*b*)

TABLE XXI (*a*).

Factors.

p=Jap. seed rate
q=Jap. seed bed
r=Jap. transplanting rate
s=Jap. method of planting
t=Jap. field manuring
u=Jap. intercultivation

The following treatments have given profits more than Rs. 300 per acre :—

Serial number.	Treatment.	Profit per acre. RS. A. P.
1	(1) all local	329–0 –11
2	pstu	327–10–11
3	pqsu	479– 4– 0
4	pr	366–13– 6
5	s	411– 2–11
6	pqs	381– 1– 4
7	t	324– 4– 1
8	su	427– 3– 5
9	qrs	314– 6– 3
10	prsu	401–15 –0
11	u	324– 8– 5
12	st	325–14– 2
13	pqstu	329– 0– 3
14	pq	303–14– 5
15	psu	319– 0– 5

The following treatments have given loss:—

Serial number.	Treatment.	Loss.
1	pqrtu	8–10– 3
2	qrtu	38– 9– 9

TABLE XXI (*b*)—*Confounded Factorial Experiment to test the merits of the Japanese method of rice cultivation (Economics of cultivation).*

Serial Number.	Treatment.	Total cost of cultivation per plot.	Cost of cultivation per acre.	Grain yield per acre.	Straw yield per acre.	Value of grain per acre at 2¼ annas per pound.	Value of straw per acre at 50 pounds per rupee.	Total value of produce per acre.	Profit (+) or loss (—) per acre.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	prs.	6 13 3	297 6 11	3,060	5,428	478 2 0	108 9 0	586 11 0	+ 289 4 1
2	pqu.	11 3 5	485 15 6	3,072	5,750	480 0 0	115 0 0	595 0 0	+ 109 0 6
3	stu.	9 15 11	435 6 2	3,278	7,038	512 3 0	140 12 2	652 15 2	+ 217 9 0
4	prtu.	10 13 4	471 14 5	2,813	8,280	439 8 6	165 9 7	605 2 1	+ 133 3 8
5	pqst.	10 4 8	448 4 11	3,094	5,316	483 7 0	106 11 6	590 2 6	+ 141 13 7
6	qrsu.	8 11 10	380 11 2	2,944	5,060	460 0 0	101 3 2	561 3 2	+ 180 8 0
7	(1)	7 11 3	335 8 9	3,241	7,910	506 6 6	158 3 2	664 9 8	+ 329 0 11
8	qrt.	16 4 3	708 8 6	3,365	9,765	525 12 6	195 4 10	721 1 4	+ 12 8 10
9	qst.	10 14 6	475 1 3	3,542	7,084	553 7 0	141 10 11	695 1 11	+ 220 0 8
10	rs.	6 13 4	297 10 7	2,979	5,336	465 7 6	106 11 6	572 3 0	+ 274 8 5
11	pqrsu.	8 3 10	358 14 8	3,163	5,424	494 3 6	108 7 8	602 11 2	+ 243 12 6
12	rtu.	11 0 9	481 3 1	2,959	8,000	462 5 6	160 0 0	622 5 6	+ 141 2 5
13	qu.	11 13 5	515 11 0	2,929	5,625	457 10 6	112 8 0	570 2 6	+ 54 7 6
14	p.	7 5 10	320 12 10	2,993	5,895	467 10 6	117 14 5	585 8 11	+ 264 12 1
15	pstu.	10 6 8	453 12 0	3,853	8,970	602 0 6	179 6 5	781 6 11	+ 327 10 11
16	pqrt.	14 8 10	633 14 3	3,286	6,795	513 7 0	135 14 5	649 5 5	+ 15 7 2
17	p.	11 3 3	488 0 2	3,477	7,110	543 4 6	142 3 2	685 7 8	+ 197 7 6
18	qu.	8 7 3	368 3 6	3,128	7,020	488 12 0	140 6 5	629 2 5	+ 260 14 11
19	pqrs.	8 0 1	348 11 4	3,255	5,336	508 9 6	106 11 6	615 5 0	+ 266 9 8
20	pst.	10 0 11	438 1 6	3,611	6,624	564 3 6	132 7 8	696 11 2	+ 258 9 8
21	rsu.	7 0 6	306 4 6	2,829	4,922	442 0 6	98 7 0	540 7 6	+ 234 3 0
22	rt.	10 0 6	436 15 5	2,982	6,795	465 15 0	135 14 5	601 13 5	+ 164 14 0
23	pqrtu.	14 15 11	653 2 9	3,117	7,875	487 0 6	157 8 0	644 8 6	— 8 10 3
24	qstu.	11 12 0	511 13 3	3,813	6,762	598 7 0	135 3 10	733 10 10	+ 221 13 7
25	qt.	14 6 7	627 12 3	3,274	7,200	511 9 0	144 0 0	655 9 0	+ 27 12 9
26	pqru.	13 11 7	597 13 1	3,128	6,570	488 12 0	131 7 2	620 3 2	+ 22 6 1
27	ps.	6 12 0	294 0 6	3,082	4,600	481 9 0	92 0 0	573 9 0	+ 279 8 6
28	ptu.	10 1 2	438 12 5	3,207	6,660	501 1 6	133 3 2	634 4 8	+ 195 8 3
29	qsu.	7 10 3	332 13 3	3,071	4,646	479 13 6	92 14 8	572 12 2	+ 239 14 11
30	pqrst.	11 7 6	499 9 3	3,232	6,072	505 0 0	121 7 0	626 7 0	+ 126 13 9
31	r.	8 7 0	367 8 7	3,252	7,830	508 2 0	156 9 4	664 11 4	+ 297 2 9
32	rstu.	10 7 10	456 4 10	3,439	7,038	537 5 6	140 12 2	678 1 8	+ 221 2 10
33	qru.	14 7 7	630 7 9	3,364	6,345	525 10 0	126 14 5	652 8 5	+ 22 0 8
34	prstu.	10 12 6	469 10 1	3,726	8,418	582 3 0	168 5 9	750 8 9	+ 280 14 8
35	qrst.	13 14 5	578 4 5	3,841	8,050	600 2 6	161 0 0	761 2 6	+ 182 13 8
36	pqsu.	7 7 11	326 7 7	4,244	7,130	663 2 0	142 9 7	805 11 7	+ 479 4 0

37	pr.	8 3 11	359 2 3	3,454	9 315	539 11 0	186 4 9	725 15 9	+ 366 13 6
38	tu.	10 4 2	446 15 1	3,454	9,495	539 11 0	189 14 5	729 9 5	+ 282 10 4
39	s.	6 11 3	291 15 10	3,623	6,854	566 1 6	137 1 3	703 2 9	+ 411 2 11
40	pqt.	12 0 3	523 6 5	3,679	10,350	574 13 6	207 0 0	781 13 6	+ 258 7 1
41	pqs.	7 7 5	325 0 9	3,795	5,658	592 15 6	113 2 7	706 2 1	+ 381 1 4
42	t.	9 13 4	428 5 6	3,724	8,505	582 8 0	170 1 7	752 9 7	+ 324 4 1
43	pru.	9 10 4	420 2 9	3,387	9,090	529 3 6	181 12 9	711 0 3	+ 290 13 6
44	qr.	14 10 10	639 5 4	3,589	8,220	560 12 6	176 6 5	737 2 11	+ 97 13 7
45	su.	7 7 3	324 10 6	3,864	7,406	603 12 0	148 1 11	751 13 11	+ 427 3 5
46	prst.	10 14 2	474 2 8	3,761	9,246	587 10 6	184 14 9	772 9 3	+ 298 6 7
47	pqtu.	12 14 6	562 3 2	3,623	9,765	566 1 6	195 4 9	761 6 3	+ 199 3 1
48	qrstu.	12 4 8	535 6 9	3,784	8,694	591 4 0	173 14 1	765 2 1	+ 229 1 4
49	qrs.	9 2 9	399 8 6	3,680	6,946	575 0 0	138 14 9	713 14 9	+ 314 6 3
50	qrtu.	17 1 3	743 12 11	3,488	8,010	545 0 0	160 3 2	705 3 2	— 38 9 9
51	prsu.	7 11 8	336 10 11	3,611	8,720	564 3 6	174 6 5	738 9 11	+ 401 15 0
52	u.	9 2 2	397 15 0	3,510	9,045	541 9 0	180 14 5	722 7 5	+ 324 8 5
53	st.	10 8 9	459 6 9	4,025	7,820	628 14 6	156 6 5	785 4 11	+ 325 14 2
54	pqstu.	11 6 11	497 15 10	4,233	8,280	661 6 6	165 9 7	827 0 1	+ 329 0
55	pq.	11 0 0	479 2 6	3,825	9,270	597 10 6	185 6 5	783 0 11	+ 303 14 5
56	prt.	10 13 10	473 4 2	2,565	11,700	400 12 6	234 0 0	634 12 6	+ 161 8 4
57	ru.	9 12 6	426 1 2	3,388	7,965	529 6 0	159 4 9	688 10 9	+ 262 9 7
58	rst.	10 12 6	469 10 1	3,815	7,740	599 3 6	154 12 9	754 0 3	+ 284 6 2
59	pt.	9 11 2	422 7 0	3,364	9,405	533 2 0	188 1 7	721 3 7	+ 298 12 7
60	pqr.	14 0 6	611 3 3	3,376	12,600	531 4 0	252 0 0	783 4 0	+ 172 0 9
61	psu.	7 5 7	320 1 11	3,278	6,348	512 3 0	126 15 4	639 2 4	+ 319 0 5
62	qs.	7 13 1	340 8 8	3,209	6,164	501 6 6	123 4 6	624 11 0	+ 284 2 4
63	qtu.	14 10 2	637 8 4	3,454	10,305	539 11 0	206 1 7	745 12 7	+ 108 4 3
64	pqrstu.	12 5 5	537 7 6	3,508	8,464	541 4 0	169 4 6	710 8 6	+ 173 1 0

D. Spacing experiment —The experiment was started during this season to find out the optimum spacing and number of seedlings to secure high yields. The treatments were 6″ x 6″ 3″ x 12″ 4″ x 9″, 12″ x 6″ 18″ x 4″ and 9″ x 8″ with two and four seedlings per hole. The results on analysis satisfied 'Z' test for spacing and interaction whereas no significant differences were obtained for the number of seedlings. The date are presented in Table XXII (*a*) and XXII (*b*).

TABLE XXII (*a*)—*Summary of results of spacing experiment—Variety Co. 25 (First crop).*

Field No.	L. 7 a b and 8 a b.	Size of plot	12′ x 24′.
Sown on	3rd September 1953.	Lay out	Split plot.
Planted on	19th and 20th October 1953.	Replications	4 times.
Harvested on	5 March 1954.		

Grain Yield.
for spacing only.

Particulars.	6″×6″	9″×8″	9″×4″	12″×3″	18″×4″	General mean.	12″ × 6″	Standard error.	'Z' test satisfied or not (P=0·05).	Critical difference (P=0·05)
Acre yield of grain in lb.	3,662	3,674	3,596	3,620	3,805	3,668	3,650	23·8	Yes	69·7
Yield as percentage on general mean.	99·9	100·2	98·0	98·7	103·7	100·0	99·6	0·65	„	1·9

Conclusion 18″×4″ 9″×8″ 6″×6″ 12″×6″ 12″×3″ 9″×4″.

TABLE XXII (*b*)—*Spacing experiment—Variety Co 25 (First crop).*

Grain yield.

Summary of results for Interaction (seedlings x spacings).

Particulars.	Two seedlings per hole.						Four seedlings per hole.	
	6″x6″	12″x3″	9″x4″	18″x4″	12″x6″	9″x8″	6″x6″	12″x3″
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Acre yield of grain in lb. ..	3,726	3,678	3,701	3,667	3,703	3,742	3,598	3,563
Yield as percentage on genreal mean.	101·6	100·2	100·9	99·95	100·9	102·0	98·1	97·1

Particulars.	Four seedlings per hole—*cont.*				General Mean.	Standard error.	'Z' test satisfied or not (P=0·05)	Critical difference (P=0·05)
	9″x4″	18″x4″	12″x6″	9″x8″				
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Acre yield of grain in lb. ..	3,491	3,944	3,607	3,607	3,669	14·31	Yes·	41·46
Yield as percentoge on general mean.	95·2	107·5	98·3	98.3	100·0	0·39	„	1·13

Conclusion—10 6 1 5 3 2 4 11 12 7 8 9

16. *Fundamental studies.*—Different methods have been adopted for inducing mutations in rice with a view to improving the yield. Results obtained by the several methods are briefly reported below :—

(i) *Benzene vapour.*—The spikelets of Co. 13 were exposed to Benzene vapour for 30 seconds at the time of blooming. Either the entire spikelet was exposed or the emasculated one alone was exposed and then pollinated with either treated or untreated pollen. Seven promising cultures obtained by such treatment were under comparative yield test with Co. 13 as the standard, in the first as well as in the second crop seasons. Five cultures in the first crop season which gave yields ranging increased from 4 to 28 per cent over the standard were carried forward for further trials. In the second crop season all the cultures except one, recorded lower yields than the standard. The results are furnished in Tables XXIII (*a*) and XXIII (*b*).

TABLE XXIII (*a*)—*Comparative yield trial of Co.* 13 *Mutants (Benzene treated) (First crop).*

Field No —B.4a
Sown on—11th July 1953.
Transplanted on—8th August 1953.
Harvested on—1st November 1953.

Size of plot—3½ (x15).
Lay out—Randomised blocks.
Replications—4 times.

Particulars.	Cultures and strains.										'Z' test satisfied or not (P=0·05)
	164	165	168	170	176	179	180	Co 13 std.	General mean.	Standard error.	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Acre yield of grain in lb.	2,052	2,529	1,997	2,151	2,090	2,599	2,316	2,014	2,216	183·27	Not significant.
Percentage on standard	101·9	125·6	99·17	106·8	103·8	128·0	115·0	100·0	110·3	9·1	
Percentage on General mean.	92·6	114·1	90·1	97·1	94·4	116·3	104·5	90·0	100·0	8·26	
Flowering duration ..	71	76	76	74	73	72	76	80			

TABLE XXIII (*b*)—*Comparative yield trial of Co.* 13 *Mutants (Benzene treated) (Second crop).*

Field No.—B. 7c.
Sown on—13th January 1954.
Transplanted on—17th February 1954.
Harvested on—6th May 1954.

Size of plot—4 (x12½).
Lay out—Randomised blocks.
Replications—4 times.

Particulars.	Cultures and strains tested.					
	160	164	168	170	176	179
	(1)	(2)	(3)	(4)	(5)	(6)
Acre yield of grain in lb. ..	1,208	929·7	1,147	1,061	1,113	1,103
Percentage on standard ..	82·9	63·8	78·7	72·9	78·3	75·7
Pereentage on general mean ..	105·3	80·97	99·95	92·53	96·99	96·12
Flowering duration	82	80	84	82	82	82

Particulars.	180	Co 13	General mean.	Standard error.	'Z' test satisfied or not (P=0·05)	Certical difference (P=0·05)
	(7)	(8)	(9)	(10)	(11)	(12)
Acre yield of grain in lb. ..	1,133	1,456	1,191	104·4	Yes.	308·7
Percentage on standard ..	77·8	100·0	64·97	5·7	„	·16·9
Percentage on general mean ..	98·8	127·0	100·0	8·8	„	25·9
Flowering duration	83	87				

Conclusion—Co. 13 160 168 180 176 179 170 164

(ii) *Ceresan or Agrosan G.N.*—Seeds of Co. 2 strain were treated with ceresan at two grams per pound of seed during the year 1942. After a study of the progenies through a number of years from 1943–44, two cultures 893 and 5,860 were selected and subjected to yield trial during the season. Even though both the cultures recorded higher yields than the standard, which was severely affected by blast, whereas the cultures were not so affected, which is an added advantage in favour of the culture, the yield data therefore could not be statistically analysed.

Seeds of Co. 13 were similarly treated with 3, 4 and 5 grams of ceresan per pound of seed in 1949–50. After a number of years' study six promising cultures from Co. 13 (3 grams treatment) were isolated and were under comparative yield test against Co. 13, during first and second crop seasons. Three cultures which had consistently given higher yields over the standard have been carried forward. In addition one culture from each of Co. 13 treated with 4 grams and 5 grams of ceresan were also under yield trial during the past three seasons. The results were not however consistent. In the year 1951–52 both the cultures gave significantly poor yield compared to Co. 13. In 1952–53 due to severe drought no reliable data could be obtained. In 1953–54 in the first crop season both of them recorded lower yields than Co. 13 though the yield differences were not statistically

significant. In the second crop season Co. 13 (5 grams treated) gave 51 per cent increased yield over control but Co. 13 (4 grams treated) yielded only 64·5 per cent of the control. The data are furnished in Tables XXIV (*a*), XXIV(*b*) and XXIV(C).

TABLE XXIV (*a*)—*Comparative yield trial of Co.* 13 *Mutants* (*Ceresan treated*) (*First crop*).

Field No.—B. 3 b.
Sown on—11th July 1953.
Planted on—7th August 1953.
Harvested on—12th November 1953.

Size of plot—4′ × 20′.
Lay out—Randamised blocks.
Replications—4 times.

Particulars.	Cultures and strain. 263	265	275	291	297	257	Co. 13	General Mean.	Standard Error.	'z' test satisfiedor not.(P = 0·05)	Critical difference (P = 0·05)
Acre yield of grain in lb.	2,784	2,663	3,451	2,688	3,208	3,120	2,902	2,974	136·1	Yes.	396·8
Percentage on standard.	95·9	91·7	118·3	92·6	110·5	100·6	100·0	102·5	4·69	..	13·67
Percentage on general mean.	93·6	89·5	116·1	90·4	107·9	104·7	97·6	100	4·58	..	13·3[1]
Flowering duration.	86	82	83	83	83	83	81	..	..	..	..
Conclusion	275	297	257	Co. 13	263	291	265				

TABLE XXIV (*b*)—*Comparative yield trial of Co.* 13 (*Ceresan treated*) *cultures* (*Second crop*).

Field No.—B. 5 c.
Sown on—13th January 1954.
Planted on—16th February 1954.
Harvested on—3rd May 1954.

Size of plot—4′ × 20.
Lay out—Randomised blocks.
Replications—4 times.

Particulars.	257	263	265	275	291	297	Co 13 control.	General Mean.	Standard Error.	'z' test satisfied or not (P = 0·05)	Critical difference (P = 0·05)
Acre yield of grain in lb.	1,125	937	378	1,322	1,289	1,909	1,199	1,166	47·6	Yes.	141·6
Yield as percentage on standard.	93·3	78·5	63·1	110·3	107·5	158·6	100·9	97·3	3·97	Yes.	11·
Yield as percentage on general mean.	96·6	80·7	32·4	113·6	110.7	163·2	102·9	100·0	4·8	..	12·1
Flowering duration.	90	95	90	94	91	91	89	..	..	..	..
Conclusion	297	275	291	Co. 13	257	263	265				

TABLE XXIV (*c*)—*Comparative yield trial of Co.* 13 *Mutants* (*Ceresan treated* (*Second crop*).

Field No.—B. 4 c.
Sown on—13th January 1954.
Transplanted on—16th February 1954.
Harvested on—4th May 1954.

Size of plot—4′ × 20′.
Lay out—Randomised blocks.
Replications—8 times.

Particulars.	Cultures and strain tested. Co 13 4 gms.	Co 13 5 gms.	Co13 control.	General Mean.	Standard error.	'z' test satisfied or not (P—0.05)	Cretical Difference (P—0·05)
Acre yield of grain in lb. ..	1,466	2,388	1,700	1,851	71·39	Yes.	215.9
Percentage on standard ..	64·5	151·3	100·0	106·4	4·2	,,	12·7
Percentage on general mean ..	268·3	437·0	311·2	100·0	3·86	,,	11·66
Flowering duration	83	82	81	..	..	..	..
Conclusion	Co. 13 (5 gms.)>Co. 13 (Control)>Co. 13 (4 gms.).						

(iii) *Acenaphthene.*—One mutant in Co. 13 has been secured by treating with acenaphthene which was tested for yield against Co. 10 since it was found to be of Co. 10 duration. The yield trial was conducted both in the main crop and Navarai seasons. The mutant gave 7 per cent increased yield over the control and was of the same duration as Co. 10. The data are presented in Table XXV.

TABLE XXV—*Comparative yield trial of Co. 13 Mutant and Co. 10 Control.*

Field No.—B. 4c.
Sown on—11th July 1953.
Planted on—8th August 1953.
Harvested on—16th November 1953.

Size of plot—4′ × 10′.
Lay out—Randomised blocks.
Replications—12 times.

Particulars.	Co. 13 Mutant.	Co. 10 control.	General Mean.	Standard error.	'Z' test satisfied or not (P—0.05)
Acre yield of grain in lb.	2,358	2.202	2,280	45·6	No.
Percentage on standard	107·1	100	103·6	2·07	..
Percentage on general mean	103·4	96·56	100	47·2	..
Flowering duration	84	84	..	..	..

Six homozygous selections from culture 6753, 22 from culture 6761 and two pure breeding cultures isolated from G.E.B. 24, similarly treated with acenaphene were under yield trial with G.E.B. 24 as control. All these cultures were 4 to 7 days longer in duration than G.E.B. 24. Two selections from 6753 and 12 selections from 6761 gave increased yields over the standard, ranging from 2 to 22 per cent. The data are furnished in Tables XXVI (*a*), (*b*) and (*c*).

TABLE XXVI (*a*)—*Comparative yield trial of GEB. 24 Mutant (Acenaphthene treated) (First crop) Series I.*

Field number—B. 5b.
Sown on—11th July 1953.
Planted on—9th August 1953.
Harvested on—28th December 1953.

Size of plot—3′ × 10′
Lay out—Randomised blocks.
Replications—4 times.

Particulars.	6753 1/3	6753 1/4	6753 2/4	6753 2/5	6753 4/2	6753 4/6	6761 1/1
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Acre yield of grain in lb. ..	3,702	3,600	4,517	4,239	2,601	3,129	3,989
Percentage on standard ..	116·6	113·4	142·4	133·6	81·93	98·56	125·7
Percentage on general mean ..	100·7	97·9	122·9	115·3	70·7	85·5	108·6
Flowering duration	117	109	117	116	117	116	116

..	6761 1/3	GEB 24 Std.	General mean.	Standard error.	'Z' test statisfied or not (P=0·05).	Critical difference (P=0·05).
	(9)	(10)	(11)	(12)	(13)	(14)
Acre yield of grain in lb. ..	4,138	3,175	3,677	191·5	Yes.	558.5
Percentage on standard ..	130·3	100·0	115·8	6·03	,,	17·59
Percentage on general mean ..	112·5	86·4	100·0	5·2	,,	15·17
Flowering duration	117	107	..	..	..	..

Conclusion—6753 2/4, 6753 2/5, 6761 1/3, 6761 1/1, 6753 1/3, 6753 1/4, GEB 24, 6753 4/6

TABLE XXVI (*b*)—*Comparative yield trial of GEB. 24 Mutants (Acenaphthene treated) (First crop) Series II.*

Field number—B. 5b.
Sown on—11th July 1953.
Planted on—9th August 1953.
Harvested on—16th December 1953.

Size of plot—3′ × 10′
Lay out—Randomised blocks.
Replications—4 times.

Cultures and strain tested.

Particulars.	6761 11/5/5	6761 11/5/2	6761 10/4/6	6761 10/4/5	6761 10/2/2	6761 10/2/1	6751 5/8	6761 5/7	GEB. 24 Standard.	General Mean.	Standard error.	'Z' test satisfied or not (P=0·05).
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Acre yield of grain in lb.	3,819	3,616	3,481	3,663	3,624	3,712	3,629	3,851	3,366	3,640	154·8	No.
Percentage on standard.	113·4	107·4	103·5	108·8	107·7	110·4	107·9	114·5	100·0	108·1	4·6	..
Percentage on general mean.	104·9	99·3	95·6	100·6	99·6	102·0	99·7	105·8	92·4	100.0	4·25	..
Flowerins duration.	114	115	116	115	115	116	116	116	109	..		..

TABLE XXVI (c)—*Comparative yield trial of GEB. 24 Mutants (Acenaphthene treated) (First crop) Series III.*

Field number—B. 5a.
Sown on—11th July 1953.
Transplanted on—9th August 1953.
Harvested on—15th December 1953.

Plot Size—3′ × 10′
Lay out—Randomised blocks.
Replications—4 times.

Particulars.	Cultures and strain. 6761 11/5/6	6761 11/6/1	6761 18/4/1	6761 11/6/2	6761 18/4/6	6761 15/1/2	6761 18/5/2	6761 15/1/3
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Acre yield of grain in lb.	4,285	3,815	3,861	4,332	4,184	4,267	4,295	4,239
Percentage on standard.	111·8	99·5	100·7	113·0	109·2	111·1	112·1	110·6
Percentage on general mean.	103·1	91·7	92·8	104·2	100·6	102·6	103·3	102·0

—	6761 18/5/4	6761 15/2/3	6761 18/5/5	6761 15/2/4	GEB. 24 standard.	General mean.	Standard error.	'Z' test satisfied or not (P=0·05).
	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
Acre yield of grain in lb.	4,323	4,092	4,517	4,009	3,832	4,150	160·9	No.
Percentage on standard.	112·8	106·8	117·9	104·6	100·0	108·3	4·2	..
Percentage on general mean.	104·0	89·4	108·7	96·4	92·2	100·0	3·88	..

(iv) *Co. 25 treated with eight different chemicals.*—Seeds of the most popular blast resistant strain Co 25 were treated at Indore, with eight different chemicals and the treated samples were compared with Co 25 for yield as well as other economic characters. Seven out of the eight treatments gave slightly higher yield over Co 25 but the differences were not statistically significant. The data are presented in Table XXVII.

TABLE XXVII—*Comparative yield trial of 25 (Treated with eight different chemicals).*

Field number—A. 6c.
Sown on—5th September 1953.
Transplanted on—3rd November 1953.
Harvested on—16th March 1954.

Size of plot—3′ × 20′
Lay out—Randomised blocks.
Replications—4 times.

Particulars.	Co 25 1	Co 25 2	Co 25 3	Co 25 4	Co 25 5	Co 25 6	Co 25 7	Co 25 8	Co. 25 Standard.	General mean.	Standard error.	'Z' test satisfied or not (P=0·05).
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Acre yield of grain in lb.	3,597	3,250	3,627	3,367	3,727	3,798	3,523	3,637	3,451	3,586	151·8	No.
Percentage on standard.	104·3	98·85	105·1	106·3	108·0	107·6	102·1	103·0	100·0	104·0	4·4	..
Percentage on general mean.	109·9	91·09	101·6	102·8	104·4	104·0	98·74	99·61	96·74	100·0	1·23	..
Flowering duration.	158	158	158	158	158	158	158	158	158	..	..	..

17. *Type collections.*—The maintenance of a very large number of available pure lines totalling 2322 collected from foreign countries as well as from different parts in the Indian Union is being continued. They are being studied carefully for desirable characters so that they can be utilised in hybridisation work. The collection so far made contains the following:

General collections	2241
Wild species	12
Identification lots included under type ..	57
New collections during the season ..	10
Barren sterile lots	2
	2322

18. *Other crops*—(*i*) *Green manure Crops*—(*a*) *Sunnhemp.*—An area or 40·8 cents in A and H blocks was under this crop. A total quantity of 5588 lb. of green matter was obtained and applied to the nursery plots. The yield per acre was computed to be 13,696 lb. green matter.

(*b*) *Daincha.*—An area of 23.6 cents was under this crop A total quantity of 5,734 lb. green leaf and 10 lb. of seeds were obtained from this crop. The yield of green leaf per acre was 24,300 lb.

(*c*) *Pillipesara.*—Pillipesara was raised both as a pure crop as well as mixed with Cumbu.

Pure crop	1·02	acres
Mixed with cumbu ..	3·24	acres
Mixed with Sesbania ..	4·47	acres

The seed rate adopted was 25 lb. per acre for pure crop and 10 lb. per acre for the mixture. A total quantity of 19,436 lb. of green matter was obtained and applied to the fields.

(*d*) *Sesbania speciosa.*—Sesbania was raised pure or mixed with Pillipesara in an area of 7·85 acres. A total quantity of 94,727 lb. of green matter has been obtained. A total quantity of 856 lb. of seed was collected from the Sesbania plants grown along the margins of fields. Six hundred and thirty six pounds of the seed was used for farm sowing and 103 lb. distributed by sale or transfer. Forty nine thousand seedlings were distributed to the district staff during the year.

(*e*) *Gliricidia maculata.*—A total quantity of 20,719 lb. of green leaf was obtained by pruning the plants. Twenty-one thousand six hundred and sixty-six seedlings and 11,202 cuttings were obtained. These were either used in the farm for further propagation or distributed to the district staff. Out of a total quantity of 132 lb. of seeds collected, 63 lb. were distributed in the districts.

(*f*) *Miscellaneous leaves.*—A total quantity of 7556 lb. of green leaves from other sources of vegetation on the farm was also obtained and utilised.

(*g*) *Indigofera teysmanii.*—Thirteen and a half ounces of seeds were collected from the two existing well grown plants and issued for raising seedlings.

(ii) *Fruits* —(*a*) *Grape vine.*—The two plants were pruned properly in December 1953 and in June 1954. Fourteen rooted cuttings were sold. There was no setting of fruits.

(*b*) *Mango.*—The mango trees (two in Peter, one in Mulgoa, one in Neelam and one in Kudhadad and one pickle variety) were all healthy. The bearing during the season was very poor. Altogether 257 lb. of Peter, 12 lb. of Mulgoa and 357 lb. of the pickle veriety were all the yield of fruits obtained this year. Total revenue realised by sale of the produce was Rs. 55-8-0.

Five thousand seven hundred and eighty two mango stones were sown and 360 seedlings were potted. Fifty four grafts were made and 25 of them have so far been successfully separated.

(*c*) *Papaya*—Total quantity of 1,183 lb. of pulp was sold, 105 seedlings were planted in the farm. Thirty pounds and ten ounces of seeds were collected.

(*d*) *Custard apple.*—Nineteen pounds of fruits were collected and sold.

(*e*) *Malta Lemon.*—Twenty seven and a half pounds of fruits were harvested from the plants behind the farm and sold. The young plants in front of the cage are coming up satisfactorily.

(iii) *Vegetables.*—(*a*) *Dolichos lab lab.*—The crop raised in D. H. and L blocks yielded 19 lb. 14 oz. of seed out of which 6½ oz. of seed was distributed.

(*b*) *Coccinea indica.*—The vines were pruned twice and they yielded 73½ lb. of vegetable. Seven rooted cuttings were sold.

(*c*) *Roselle* (*H. Subdariffa*).—The seedlings were transplated on 30th August 1953 in an area of three cents with a spacing of 3′ by 1½′. The crop was removed on 4th January 1954. Nine pounds of seeds were collected.

(*d*) *Brinjal.*—The variety okhla was raised in 2½ cents Two pounds and thirteen ounces of seeds were collected of which five and a half ounces were sold.

(*e*) *Tomato.*—The crop was raised in eight cents. One hundred and forty-two pounds of pulp was sold and 9¾ oz. of seed was collected.

(iv) *Fodder.*—(*a*) *Hybrid cumbu grass.*—Five hundred pounds of green grass was obtained from the crop behind the office building.

(*b*) *Co* 11 *fodder cholam.*—Co. 11 fodder cholam was raised in an area of 19·3 cents. A total quantity of 3,745 lb. of green fodder was obtained and fed to cattle.

(v) *Ornamental plants.*—One thousand one hundred and sixty six roses and 82½ ounces of Jasmine flowers were collected and sold. Two rooted cuttings of the shoe-flower plant were also sold.

(vi) *Potato.*—The variety President was grown in an area of 3·5 cents between November and March: The crop suffered from virus disease and had to be removed. The yield obtained was only 30 lb.

(vii) *Crops in rice follows.*—(a) *Cotton* : The variety P. 216 F was grown in an area of 55·1 cents. The sowing was done on 28th Februay 1954. Ammonium sulphate was applied at 200 lb. per acre in two doses. The crop yielded 309 lb. of kapas and 2,380 lb. of stalks per plot and the estimated yield of kapas per acre was 562 lb. and stalks 4,327 lb.

(*b*) *Groundnut* : TMV 2 groundnut was sown in an area of 61·2 cents on 28th February 1954. The crop grew satisfactorily and yielded 1,062 lb. of pods and 6,374 lb. of haulms per acre.

(viii) *Bastard sago.*—Twelve seedlings received from Agricultural Research Station, Taliparamba were planted indifferent places in the farm on 23rd November 1953. Ten seedlings have established and are coming up well.

(ix) *Pepper cuttings.*—Twenty pepper cuttings received from Agricultural Research Station, Taliparamba were planted in the farm on 19th December 1953. Sixteen cuttings have established. The growth has been very slow so far.

(*x*) *Babul.*—Thirty pounds of babul seeds were collected and distributed.

(xi) *Kapok.*—Five hundred and nine seedlings were distributed to the district staff. Hundred seedlings were planted on the farm.

(xii) *Agathi.*—Twenty agathi seedlings were planted on the farm.

19. *Other organic manures.*—(i) *Farm yard manure*: A total quantity of 1,28,648 lb. (57-3/7 tons) of cattle manure was collected during the year.

(ii) *Compost* : A total quantity of 26,879 lb. (12 tons) of compost was produced.

K. RAMASWAMY,
Paddy Specialist-in-charge.

OFFICE OF THE PADDY SPECIALIST,
LAWLEY ROAD P. O., COIMBATORE,
2nd September 1954.

APPENDIX I.

FINANCIAL STATEMENT OF THE PADDY BREEDING STATION, COIMBATORE FOR THE YEAR 1953–54.

A. Expenditure.

40 G. Agriculture—Experiments and Research (i) Excluding post war reconstruction—A. Research Institute.

	RS.	A.	P.
(1) *Pay and Allowances*—			
Pay of Officers	6,374	7	0
Pay of establishment (permanent)	21,756	6	0
Pay of establishment (temporary)	54	0	0
Dearness allowance	8,712	11	0
Travelling allowance	1,261	8	0
House rent allowance	2,685	14	0
(2) *Contingencies*—			
Petty construction and repairs	90	0	0
Apparatus and materials	449	11	0
Dead stock	59	1	6
Repairs and upkeep	2,598	12	0
Maintenance of cattle	1,950	12	9
Mazdoor labour	9,338	1	6
Miscellaneous cultivation expenses	872	8	6
Other miscellaneous charges	1,428	4	9
Dearness allowance to menials	216	0	0
Dearness allowance to mazdoors	2,222	10	0
Other contingencies	1,114	7	6
Total	61,185	3	6

B. Receipts.

XXIX Agriculture—Agricultural Receipts—			
Agricultural stations	2,693	14	10
Miscellaneous	532	2	0
XIII. Other taxes and duties, sales tax	3	3	0
Total	3,220	3	10
Value of stock transferred	2,865	4	3
Grand total	6,085	8	1

APPENDIX II.

SEED DISTRIBUTION STATEMENT—1953-54.

Seeds and seedlings.	Quantity.		
	Lb.	Oz.	Nos.
Paddy seed	17,027	12	..
Cumbu	911	0	..
Ragi	524	0	..
Tenai	255	0	..
Gliricidia seed	63	0	..
Sesbania seed	103	0	..
Sunnhemp seed	100	0	..
Agathi seed	9	0	..
Brinjal seed	3	5½	..
Tomato seed	0	10	..
Lab lab	0	6½	..
Papaya	0	5	..
Groundnut pods	564	0	..
P. 216 F cotton kapas	48	0	..
P. 23 F cotton kapas	530	0	..
Malta lemon layers	..	..	3
Grape vine cuttings	..	..	14
Indian goosberry seedlings	..	..	15
Curry leaf seedlings	..	..	29
Tamarind seedlings	..	..	75
Coccinea rooted cuttings	..	..	7
Gliricidia seedlings	..	..	17,475
Gliricidia cuttings	..	..	9,487
Sesbania seedlings	..	..	49,000

ANNUAL REPORT OF THE POMOLOGICAL STATION, COONOOR (THE NILGIRIS), FOR THE FASLI YEAR 1953–54 (FASLI 1363).

Season and rainfall.—The summary of the weekly rainfall distribution for the year under report is presented in Table I.

TABLE I.—*Statement of Rainfall of Pomological Station, Coonoor for the year* 1953–54.

Month.	Week.	1953–54.		1952–53.		Average for the past 10 years.		Average for the past 42 years	
		Quantity in inches.	Number of rainy days.	Quantity in inches.	Number of rainy days.	Quantity in inches.	Number of rainy days.	Quantity in inches.	Number of rainy days
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
				South-west monsoon.					
June	7–13	0·29	1	0·03	1	0·61	2·31	0·84	2·45
	14–20	0·15	..	2·06	3	0·79	1·81	0·68	1·88
	21–27	1·80	5	0·35	1	0·52	2·14	0·54	2·49
June to July ..	28–4	0·68	4	0·20	1	0·28	1·89	0·34	2·49
	5–11	1·63	4	0·27	2	0·86	3·44	0·77	3·25
	12–18	1·10	2	1·00	2	0·76	3·68	0·81	3·41
	19–25	2·23	4	..	..	0·49	2·82	0·51	3·12
July to August ..	26– 1	1·80	5	..	..	0·54	2·18	0·58	2·40
	2– 8	0·14	1	0·16	1	1·08	2·77	1·19	3·06
	9–15	0·22	1	0·09	1	0·93	3·30	1·02	3·22
	16–22	0·64	3	..	..	1·19	1·58	0·41	2·12
	23–29	1·84	4	1·85	5	1·04	2·61	0·83	2·44
August to September.	30– 5	0·20	2	0·44	2	0·50	2·27	0·53	2·45
	6–12	1·76	3	0·03	1	0·55	2·45	0·57	2·66
	13–19	1·00	2	..	..	0·81	2·76	0·75	2·78
	20–26	0·44	2	0·55	4	1·27	3·13	0·98	2·65
Total ..		15·83	43	7·03	24	12·22	41·14	11·35	42·87
				North-east monsoon.					
September to October.	27– 3	0·56	4	1·38	4	1·23	3·08	1·35	3·61
	4–10	1·99	5	1·82	5	1·25	3·28	1·43	3·43
	11–17	4·59	5	1·54	4	3·01	4·42	2·81	4·78
	18–24	5·48	6	0·03	1	2·49	3·54	3·11	4·30
	25–31	1·10	4	0·15	1	1·84	2·94	3·71	3·35
November	1– 7	..	..	0·46	2	2·65	3·25	3·79	3·97
	8–14	0·61	2	..	..	4·78	4·78	3·10	2·69
	15–21	1·33	2	..	..	3·84	4·17	2·35	2·41
	22–28	1·27	3	1·17	2	3·00	3·09	1·98	3·05
November to December.	29– 5	0·05	..	14·14	5	4·63	3·45	2·56	2·93
	6–12	..	..	2·07	6	0·32	1·17	1·54	1·78
	13–19	0·90	2	5·02	2	2·11	2·42	1·54	2·35
	20–26	0·17	1	0·15	2	0·82	0·72	0·81	1·55
December to January.	27– 3	1·90	2	..	..	0·52	0·95	0·88	1·56
	4–10	5·21	4	1·10	2	0·24	0·99	1·50	1·63
	11–17	3·70	3	0·11	2	0·54	0·69	0·83	0·98
	18–24	..	..	4·70	3	1·12	0·80	1·41	0·74
	25–31	..	..	0·46	1	0·76	1·10	1·17	1·20
Total ..		28·86	43	34·30	42	35·15	44·85	35·87	46·31
				Hot-weather.					
February	1– 7	..	..	..	..	0·71	0·71	1·04	1·35
	8–14	..	..	..	..	0·24	0·39	0·58	1·01
	15–21	..	..	0·03	1	0·48	0·56	0·29	0·08
	22–28 or 29	1·70	1	4·67	3	1·76	1·56	0·85	0·82
March	1– 7	..	..	5·25	2	1·60	0·61	0·42	0·82
	8–14	0·68	2	..	..	0·09	0·09	0·30	0·80
	15–21	9·06	5	..	..	0·26	0·77	0·55	1·02
	22–28	0·03	..	0·95	1	0·70	1·20	0·60	1·33
March to April ..	29– 4	0·30	1	1·55	2	0·71	1·62	0·98	1·41
	5–11	..	..	0·79	3	2·03	2·53	1·40	2·31
	12–18	0·11	..	0·82	2	1·94	3·12	1·81	1·52
	19–25	2·98	2	1·97	7	1·06	2·10	0·87	1·97
April to May ..	26– 2	0·08	..	0·39	2	0·87	1·78	1·02	2·21
	3– 9	0·79	2	0·70	1	0·84	1·28	1·20	1·34
	10–16	1·77	4	..	..	0·70	1·51	0·92	2·05
	17–23	1·41	4	2·17	3	0·67	1·84	0·96	2·85
	24–30	0·52	1	0·16	1	0·82	1·57	0·91	2·46
May to June ..	31– 6	0·29	2	2·04	3	1·23	2·05	0·95	2·18
Total ..		19·72	24	21·49	31	16·71	25·29	15·65	27·53
Grand total ..		64·41	110	62·82	97	64·08	11·28	62·87	116·71

The total rainfall during the year accounted to 64·41 inches which was received in 110 days.

The rainfall was slightly more than that of the previous year by 2·09 inches and the total number of rainy days also was more by 13 days. The distribution of rain was rather uneven. However, a precipitation of 15·83 inches received during the south-west monsoon period as compared to 7·03 inches in the previous year should be considered as very satisfactory. This was also better than the averages for the past ten-year period and 42 year period. This improvement in south-west monsoon showers was very conducive for the satisfactory vegetative growth of the more important deciduous fruit crops. Heavy showers of 9·06 inches received during the third week of March 1954 which caused severe flower and fruit drops had serious influence especially on plums. Nevertheless the cropping in plums was as good as in the previous year due to heavy flowering which was able to compensate the loss by flower shedding. The rainfall of 28·86 inches received during the north-east monsoon period was comparatively much lower than that of the previous year (34·30 inches). The average for the past ten years was 35·15 inches, and the average for the past 42 years 35·87 inches. The general short delay during the year in breaking dormancy in the several varieties of plum may possibly be attributed to this lower rainfall received during the north-east monsoon period. These rains also proved sufficient in soaking down the manurial ingredients in the soil in most of the crops at the station which received their annual manurial applications during the north-west monsoon season.

The maximum temperature ranged between 52°F and 80°F and the minimum between 34°F and 69°F while the humidity fluctuated between 16 and 100 per cent.

I. Apple.

A. *Varietal performance.*—The fruiting performance of the more important commercial varieties was satisfactory during the year recording a general orchard/ average of 29 lb. per tree as against 16 lb. during the previous year. The increased yield obtained during the year may perhaps be attributed to the influence of the dormant sprays of Sandolin ' A ' given to the trees. The two apple varieties Winterstein and Rome Beauty which form the two varieties in full bearing age, showed further improvement in their cropping, recording a mean tree yield of 108 lb. and 19 lb. respectively as against 90 lb. and 16 lb. during the previous year. Out of the nine introductions brought under trial in 1948 the Mixed American variety successfully matured a small crop for the third season since its planting. Delicious, another variety obtained in 1947 from Chaubattia (Uttar Pradesh State) and Braddocks' Non-Pariel, a local selection bore a few fruits for the third time since planting. The varieties Paragon, Blenheim Orange Pippin, Unnamed and a cooking variety also matured a few fruits each for the first time since their planting in 1948. Among these, the Mixed American, Braddock's Non-Pariel and Blenheim Orange Pippin proved to be good dessert varieties. A description of these varieties is furnished in the Appendix VI.

Out of the twenty varieties introduced from Auckland (New Zealand) in 1951 and 1952 thirteen varieties, viz., Pigeonette, Laxton's Epicure, Giant Geniton, Ellison's Orange, Cornish Aromatic, Parlin's Beauty, Kidd's Orange Red, Monarch, Willie Sharp, Dunn's Favourite, Roke Wood, Laxton's Exquisite and Ballarat established satisfactorily. In initial growth Parlin's Beauty led the rest followed by Pigeonette, Giant Genitan, Cornish Aromatic, Kidd's Orange Red, Willie Sharp and Laxton's Exquisite in order. The other varieties were comparatively poor in growth. Out of the five hybrid types obtained from the Fruit Research Station, Rehovet (Israel) in March 1953, grafts raised of types I, II, III and V have established successfully while the grafts of type IV failed to survive. Grafts of the variety Rome Red selected from Kodaneri (Kotagiri) in 1953 were growing satisfactorily.

B. *Nursery investigations.*—A summary of the mean sucker production in Crab and Merton stocks during the year under report is presented in Table II below :—

TABLE II.—*Apple—Rootstocks.*

Multiplication of stocks (Mother plants layered) in September 1946.

Rootstock.	Number of mother plants set out.	Mean number of suckers produced per mother plant (from 1st July 1953 to 30th June 1954).	Mean number of rooted suckers produced per mother plant.
(1)	(2)	(3)	(4)
Crab	70	11·1	3·7
Merton 778	57	10·6	4·6
Merton 779	30	8·9	3·7
Merton 789	6	5·3	1·2
Merton 793	4	2·5	1·0

The multiplication of the Merton and Crab stocks was generally satisfactory. The mean sucker production and the mean number of rooted suckers in Crab, M. 778 and M. 779 was much better than in the previous year, while the suckering in M. 789 and M. 793 was comparatively poor. M. 778 maintained its lead with a mean number 4·6 rooted suckers followed by 3·7 in each of Crab and M. 779, while M. 789 and M. 793 recorded only a mean of 1·2 and 1·0 rooted suckers respectively. The order in which the different rootstocks developed the rooted suckers, was in conformity with that of the previous data.

The Merton stocks continued to be free from the incidence of the woolly aphis pest in the layering beds.

Merton-Malling stocks.—Twelve rooted plants in each of four Marton-Malling stocks, viz., M.M. 108, 110, 112 and 113 from East Malling Research Station, Kent, England, were introduced and planted on 8th April 1954. The plants, however, were received in a completely dried up condition owing to long delay in shipment. None of them therefore survived.

C. *Orchard investigations*—(1) *Rootstock trial.*—The annual yield growth measurements of apple Rome Beauty on five rootstocks are summarised below :—

TABLE III.—*Apple—Rootstock trial.*

Rome Beauty—Growth and yield records of the trees on five rootstocks.

Rootstock.	Mean girth of trees in 1945–46 (in cm.).	Mean girth of trees in 1953–54 (cm.).	Difference between columns (2) and (3).	Mean percentage of increase in girth of trees between 1945–54.	Cumulative mean number of fruits borne during the past five years.
(1)	(2)	(3)	(4)	(5)	(6)
Merton 778	5·6	27·9	22·4	409·9	25·7
Merton 779	5·1	26·1	21·0	411·2	39·7
Merton 789	6·1	25·9	19·8	323·5	22·2
Merton 793	5·7	26·0	20·3	352·6	27·1
Crab	6·0	24·7	18·7	312·7	31·7

Merton 779 and 778 once again established their superiority over the other stocks in respect of tree vigour recording the mean increment of 411·2 and 409·9 per cent respectively. Considering the mean cumulative yield for the past five years it was found that M. 779 gave the maximum yield of 39·7 fruits closely followed by Crab with 31·9 fruits per tree. The other stocks, viz., M. 793, M. 778 and M. 789 recorded a mean cumulative yield of 27·1, 25·7 and 22·2 fruits respectively.

(2) *Irrigation trial.*—The progress of the newly laid trial with garfts of Rome Beauty raised on Merton 779 was again unsatisfactory as only 13 out of 24 grafts ultimately established. The growth of the surviving plants was also slow.

(3) *Trial to break the dormancy of apple buds.*—The trial was continued for the seventh year in succession using three per cent linseed oil emulsion on Winterstein trees for breaking dormancy. The application of Sandolin 'A', a proprietory product containing dinitrocresol was also continued for the third year in succession to asses the relative potentiality of the two substances in breaking dormancy and promoting yields. The following data represents the data recorded :—

TABLE V.—*Apple Winterstein—Trial with a dormant spray of 3 per cent linseed oil emulsion and 0·5 per cent Sandolin 'A'.*

Number of new flushes and fruits per tree and dates of blossoming.

Treatment.	Number of shoots treated.	Date of spraying.	Date of breaking dormancy.	Number of new flushes.	Number of fruits.	Number for 100 shoots.	Increase in yield over control.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1 Control ..	325	16th January 1954.	8th March 1954.	324	185	57·0	..
2 Linseed oil ..	480	Do.	25th February 1954.	524	460	97·5	40·5
3 Sandolin, 'A'.	210	Do.	15th February 1954.	604	220	104·8	47·8

The results indicated that both the trees that received a dormant spray of linseed oil and Sandolin 'A' broke dormancy earlier by 11 days and 21 days respectively. Sandolin 'A' and linseed oil treated trees gave a mean of 47·8 and 40·5 more fruits respectively over the control. The data also confirms the findings of the past years that Sandolin 'A' is better than the other treatments having given a mean of 47·8 fruits and 7·3 fruits more than the control and linseed oil treated trees respectively.

(4) *Cordon training.*—The Irish Peach and Rome Beauty cordons recorded a mean yield of ten and two fruits respectively during the year.

II. PLUM.

A. *Varietal performance.*—The yield performance of the several established varieties was continued to be recorded. The overall orchard average of this fruit worked out to 33 lb. as against 32 lb. recorded during the previous year. The varieties Alu Bokhara and Rubio performed much better during the year with their mean yields of 50 lb. and 39 lb. as against 36 lb. and 30 lb. respectively in the previous year. The variety Satsuma seedling recorded a low yield of 41 lb. during the year as against 54 lb. of the previous year. The early varieties Rubio, Satsuma seedling and Alu Bokhara as a group recorded an average yield of 43 lb. which was slightly higher than the previous year's average. The usually shy bearing varieties like Shiro, Abundance and Gaviota showed better yield performance during the year recording an overall average of 12½ lb. per tree as against 10½ lb. of the previous year. Of these, Gaviota led with an average of 15 lb. per tree. Czar was the lowest yielder of the varieties in collection at the station recording an average of 3 lb. per tree during the year.

The cropping in plums during the year was as good as the previous year in general, the season being favourable with fairly good rainfall received during the pre-blossoming period without very heavy showers. The two new varieties, viz., Blue Damson and Reine Claude introduced from United States of America in 1950 were showing very poor establishment with no extension growth. Two more varieties Doris and Purple King introduced from Auckland (New Zealand) in 1952 were propagated successfully. The budded plants of the two varieties were set out in the field on 28th August 1953 and had established satisfactorily.

B. *Orchard investigations*—(1) *Plum—Orchard performance on (a) Common stock and (b) Prunus divericata stock—(a) Common peach stock.*—The annual growth

increments and yields of the trees of seven plum varieties on peach stock planted in October 1946 are presented in Table IV.

TABLE IV.—*Plum—Growth performance and yield of seven plum trees.*

(Measurements recorded in June 1954.)

Scion varieties.	Mean growth increments in scion girth (cm.).	Mean growth increments in stock girth (cm	Mean Yield.
(1)	(2)	(3)	(4)
Shiro	1·3	1·	1·8
Hale	1·4	2·7	5·6
Abundance	1·9	2·3	2·5
Alu Bokhara	1·4	1·3	29·0
Rubio	1·3	0·9	16·0
Gaviota	1·1	1·0	16·5
Czar	1·0	1·1	..

The best scion growth increment was made by Alu Bokhara followed by Hale, while the least was recorded by Czar. The largest stock growth measurement was made by Hale. Alu Bokhara gave the maximum fruit set of 29 lb. followed by Gaviota (16·5 lb.) and Rubio (16 lb.). There was no yield in the Czar variety.

(*b*) *Prunus divericata stock.*—The growth and yield performance of three plum varieties on *Prunus divericata* stock is presented below in Table V.

TABLE V.—*Plum—Growth performance and yield of three varieties on Prunus divericat a stock.*

(Measurments recorded in June 1954.)

Scion variety.	Stock girth in cm.	Scion girth in cm.	Height in cm.	Yield.
(1)	(2)	(3)	(4)	(5)
				LB.
Hale	26·0	27·2	251·5	2·0
Rubio	20·8	19·1	133·4	1·2
Combination	18·4	22·3	113·0	0·8

As all the three varieties failed to register appreciable growth of stock and scion as well as to give satisfactory yield, it brings out again the unsuitability of this rootstock for the plum varieties tested under indentical conditions.

(2) *Rootstock trial—Performance of Czar and Gaviota on Plum seedling stocks and common peach.*—The growth measurements during the year in each of the stionic combinations in this trial are set out in Table VI.

TABLE VI.—*Plum—Growth performance of Czar and Gaviota on plum seedling stocks and on common peach.*

Scion variety	Rootstock.	Mean measurements in		
		Stock girth.	Scion girth.	Diffeence between stock, and scion
(1)	(2)	(3)	(4)	(5)
Gaviota	Alu Bokhara	14·6	16·5	1·9
Do.	Rubio	15·8	17·3	1·5
Do.	Satsuma Seedling	18·4	17·9	0·5
Do.	Hale	17·4	17·8	0·4
Do.	Common peach	26·0	29·0	3·0
Czar	Alu Bokhara	13·1	11·7	1·4
Do.	Rubio	10·9	10·1	0·8
Do.	Common peach	21·3	18·5	2·8

In both the varieties the plants on common peach stock made the maximum growth in stock as well as scion girth. The Gaviota scion registered the least stoch scion growth with Alu Bokhara stock while Czar registered similar performance with Rubio stock. Regarding Czar scion, the growth of stock outstripped that of scion

in the case of common peach and Alu Bokhara stocks whereas the scion growth outstripped stock growth in the case of Rubio stock. With Gaviota scion the stock growth outstripped that of scion in all cases of stocks except Rubio where alone the scion growth outstripped the stock growth. The above observations indicate that in none of the combinations there is perfect stock scion combination the incompatibility being maximum in the case of common peach stock with both Gaviota and Czar scions. As only stray fruit set was recorded in all the trees it is premature to pass any remarks on the yield of the scions on different stocks.

(3) *Top-working trials.*—The beneficial effects of providing pollinisers to shy bearing trees like Shiro and Abundance were confirmed during the year under review. The trees of Shiro in the vicinity of top-worked Shiro trees with Hale scion recorded a mean yield of 119·5 fruits as against 59·8 fruits recorded on those situated away from it. Similarly in a row of Shiro and Abundance trees, the branches nearer Kotagiri plum bore a mean crop of 74 fruits and 73·5 fruits as against 19 and 33·7 fruits respectively on those away from it. The shoots of Kotagiri plum top-worked to trees of Shiro and Abundance in December 1950 were observed to have made an average extension growth of 28·5 inches.

III. Pear.

A. *Varietal performance.*—The yield of the variety Kieffer the only variety representing trees of full bearing age at the station was quite satisfactory recording an average yield of 66 lb. per tree as against 40 lb. during the previous year. The fruit set during the year under report was estimated to be over 60 lb. per tree. None of the other varieties brought under trial in 1946 and 1949, viz., New Pear, Jargonelle, Kalhatti, Beurre Hardy and Marie Louise fruited during the year. On considerations of tree growth, New Pear continued to be outstanding closely followed in order by Jargonelle, Marie Louise, Kalhatti, and Beurre Hardy during the year. The four selections from Kotagiri brought under trial in 1949 were yet to attain bearing age. Of these, selection No. IV was generally superior to the rest in initial tree growth. Graft sticks of a new variety, viz., Wintercole were obtained from Auckland (New Zealand) and propagated successfully on stock pear during October 1952. Two grafts of these were planted out in Field No. IV on 28th August 1953. These have satisfactorily established. Graft sticks of a selection from Kodaikanal were also obtained and propagated successfully on stock pear in January 1952. The grafts thereof were awaiting planting in the field.

B. *Orchard investigations*—(1) *Growth performance of four pear varieties (Kieffer, Jargonelle, William and Beurre Giffard.)*—The growth measurements of four pear varieties planted in 1942 are set out in Table VII.

Table VII.—*Pear—Mean growth measurements of four pear varieties on stock pear.*
(Measurements recorded in June 1954.)

Name of variety. (1)	Stock girth. (2)	Scion girth. (3)
	CM.	CM.
Kieffer	35·5	32·2
Jargonelle	30·6	37·1
William	30·3	35·8
Beurre Giffard	28·6	30·6

Jargonelle followed closely by William recorded the maximum scion girth while Beurre Giffard was the least in this respect. Of the four varieties, Kieffer came to bearing during 1951 season nearly nine years after planting while Jargonelle put forth stray blossom during the year under report nearly twelve years after planting. The other two varieties were yet to flower.

(2) *Top-working trial.*—The China pear trees which were found to be unthrifty and top-worked with Kieffer scions in 1944 continued to show good growth performance. The mean yield of these trees worked out to 16 fruits per tree with a maximum of 20 fruits.

IV. Peach.

A. *Varietal performance.*—The cropping in peaches during the year was again below normal. The variety Killikrankie recorded a mean yield of 5 lb. per tree. The cropping in Shah pasand, Red Shanghai and Shangahi Seedling worked out to 12 lb., 7 lb. and 6 lb. per tree respectively. The low yield in Killikrankie is attributed to the heavy rains received during the third week of March 1954 when the trees suffered heavy fruit shedding.

B. *Orchard investigations—Peach age group trail.*—The growth measurements recorded in two varieties in this trial on three age groups of stocks, viz., eight, twenty and thirty-two months of age are presented in Table VIII.

Table VIII.—*Mean growth increments of Red Shanghai and Shanghai Seedling on differently aged rootstocks since planting.*

(Measurements recorded in June 1954.)

Treatments.	Mean growth increment in Red Shanghai, Shanghai Seedling.			
	Stock girth.	Scion girth.	Stock girth.	Scion girth.
(1)	(2)	(3)	(4)	(
	INCHES.	INCHES.	INCHES.	INCHES.
I Age-group : 8-month old stock.	9·6	9·7	8·9	9·0
II Age-group : 20-month old stock.	8·8	8·4	8·4	8·5
III Age-group : 32-month old stock.	7·3	7·8	7·1	7·6

The above data indicates that the trees on the youngest age group, viz., 8-months made the maximum growth followed by trees on the 20-month old and 32-month old stocks in both the varieties under test. Considering the yield, the Red Shanghai trees on 8-month old stocks developed a mean crop of 24·9 fruits while those on 20 and 32-month old stocks carried 21·0 and 14·1 fruits respectively. Plants of Shanghai Seedling on eight month old stocks matured a mean crop of 15·2 fruits while those on 20-month and 32-month old stocks developed a mean crop of 8·5 and 9·8 fruits respectively. It would appear from the above data that the growth performance of the budlings of the two varieties appears to be inversely proportional to the age of stock used.

V. Persimmon.

A. *Varietal performance.*—The orchard average of the variety Dai Dai Maru worked out to 19 lb. which is below the average yield of 40 lb. recorded during the previous year. The varieties Unnamed and Tenanashi recorded mean yields of 11 lb. and 12 lb. as against 35 lb. and 30 lb. respectively during the previous year. The low yield during the year is attributed to the heavy showers received during the pre-blossoming period which have adversely influenced the cropping in this fruit.

B. (1) *Nursery investigations.*—A trial was initiated in December 1952 with cincturing as a method of propagation using two different wrapping materials, viz., dried banana sheath and Alkathene wrapper. The latter material is a plastic substance said to possess properties of preserving moisture without detriment to the normal transpiration activity of the plant. Twenty selected shoots of mature wood per treatment were operated every month commencing from December 1952 up to the November 1953. From these operations no rooting was seen in any of the cinctured shoots of either treatment. Pronounced callussing, however, was noticed in both the treatments. The operations were therefore discontinued as unsuitable for the propagation of this fruit.

Rootsuckers of the variety Dai Dai Maru planted in 1951 attained bearing age during the year, i.e., within 3½ years of planting and a few grafts were developing tray fruits.

(2) *Rootstock collection and multiplication.*—The seedlings of *Diospyros virginiana* and *Diospyros lotus* planted in the field in June 1951 were progressing well.

VI. Other Fruits.

Cherimoyer—(1) *Varietal performance.*—Clonal and seedling progenies of the following selections were planted in 1949 with a view to determine the most promising of these for the multiplication of plants and their distribution :—

(1) Seedlings of two outstanding local selections.

(2) Seedlings of a reputed type from Kolakombai.

(3) Farm seedlings and grafts.

(4) Grafts on soursop from Ceylon.

(5) Plants raised from seeds obtained from United States of America.

Of these the grafts on soursop introduced from Ceylon were exhibiting very poor growth indicating perhaps incompatibility between the scion and the stock. The grafts ultimately perished in March 1953. Among the rest, the seedlings of the two outstanding local selections recorded very vigorous tree growth with a mean tree height of 396·2 cm. while the seedlings of United States of America selection led in respect of stem girth with the mean of 42·0 cm. The United States of America seedlings, seedlings of two local selections and the Farm graft bore fruits for the second time after planting during the year. An average crop set of 50 fruits per tree was recorded on one of these trees. The Farm seedling came to bearing for the first time during the year with a mean crop set of 9 fruits per tree, while the graft of the Farm selection recorded a crop set of 15 fruits during the year. The Farm seedling gave medium sized fruits of very superior quality while the fruits of the United States of America selection were unusually large in size.

(2) *Grafts* versus *seedlings.*—The mean growth measurements made during the year by the seedlings and grafts in this trial are recorded in Table IX.

Table IX.—*Cherimoyer—Showing mean growth measurement in inches of cherimoyer seedlings and grafts (recorded in June* 1954).

Treatment.	Stock girth inches.	Scion girth inches.	Height in inches.	Spread in inches.
(1)	(2)	(3)	(4)	(5)
Grafts	15·7	13·8	112	124
Seedlings	17·0	—	115	124

On consideration of vegetative growth it was seen that the seedlings put forth better growth in height than the grafts.

Passion fruit.—The purple fruited variety continued to be definitely more promising than the yellow variety recording a mean yield of over 220 fruits per vine during the season.

The single yellow passion fruit seedling introduced from Ceylon continued to make vigorous growth. The vine matured its third crop but yielded only 10 fruits which compare very unfavourably with its performance at Kallar. Rooted cuttings of Giant grenadilla (*Passiflora quadrangularis*) introduced from Anamalais in June 1952, flowered during the season but none of the flowers set fruits. The vegetative growth of these plants was satisfactory.

Apricot.—The variety Frog More Early yielded a mean crop of eight fruits while Red French failed to flower during the year. This crop, therefore, continues to exhibit a poor performance.

Fig.—Kalhatti fig performed very well during the year with a mean crop of 100 fruits as compared to 98 fruits in the previous year. Brown Turkey, two selections from Penukondah and Kodaikanal introduced in 1952 have established but had not attained bearing age.

Miscellaneous fruits—(*a*) *Blackberry and raspberry.*—The fruiting performance of these two berry fruits continued to be rather poor on considerations of yield.

(*b*) *Walnut.*—A mean fruit set of 51 was developing at the time of this report which is far below the mean fruit set of 175 recorded during the previous year.

(*c*) *Japanese chestnut.*—This crop was developing a mean fruit set of 182 fruits as against 62 fruits, of the previous year.

(*d*) *Seville lemon.*—This fruit continued to perform satisfactorily and recorded a mean yield of 75 fruits per tree each fruit weighing $4\frac{3}{4}$ oz. on an average.

New introductions—(*a*) *Cssimiroa edulis.*—(White sapote)—Introduced from United States of America and planted in 1950 had grown to a height of 10 feet but had not flowered yet.

(*b*) *Melons.*—Of the four varieties, viz., Jalbudama, Bathasa, Hingan and Sherbat Anar tried during the previous year, three failed and seeds could be collected only from the variety first mentioned. The seeds were sown during the year and though the plants grew well they failed to blossom.

(*c*) *Tree-tomato.*—Seedlings of the Purple Red and Yellow varieties introduced from Auckland were planted out in the field in December 1953, and were making satisfactory progress.

(*d*) *Olive grafts.*—Two grafts of olive introduced from Italy successfully established in the nursery and were awaiting planting.

(*e*) *Pomegranate.*—A promising selection of pomegranate from Yercaud was introduced and cuttings of these were rooted successfully in the nursery.

VII. Vegetables and other Economic Plants.

Vegetables.—The work on vegetables was confined to growing them as intercrops to augment the revenue at the station as well as for the multiplication of seed. A cucumber variety from Chicago known as Improved Long Green was grown at the station for the third season in succession and an estimated yield of 1,000 lb. per acre was recorded. The variety is suitable for cultivation at Coonoor but had an inferior eating quality.

The Canadian varieties of tomato, viz., Ottawa, Red Jacket and Bounty were found to be promising at the station recording an estimated yield of 27,200 lb. 32,600 lb. and 21,700 lb. per acre respectively. Collection of seeds from these varieties was in progress. The leafy vegetables *Basella alba*, *Basella rubra* and *Talinum* sp. introduced from Coimbatore exhibited a very slow girth and succumbed to the winter conditions. Bringner, a variety of cabbage from Kuly Valley and beet root Grossly's Egg proved promising recording an estimated yield of 16,335 lb. per acre and 7,200 lb. per acre respectively. A promising local selection of cauliflower was made and seeds collected for distribution. The selection yielded well, formed compact heads weighing on an average 10 or $\frac{5}{8}$12 lb. each head.

Other economic plants.—Five cuttings of Linaloe, an essential oil yielding plant were successfully rooted in the nursery and were awaiting planting in the field.

Among the green manure and cover crops one Australian lupin was showing promise and the crop was still under trial. Of the four types of clovers, viz., Subterranean, Crimson, Ladino and Dutch White Clover tried at this station, Crimson and Ladino performed satisfactorily. Nine green manure crops received from the Systematic Botanist and Professor of Botany, Coimbatore, one legume tentatively identified as *Shuteria vestita* W. & A. collected from nearby forest area and a perennial bean variety (*Phaseolus multiflorus*) were also under trial.

VIII. Miscellaneous.

(*a*) *Bee-keeping.*—During the year under report 273 lb. of honey was extracted from 42 working hives recording an average of $6\frac{1}{2}$ lb. per hive.

(*b*) *Advisory work.*—Skilled labour was deputed to 20 private orchards at the request of orchardists. Farmers' Day functions were held on two occasions in February and May 1954 when the fruit growers were appraised of the achievements of the station. Practical demonstrations of scientific cultural practices were also held on the occasions. The station actively participated in holding a Fruit Show at Coonoor for the first time when choice private exhibits of fruits and horticultural crops were received for competition.

(*c*) *Supply of seeds and plants.*—The details of supplies of plants, seeds, etc., made during the year are furnished in Table X.

TABLE X.

Serial number and kind of plants, seeds, etc.	Plants.	Cuttings.	Layers.	Splits.	Seeds.
(1)	(2)	(3)	(4)	(5)	(6)
	Nos.	Nos.	Nos.	Nos.	lb. oz.
1 Plum	16	..	..	..	..
2 Peach	12	..	..	..	.
3 Strawberry	..	..	..	849	..
4 Pyrethrum	..	..	..	600	0
5 Pear	24	..	..	..	..
6 Tree tomato	79	..	..	..	0 4½
7 Common Peach	300	..	..	..	..
8 Passion fruit	4	..	..	..	5 ¼
9 Seville lemon	..	..	37	..	..
10 Budsticks of plum, apple, pear and peach.	..	1,520	..	..	..
11 Fig	..	26	..	..	..
12 Cape gooseberry	..	20	..	..	..
13 Yellow passion fruit	..	83	..	..	..
14 Raspberry	..	..	19	..	..
15 Blackberry	..	..	4	..	..
16 Mulberry	..	2	..	..	..
17 Cauliflower	2,228	..	..	..	..
18 Knol Khol	..	..	..	..	..
19 Cabbage Early Drum Head	..	..	..	..	1 12¾
20 Peas (Local)	..	..	..	..	30 8
Total	2,663	1,651	60	1,449	37 10½

General.—Special attention was continued to be bestowed during the year on the trial of green manure crops to determine the best of them for cultivation under Coonoor conditions with special reference to the yield of green leaf material, tolerance to drought conditions, etc. Only Blue lupin continued to be very vigorous in vegetative growth and promising in its tolerance to dry spells. One Australian lupin newly introduced shows promise in respect of yielding green leaf matter owing to the presence of broad leaves. This was still under trial at the time of writing this report. Clovers, berseem, and lucerne could be cultivated successfully but appeared to require constant watering for satisfactory growth. Several grasses were tried for choosing the best ones for soil binding effect. Of these tried Cox's Foot grass, Perennial Rye grasses, *Eragrostris sp.* and *Chrysopogon sp.* were showing promise.

MODEL ORCHARD-*cum*-NURSERY.

This annexe to the Pomological Station, Coonoor, continued to serve as visual demonstration centre, running on commercial lines. The unit extends over an area of 10 acres, 6 acres of which were planted to the most promising varieties of apple, pear, plum, peach and cherimoyer, the rest of the area being occupied by the nursery. The orchard came into existence in 1949 and the nursery went into production in 1951.

Orchard.—Of the perennial fruit crops planted in 1949, the six promising peach varieties attained bearing age during the year 1953. The overall average of the plum crop during 1954 was 16 lb. while the peaches yielded a mean crop of 4 lb. per tree. The average was found to be satisfactory for the second year of the bearing.

The seedlings of cherimoyer plants planted in 1949 gave stray fruits during their first season of bearing in 1953. The 1954 crop was just setting at the time of writing this report and was not ready for harvest. During the year potato cultivation was not taken up since in all the plots the fruit trees were attaining bearing age or had already attained bearing age and since no other area suitable for potato cultivation was available.

The details of supplies of plants made during the year are furnished in Table XI.

TABLE XI.

Serial number and kind of plants, seeds, etc.	Plants.	Cuttings.	Layers.	Splits.
	Nos.	Nos.	Nos.	Nos.
1 Plum	1,311	..	..	..
2 Peach	390	..	..	..
3 Pear	1,281	..	..	..
4 Common peach	308	4	..	..
5 Fig	..	50	..	..
6 Mulberry	..	6	..	..
7 Cherimoyer	9	..	.	..
8 Cape gooseberry	4	..	..	..
9 Tree tomato	74	..	..	..
10 Passion fruit	38	..	..	..
11 Lemon	..	..	26	..
12 Strawberry	..	..	..	310
13 Raspberry	..	..	..	6
14 Pyrethrum	..	..	..	820
15 Scented geranium	..	5,287	..	..
Total ..	3,415	5,347	26	1,136

Nursery.—There was a total stock of 10,920 vegetatively propagated plants in June 1954 which were ready for distribution for the next planting season. Efforts were under way to reduce the nursery area by bringing the Western nursery block under promising apple varieties and confining the nursery activities only to the Eastern block where irrigation facilities were available to some extent.

Miscellaneous.—This unit continued to be a profitable commercial orchard which marks the realisation of the objective for which it was incepted. As against a total expenditure of Rs. 41,130–7–9 spent on its maintenance since its inception a value of Rs. 49,082–10–3 had been realised including the value of the plant material on hand. From the year 1951–52 onwards the orchard has been running on profits as brought out in the enclosed statements.

COONOOR,
24th August 1954.

J. S. SUNDARARAJ,
Assistant Fruit Specialist.

COIMBATORE,
26th August 1954.

U. NARASINGA RAO,
Horticulturist and Professor of Horticulture.

TABLE I-A.—*Statement showing the cost of production of bulk crops of Pomological Station, Coonoor, 1953–54.*

Details of crop.	Area	Seeds. Yield.	Seeds. Value.	Fruit (old or transferred). Yield.	Fruit (old or transferred). Value.
	ACS.	LB. OZ.	RS. A. P.	LB. OZ.	RS. A. P.
Plum	1·60	..	..	1,461 8	610 0 0
Persimmon	0·60	..	..	672 4	252 1 6
Honey	..	..	..	229 10	688 14 0
Vegetable seeds	..	30 11¾	45 10 0	..	..
Passion fruit	..	10 10¼	170 4 0	..	..
Tree tomato	..	7	14 0 0	..	..
Total	..	..	229 14 0	..	1,550 15 6

Details of crop.	Plants (sold or transferred). Yield.	Plants (sold or transferred). Value.	Total receipts for the year 1953–54.	Total receipt for three years. 1950–51.	1951–52.	1952–53.
	NOS.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
Plum	..	..	610 0 0	..	..	897 7 0
Persimmon	4	8 0 0	260 1 6	..	..	459 12 0
Honey	..	..	688 14 0	..	..	771 0 0
Vegetable seeds	3,144	32 14 0	78 8 0	..	..	261 0 0
Passion fruit	4	0 12 0	171 0 0	..	..	230 0 0
Tree tomato	128	30 12 0	44 12 0	..	..	21 0 0
Total	..	72 6 0	1,853 3 6	1,155 0 0	1,676 0 0	2,641 3 0

TABLE I-B.—*Statement showing the cost of production of bulk crops of Pomological Station, Coonoor, 1953–54.*

Particulars.	Seeds. Retained at the station. Quantity.	Seeds. Retained at the station. Value.	Seeds. Transferred and sold. Quantity.	Seeds. Transferred and sold. Value.	Fruits. Retained at the station. Quantity.	Fruits. Retained at the station. Value.	Fruits. Transferred and sold. Quantity.	Fruits. Transferred and sold. Value.
	LB. OZ.	RS. A. P.	LB. OZ.	RS. A. P.			LB. OZ.	RS. A. P.
Plums	..	..	..	..	..	..	1,461	610 0 0
Persimmon	..	..	..	..	..	..	672¼	252 1 6
Honey	..	..	..	..	..	..	229	688 14 0
Vegetable seeds	23 11¾	97 6 0	30 11¾	45 10 0	..	..	..	..
Passion fruit seeds	..	..	10 10¼	170 4 0	..	..	..	..
Tree tomato seeds	..	..	7	14 0 0	..	..	..	..
Total	..	97 6 0	..	229 14 0	..	..	..	1,550 15 6

Particulars.	Plants. Retained at the station. Quantity.	Plants. Retained at the station. Value.	Plants. Transferred and sold. Quantity.	Plants. Transferred and sold. Value.	Total.	Total receipts for the year 1950–51.	1951–52.	1952–53.
	LB.	RS. A. P.			RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
Plums	..	..	..	..	610 0 0	..	..	898 7 0
Persimmon	4	8 0 0	..	..	260 1 6	..	..	471 12 0
Honey	..	..	..	..	688 44 0	..	..	771 0 0
Vegetable seeds	3,144	32 14 0	..	..	175 14 0	..	..	340 9 0
Passion fruit seeds	4	0 12 0	..	..	171 0 0	..	..	230 0 0
Tree tomato seeds	123	30 12 0	..	..	44 12 0	..	..	21 0 0
Total	..	72 6 0	..	..	1,950 9 6	1,155 0 0	1,676 0 0	2,732 12 0

TABLE II—*Statement showing the cost of maintenance (bulk areas) of the Pomological Station for three years* (1951 *to* 1954).

Serial number and details of expenditure.	Actual expenditure for three years. 1951–52.	1952–53.	1953–54.
	RS.	RS.	RS.
1 Pay and allowance of staff (1/3 of actuals) Farm Manager and Maistry or Fieldman.	881	905	896
2 Miscellaneous cultivation expenses (1/3 actuals) ..	included in item No. 3.		
3 Working Expense (actuals)	1,020	685	708
4 One tenth of expenditure on live and dead stock ..	2	19	10
5 Proportionate rent for the land if the station is leased land ; if it is Government Farm the normal rental value of the tract subject to 15 times the land assessment per acre to be debited as expenditure.	114	114	114
6 Unforeseen contingencies if any	Nil.	Nil.	Nil.

TABLE III.—*Statement of abstract expenditure and receipts of the Pomological Station, Coonoor,* 1953–54.

Serial number and particulars.	1949–50.	1950–51.	1951–52.	1952–53.	1953–54.
1 Expenditure Working Expenses.	1,919	1,778	2,017	1,723	1,379
2 Revenue	1,342	1,155	1,676	2,733	1,951

APPENDIX I.

STATEMENT OF CHARGES AND RECEIPTS OF THE POMOLOGICAL STATION, COONOOR, FROM 1ST JULY 1953 TO 30TH JUNE 1954.

Pomological Station, Coonoor.

		RS.	A.	P.
Charges—				
Pay of establishment		4,250	7	0
Dearness allowance		1,519	14	0
Other compensatory allowances		781	11	0
House rent allowance		185	3	0
Travelling allowance		619	7	0
	Total ..	7,356	10	0
Contingencies—				
Petty construction and repairs		96	6	0
Purchase of deadstock		99	1	6
Working expenses		7,085	7	3
Dearness allowance to menials		1,702	9	0
Rates and taxes		307	10	6
Other contingencies		214	12	0
	Total ..	9,505	14	3
Receipts—				
XXIX-A. Agricultural Stations		3,607	8	0
Miscellaneous		1,271	5	0
XLV. Stationery		14	7	3
P.W.D. III. O.R.		84	8	0
XIII. Other taxes		12	4	6
Value of free transfers		1,157	10	8
	Total ..	6,147	11	5

APPENDIX II.

MODEL ORCHARD.

Statement of Charges and Receipts of Model Orchar-cum-Nursery, Coonoor from July 1953 to June 1954.

	RS.	A.	P.
Charges—			
Pay of establishment (temporary)	1,118	0	0
Dearness allowance	516	0	0
Other compensatory allowance	270	0	0
House-rent allowance	72	0	0
Travelling allowance	119	0	0
Total ..	2,095	0	0
Contingencies—			
Petty construction and repairs	..		
Purchase of deadstock	104	4	6
Working expenses	4,637	7	9
Dearness allowance to menials	354	7	0
Other contingencies	36	2	0
Total ..	5,132	5	3
Receipts—			
XXIX.—A. Agricultural Stations	5,196	8	6
Miscellaneous	258	8	0
XLV. Stationery	..		
XIII. Other taxes	1	9	3
Value of free transfers	1,966	15	0
Total ..	7,423	8	9

APPENDIX III.

MODEL ORCHARD-*cum*-NURSERY, COONOOR.

Field war Expenditure from 1949 to 1954.

Field number with names of crops.	1949–1950.			1950–1951.		
	Working expenses.	Permanent improvement.	Total.	Working expenses.	Permanent improvement.	Total.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
I. Plums	882	297	1,119	2,178	..	2,178
II. Pears	375	..	375	1,144	..	1,144
III. Apples	293	..	293	1,017	288	1,305
Iv. Peaches	539	..	539	1,389	..	1,389
V. Cherimoyer	161	..	161	612	..	612
Nursery "A"	1,875	120	1,995	1,257	1,130	2,387
Nursery "B"	106	..	106	388	..	388

Field number with names of crops.	1951–1952.			1952–1953.			1953–1954.		
	Working expenses.	Permanent Improvement.	Total.	Working. expenses.	Permanent Improvement.	Total.	Working expenses.	Permanent Improvement.	Total.
	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
I. Plums	1,484	..	1,484	541	28	569	595	15	610
II. Pears	967	..	967	466	28	494	312	15	327
III. Apples	577	..	577	355	28	383	463	15	478
IV. Peaches	1,099	..	1,099	410	28	438	423	15	438
V. Cherimoyer	538	..	538	310	28	338	202	15	217
Nursery "A"	1,649	..	1,649	1,165	..	1,165	1,439	15	1,454
Nursery "B"	2,546	251	2,797	1,672	22	1,754	1,594	15	1,609

APPENDIX III—*cont.*

MODEL ORCHARD-*cum*-NURSERY—*cont.*

Fieldwar receipts from 1949 *to* 1954—cont.

Field number and name of crops.	1949–50.	1950–51.	1951–52.	1952–53.	1953–54
	RS.	RS.	RS.	RS.	RS.
I. Plums	..	109	1,672	626	607
II. Pears	..	116	2,159	767	415
III. Apple	..	442	468	261	597
IV. Peaches	..	713	729	530	1,213
V. Cherimoyer	..	51	253	293	371
Nursery "A"	292	4,446	6,411	5,477	1,986
Nursery "B"	..	..	229	2,122	2,223

APPENDIX IV.

STATEMENT OF EXPENDITURE AND RECEIPTS FROM THE INCEPTION OF THE SCHEME UP TO THE END OF JUNE 1954.

	RS.	A.	P.
Expenditure—			
Establishment	7,931	3	0
Contingencies	33,199	4	9
Total ..	41,130	7	9
Receipts—			
Actual receipts	28,426	5	3
Value of transfers	8,188	13	0
Total ..	36,615	2	3
Value of stock on hand—			
Cost of 6,230 pear grafts at Re. 1 each	6,230	0	0
Cost of 4,690 plum and peach budded plants at Rs. 1-4-0 each.	5,862	8	0
Cost of 1,000 passion fruit seedlings at As. 3 each	187	8	0
Cost of 1,000 Common peach seedlings at As. 3 each ..	187	8	0
Total ..	12,467	8	0
Total assets including receipts ..	49,082	10	3

STATEMENT OF EXPENDITURE AND RECEIPTS FOR THE FIVE YEARS OF ITS PROGRESS.

Abstract.

Year.	*Expenditure.*			*Receipts.*		
	RS.	A.	P.	RS.	A.	P.
1949–50	5,763	0	6	467	8	0
1950–51	10,520	1	0	5,896	15	3
1951–52	9,078	5	0	12,105	8	3
1952–53	8,541	12	0	10,721	10	0
1953–54	7,227	5	3	7,423	8	9
Total ..	41,130	7	9	36,615	2	3

Steps taken to augment the revenue.—Inadequate irrigation facilities were continued to be felt in this area throughout the year. However, two sources of water located in the eastern wing of the Model Orchard during the previous year were sustaining the needs of the nursery plants to an extent. One of these was fitted up with picottah which ensures labour economy in baling out water for watering nursery plants. Intercropping of the alley spaces with vegetable and other crops to enhance the normal revenue was systematically adopted. Extension of cultivation under passion fruit and scented geranium and increasing the number of bee-hives for production of pure honey were the other steps taken to maximise the supplemental revenue in the Pomological Station and the Model Orchard, Coonoor.

ANNUAL REPORT OF THE SUGARCANE RESEARCH STATION, GUDI YATTAM, NORTH ARCOT DISTRICT, FOR THE YEAR 1953-54.

(FASLI 1363.)

Season and rainfall.—During the year under report, there was a total rainfall of 25·90 inches in 54 rainy days, as compared to 26·17 inches in 41 rainy days in the previous season. Though this season was better than the last one, it is in deficit as compared to 38·73 inches in 50 rainy days which is the average for the last 10 years and 32·71 inches which is the average for the last 38 years.

2. On account of the continued drought during the last five seasons and on account of the partial failure of the south-west monsoon which brought in only 9·7 inches as compared to 19·80 inches, the average for 10 years, the sub-soil water was completely dried up and most of the wells in this region failed. The filter point which was put up in field No. 9 also failed due to severe drought. The cropping under samba paddy was affected due to lack of irrigation resources.

3. The north-east monsoon was somewhat favourable in that it was almost normal with 13·11 inches of rain as compared to 13·07 inches, the average for 10 years. The heavy rainfall at the beginning of the north-east monsoon in October which brought floods in the local rivers was not only useful to the standing crops but also very greatly helped in replenishing the underground spring water. The dried up wells were again normal and the tanks got supply of water to last up to February 1954. Thus the season commenced late and this affected sugarcane to some extent by late growth and top heaviness. The season was almost normal in respect of kar paddy.

4. The hot weather of 1954 was fairly normal with 3·08 inches of rain as compared to 3·98 inches, the average for the last ten years.

The detailed rainfall statement for the year is given in Table I.

TABLE I.—*Statement of rainfall.*

Month.	Week days.	Rainfall in 1953-54.		Rainfall in 1952-53.		Average for ten years.		Average rainfall for 38 years.
		Days.	Rain.	Days.	Rain.	Days.	Rain.	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
June	7—13	2	0·73	1	0·53	1	0·55	2·37
	14—20	1	0·21	1	0·11	1	0·53	
	21—27	1	0·21	..	..	1	0·37	
June-July	28— 4	..	..	1	0·15	1	0·47	3·20
	5—11	..	..	2	0·59	2	1·20	
	12—18	2	1·21	2	1·53	2	0·73	
	19—25	2	1·11	..	..	2	0·76	
July-August	26— 1	1	0·93	..	..	2	0 86	4·04
	2— 8	1	0·70	..	..	1	0 76	
	9—15	..	..	..	..	2	0·66	
	16—22	1	0·10	..	..	1	0·18	
	23—29	3	1·48	3	2·96	2	2·05	
August-September	30— 5	1	0 25	1	0·26	1	1·10	5·52
	6—12	1	0·30	..	..	2	0·88	
	13—19	3	1·53	..	..	1	0·72	
	20—26	1	1·03	1	1·11	2	0·98	
Total for the season		20	9·79	12	7·24	24	19·40	15·13
			North-east monsoon.					
September-October	27— 3	2	0·92	1	0·21	2	1·11	5·61
	4—10	2	2·74	2	0·63	2	1·41	
	11—17	3	1·51	5	2·63	3	1 76	
	18—24	4	2·22	1	0·25	2	0 93	
	25—31	3	0·84	1	0·32	1	0 86	
November	1— 7	..	..	..	..	1	0·81	5·05
	8—14	..	..	..	..	2	0·76	
	15—21	1	0·25	..	..	2	1·87	
	22—28	3	2·29	1	0·27	1	0·58	

TABLE 1.—*Statement of rainfall*—cont.

Month.	Week days.	Rainfall in 1953-54.		Rainfall in 1952-53.		Average for ten years.		Average rainfall for 38 years.
		Days.	Rain.	Days.	Rain.	Days.	Rain.	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
November-December ..	29— 5	..	..	2	4·23	1	1·12	1·57
	6—12	..	..	5	4·11	1	1·07	
	13—19	..	..	1	0·31	1	0·34	
	20—26	..	..	..	..	..	0·04	
December-January ..	27— 3	2	0·33	..	..	..	0·06	0·72
	4—10	2	1·26	..	..	1	0·12	
	11—17	2	0·75	..	..	..	0·08	
..	18—24	..	..	..	..	..	0 09	
	25—31	..	..	..	..	..	0·04	
Total for the season ..		24	13·11	19	12·96	19	13·07	12·95
		Hot weather period.						
February	1— 7	..	..	..	..	..	..	0·67
	8—14	..	..	..	..	..	..	
	15—21	..	..	..	..	..	0·12	
	22—29	..	..	..	..	..	0·05	
March	1— 7	..	..	..	..	..	0·02	
	8—14	1	0·24	..	..	..	0·02	0·26
	15—21	..	..	..	..	..	0·01	
	22—28	1	1·10	..	..	..	0·11	
March-April	29— 4	..	..	..	..	..	0·22	0·72
	5—11	..	..	1	2·75	..	0·27	
	12—18	..	..	..	..	..	0·17	
	19—25	..	..	2	1·72	..	0·15	
April-May	26— 2	..	..	..	..	1	0·19	2·98
	3— 9	2	0·33	3	0·70	1	0·45	
	10—16	2	0·44	..	..	1	0·47	
	17—23	1	0 21	1	0·14	1	0·38	
	24—30	2	0·76	1	0·16	1	0·77	
May-June	31—6	..	..	2	0·50	2	0·58	
Total for the season ..		9	3·08	10	5·97	7	3·98	4·63
Grand total ..		53	25·98	41	26·17	50	36·85	32·71

SUGARCANE.

5. Sugarcane was the main crop on which experimental work was in progress in this station. An area of 7·99 acres was under sugarcane. An average yield of 33·72 tons of cane per acre was recorded again the average of 33·10 tons on the previous season.

6. *Varietal study plots.*—A consignment of seedling canes released from the Indian Cane Breeding Institute, Coimbatore were planted for multiplication. Thirty-nine varieties were received from Coimbatore during this season and a total of 59 varieties were under study in the study plots. The following 59 varieties were under study during this year.—

	Varieties.
Third year of study—	
Co. 734, Co. 747, Co. 750, Co. 758, Co. 761, Co. 776, Co. 779, Co. 782, Co. 792, Co. 795, Co. 799, Co. 805 and Co. 810	13
Second year of study—	
Co. 785, Co. 793, Co. 803, Co. 821, Co. 851, Co. 853, Co. 858, Co. 869, Co. 873, Co. 876, Co. 877, Co. 879, Co. 887, Co. 888, Co. 889, Co. 890, Co. 894, Co. 896, Co. 901, Co. 905, Co. 911, Co. 913, Co. 916, Co. 931, I.C. 222, I.C. 223, I.C. 225, I.C. 227, I.C. 229, I.C. 232, I.C. 233, I.C. 234 and I.C. 235	33
First year of study—	
Co. 964, Co. 830, Co. 856, Co. 859, Co. 878, Co. 910, Co. 899, Co. 915, Co. 953, Co. 957, Co. 885, Co. 919 and Co. 943	13
Total ..	59

The varieties were planted during the first week of March 1953.

Economic characters like germination, tillering, arrowing, resistance to drought, pests and diseases were studied. The salient features of observations are recorded below :—

Germination.—The standard varieties Co. 527, Co. 449 and Co. 419 recorded average germination percentage of 55·35, 54·62 and 53·01, respectively. Varieties Co. 761, Co. 782, Co. 810, Co. 851, Co. 853, Co. 858, Co. 871, Co. 901, Co. 916, Co. 856, and Co. 943 recorded over 60 per cent germination. The lowest percentage of 32·60 was recorded by I.C. 232 and the highest of 89·34 by Co. 851.

Tiller.—Standard varieties Co. 527, Co. 449 and Co. 419 recorded 1·47, 1·30 and 1·23 tillers per germinated bud, respectively. This again confirms the field performance of Co. 527 as the best tillering variety.

In the varieties under study, tillering varied from 1·0 in Co. 830 to 2·3 in Co. 873. The varieties Co. 758, Co. 869 and Co. 873 recorded over 2·0 tillers per germinated bud.

Arrowing.—Of the following 59 varieties under study, the following 39 varieties did not arrow during the season:—

Co. 750, Co. 761, Co. 782, Co. 795, Co. 799, Co. 805, Co. 810, Co. 785, Co. 793, Co. 808, Co. 821, Co. 873, Co. 877, Co. 879, Co. 887, Co. 888, Co. 889, Co. 957, Co. 893, Co. 890, Co. 905, Co. 911, Co. 913, Co. 889, Co. 960, Co 931, Co. 878, Co. 910, Co. 919, Co. 954, I.C. 222, I.C. 223, Co. 227 and I.C. 232.

The lowest arrowing percentage among the flowering type was 1·06 in I.C. 223 and the highest of 55·44 in Co. 859.

The following varieties recorded arrowing percentage of over 30:—

Co. 527, Co. 779, Co. 859, Co. 853 and Co. 851.

Drought.—The following varieties indicated poor drought resistance as judged by wilting of leaf tips and margins :—

Co. 747, Co. 858, Co. 876, Co. 877, Co. 889, Co. 905, Co. 991 and Co. 915.

Pests and diseases.—Early shoot borer (Chilotræa infuscatella) was the major pest of sugarcane. The degree of infestation ranged from 1·09 per cent in Co. 876 to 22·80 per cent in Co. 825. But on the whole the damage by this pest was less when compared to the preceding year. The following varieties recorded infestation of over 10 per cent on shoot basis :—

Co. 792, Co. 793, Co. 795, Co. 885, Co. 889, Co. 901, Co. 905, Co. 910, Co. 957, I.C. 225, I.C. 229, I.C. 232 and I.C. 235.

The incidence was 11·01 per cent, 6·40 per cent and 8·57 per cent, respectively, in the standard varieties of Co. 527, Co. 449 and Co. 419.

Smut.—The following varieties recorded high incidence of smut:—

Co. 782, Co. 785, Co. 793, Co. 931 and Co. 799.

Juice quality.—Analysis of cane juice for the varieties in study plots was carried out in December, February, March and May so that varieties could be suitably classified as early, mid and late season varieties.

Early maturing varieties.—Sixteen per cent sucrose and 85 per cent purity in December-January.

Co. 859, Co. 853, Co. 851, Co. 792, Co. 913, Co. 873, I.C. 222 and Co. 527 (control) (vide Table 2).

Mid-season varieties.—Eighteen per cent sucrose and 85 per cent purity in the months of February-March.

Co. 750, Co. 792, Co. 810, Co. 785, Co. 793, Co. 853, Co. 858, Co. 911, Co. 913, I.C. 227, Co. 856, Co. 910, Co. 859, Co. 758, Co. 879, Co. 888 and Co. 449 (control) (vide Table 2).

Late varieties.—Sixteen per cent sucrose and 85 per cent purity in May. Co. 761, Co. 810, Co. 856, Co. 859, Co. 750, Co. 782, Co. 785, I.C. 225 and Co. 419 (control) (vide Table 2).

TABLE 2.—*Early season group—Standard Co. 527.*

Serial number and variety.	Average yield in tons.	Average population per acre.	C.C.S.	C.C.S. in tons per acre.
(1)	(2)	(3)	(4)	(5)
1 Co. 859	23·57	39,200	12·30	2·74
2 Co. 853	39·47	44,400	10·69	4·90
3 I.C. 222	24·64	27,600	10·55	2·22
4 Co. 851	28·52	34,800	7·71	2·60
5 Co. 792	28·53	33,200	9·10	2·20
6 Co. 913	45·38	57,200	8·67	3·60
7 Co. 873	41·60	51,600	5·44	3·93
8 Co. 527	30·53	44,800	9·81	2·92
Mid season group—Standard Co. 449.				
1 Co. 750	57·16	41,200	12·86	7·30
2 Co. 792	38·40	33,600	13·37	5·15
3 Co. 810	31·25	33,600	13·98	4·34
4 Co. 785	41·08	35,200	13·01	5·31
5 Co. 793	47·34	38,000	13·11	6·24
6 Co. 853	32·14	35,200	13·19	4·25
7 Co. 858	29·02	30·800	13·25	3·88
8 Co. 911	37·95	22,400	12·11	4·62
9 Co. 913	40·64	34,400	12·99	5·28
10 I.C. 227	30·90	27,700	12·22	3·78
11 Co. 856	30·90	35,200	12·74	3·95
12 Co. 910	29·71	25,600	13·42	3·96
13 Co. 859	33·04	43,600	13·76	4·50
14 Co. 758	34·82	30,400	12·41	4·38
15 Co. 879	34·38	35,600	10·70	3·68
16 Co. 888	34·38	26,800	13·07	4·49
17 Co. 449	39·00	27,100	12·16	4·74
Late season group—Standard Co. 419.				
1 Co. 761	29·46	28,000	10·92	3·22
2 Co. 810	28·58	17,600	12·53	3·59
3 Co. 856	56·26	59,200	13·14	7·39
4 Co. 859	17·15	28,000	12·25	2·10
5 Co. 750	43·76	28,000	9·38	4·11
6 Co. 782	45·10	28,000	6·72	3·03
7 Co. 785	23·67	22,400	7·37	1·75
8 I.C. 225	16·52	14,000	5·55	0·92
9 Co. 419	19·94	24,000	8·93	1·78

7. *Preliminary yield trials—Early varieties.*—Such of the varieties that are found promising in the varietal study plots are selected and tested on a small scale for their yields. Promising varieties from this preliminary tests are selected and tested in the main yield trial. During this year, seven varieties were tried. The details of lay out are given in Table 3.

TABLE 3.—*Details of layout.*

Lay out—10 × 4 randomized blocks.
Replications—Four.
Treatments—Ten—Co. 703, Co. 705, Vol.Co. 709, Co. 729, Co. 740, Co. 747, Co. 691 and Co. 419, Co. 449 and Co. 527 as controls.
Manures—Ten tons of farm-yard manure per acre as basal dressing plus 200 lb. of Nitrogen as groundnut cake and ammonium sulphat ein one; two proportions in two equal doses half at 45 days after planting and half at the time of earthing up.
Area of each plot—One cent (50 links × 20 links).
Seed rate—15,000 three budded sets per acre.
Spacing between cane rows—5 links or 3′ 4″.
Soil—Sandy loam.
Previous crop—Paddy.
Date of planting—13th January 1953.
Period of harvest—From 14th to 20th December 1953.

Serial number and variety.	Yield of cane per acre in Tons.	Yield of cane per acre in Maunds.	As per cent on control.	Number of canes harvested per acre.	C.C.S. per acre in tons.
(1)	(2)	(3)	(4)	(5)	(6)
1 Co. 740	37·90	1,030·88	123·85	40,700	2·91
2 Co. 691	32·70	889·44	106·86	59,400	3·18
3 Co. 449	31·60	859·52	103 26	38,800	2·91
4 Co. 419	30·60	832·32	100 00	34,200	2·31
5 Co. 703	30·00	816·00	98·04	48,000	3·28
6 Co. 705	29 60	805·12	96·73	52,600	3·10
7 Co. 709	29·40	799·68	96·08	47,200	2·45
8 Co. 729	27 60	750·72	90·19	40,800	3·07
9 Co. 527	27·50	748·00	89 87	42,800	2·82
10 Co. 747	27·40	745·28	89·54	52,200	2·81

"Z" test is satisfied.

	In tons.	In maunds.
Standard error of treatment mean	1·612	43·85
Critical difference	4·68	127·21

Conclusions—Co. 740, Co. 691, Co. 449, Co. 419, Co. 703, Co. 705, Co. 709, Co. 729, Co. 527 and Co. 747.

Maturity observations.—The analysis of juice of the varieties conducted prior to harvest in January is given in Table 4.

TABLE 4.—*Juice analysis in January—Early season varieties.*

Serial number and variety.	Sucrose.	Purity.	Jaggery recovery per cent.	Jaggery. in tons per acre.
(1)	(2)	(3)	(4)	(5)
1 Co. 691	14·38	80·06	9·72	3·21
2 Co. 703	15·02	80·49	9·83	2·95
3 Co. 705	15·55	79·49	10·58	5·17
4 Co. 709	12·85	79·98	8·79	2·59
5 Co. 729	15·16	82·12	10·88	3·01
6 Co. 740	11·79	75·39	8·91	3·37
7 Co. 747	13·98	81·09	9·91	2·71
8 Co. 419	11·69	74·33	9·10	2·78
9 Co. 449	13·59	80·70	8·92	2·81
10 Co. 527	14·91	83·02	10·25	2·85

8. *Main yield trial.*—Promising varieties of preliminary yield trial are selected and tested for three consecutive seasons before the best ones are released for further trial in the districts. Three varieties Co. 620, Co. 630 and Co. 659 were under test. Variety Co. 620 alone was on par with Co. 419, but all the varieties were inferior to Co. 449. But Co. 620 was found to be very susceptible to smut and also to wilt and hence rejected. The details of layout with the summary of results are given in Table 5.

TABLE 5.—*Details of layout.*

Layout—5 × 6 randomized blocks.
Replications—Six.
Treatments—Five varieties—Co. 620, Co. 630, Co. 659 with Co. 419 and Co. 449 as controls.
Manures—Ten tons of farm yard manure per acre as basal dressing and 200 lb. of nitrogen, two-thirds as groundnut cake and one thirds as ammonium sulphate.
Size of plot—
Gross—32 links × 112·5 links—3 6 cent.
Nett—24 links × 104·0 links—2·5 cents.s
Seed rate—1,500 three budded setts per acre.
Spacing between cane rows—5′ links or 3′ 4″.
Soil—Loam.
Previous crop—Sunnhemp for seed.
Date of planting—5th January 1953.
Period of harvest—8th January to 2nd February 1954.

Early yield trial.

Summary of results.

Serial number and variety.	Yield of cane per acre. In tons.	Yield of cane per acre. In maunds.	As per cent on control.	Number of canes per acre.	C.C.S. per acre in tons
(1)	(2)	(3)	(4)	(5)	(6)
1 Co. 620	32·54	885	86·04	39,220	3·45
2 Co. 630	23 42	537	61·92	37,660	2 82
3 Co. 659	25·44	692	67·26	38,680	3 09
4 Co. 449	44,71	1,216	118·22	39,780	4·35
6 Co. 419	37 82	1,029	100·00	33,680	4·38

"Z" test is satisfied.

	Tons.	Maunds.
Standard error of treatment mean	5·06	137·63
Critical difference	10·55	286·96

Conclusion—Co. 449, Co. 419, Co. 629, Co. 659, and Co. 630.

Maturity observations—(*a*) *Juice quality.*—Periodical data pertaining to juice quality are recorded in Table 6. Variety Co. 659 recorded high sucrose by December and maintained it fairly up to March. The other varieties too were better than the standards in respect of juice quality.

TABLE 6.—*Juice analysis of early maturity varieties—December to May.*

Variety.	December.		February.		March.		May.	
	Sucrose.	Purity.	Sucrose.	Purity.	Sucrose.	Purity.	Sucrose.	Purity
(1)	(2)	(3)	(4)	(4-a)	(5)	(6)	(7)	(8)
Co. 620	16·77	87·53	16·26	85·75	18·75	87·98	13·67	83·56
Co. 630	16·79	86·39	16·09	84·40	17·57	86·38	14·25	88·18
Co. 659	17·32	85·74	17·28	86·52	19·00	85·11	15·38	78·15
Co. 419	13·49	79·63	15·40	94·53	15·04	75·92	13·42	77·71
Co. 449	14·41	83·58	15·28	82·99	17·80	87·51	16·89	84·05

(*b*) *Jaggery.*—Periodical recovery per cent of jaggery on cane weight was also recorded. None of the varieties proved superior to the standards in respect of consistency and colour. The monthwar (four months) recoveries of jaggery from the varieties are recorded in Table 7.

TABLE 7.—*Jaggery recovery per cent on cane weight.*

Early varieties.

Variety.	December.	February.	March.	May.
(1)	(2)	(3)	(4)	(5)
Co. 620	9·16	10·35	10·70	7·26
Co. 530	11·86	10·62	11·80	8·65
Co. 659	11·43	10·66	11·10	..
Co. 419	9·45	11·45	10·20	8·03
Co. 449	9·00	9·76	10·70	9·71

9. *Review of three years' results.*—The trial having completed three years during this season, the consolidated data for all the three years are reviewed and furnished in Table 8.

TABLE 8.—*Main yield trial—Early varieties—Review of three years' results.*

Year.	Yield in tons per acre.				
	Co. 620.	Co. 630.	Co. 659.	Co. 419.	Co. 449.
(1)	(2)	(3)	(4)	(5)	(6)
1951–52	36·39	38·92	35·54	46·70	44·73
1952–53	25·60	27·94	23·19	26·52	32·94
1953–54	32·54	23·42	25·44	37·82	44·71
Average for three years ..	31·58	30·10	28·06	37·05	44·13
	(Sucrose per cent in December).				
1951–52	16·09	14·43	16·40	13·76	14·31
1952–53	16·28	15·87	15·46	13·25	15·56
1953–54	16·26	17·15	17·28	14·65	14·28
Average for three years ..	16·21	15·82	16·38	13·89	14·72
	(Purity per cent).				
1951–52	86·96	84·39	87·50	83·39	82·71
1952–53	87·20	87·80	86·60	76·60	87·20
1953–54	85·75	36·40	86·52	81·57	81·37
Average for three years ..	83·63	86·84	86·87	80·52	83·76

(Calculated C.C.S. per cent.)

Year.	(Yield in tons per acre.) Co. 620.	Co. 630.	Co 659.	Co. 419.	Co. 449.
(1)	(2)	(3)	(4)	(5)	(6)
1951–52	11·29	9·97	11·55	9·45	9·78
1952–53	11·49	11·24	10·84	8·71	10·97
1953–54	10·62	12·06	12·16	10·00	9·74
Average for three years ..	11·13	11·09	11·52	9·39	10·16

Year.	(C.C.S. in tons per acre). Co. 620.	Co. 630.	Co. 659.	Co. 419.	Co. 449.
1951-52	4·13	3·88	4·10	4·40	4·37
1952–53	2·94	3·14	2·51	2·32	3·61
1953–54	3·45	2·82	3·09	3·78	4·55
Average for three years ..	3·51	3·28	3·23	3·50	4·11

None of the varieties under trial have yielded better than the controls—Co. 449 and Co. 419, in any of the three years. Variety Co. 449 has yielded the highest closely followed by Co. 419.

In respect of sugar per acre also, Co. 449 has proved better than all the other varieties though Co. 620 and Co. 659 have recorded higher C.C.S. per cent than the controls Co. 419 and Co. 449. So none of the varieties under trial are considered fit to replace the existing standards Co. 449 and Co. 419. Variety Co. 620 is susceptible to smut and hence to be rejected.

10. *Time of planting and harvesting studies.*—The object of the study is to explore the possibility of extending the crushing season to detect the presence of special season (July-September) and also to determine the best time for planting and the age for harvest. The details of layout and the summary of results are given in Table 9.

TABLE 9.—*Time of planting and harvesting—Details of layout.*

Layout—18 × 4 randomized blocks.
Replications—Four.
Treatments—
(1) Varieties—Two—Co. 419 and Co. 449.
(2) Plantings—Three—in January-May and September.
(3) Harvests—Three—10, 12 and 14 months age after planting.
Manures—Ten tons of farm yard manure as basal dressing per acre plus two hundred pounds nitrogen in the form of groundnut cake and ammonium sulphate in 1 : 2 proportion and applied in two equal doses, half at 45 days after planting and the second half at the time of earthing up.
Size of plot—
Gross—75′ 6″ × 13′ 4″ = 2·25 cents.
Nett—68′ 6″ × 8′ 0″ = 1·25 cents.
Seed rate—15·000 three budded setts per acre.
Spacing between cane rows—5 links or 3′ 4″.
Soil—Loam.
Previous crop—
For January crop—Paddy.
For May crop—Paddy and ragi.
For September crop—Paddy, ragi and cowpea.
Dates of planting—
27th January 1953.
22nd May 1953.
24th September 1953.

Time of planting and harvesting.

Summary of results.

Variety.	Month of planting.	Age at harvest.	Yield of cane per acre. In tons.	In maunds.	As per cent on control.	Number of canes per acre.	C.C.S. per acre in tons.	C.C.S. per acre in tons per month.
	1952.							
Co. 419 ..	January	.. 10	30·57	832·16	101·26	37,920	1·88	0·19
	Do.	.. 12 (ton)	30·09	819·05	100·00	33,960	2·81	0·23
	Do.	.. 14	30·38	825·59	100·75	30,300	3·43	0·25

Variety.	Month of planting.	Age at harvest.	Yield of cane per acre. In tons	Yield of cane per acre. In maunds.	As per cent. on control.	Number of ca es per acre.	C.C.S. per acre in tons.	C.C.S. per acre in tons per month.
Co. 419 ..	May ..	.. 10	31·79	865·05	105·61	33,780	3·27	0·33
	Do. ..	.. 12	33·93	923·57	112·73	27,900	2·79	0·23
	Do. ..	.. 14	28·02	762·70	93·12	22,800	1·71	0·12
Co. 419 ..	September	.. 10	18·52	504·81	61·52	25,980	1·34	0·13
	Do.	.. 12	14·30	389·25	47·52	18,800	1·39	0·12
	Do.	.. 14	7·61	207·14	25·22	11,620	0·56	0·04
Co. 449 ..	January ..	.. 10	27·16	739·10	84·32	39,800	2·14	0·21
	Do. ..	.. 12 (con)	32·21	876·75	100·00	38,200	3·56	0·30
	Do. ..	.. 14	36·67	998·15	110·74	35,960	4·57	0·32
Co. 449 ..	May ..	.. 10	31·97	870·32	99·25	34,140	3·58	0·36
	Do. ..	.. 12	42·52	1,157·39	132·09	31,460	3·30	0·27
	Do. ..	.. 14	35·06	956·33	108·83	30,080	3·03	0·21
Co. 449 ..	September	.. 10	19·87	540·36	61·62	37,260	1·55	0·16
	Do.	.. 12	28·00	762·16	86·93	38,040	2·87	0·24
	Do.	.. 14	30·71	835·92	95·36	36,700	3·38	0·24

"Z" test is satisfied.

	TONS.	MAUNDS.
Standard error of treatment mean	3·13	85·20
Critical difference	8·90	242·00

The variety Co. 449, in general, has yielded better than Co. 419 under all months of planting and also at all ages of harvest. Planting in September yielded lowest and that in January the highest in respect of C.C.S. per acre, while in term of cane alone there is small improvement even under late planted conditions.

The months of April, May are characterized by hot, dry winds and all the varieties tend to deteriorate. The deterioration is more rapid when the age is more than twelve months for this period. In respect of crop planted in January, there is improvement in quality even beyond twelve months up to fourteen months. The crop planted in September records poorest quality, particularly with Co. 419. In this variety the peak quality is reached in twelve months and there is slight depression thereafter. With Co. 449, there appears to be continuous improvement up to 14th month. This broadly confirms the findings reported from here previously, that, for peak sugar content, age alone is not the criterion but it is the product of interactions of age and season.

TABLE 10.—*Progress of maturity—Time of planting and harvesting.*

Co. 419.

Month of analysis of juice.	January planting. Age at analysis.	Sucrose per cent.	Purity per cent.	May planting. Age at analysis.	Sucrose per cent.	Purity per cent.	September planting. Age at analysis.	Sucrose per cent.	Purity per cent.
1952.—									
October ..	9	10·54	72·99	..	..	..	..	..	..
November ..	10	9·98	69·10	..	..	..	..	..	..
December ..	11	12·28	81·30	..	..	..	..	..	..
1953.—									
January ..	12	13·51	83·33	..	..	..	..	..	..
February ..	13	15·40	83·24	9	12·57	77·27	..	..	..
March ..	14	16·23	85·37	10	14·07	80·34	..	..	..
April ..	..	..	..	11	13·59	80·46	..	..	..
May ..	..	..	..	12	12·52	77·81	..	..	..
June ..	..	..	..	13	10·87	75·18	9	8·36	61·20
July ..	..	..	..	14	11·12	76·91	10	11·29	73·24

Co. 449.

1952.—									
October ..	9	10·49	74·72	..	..	..	..	..	..
November	10	11·96	76·49	..	..	..	..	..	..
December	11	13·98	84·39	..	..	..	..	..	..
1953.—									
January ..	12	15·68	87·00	..	..	..	..	..	..
February ..	13	17·40	88·31	9	13·98	80·52	..	..	..
March ..	14	17·61	87·76	10	16·12	84·78	..	..	..
April ..	..	..	..	11	14·44	83·50	..	..	..
May ..	..	..	..	12	11·61	78·62	..	..	..
June ..	..	..	..	13	10·71	76·19	9	19·57	72·68
July ..	..	..	..	14	11·69	80·31	10	12·65	74·78
August ..	..	..	..	..	..	..	11	13·97	..
September	..	..	..	..	..	..	12	14·80	..
October	..	..	..	..	..	..	13	15·36	..
November	..	..	..	..	..	..	14	16·19	..

The study of data in respect of sugar per acre per month indicates, that sugar accumulation is most rapid with May planted 10 months' old crop, followed by January planted 14 months' old crop. Next in descending order, are the January and May planted 12 months' old crops, while January 14 months' old crop yields the highest yield per acre. This speed of sugar accumulation is the greatest with the May planted 10 months' crop. Under all the harvests Co. 449 records higher sugar per acre per month than Co. 419.

11. *Rayungan trial.*—The suitability of Rayungans as seed material and the reported uniformity of clumps were under test. The details of the layout with the summary of results are given in Table 11.

TABLE 11.—*Details of layout—Rayungan trial.*

Layout—Duplicate observation plots.
Treatments—Two types of seed materials—
(1) Rayungans and
(2) Top setts.
Manures—Ten tons of a farm yard manure as basal dressing plus 200 pounds of nitrogen ¾ as ammonium sulphate and ¼ as groundnut cake.
Size of plot—
Gross—53 links × 40 links = 2·12 cents.
Nett—45 links × 30 links = 1·35 cents.

Spacing—Three spacings in the (viz.) 6", 12" and 18".
Seed rate—As per spacings above.
Soil—Loam.
Previous crop—Paddy Co. 13.
Date of planting—1st March 1953.
Period of harvest—6th to 15th March 1954.

Summary of results.

Treatments.		Yield of cane per acre in		As per cent on control.	Number of canes per acre.	C.C.S. per acre in tons (March).
		TONS.	MDS.			
	Rayungans.					
Co. 419—6"		45·34	1,234·15	85·68	39,780	4·72
12"		48·97	1,322·96	91·88	31,030	5·03
18"		47·23	1,285·60	88·62	31,260	5·29
	Setts.					
Co. 419—6"		47·66	1,297·30	90·07	38,520	3·45
12"	(control)	52·93	1,440·75	100·00	35,260	3·97
18"		38·90	1,058·86	73·54	26,970	3·80
	Rayungans.					
Co. 449. 6"		42·40	1,154·13	94·90	36,080	5·10
12"		45·70	1,239·95	101·97	33·340	5·71
18"		46·92	1,275·16	104·35	32,900	5·19
	Setts.					
Co. 449. 6"		42·99	1,170·19	96·00	40·830	4·39
12"	(control)	44·68	1,216·19	100·00	35,260	5·00
18		34·02	962·02	76·15	27,640	3·97

The difference in maturity between the setts and the Rayungan planted crop, was studied by taking 55 number of clumps for individual analysis. It is observed that the average quality for sett planted crop is 12·59 per cent in juice, while that of Rayungan planted crop 13·77 per cent, the difference being statistically not significant. The studies are under further progress.

12. *Chilean nitrate.*—The efficiency of chilean nitrate as nitrogenous manure as compared to the usual mixture of ammonium sulphate and groundnut cake, was under study. Both the control and the treated plots received the following basal dose of manure:—

(1) Farm yard manure at 10 tons per acre.

(2) Lime (slaked) at 1,000 pounds per acre.

(3) P_2O_5 (as superphosphate to supply 60 pounds of phosphoric acid per acre).

(4) Potash sulphate to supply 60 pounds of potash per acre.

Details of layout and summary are given in Table 12.

TABLE 12.—*Chilean nitrate—Details of layout.*

Layout—Half plot observation plot.
Treatments—(1) Chilean nitrate and (2) groundnut cake and ammonium sulphate in the ratio of 2 : 1 respectively.
Manures—200 lb. nitrogen in the form of Chilean nitrate and 200 lb. nitrogen in the form of ammonium sulphate and groundnut cake.
Size of plot—
Gross—120 links × 50 links = 6·00 cents.
Nett—120 links × 50 links = 6·00 cents.
Seed rate—15,000 three-budded setts per acre.
Spacing between cane rows—5 links or 3′ 4″.
Soil—Loam.
Previous crop—Paddy.
Date of planting—28th March 1953.
Period of harvest—5th and 8th April 1954.

Summary of results.

Treatment.	Yield of cane in tons per acre.	Number of canes per acre.	Sucrose.	Purity.	C.C.S.	C.C.S. in tons per acre.
			PER CENT.	PER CENT.	PER CENT.	
Chilean nitrate	38·62	24,583	14·29	80·00	9·65	3·73
Control	30·21	20,283	14·89	80·05	10·06	3·04

Chilean nitrate has shown advantage over the control. The observation is still in progress.

13. *Pit method of planting.*—The practice of planting setts in pits of 1½′ × 1½′ × 1½′, as is practiced in Madura district, was compared in observation plots with the normal trench planting. The spacing adopted last season was 6′ either way for pit with three setts per pit, while for the control the normal spacing of 4 links between rows and the seed rate of 15,000 three-budded setts per acre were adopted. During this season spacing adopted for pits was 4½′ either way with 5 links spacing for trenches.

The details of layout and the summary of results are furnished in Table 13.

TABLE 13.—*Pit planting—Details of layout.*

Layout—Half plot observation plot.
Treatments—Two—
(1) Pits and (2) Control.
Manures—Ten tons of farm yard manure as basal dressing per acre plus 200 pounds nitrogen in the form of groundnut cake and ammonium sulphate in 1 : 2 proportion and applied in two equal doses, half at 45 days after planting and the next half at the time of earthing up.
Size of plot—Nett—164 links × 61 links = 10 cents.
Seed rate—15,000 three-budded setts per acre.
Spacing—
Pits—4½′ either way.
Trenches—5 links apart.
Soil—Loam.
Previous crop—Paddy.
Date of planting—20th March 1953.
Period of harvest—8th to 12th March 1954.

Summary of results.

Pit planting.

Particulars.	Pit method.	Trenches Control.
Number of canes per acre	22,700	23,030
Yield of cane in tons per acre	33·40	32·00
C.C.S. per cent	11·26	11·00
Yield of C.C.S. in tons per acre	3·76	3·52
	RS. A. P.	RS. A. P.
Cost of production per ton	19 7 0	18 5 0

The observation is still in progress.

14. *Miscellaneous studies*—(1) *Lodging in cane.*—On account of vigorous growth particularly late in the monsoon season, the crop generally proved to be top heavy with consequent lodging in crop. Observations during the season revealed that the canes in general were poor in girth at bottom due to severe drought and lack of irrigation facilities during summer and early south-west monsoon periods. It is also within common experience that the physical condition of soil changes by summer leading to severe contraction. When the crop is irrigated under such conditions,

the soil is loosened and the crop begins to lodge severely. Combined with strong winds, which are not infrequent in April-May, the conditions of soil and wind are more favourable than even during the early monsoon period. Taking advantage of lodging during the season, samples were drawn periodically and analysed. The data are presented in Table 14.

TABLE 14.—*Lodging in cane—Juice analysis.*

Date of analysis.	Co. 419. Lodged canes. Sucrose.	Purity.	Weight of 20 canes.	Erect canes. Sucrose.	Purity.	Weight of 20 canes.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1954.	PER CENT.	PER CENT.		PER CENT.	PER CENT.	
1st February	11·29	71·25	11	11·20	61·25	60
4th February	11·10	71·90	56	..	..	..
6th February	10·75	70·69	60	..	..	..
8th February	11·27	72·18	50	..	..	..
9th February	11·61	74·57	62	..	..	..
10th February	12·45	76·32	53	..	..	..
11th February	12·13	74·35	52	..	..	..
12th February	12·07	75·01	51	..	..	..
13th February	12·05	73·86	53	..	..	..
15th February	9·99	66·12	57	..	..	..
16th February	9·29	64·19	54	..	..	..
17th February	11·05	72·30	44	..	..	..
18th February	11·66	74·71	65	..	..	..
19th February	12·62	74·30	47	..	..	..
20th February	10·88	72 98	59	..	..	..
22nd February	12·33	74·84	60	..	..	..
23rd February	9·74	66 67	50	..	..	..
24th February	10·88	71·08	46	..	..	..
25th February	11·54	72·08	44	13·18	76·25	70
26th February	13·18	78·11	61	11·81	72·64	61
1st March	11·73	73 26	62	12·35	74·61	63
6th March	12·59	74·89	35	12·05	74·32	53
23rd March	12·47	76·54	67	12·76	75·93	74
24th March	13·66	80·30	74	14·79	79·36	66
25th March	13·06	79·36	73	14·72	79·49	67
27th March	12·98	75·22	69	14·41	80·02	71

Date of analysis.	Co. 449. Lodged canes. Sucrose.	Purity.	Weight of 20 canes.	Erect canes. Sucrose.	Purity.	Weight of 20 canes.
	(8)	(9)	(10)	(11)	(12)	(13)
1954.	PER CENT.	PER CENT.		PER CENT.	PER CENT.	
1st February	15·43	84·03	57	15·43	84·03	57
4th February	13·01	79·13	44	..	..	..
6th February	13·64	80·66	46	..	..	..
8th February	15·92	86·43	56	..	..	..
9th February	15·07	84·38	52	..	..	..
10th February	15·54	91·27	53	..	..	..
11th February	14·87	83·49	48	..	..	..
12th February	15·43	84·31	49	..	..	..
13th February	14·29	82·10	59	..	..	..
15th February	15·61	83·39	49	..	..	..
16th February	15·40	80·89	52	..	..	..
17th February	14·27	82·43	46	..	..	..
18th February	14·02	87·27	56	..	..	..
19th February	16·32	81·36	49	..	..	..
20th February	16·01	81·17	52	..	..	..
22nd February	16·40	82·96	54	..	..	..
23rd February	14·94	81·75	54	..	..	..
24th February	14·91	..	53	..	..	..
25th February	14·91	81·00	66	15·71	82·64	62
26th February	14·68	81·93	45	16·98	87·18	66
1st March	15·45	84·31	77	16·09	85·47	62
6th March	17·27	89·62	42	17·90	87·66	55
23rd March	17·80	86·36	50	15·63	83·54	57
24th March	16·25	86·72	65	16·94	88·53	53
25th March	16·58	87·30	68	18·34	89·47	80
27th March	16·69	85·88	70	17·37	86·30	73

The following indications are evident :—

(1) Erect canes weigh more and contain more sugar in juice than the lodged canes.

(2) Deterioration of juice commences within three days after lodging.

(3) The rate of progress of improvement of juice, quality is less in lodged canes than in erect ones.

(4) Loss in sugar due to lodging is less in Co. 449 than in Co. 419 though both the varieties record loss due to lodging.

(5) Both sucrose per cent and purity per cent are lowered due to lodging but the depression is less in Co. 449 than in Co. 419.

(6) Breaking of canes at the bottom consequent to lodging is much less in Co. 449 than in Co. 419.

(2) *Gur studies.*—Gur moulds with good structure and consistency preserve well on storage. In the market, it is the colour of gur that commands premium with structure and consistency as secondary factors. Clarificants lime, hydros (sodium hydro sulphate), super, Bendai juice were used and the following are the broad indications.

(1) Liming is necessary to improve consistency of the resulting gur.

(2) Gur from juice without the use of lime as clarificant is poor in keeping quality, soft in structure and runs down in damp atmosphere.

(3) Super phosphate does not effectively remove the ill-effects of excess lime.

(4) Hydros is the best chemical for improving colour but the colour changes very shortly to lighter and darker shades. Sometimes the change is evident even within 24 hours.

(5) Next to hydros, addition of Bendai juice up to removing the scum was found to be useful. But excess of this clarificant too rendered the gur soft. In the studies of liming to different pH levels, the pH 5·5 to 6·7, it was found that pH of 6·1 to 6·4 after clarification yielded gur of good colour and consistency. But this range was not useful with overaged and deteriorated canes, where pH of over 7·0 was necessary to achieve good consistency.

Lime added to the juice before boiling, though gives consistency to the gur, it tends to darken the colour. Addition of lime at later stages (i.e.) at syrup stage —100—115 C. seems to improve the colour. Initial clarification of cane juice by Bendai juice and liming at the syrup stage improves both quality and colour quite favourably.

Addition of acid lime juice did not give any useful results as a good clarificant. The bleaching powder as a clarificant did not also prove useful as it darkened the colour of gur.

The best clarificants are seen to lime and Bendai juice only. Best results are obtained by liming to pH 6·1 level, removing the scum completely, and further clarifying by the addition of Bendai juice.

(3) *Deterioration in cane.*—Apart from over gaging and effect of season, breaking of cane consequent to lodging and sprouting at tops, are factors leading to detrioration of cane. Samples were drawn to evaluate the extent of deterioration.

In respect of fallen and broken canes, it was found that in Co. 419 by May, the percentage of broken canes was 14·85 and completely dried canes was 20·35 while in Co. 449, the percentage of broken canes was 6·29 and completely dried canes was 2·66. It is therefore seen that Co. 449 does not easily break on lodging.

In respect of juice analysis the data furnished in Table 15 indicate that the brix is significantly more in broken canes, while sucrose per cent is less, thus leading to lower purity per cent. This fall is greater in Co. 419 than in Co. 449.

There are various factors which lead to sprouting of canes at the top. For example, broken tops, top borer and arrowing. When the top buds sprout due to top borer, there does not appear to be much loss in sucrose per cent or purity of cane juice. But there is considerable reduction in the length of millable cane. In such studies, it was found necessary to classify the samples according to the age

of the crop, *top* sprouts and the primary causes for such sprouting. Such detailed study could not be made during the current season.

TABLE 15.—*Deterioration in cane—Juice analysis.*

Sample number.	Good canes.			Broken canes.		
	Brix.	Sucrose.	Purity.	Brix.	Sucrose.	Purity.
	PER CENT.	PER CENT.	PER CENT.	PER CENT.	PER CENT.	PER CENT.
			Co. 419			
1	16·46	13·13	79·97	21·58	10·66	49·41
2	16·86	12·83	76·08	15·16	6·79	44·79
3	13·36	9·13	68·34	20·38	..	..
4	18·06	14·67	81·06	14·86	9·86	66·34
5	16·66	13·35	80·08	17·76	12·42	69·72
6	16·16	12·66	78·36	19·58	11·23	62·46
7	14·66	11·53	78·63	18·18	13·19	72·57
8	16·16	13·99	86·60	16·56	11·61	70·01
9	14·96	11·56	77·68	15·36	11·12	72 40
10	11·34	..	..	16·16	11·46	70 92
11	13·66	10·09	73·84	19·08	9·64	50·58
12	14·86	10·82	72·90	15·16	11·34	74·80
Average ..	15·26	12·16	77·56	17·49	10·85	64·00
			Co. 449.			
1	15·06	10·33	68·58	15·96	12·99	78·86
2	17·86	14·93	80·56	17·26	14·55	84 37
3	14·36	11·39	86·28	15·46	10·46	67·66
4	14·76	11·41	80·02	12·26	9·21	75·13
5	15·06	11·98	79·56	16·06	13·31	82·88
6	14·86	12·08	81·27	14·76	11·53	78·11
7	12·64	8·84	69·93	16·86	14·05	83·32
8	13·86	11·06	79·79	12·86	9·94	77.47
9	16·06	..	..	14·86	11·19	75·44
10	14·76	11·19	75·97	19·38	12·85	82·15
Average ..	14·88	11·41	77·99	15·57	12·00	78·54

OTHER CROPS.

Paddy.—This was the main bulk crop raised in rotation with sugarcane on this farm. The south-west monsoon showers were not very helpful for raising the early samba crop. An area of 6·76 acres and 0·89 acre as against 2·15 and 2·20 acres in the last year were under paddy with samba and navarai kar respectively. An area of 3·34 acres was under kar crops.

GEB. 24, the early samba variety covered an area of 0·25 acre and yielded 3,036 pounds of grain and 3,800 pounds of straw per acre. Variety ASD. 5 was sown as late samba, yielded 1,519 pounds of grain and 3,305 pounds of straw per acre. Variety TKM. 3 was sown during the Navarai season and an area of 0·89 acre was under this variety and gave 666 pounds of grain and 1,110 pounds of straw per acre. During the kar season an area of 2·36 acres under TKM. 6 and 1·48 acres under Co. 13 were raised and gave on an average 2,900 pounds and 2,020 pounds of grain respectively.

2. *Green manure.*—Sunnhemp in nearly 12·00 acres was grown as main green manure crop and gave an average yield of 5,012 pounds of green manure per acre. Apart from this, the green leaf yielding trees like pungam, glyricidia and plants like Adathoda, Calatropis on the farm yielded an overall quantity of 29,379 pounds of green leaf.

3. *Ragi.*—Co. 2 ragi was raised on an area of 2·22 acres and gave on an average 1,000 pounds of grain per acre.

4. *Fodder cholam.*—An area of 2·56 acres was grown under fodder cholam. An acre yield of 4,620 pounds of fodder was obtained on an average.

5. *Vegetables.*—Tomatoes, " New Era " Cowpea, ladies' finger, snake gourd, lab-lab and brinjal were cultivated during the year. A small area of about 10 cents was cultivated with cabbage and cauliflower during the cold months.

The yields of different vegetables are given below :—

Serial number and name.	Quantity. LB.	Serial number and name.	Quantity. LB.
1 Drumstick	63¼	6 Bottle-gourd	38
2 Cauliflower	56½	7 Snake-gourd	130
3 Knolkhol	363	8 Lab-lab	120
4 Pumpkin	227	9 " New era " cowpea ..	1,013
5 Cabbage	137	10 Tapioca	433

ORCHARD.

The fruit trees were given timely irrigations and adequate manuring during the year. The following yields were obtained.

Serial number and name of fruit trees.	Number of trees.	Yield of fruits in pounds.
1 Mango, Bangalora	1	17¼
2 Do. country	2	202
3 Do. neelam	1	72¾
4 Sapota	2	146
5 Sathgudi	1	39½
6 Batavian	1	71½
7 Coconuts	13	55 (Nos.)
8 St. Michael	1	5¼
9 Pomello	1	135½
10 Mozambique	1	31¾
11 Grape fruit	1	31
12 Lime palakole and acid	2	10½
13 Malta lemons	36	64

Two Singapore jack fruit trees, planted in 1947, did not bear even this year.

Multiplication of fruit plants for distribution.—The trained permanent mazdoor was entrusted with the work of multiplication of fruit plants by layering, budding, grafting, gooteeing and the following plants produced in number mentioned, for sale to ryots.

Name of plot.	Number sold.
Malta lemon layers	11
Mango—Himayudin graft	18
Banganapalli graft	22
Bangalora graft	11
Neelam graft	5
Kadhar graft	2
Fig rooted cuttings	5
Murungai seedlings	540

Yield of bulk crops.—The yields of bulk crops raised on the Sugarcane Research Station, Gudiyattam, during 1953–54 are given below :—

Name of crop.	Average acre yield in lb.	Name of crop.	Average acre yield in lb.
Paddy—			
GEB. 24	3,036	Paddy—Tkm. 6	2,906
MTU. 19	2,375	Ragi—Co. 2	1,000
ASD. 5	1,519	Fodder cholam	11,846
Co. 13	1,996	Sunnhemp	5,000
TEN. 3	674		

The statements prescribed in Director of Agriculture's Circular D. Dis. No. X-1023/52, dated 8th May 1952, are appended to this report.

GUDIYATTAM,
23rd August 1954.

S. V. PARTHASARATHY,
Sugarcane Agronomist, Gudiyattam

APPENDIX L

FINANCIAL STATEMENT OF THE WORKING OF THE SUGARCANE RESEARCH STATION, GUDIYATTAM, FOR 1953–54 (FASLI 1363).

Head of account.	Fasli 1361 (July 1951–June 1952).	Fasli 1362 (July 1952–June 1953).	Fasli 1363 (July 1953–June 1954).
	RS. A. P.	RS. A. P.	RS. A. P.
"40. *Agriculture—O. Development Schemes—(1) Schemes included in the five year plan—C. Experimental farms—Sugarcane Research Station at Gudiyattam.*"			
Expenditure.			
1 Pay and allowances of officers and establishment—			
Pay of officer	..	..	2,119 5 0
Pay of establishment	8,267 11 0	7,784 11 0	7,250 3 0
Dearness allowance	2,545 2 0	2,425 3 0	2,758 2 0
House rent allowance	262 14 0	256 7 0	303 1 0
Travelling allowance	420 8 0	427 0 0	1,427 1 0
Total..	11,496 3 0	10,893 5 0	13,857 12 0
2 Contingencies—Authorized—			
Contingencies	103 3 3	274 5 3	229 5 8
Service stamps and telegram charges.	180 0 0	260 0 0	360 0 0
Purchase of live stock and dead stock.	2,139 1 6	205 2 0	183 11 9
3 Working expenses—			
Repairs and upkeep	1,198 13 3	1,351 8 10	1,428 11 6
Maintenance of cattle	3,101 11 6	1,729 6 0	976 15 0
Mazdoor labour	6,420 9 0	5,050 13 6	6,773 4 6
Miscellaneous cultivation expenses...	5,521 13 5	4,558 6 0	2,679 6 9
Manures and chemicals	2,546 14 5	1,747 12 0	3,634 11 3
Seeds and plants	576 11 0	285 5 0	423 13 6
Sundries	38 12 3	34 12 0	59 1 0
Dearness allowances to menials ..	3,501 14 0	3,698 12 0	3,755 12 0
Apparatus and materials ..	343 4 9	11 10 5	107 1 0
Petty construction and repairs ..	658 4 9	..	..
Total ..	24,331 1 1	19,316 13 0	20,611 13 11
Grand total ..	35,827 4 1	30,210 2 0	34,469 9 11
Revenue Receipts.			
(1) XXIX-A. Agricultural Receipts ..	8,296 11 7	7,570 5 1	8,929 9 3
(2) Value of farm produce transferred ..	2,759 2 6	1,911 9 0	1,814 6 0
Total ..	11,055 14 1	9,481 14 1	10,743 15 3

APPENDIX II.

Cost of cultivation of bulk crops raised in 1953–54 on the Sugarcane Research Station, Gudiyattam.

Serial number and name of bulk crop.	Extent.	Preparatory cultivation.	Manures and manuring.	Seeds and sowing.	After cultivation.	Irrigation.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ACS.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
1 Paddy	10·99	517 8 3	407 6 3	196 1 0	48 2 6	258 14 4
2 Groundnut ..	0·80	3 12 6	..	16 0 0	17 2 0	..
3 Ragi	2·22	62 12 8	42 5 0	19 3 3	16 1 6	30 4 0
4 Cholam ..	2·56	18 0 0	..	15 4 6	..	7 4 0
5 Vegetables ..	1·11	29 6 9	13 7 0	7 0 0	25 9 0	1 9 0
Total ..	..	631 8 2	463 2 3	253 8 9	106 15 0	297 15 4

Serial number and name of bulk crop.	Harvesting.	Total cost of cultivation.	Yield from the plot.		Value.	Profit (+) or Loss (—).
			Seeds and grain.	Straw.		
	(8)	(9)	(10)	(11)	(12)	(13)
	RS. A. P.	RS. A. P.	LB.	LB.	RS. A. P.	RS. A. P.
1 Paddy	338 4 6	1,766 4 10	20,814	31,250	2,970 0 0	+1,203 11 2
2 Groundnut ..	31 7 0	68 5 5	1,327	..	189 8 0	+ 121 2 6
3 Ragi	53 3 6	223 13 11	2,282	..	285 4 0	+ 61 6 1
4 Cholam	23 7 0	63 15 6	..	8,250	82 8 0	+ 18 8 6
5 Vegetables ..	7 4 0	84 3 9	821	..	103 0 0	+ 18 12 3
Total ..	453 10 0	2,206 11 6	..	..	3,630 4 0	1,423 8 6

APPENDIX III.

Serial number and details of crops raised.	Area in acres.	Seed.		Grain.		Straw.	
		Yield in pounds.	Value.	Yield in pounds.	Value.	Yield in pounds.	Value.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			RS. A. P.		RS. A. P.		RS. A. P.
1 Paddy	10·99	16,427	2,190 4 0	1,941	258 11 0	30,392	199 15 0
2 Cholam	2·56	126	15 12 0	..	..	8,250	51 9 0
3 Cotton (Kapas) ..	..	257	128 8 0	..	..	..	..
4 Gingelly ..	..	..	..	..	..	..	..
5 Groundnut ..	0·80	540	75 15 0	..	..	..	..
6 Ragi	2·22	845	142 1 4	..	..	2,775	15 6 8
7 Vegetables ..	1·11	(S) 456–7	115 1 0	..	..	..	..
		(V) 1415	154 3 1	..	..	..	..
Total ..	..	20,067–7	2,824 12 5	1,941	258 11 0	41,417	256 14 9

Serial number and details of crops raised.	Total Receipts.	Total receipts for the year.		
		1951–52.	1952–53.	1953–54.
	(9)	(10)	(11)	(12)
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
1 Paddy	2,638 14 5	2,550 12 6	1,400 11 5	2,638 14 6
2 Cholam ..	67 5 0	29 2 9	121 1 7	67 5 0
3 Cotton (Kapas) ..	128 8 0	27 8 0	216 2 8	128 8 0
4 Gingelly ..	....	....	237 5 4	....
5 Groundnut ..	75 15 0	8 0 0	37 2 3	75 15 0
6 Ragi	162 8 0	66 0 0	30 8 0	162 8 0
7 Vegetables ..	267 4 1	72 3 6	203 14 0	75 4 1
Total ..	3,340 6 7	2,753 10 9	2,246 13 3	3,340 6 7

APPENDIX IV.

Serial number and crop.	Seed. Retained on the station. Quantity.	Seed. Retained on the station. Value.	Seed. Transferred. Quantity.	Seed. Transferred. Value.	Grain. Retained on the station. Quantity.	Grain. Retained on the station. Value.	Grain. Transferred. Quantity.	Grain. Transferred. Value.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	LB.	RS. A. P.	LB.	RS. A. P.	LB.	RS. A. P.	LB.	RS. A. P.
1 Paddy	8,409	1,121 0 0	8,660	1,148 0 0	1,913	255 0 0	1,065	142 0 0
2 Cholam	..	..	125	25 0 0	..	..	..	..
3 Cotton	183	61 0 0	..	..	..	..	..	..
4 Gingelly	12	8 3 0	..	..	..	..	..	..
5 Groundnut	180	26 4 0	440	67 12 0	..	..	..	..
6 Ragi	1,067	166 12 0	837	133 10 0	..	..	..	..
7 Vegetable seed ..	41	27 8 0	37½	77 0 0	..	..	..	..
Total ..	9,892	1,410 11 0	10,100½	1,451 6 0	1,913	255 0 0	1,065	142 0 0

Serial number and crop.	Straw. Retained on the station. Quantity.	Straw. Retained on the station. Value.	Straw. Transferred. Quantity.	Straw. Transferred. Value.	Total. 1954.	Total. 1953.	Total. 1952.
	LB.	RS. A. P.	LB.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1 Paddy	16,525	103 4 0	..	..	2,769 4 0	2,550 12 6	1,400 11 5
2 Cholam	1,150	6 2 0	..	..	31 8 0	29 2 9	121 1 7
3 Cotton	..	..	..	..	61 0 0	27 8 0	216 2 8
4 Gingelly	..	..	..	..	8 3 0	..	237 5 4
5 Groundnut	..	..	..	..	94 0 0	8 0 0	37 2 3
6 Ragi	4,475	27 8 0	..	..	327 14 0	66 0 0	30 8 0
7 Vegetable seed ..	..	..	..	..	104 8 0	72 3 6	203 14 0
Total ..	22,150	137 14 0	..	..	3,396 5 0	2,753 10 9	2,246 13 3

APPENDIX V.

COST OF CULTIVATION OF BULK CROP RAISED ON THE SUGARCANE RESEARCH STATION, GUDIYATTAM.

Comparative Statement for three years 1951–52 *to* 1953–54.

Serial number and details of expenditure.	Expenditure for three years. 1951–52.	1952–53.	1953–54.
(1)	(2) RS. A. P.	(3) RS. A. P.	(4) RS. A. P.
1 Pay and allowances of staff	1,277 6 0	1,296 3 0	1,020 0 0
2 Miscellaneous cultivation expenses	1,149 1 10	1,569 10 8	893 2 3
3 Working expenses (actual cost of cultivation)	2,723 15 1	2,132 14 3	2,206 11 6
4 Expenditure on live and dead stocks	213 10 11	33 1 7	18 5 0
5 Rent on land at 15 times assessment	2,037 0 0	1,999 8 0	2,018 4 0
6 Unforeseen expenditure if any	..	..	..
Grand total ..	7,401 1 10	7,031 5 6	6,156 6 9

APPENDIX VI.

STATEMENT OF ABSTRACT EXPENDITURE AND RECEIPTS DURING 1953–54 COMPARED WITH THE FIGURES OF 1951–52 and 1952–53 OF THE SUGARCANE RESEARCH STATION, GUDIYATTAM.

Serial number and particulars. (1)	1951–52. (2)	1952–53. (3)	1953–54. (4)
	RS. A. P.	RS. A. P.	RS. A. P.
Expenditure	7,401 1 10	7,031 5 6	2,206 11 6
Receipts	2,753 10 9	2,246 6 3	3,630 4 0
Profit or loss (less in 3rd col.)	4,648 7 1	4,784 8 3	1,423 8 6

ANNUAL REPORT OF THE KALLAR FRUIT STATION FOR THE YEAR 1953–54 (FASLI 1363).

Season and rainfall.—The summary of weekly rainfall distribution for the year is presented in Table I.

TABLE I.—*Weekly rainfall statement of the Kallar Fruit Station for the year* 1953–54.

Month.	Week.	1953–54.		1952–53.		Average rainfall for the past 10 years.		Average rainfall for the past 41 years.	
		Quantity in inches.	Number of rainy days.	Quantity in inches.	Number of rainy days.	Quantity in inches.	Number of rainy days.	Quantity in inches	Number of rainy days.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
South-west monsoon.									
June	7 to 13	0·30	1	..	..	0·29	1·5	0·40	1·48
	14 to 20	0·25	1	0·24	1	0·34	1·4	0·40	1·84
	21 to 27	0·35	1	..	..	0·24	1·4	0·42	1·61
June to July	28 to 4	0·71	3	..	..	0·21	1·4	0 45	1·88
	5 to 11	1·58	2	0·25	1	0·56	2·3	0·44	2·14
	12 to 18	0·38	2	0·72	2	0·46	2·1	0·39	2·57
	19 to 25	0·59	3	..	..	0·49	2·2	0·52	2·44
July to August	26 to 1	0·80	4	..	..	0·57	2·1	0·45	2·00
	2 to 8	0·20	1	0·30	1	0·66	1·5	0·72	2·40
	9 to 15	0·15	1	0·20	1	0·54	1·4	0·60	2·20
	16 to 22	..	..	0·26	1	0·69	1·7	0·77	2·27
	23 to 29	0·86	2	0·63	3	0·70	2·4	0·76	2·48
August to September ..	30 to 5	..	..	0·63	2	0·47	1·6	0·58	2·31
	6 to 12	1·69	2	..	..	0·75	2·2	0·60	1·63
	13 to 19	0·47	3	..	..	0·63	2·2	1·23	2·43
	20 to 26	0·02	..	1·01	2	1·00	2·2	1·06	2·89
Total ..	..	8·35	26	4·24	14	8·60	29·6	9·79	34·52
North-east monsoon.									
September to October ..	27 to 3	0·12	..	1·43	4	0·62	1·9	1·16	2·04
	4 to 10	1·48	3	1·04	4	0·98	2·5	1·39	3·28
	11 to 17	2·64	5	0·39	2	2·61	3·6	2·80	3·69
	18 to 24	2·94	4	..	..	2·47	3·5	3·73	4·17
	25 to 31	0·78	2	0·51	1	1·85	2·7	4·60	3·84
November	1 to 7	..	..	1·35	1	2·63	3·1	3·34	4·04
	8 to 14	0·17	1	..	..	3·75	3·5	3·27	3·54
	15 to 21	1·16	3	..	..	1·82	3·1	2·60	2·40
	22 to 28	0·55	1	1·20	2	3·20	2·5	2·19	2·80
November to December ..	29 to 5	..	..	2·24	3	1·55	1·6	2·53	2·27
	6 to 12	..	..	5·34	4	1·28	1·3	1·18	1·35
	13 to 19	0·15	1	4·77	2	0·49	0·9	0·88	2·62
	20 to 26	0·08	..	..	..	0 89	1·7	0·52	1·03
December to January ..	27 to 3	2 30	3	..	..	0·62	0·9	0·85	1·31
	4 to 10	2 99	3	1·04	2	1·33	1·5	1·07	1·34
	11 to 17	2·04	3	..	..	3·12	0·6	0·61	0·87
	18 to 24	..	..	2·97	3	0·55	1·0	0·57	0·89
	25 to 31	..	..	1·35	1	0 29	0·4	0·86	1·23
Total ..	..	17·40	29	23·63	29	30·05	36·3	34·15	42·71
Hot weather.									
February	1 to 7	0·38	1	..	..	0·60	0·5	1·82	1·56
	8 to 14	..	..	..	..	0·43	0·6	0·87	0·95
	15 to 21	..	..	..	..	1·06	0·9	0·70	0·36
	22 to 28 or 29	1·15	1	5·08	1	1·36	1·0	1·42	0·46
March	1 to 7	..	..	2·00	1	0·40	0·4	0·44	0·80
	8 to 14	0·79	1	..	..	0·30	0·4	0·47	0·77
	15 to 21	1·34	3	..	..	0·70	1·1	0·99	0·82
	22 to 28	2·40	3	..	..	0·74	1·1	1·50	0·84
March to April	29 to 4	0·17	1	0·70	1	0·63	0·9	0·42	1·07
	5 to 11	..	..	0·60	2	0·77	1·7	1·22	1·70
	12 to 18	0·27	2	0·18	1	1·77	1·4	0·85	1·98
	19 to 25	2 22	2	1·13	4	0·54	1·1	1·08	1·60
April to May	26 to 2	0·81	3	0·23	1	0·37	1·1	0·33	1·49
	3 to 9	1·14	3	0·59	1	0·55	1·3	0 76	1 97
	10 to 16	2·30	3	..	..	1·35	3·0	0 90	1·54
	17 to 23	1·39	2	0·41	2	0·68	2·2	0·65	2·58
	24 to 30	0·84	1	0·14	1	0·46	0·8	0·82	1·48
May to June	31 to 6	0·22	1	1·98	4	0·32	2·0	0·52	1·55
Total ..	..	15·42	27	13 04	19	13·03	21·5	15·76	23·52
Grand total ..	..	41·17	82	40·91	62	51·68	87·4	59·70	100,75

The precipitation during the year was distributed over 82 rainy days as against 62 rainy days in the previous year. Even so, the total quantity of rain was more or less equal to the previous year's record. The distribution was favourable to many crops, despite the fact that the north-east monsoon period received a much lesser precipitation than in the previous year. The favourable distribution of rains appears to have influenced towards better yields in the rainfed crops in particular such as bananas, pineapple and arecanut.

I. Orchard.

A. *New plantings and sowings.*—The chief feature in the orchard section during the year was the expansion of the area under the short term remunerative crops such as cacao, banana and pineapple. Over 1,260 seedlings and budlings of cacao were set out in suitable odd patches with a view to build up a sizeable plantation of this crop. An area of over 2·5 acres was planted to six promising banana varieties, viz., Rasthali, Red Banana, Gros Michel, Virupakshi, Mauritius and Laden. The pineapple area also was extended further by planting 220 suckers of the varieties Kew and the 'Local' from Taliparamba. These short duration crops were cultivated mainly under rainfed conditions and were intended to augment the overall production of fruits at the station.

Another striking feature during the year was the planting of hybrid and selfed progenies of number of fruit crops including annonaceous fruits, bananas and citrus. These plantings comprised 257 selfed progenies of three pummelo selections, 109 hybrid citrus seedlings, representing five different combinations, twelve selfed progenies of mandarin orange, forty-three hybrid seedling progenies of four different annonaceous fruits and ten inter-specific crosses of bananas of four combinations. Besides these 165 seedlings of a local Indian gooseberry were planted along the channel course, as a feeding source for the state preservation unit. An observation plot of nutmeg with grafts raised on *Myristica beddomei*, *M. Malabarica* and *M. fragrans* was laid out at the rate of four grafts for each combination. Twelve rooted cuttings of *Vanilla planifolia* were planted in the vanillary to further extend the area under this crop.

Special efforts were put under way to build up a large collection of the three popular ornamental plants, viz., roses, cannas and crotons. As a result of these efforts, nine distinct canna types, 35 varieties of crotons and eleven varieties of roses were successfully established.

The major sowings made during the year comprised 3,950 seeds of cacao, 12,500 of grapefruit, 26 lb. of *Mimusops hexandra*, 2,150 seeds of jack fruit, 850 of litchi, 3,200 of bull's heart, 1,200 of sapota, 900 of custard apple and 102 of four different avocado varieties. From these sowings, 3,500 plants of cacao, 1,500 seedlings of grapefruit, 450 of *Mimusops hexandra*, about 200 of jack, 600 of bull's heart, 400 of sapota, 118 of litchi, 520 of Malayan apple and 530 of carambola were ultimately obtained for distribution. A variety of papaya known as 'Ranchi' supplied by the Horticulturist was introduced for expansion. Three hundred and sixty-five seeds of *Cullenia excelsa* obtained from a source in Anamalais were sown for raising seedlings for the propagation of durian.

From the seeds of eight arecanut types secured from six different East Asiatic countries during the previous year, the type from Andaman and Nicobar alone yielded 5 seedlings which are growing vigorously. During the current year six more types of arecanut from the Arecanut Research Station, Vittal were freshly sown. Of these, five types had germinated with a germination percentage varying from four to twenty-eight.

B. *Harvest of orchard produce.*—The summary of the harvests made of the important horticultural crops during the year is presented in the following table:—

TABLE II.—*Summary of harvest in* 1952-53 and 1953-54.

Serial number and name of produce.	1952-53.			1953-54.		
	Number of trees yielded.	Yield.		Number of trees yielded.	Yield.	
		LB.	OZ.		LB.	OZ.
1 Mangosteen	74	76,202	Nos.	70	18,554	Nos.
2 Mandarin orange	2	50		1	25	
3 Grapefruit	90	3,814		70	7,121	
4 Litchi	1	154		1	15	
5 Mango	1	440	8	3	1,128	
6 Avocado	10	108		8	87	8
7 Malayan apple	1	28		1	110	
8 Carambola	20	3,032	8	20	3,217	
9 Bull's heart	6	296		4	168	8
10 Rambutan	2	124		1	5	
11 Papaya	2	15		2	143	8
12 Sapota	106	680		10	767	8
13 Bilimbi	22	5		4	88	8
14 Rose apple	6	8		6	3	
15 Cacao	10	362	Nos.	10	423	Nos.
16 Arecanut	100	73,675	,,	100	83,726	,,
17 Custard apple	16	64		16	64	
18 Nutmeg mature	2	337	Nos.	2	1,479	Nos.
19 Nutmeg green	2	1,157	,,	2	1,127	,,
20 Annatto	8	106		8	127	
21 Banana	300	1,377	8	350	3,951	8
22 Lemon	11	5		10	11	
23 Passion fruit	1	3		1	13	8
24 Pineapple	106	147	8	165	373	8
25 Singapore jack	2	217		5	507	8

The harvests during the year would reveal that there has been a good increase in the yields of grapefruits, mangoes, bananas, Malayan apple, papaya, sapotas, pineapples, arecanut and cacao. But the year proved disappointing for litchi, avocado and rambutan. There has been a marked reduction in the mangosteen crop which is the chief revenue yielding fruit at the station. The increased harvests in banana and pineapple are primarily due to the steps taken to expand the area under the short term fruit crops during the past two years. The marked improvement in the yields of cacao, nutmeg, bilimbi and Singapore jack is attributed to the advancing maturity of the young trees. It would be interesting to note that the grapefruits have recorded nearly double the yield over the previous year, in spite of the fact that the population of trees has dwindled from 90 to 70. This is due to the hygienic orchard measures adopted during the previous two seasons by thinning out the overcrowded trees and limbs, as well as by the adoption of timely control measures against pests and diseases.

II. FRUIT CROPS.

A. *Mangosteen—Progeny trial.*—Seven seedling progenies representing different selections characterised by high and low yields in the summer and monsoon crops, and for resistance to 'gambog' were kept under observation since their planting in October 1952. All the progenies were slow in growth, the mean increments ranging from 0·13 inches to 0·32 inches only. Among the progenies, the 'gambog' free selection made the best growth during the present and the preceding season.

B. *Mandarin orange*—(1) *Progeny trial.*—The performance of the seedling and clonal progenies of twenty-three different mandarin selections from various sources in South India was continued to be recorded.

According to the growth measurements recorded in June 1954, the Poona Sangtra budded plants led all the other selections with mean stock girth of 4·4 inches followed by the Nagpur Sangtra budlings which recorded a mean measurement of 3·1 inches.

In respect of scion girth again, the same selections maintained their superiority over the other clonal progenies. The grafts of the Kallar off-season selection were next in order, with a mean scion girth of 1·8 inches. In respect of tree height, the Kookal selections dominated the rest with mean increments of 39·8 inches, 39·3 inches and 34·6 inches by the off-season seedling, the main-season seedling and the main season graft respectively. In tree spread, however, the Shevroys main-season seedling recorded the maximum measurement of 22·8 inches, closely followed by the Kookal off-season seedling with 20·5 inches.

Two selections, viz., Poona Sangtra and Nagpur Sangtra attained bearing for the first time in 1953 and developed successfully a few fruits. During 1954, a better crop of fruits was developing on the Poona Sangtra budlings but the Nagpur Sangtra clones failed to fruit. During the season under report the seedlings of Nagpur Sangtra, the Kookal off-season selection and the Kolakombai main-season selection attained bearing for the first time since their planting in 1948.

(2) *Rootstock trial.*—(*a*) Due to repeated casualties in this trial, further observations were discontinued as they did not lend themselves for any valid analysis.

(*b*) *Mandarin orange on different rootstocks.*—The trial was initiated in July 1950 with budlings and grafts of the Kallar Mandarin on four different rootstocks, viz., Jamberi, Gajanimma, pummelo and sweet lime. Table III below presents a summary of the cumulative data of girth, height and spread of each combination since the inception of the trial—

TABLE III.—*Mandarin orange on different rootstocks.*

Growth performance of grafts and buildings of mandarin on four rootstocks—recorded in June 1954.

(Mean growth measurements in inches.)

Serial number and Stionic combination.	Average of cumulative growth measurements recorded over the four year period from 1950–54.			
	Stock girth.	Scion girth.	Height.	Spread.
(1)	(2)	(3)	(4)	(5)
1 Grafts on Jamberi	1·72	0·58	17·54	3·14
2 Grafts on Gajanimma	1·07	0·61	10·57	2·78
3 Grafts on pummelo	1·57	0·46	14·73	1·65
4 Grafts on sweet lime	0·65	0·33	3·83	1·40
5 Budlings on sweet lime	0·53	0·31	3·00	0·66

The grafts on Jamberi were generally superior to all other stionic combinations and recorded the maximum measurements in stock girth, tree spread and height. The budlings and grafts on sweet lime accounted for the least growth in all respects. Gajanimma recorded maximum scion girth, although in respect of stock girth and height, the grafts on this stock were inferior to those on Jamberi and pummelo. None of the trees had attained bearing age.

(*c*) *Wynaa orange rootstock trial.*—With a view to assess the potentialities of hardier rootstocks such as kichili, rough lemon, sour orange and sweet orange, yet another trial employing the abovenamed stocks with the Wynad orange as the scion, was initiated in November 1952. The mean measurements of the budlings and the unworked seedlings, in this trial are set out in Table IV below—

TABLE IV.—*Wynad orange rootstock trial.*

Mean growth increments of the seedlings and budlings recorded in June, 1954.

Serial number and stionsuqa·uic soiioii	Mean increment of		
	Stock girth (in inches).	Scion girth (in inches).	Height. (in inches).
1 Budlings on kichili	0·41	0·48	5·50
2 Budlings on rough lemon	0·33	0·28	2·75
3 Budlings on sweet orange	0·58	0·38	5·75
4 Budlings on sour orange	0·35	0·54	3·75
5 Unworked seedlings	0·58	..	3·67

The maximum stock girth and tree height was observed in the budlings on sweet orange, while in respect of scion girth the budlings on sour orange led the rest. The unworked seedlings were the most vigorous of all accounting for an average tree height of 8·87 inches. The budlings on rough lemon recorded the minimum growth in all respects.

It is interesting to note the contrasting behaviour of Jamberi (rough lemon) with the two scion types, viz., Kallar and Wynad. The stock has exhibited a very superior growth performance in almost in all respects with the Kallar type, while with the Wynad mandarin it is inferior in all growth phases to all the other stocks.

(3) *Propagation trials—Cincturing and etiolation of shoots*—The attempts to root the shoots with the aid of 'Alkathene' wrapper a proprietory film product the use of which is said to conserve moisture for a sufficiently long time, did not prove successful.

(4) *Hybridisation.*—(*a*) *Crossing.*—In all a total of 109 hybrid seedlings of the following parental combinations were ultimately secured from 98 reciprocal crosses made during 1952.

Female parent.		Male parent.	Number of progenies obtained.
Citrus grandis	×	*C. paradisi*	33
C. paradisi	×	*C. Limon* (*Malta*) ..	12
C. grandis	×	*C. Limon* (*Malta*) ..	26
C. grandis	×	*C. reticulata*	24
C. Limon (*Malta*)	×	*C. grandis*	14

All the seedlings were set out in the field at close spacing in November 1953, to study their growth and yield behaviour. None of the crosses had attained bearing, but on considerations of vigour, the seedlings of Malta lemon (♀) × pummelo (♂) made the maximum growth.

(*b*) *Selfing.*—Twelve selfed mandarin seedlings which resulted from the selfing operations during 1952, were planted out in the field in November 1953. The seedlings were growing satisfactorily but none had attained bearing at the time of this report.

C. *Other fruits.*—(1) *Jack*—(*a*) *Varietal—Singapore jack.*—Five out of eleven seedlings of this variety planted in 1947 developed successful crop recording a mean yield of 6·2 fruits per tree weighing on an average 101·6 lb. as against 4·3 fruits weighing 81·6 lb. of the previous season. The fruits of this variety were available for harvest for a prolonged period of eight months commencing from January and lasting up to August, which is characteristic feature of this variety.

(*b*) *Hybridisation studies.*—Twenty hybrid seedlings resulting from the crosses made with Singapore jack as the common female parent and the Velipella jack and another farm selection noted for its outstanding size were planted in the field in August 1952 to isolate the desirable progenies. Out of these, only eight seedlings of the former combination and three of the latter had established and were growing satisfactorily.

One more spike of the Singapore jack was hand-pollinated with the Velipala pollen in March 1954. The fruit thereof was developing and was yet to be harvested.

(*c*) *Rootstock trial.*—With a view to determine the optimum rootstock for the jack, grafts of a selected tree of the Velipela type were raised on Rudraksh, (a variant type of jack), *Artocarpus hirsuta* (Lamb) and jack seedlings and were planted out for comparison along with the unworked seedlings of the same parent

for observation in 1947. The following table summarises the mean measurements of each combination covered by the five-year period 1949–1954.

TABLE V.—*Jack—Rootstock trial.*

Growth performance of seedlings and grafts of jack Velipela.

(Mean of cumulative measurements recorded for the period 1949–1954.)

Serial number and treatment.	Mean of the cumulative measurement of	
	Height (in inches).	Spread (in inches).
1 Jack on Rudrakshi	338·7	163·2
2 Jack on jack seedlings	217·7	120·5
3 Jack on *Artocarpus hirsuta*	311·7	162·1

The grafts on Rudrakshi maintained their lead in tree spread and tree height over the other combinations, while the jack on *Artocarpus hirsuta* were the least vigorous in both respects.

In February–March 1954, three grafts on the seedling stocks of jack and one on Rudrakshi flowered for the first time nearly seven years after planting. But they failed to mature any fruit.

(2) *Annonas*—(*a*) *Varietal—Custard apple.*—Four seedlings in each of the two types, viz., Balanagar and Mammoth were obtained from the Horticulturist, Hyderabad and set out for observation in January 1954. The plants, had established well and were showing satisfactory growth progress.

Another type from Kodur, reputed for its red fleshed pulp was planted in July 1953. Four out of the twelve seedlings developed a small blossom in May 1954. One of the plants had set a couple of fruits, at the time of this report which were yet to mature.

(*b*) *Rootstock trial.*—The observations on the performance of custard apple on *Annona reticulata* and *A. squamosa* in comparison with the unworked seedlings were continued to be recorded.

Table VI below presents the mean cumulative growth measurements of the grafts and the seedlings :—

TABLE VI.—*Custard apple rootstock trial.*

Growth performance and yield of grafts on custard apple and bull's heart and the unworked scion seedlings.

(Mean cumulative measurements of the grafts and seedlings for the five-year period from 1950–1954.)

Serial number and variety.	Mean of the cumulative measurements.			Mean of the cumulative yield per tree.
	Stock girth (in inches).	Scion girth (in inches).	Height. (in inches).	
(1)	(2)	(3)	(4)	(5)
1 Custard apple on bull's heart.	10·6	10·2	160·2	13·5
2 Custard apple on custard apple.	8·5	8·2	154·0	8·8
3 Custard apple seedling ..	8·3	..	67·4	6·9

The custard apple grafts on bull's heart continue to maintain their superior tree growth and yield over the grafts on custard apple as well as the unworked seedlings.

Random measurements of the weight and size of the fruits obtained separately from the grafts and the seedlings were also recorded. It was interesting to note that the mean fruit weight from the seedlings varied from 2·7 ounces to 6·3 ounces per fruit, while in the case of grafts the variation was from three ounces to nine ounces. The percentage of large sized fruits (more than 3½ inches in diameter) in

the grafts was 45, while in the seedlings it worked out to only 20. These observations apparently indicate that the clonal propagation of custard apple has definitely helped to minimise the variation in the size of fruit to a considerable degree.

(*c*) *Different annonas on bull's heart stock.*—In the preceding trial, the bull's heart has emerged as the most optimum stock for *Annona squamosa*. With a view to determine whether it would prove equally suitable for the other annonas, viz., soursop and cherimoyer, a trial was initiated in 1945 employing grafts of all the three annonas raised on bull's heart as the common stock. According to 1954 measurements, the custard apple grafts recorded the maximum extension growth, with a mean tree height of 12 feet 4 inches followed by cherimoyer and soursop grafts with a mean tree height 11 feet 8 inches and 8 feet 7 inches respectively.

The custard apple grafts also led the others in yield, recording a mean crop of 86·3 fruits as compared to 6·3 fruits by cherimoyer and 5·8 fruits by soursop. The fruiting performance of soursop and cherimoyer on bull's heart in their fifth fruiting season is definitely unsatisfactory.

(*d*) *Hybridization studies.*—Out of a total of two hundred and fifty reciprocal crosses effected in 1952, forty-three seedlings representing the three following combinations were ultimately obtained and planted in November 1953 :—

Female parent.	Male parent.	Number of seedlings obtained and planted.
Annona squamosa	*Annona cherimolia*	10
Annona squamosa	*Annona reticulata*	25
Annona squamosa	*Annona muricata*	8
	Total ..	43

All the hybrid progenies were growing satisfactorily in the field. The seedlings of the combination custard apple (♀) and bull's heart (♂) were generally more vigorous than the rest. It was interesting to note that a solitary hybrid seedling resulting from a cross of custard apple (♀) and cherimoyer (♂) was observed to have flowered and set a single fruit within seven months since planting.

With a view to complete the reciprocal cycle between the three different annonaceous fruits, further crossing operations were pursued during 1954 season. The list of crosses made with the extent of fruit set in each combination is set out below :—

Serial number and female parent.	Male parent.	Percentage of fruit set.
1 *Annona muricata*	*Annona squamosa*	58
2 *Annona cherimolia*	*Annona squamosa*	33
3 *Annona reticulata*	*Annona squamosa*	50
4 *Annona squamosa*	*Annona muricata*	60
5 *Annona squamosa*	*Annona cherimolia*	66

The fruits of the crosses were developing and were not ready for sampling tests.

(3) *Pineapple*—(*a*) *Hybridization studies.*—The inter-varietal crossing operations were pursued. A total of 379 flowers of Kew were crossed with the pollen of Mauritius, and 345 flowers of Mauritius were crossed with the pollen of Kew. But, as in the previous year no seed set was observed in any of the crossed fruits and no hybrid seedlings could therefore be raised. One more variety known as the 'Local' from the Agricultural Research Station, Taliparamba, was secured for further hybridization work.

(*b*) *Trial on the forcing of pineapple with hormones.*—The application of the chemical 'Planofix' was continued as per schedule with a view to regulate the cropping. In the treatments for advancing the flowering, the lowest concentration of 0·001 per cent of the chemical accounted for the flowering of 72·2 per cent of the treated suckers within 90 days after the application, while the other two concentration, viz., 0·003 and 0·006 per cent caused only 55·5 per cent of the treated suckers to flower within the same period.

In the trial to postpone the fruit maturity period, the highest concentration of the substance, viz., 0·10 per cent recorded the least flowering of 25 per cent of the treated plants after 173 days from the date of application, while the other two concentrations, viz., 0 01 and 0·05 per cent recorded 75·5 and 58 per cent flowering within the same period. Thus, the period of cropping has been actually extended over a period of seven months in the year. The results are generally in conformity with the observations recorded in the previous season.

(*c*) *Trial with the application of calcium carbide.*—A trial was initiated during 1954 season to test the efficacy of calcium carbide combined with ice water in hastening the blossoming period in pineapple. Twenty suckers were treated at fortnightly intervals leaving an equal number as control. Eighty-five per cent of the treated plants developed blossom within 45 to 60 days after the treatment, while the untreated plants failed to flower even after 150 days. These results appear to compare more favourably with the treatment of 'Planofix' which could induce a maximum of 72 per cent in 90 days.

(4) *Banana*—(*a*) *Varietal.*—On the basis of the previous years' trials, it has been concluded that out of 70 varieties which were under study, twelve varieties, namely, Laden Dorai Vazhai, Rasthali, Poovan, Red Banana, Pedda Pacha Arathi, Kallar Sirumalai, Gros Michel, Puttu Vazhai, Adakka Kunnan, Giant Governor and Nendran were the most suitable for extended cultivation. Steps were taken to extend further cultivation of these varieties and for maximising their multiplication and distribution.

(*b*) *Hybridization.*—The inter-specific hybridization work in bananas was pursued further. From the 15 different combinations attempted during the previous year the following have recorded successful seed set :—

Serial number.	Combinations.		Number of seeds obtained.	Number ge minated.	Number of seedlings growing in the field.
	Female.	Male.			
(1)	(2)	(3)	(4)	(5)	(6)
1	Laden	*Musa acuminata* ..	21	6	5
2	Booditha Bathees. Bontha	*Musa acuminata* ..	22	..	..
3	Poovan	*M. balbisiana* ..	3	1	1
4	Red Banana	*M. Banksii* ..	43	..	..
5	Sambrani Monthan ..	*M. Banksii* ..	5	1	1
6	Dorai Vazhai	*M. Banksii* ..	6	2	1

Seedlings of the surviving four combinations were growing in the field although none of them had flowered at the time of this report. Diverse morphological features were associated with different seedlings of the same combination which were being recorded.

(5) *Avocado—Varietal.*—The three Ceylon introductions, viz., Pollock, Fuerte and Peradeniya Purple Hybrid maintained their promising growth and yield performance satisfactorily. Apart from their precocity and good yields it was interesting to note that the varieties showed diverse fruiting periods which have helped to widen the period of supply of this fruit at the station. Pollock was available for harvest from mid-July to end of August and was closely followed by Peradeniya Purple Hybrid which lasted from August to October. Fuerte which is a late variety maintained the supply from September to early January. Added to this, the two existing varieties at the station, viz., Long and Round which normally mature

the fruits from May to August, have virtually contributed for a continuous supply of avocado fruits for well over eight months in the year.

(6) *Litchi.*—The six litchi varieties introduced from Bihar in 1942, continued to make satisfactory, vegetative growth but none except Deshi fruited during the season. Their failure to fruit in spite of their long orchard life of twelve years is an unsatisfactory feature.

Other miscellaneous fruits—(*a*) *Bilimbi* (*Averrhoa bilimbi*).—The four seedling trees planted in 1948 developed a good crop of 20·1 pounds per tree for the first time.

(*b*) *Spondias mangifera.*—The single surviving seedling planted in 1948 was yet to flower.

(*c*) *Lemons.*—All the nine lemon varieties at the station developed satisfactory crop. The Rajahmundry lemon was most promising with a mean tree yield of 25 lb. On considerations of flavour, seedlessness and fruit size, Seville continued to be the best closely followed by lemon Malta.

(*d*) *Tahiti lime.*—Known for its large size and seedless pulp, six plants of this variety were introduced from Ceylon and planted in April 1954.

(*e*) *Muntingia calabura.*—The seedling trees of this fruit introduced from Mangalore and planted in December 1949 were making vigorous growth. The trees recorded a mean yield of four pounds per tree.

(*f*) *Yellow passion fruit* (*Passiflora ligularis*).—Rooted cuttings of this plant introduced from Coonoor and planted in June 1952 were growing vigorously and fruited within eight months of planting. In 1953–54 season they recorded a mean yield of 70 fruits per vine. From the observations on flowering, it was seen that the vines flowered throughout the year excepting for a brief period of two months in February and March. Considering its vigorous growth and precocious fruiting behaviour, the variety has proved to be a promising introduction for elevations similar to that of Kallar.

(*g*) *Giant granadilla* (*Passiflora quadrangularis*).—Rooted cuttings of giant granadilla obtained from Anamalais were planted in November 1952. They recorded a good vegetative growth and flowered nearly 11 months after planting. Fruit set, however, could be accomplished only with the help of hand pollination. The optimum time for the hand pollination of flowers was between 7 a.m. and 12 noon when the stigma was in a receptive condition. It was also seen that the fruits took nearly 69 days to attain maturity stage from the date of fruit set. A description of the fruit is recorded in Appendix II.

(*h*) *Aegle marmelos.*—The seedlings planted in 1950 were growing slowly.

(*i*) *Cassimiroa edulis* (*white sapote*).—The single seedling of this fruit, introduced from the United States of America, in 1950 had made an extension growth of about 2 feet making the total height to fourteen feet six inches. The seedling had not yet flowered.

(*j*) *Fig.*—The fig variety Mission obtained from United States of America, and planted in July 1950 was growing satisfactorily. The plant flowered and bore six fruits on April 1954 for the first time.

(*k*) *Queensland nut.*—The solitary tree flowered profusely and matured a good crop of 25 pounds of nuts as against ten pounds recorded in the previous year.

(*l*) *Jujube* (*Ber*).—In September 1952, six seedlings of a reputed selection of this fruit were procured from Tuni and planted for a study of its performance. The seedlings had registered a mean height of three feet and four inches The seedlings, however, were yet to flower.

(*m*) *Indian gooseberry.*—A greenish white variety of Indian gooseberry was obtained from Kodaikanal and six seedlings of this plant were planted in September 1952. The seedlings were growing vigorously.

(*n*) *Sweet tamarind.*—Eight seeds of this variety were received from Siam and sown in July 1951 for trial. Ultimately only one seedling survived which has grown to a height of 18 inches. The growth of the seedling was rather slow

III. Spices, Beverages and other Economic crops.

1. *Nutmeg.*—In 1953, a useful aromatic oil was distilled successfully from the nutmeg leaf. This process opened a cheaper source of the production of the oil, which was usually obtained from the costly nutmeg seed. The investigation was further pursued during the period under report to determine the usefulness of still cheaper materials. In these attempts, the peels of the nutmeg fruit, which are usually thrown away as an useless material were sent to the Oil Technologist, Kozhikode, for distillation. The Oil Technologist reported that the peal yielded 0·45 percent of oil, which had a specific gravity of 0·913 and a refractive index of 1·487.

The oil was less pungent than the oil from the leaf. The Oil Technologist was of the opinion that the oil could be useful in flavouring dental preparations, essences and confectionaries.

Rootstocks for nutmeg.—A small-scale observation trial with grafts raised on three different rootstocks, viz., *Myristica beddomei*, *M. Malabarica* and *M. fragrans* was laid out in January 1954 to study their comparative performance. All the grafts had established and were making satisfactory growth in the field.

2. *Cacao.*—Observations on the performance of seedlings and vegetatively propagated plants were recorded. The budlings were generally more vigorous than either the seedlings or layers. The mean heights of three years old budlings, seedlings and layers were 60 inches, 48 inches and 42 inches, respectively. In respect of cropping, it was observed that the budlings developed flowers even from the second year of planting while neither the layers nor the grafts had yet flowered. The budlings developed a successful crop of 55 fruits in the third year after planting while the layers developed only seven fruits and the seedlings none.

3. *Malayan oil palm.*—The seedlings of the plant had grown to a height of 7 feet 6 inches at the time of this report.

4. *Pejibaye palm—Bactris utilis.*—The single plant planted in December 1950 had grown to a height of 36 inches.

5. *Vanilla.*—Out of the four Vanilla vines planted in 1950–51, two vines flowered in March 1954 and set successfully nine pods in two clusters by hand pollination.

New Introductions.

1 *Arecanut types.*—Of the twenty-two different types of arecanut introduced from six different countries and sown in 1953, only five seedlings of the type from Andaman and Nicobar Islands germinated and established. From the prior introductions, the seedlings of the types from South Kanara, Malaya and Ceylon, those from Malayan type have made a growth of nine feet three inches while the Ceylon and South Kanara types were only two feet in height.

In February 1954, six more types were received from Arecanut Research Station, Vittal. Of these, five types had germinated at the time of this report.

2. *Telfaria pedata* (*Oysternut*).—Three plants of this important oil yielding vine were planted in April 1953. They were making vigorous growth and one of the vines had attained a height of nearly ninety-five feet. None of the vines has flowered as yet.

3. *Ocimum Kilimanjaricum.*—The seedlings raised from the seeds received from Dehra Dun and sown in October 1952 were growing vigorously. The leaves on distillation yielded only 0·52 per cent of camphor. The plant is highly suitable for extended cultivation in this tract.

4. *Olive grafts* (*Olea Europea*).—Two grafts of olive were received from Genoa and planted in September 1953. Of these, one graft ultimately established and was growing satisfactorily.

5. *Tree-onion* (*Allium cepa var. Aggregatum*).—Three tree-onion plants (originally received from United States of America) were set out at Kallar in January 1954 for trial. All the three plants had established well and were making satisfactory growth with a mean plant height of twenty-six inches. No bulb development was observed yet.

6. *Annona hybrids.*—Two grafts of an annona hybrid of custard apple and cherimoyer were received from the Horticulturist, Bombay, and planted in July 1953. Of these, only one established. The graft registered a height of two feet. The hybrid was yet to flower.

7. *Ramie* (*Bochmeria nivea*).—Seeds of 'Ramie', an important fibre yielding plant, were sown in March 1954 and June 1954. There were no germinations till the time of this report.

8. *Ornamental plants.*—Continued efforts were made to enrich the collection of ornamental plants during the year as a result of which, 6 types of cannas, 10 varieties of Hibiscus and Acanea, 6 varieties of standard roses, seven types of crotons. 3 types of jasmines and 4 different kinds of foliage and pot plants were added to the existing collection. In all, 786 cinctures, 400 rooted cuttings of briar rose for budding with superior roses and 1,500 bulbs of cannas were propagated.

Other Miscellaneous Economic Plants.

Green-manure and cover crops.—Among the cover-*cum*-green manure crops, *Calapogonium muconoides*, *Peuraria phaseoloides* and *Centrosema pubescens* were continued to be in trial. Of these, *Calapogonium muconoides* was found to be the most vigorous of the three.

Indigofera teysmanii, *Gliricidia*, *Sesbania*, *sunnhemp* and *lucerne* were also grown. Collection of seeds from each of these crops were made and a total quantity of 455 lb. of seeds were collected from all the above crops during the year. Large-scale propagation of *Gliricidia* and *Indigofera* was also taken up.

Eleven more cover crops, namely, *Aeschynamone americana*; *Crotalaria striata*; *C. exiensis*, *C. brownii*; *C. usaramoensis*; *C. anagyroides*; *Indigofera endecaphylla*; and *Stizolobium sp.*; *Tephrosia candida*; *Cassia didymobotrya*; *C. leschenaultiana* and *Phaseolus semierectus* were newly brought under trial in June 1954.

Drugs and Inspecticidal Plants.

The plants of *Derris elliptica* and *Milletia pachycarpa* were growing satisfactorily in the field. Root powder of the latter was sent to the Government Entomologist for analysis and testing its efficacy as an insecticide. Milletia plants flowered for the first time during the year nearly nine years after planting, while the plants of Derris which were also of about the same age were yet to flower.

Trees of *Myroxylon tolueifera*, planted in 1947, were recording good vegetative growth. Attempts to tap the balsam from the tree trunks again proved a failure, presumably because the trees were yet immature.

IV. MISCELLANEOUS.

Plant and seed distribution.—Number of plants distributed, 14,877; quantity of seeds distributed, 371 lb.; number of seeds distributed, 600.

COONOOR,
22nd July 1954.

K. FAZLULLAH KHAN,
Assistant Fruit Specialist.

COIMBATORE,
26th August 1954.

U. NARASINGA RAO,
Horticulturist and Professor of Horticulture

TABLE I-A.—*Statement showing the cost of production of bulk crops—Kallar Fruit Station.*

Crops.	Yield in lb.	Value.	Fruits (sold or transferred). Yield.	Fruits (sold or transferred). Value.	Plants (sold or transported). Yield.
		Rs.		Rs.	
Mangosteen	..	..	18,554 Nos.	1,968	208
Grape fruit	..	..	7,121 „	1,335	190
Banana	..	..	3,952 „	494	962
Other fruits and spices	302	117	10,807 lb. 86,755 Nos.	1,365	1,488
Miscellaneaus—					
Honey	..	..	9 lb.	27	..
Grass	..	..	2,732 Nos.	171	..
Other miscellaneous receipts	..	..	..	..	..
Total	..	117	..	5,360	..

Crops.	Plants (sold or transferred)—*cont.* Value.	Total receipts for the year 1953-54.	Total receipts for three years. 1950-51.	1951-52.	1952-53.
	Rs.	Rs.	Rs.	Rs.	Rs.
Mangosteen	208	2,176	..	..	6,906 9 0
Grape fruit	95	1,430	Figures under each are not available for 1950-51 and 1951-52.		731 0 0
Banana	120	614			163 4 0
Other fruits and spices	5,212	6,694			9,573 12 6
Miscellaneous—					
Honey	..	27	..	..	9 0 0
Grass	..	171	..	..	17 4 0
Other miscellaneous receipts	..	254	..	..	278 8 3
Total	5,635	11,366	4,998	6,548	17,809

TABLE I-B.—*Statement showing the cost of production of bulk crops—Kallar Fruit Station*

Particulars.	Fruits. Retained at the station. Quantity.	Fruits. Retained at the station. Value.	Fruits. Transferred or sold. Quantity.	Fruits. Transferred or sold. Value.	Plants. Retained at the station. Quantity.	Plants. Retained at the station. Value.
				Rs.		Rs.
Mangosteen	..	..	18,554	1,968	300	208
Grape fruit	..	..	7,121	1,335	2,000	1,000
Bananas	..	..	3,952	494	800	200
Other crops	..	..	10,807 lb. 86,755 Nos.	1,365	7,606	3,204
Total	..	..	11,880 lb. 105,309 Nos.	5,162	10,706	4,704

Particulars.	Plants—*cont.* Transferred or sold. Quantity.	Plants—*cont.* Transferred or sold. Value.	Total value.	Total receipts for three years. 1950-51.	1951-52.	1952-53.
		Rs.	Rs.	Rs.	Rs.	Rs.
Mangosteen	208	208	2,476			
Grape fruits	190	95	2,430	Figures under each are not available for 1950-51 and 1951-52.		7,157 0 0
Bananas	962	120	814	..	..	1,731 0 0
Other crops	4,880	5,212	9,781	..	..	188 0 0
				..	..	13,324 0 0
Total	6,240	5,635	15,501	4,998	6,548	22,400 0 0

TABLE II.—*Statement showing cost of maintenance of bulk areas—Kallar Fruit Station, 1953–54.*

	Actual expenditure for three years.		
	1951–52.	1952–53.	1953–54.
	RS.	RS.	RS.
1 Pay and allowances of staff (1/3 of actuals). Farm Manager and Maistry or Fieldman.	661	706	728
2 Miscellaneous cultivation expenses (1/3 actuals) ..	(included in item 3).		
3 Working expenses (1/10 actuals)	1,470	1,390	1,002
4 1/10 of expenditure on live and deadstock	15	10	5
5 Proportionate rent for the land if the station is on leased land, if it is Government Farm, the normal rented value of the tract subject to 15 times land assessment per acre to be debited as expenditure (estimated).	170	170	170
6 Unforeseen expenditure	Nil.	Nil.	Nil.
Total ..	2,316	2,276	1,905

TABLE III.—*Statement of abstract expenditure and receipts of Kallar Fruit Station for three years* 1951 *to* 1954 (*fasli years.*)

Serial number and particulars.	1951–52.	1952–53.	1953–54.
	RS.	RS.	RS.
1 Expenditure (working expenses)	11,232	14,132	10,024
2 Revenue	6,548	17,809	11,366

APPENDIX I.

STATEMENT OF CHARGES AND RECEIPTS OF KALLAR FRUIT STATION (FROM *JULY 1953 TO JUNE 1954*).

	RS.	A.	P.
Charges—			
Pay of Establishment	4,567	5	0
Other compensatory allowances (house rent allowance)	206	9	0
Dearness allowance	1,491	2	0
Travelling allowance	2,633	7	0
Contingencies—			
Petty construction and repairs	140	9	0
Purchase of dead-stock	43	13	0
Working expenses	10,094	7	0
Other contingencies	276	0	3 *
Dearness allowance to menials	784	9	0
Receipts—XXIX. Agricultural Receipts—			
Agricultural Stations	6,335	8	0
Miscellaneous	180	14	0
XLV. Stationery and Printing	47	9	0
III. O.R. P.W.D.	25	0	0
XIII. Other taxes	0	14	9
Abatement of charges	0	6	0
Excludes value of free transfers to the extent	4,779	0	3
Total ..	11,369	4	0
Deduct refunds ..	23	9	0
Net total ..	11,345	11	0

* *Excludes petrol bills (endorsed contingent bills.*

APPENDIX II.

STEPS TAKEN TO STEP UP THE REVENUE OF THE STATION.

The expansion of the area under the short-term fruit crops such as rainfed bananas and pine-apple was a special feature of the year which has contributed towards the increase in the revenue of station appreciably. The production and distribution of plants was continued to be maintained at a high level, the distribution for the year amounting to 14,877 numbers. Side by side with the attempts to increase the revenue of the station, the expenditure also was brought down by about Rs. 4,108 by the adoption of suitable orchard operations. Cover cropping and inter-cropping ; he alleys of the orchard with tested green-manure crops, viz., *Calapogonium muconoides*, *Centro-s ema pubescens*, and sunnhemp went a long way to keep down the weed growth and to minimise t he hand weeding charges apart from their unfailing soil fertilizing properties.

ANNUAL REPORT OF THE AGRICULTURAL RESEARCH STATION, KOILPATTI, FOR 1953-54 (FASLI 1363).

1. *Introduction.*—The main activities of this Research Station are centered round the improvement of the three crops of the tract, Karunganni cotton, Cumbu and Irungu cholam (for fodder) in the black-soil area under rainfed conditions. In the garden land of the red-soil area, irrigated cholam and irrigated ragi are being studied. The introduction and trial of other food crops and fodder crops are also being done within the limited means of the station. Hybridization work in poultry between the most suitable imported breed, the Rhode Island Red and the Desi breed, the Indian Game, is in progress and has reached the F.3 generation. The results achieved during this year are discussed under three heads (I) Crop research, (II) Agronomic research and (III) Miscellaneous studies.

2. *Season.*—The statement of rainfall for the year with the weekly totals and the number of the rainy days is presented in Table I. Similar figures for the previous years are also given. Besides average weekly rainfall for the previous ten years and 47 years are also furnished in the Table I.

TABLE I.—*Statement of rainfall at the Agricultural Research Station, Koilpatti for* 1953-54 (*fasli* 1363).

Months.	Week.	1953-54.		1952-53.		Average for ten years ending 1953-54.		Average for 47 years ending 1953-54.	
		Rainfall in inches.	Number of rainy days.	Rainfall in inches.	Number of rainy days.	Rainfall in inches.	Number of rainy days.	Rainfall in inches.	Number of rainy days.
				South-west monsoon.					
June	7—13	..	..	..	..	0·04	0·4	0·12	0·5
	14—20	..	..	..	..	0·12	0·1	0·10	0·2
	21—27	..	..	..	..	..	..	0·04	0·1
June-July ..	28— 4	0·02	..	..	..	0·20	0·4	0·14	0·5
	5—11	0·15	1	0·43	2	0·08	0·5	0·15	0·4
	12—18	..	..	..	..	0·01	..	0·23	0·4
	19—25	0·87	2	..	..	0·30	0·6	0·19	0·5
July-August ..	26— 1	0·02	..	..	..	0·23	0·3	0·17	0·4
	2—8	0·38	1	..	..	0·72	0·7	0·29	0·5
	9—15	0·27	1	..	..	0·39	1·0	0·41	0·7
	16—22	..	..	..	..	0·23	0·4	0·41	0·9
	23—29	0·78	1	0·17	1	0·61	1·0	0·50	0·9
August-September.	30— 5	2·02	2	0·04	..	0·39	1·0	0·41	1·1
	6—12	0·20	1	..	..	0·60	0·7	0·58	0·9
	13—19	0·45	1	..	..	0·65	1·2	0·61	1·2
	20—26	..	..	..	..	0·27	0·6	0·50	1·2
	Total..	5·16	10	0·64	3	4·84	8·9	4·85	10·4
				North-east monsoon.					
September-October.	27— 3	..	..	2·06	3	0·63	1·4	0·74	1·4
	4—10	1·60	3	0·42	1	0·87	1·5	1·05	1·8
	11—17	2·45	5	0·85	1	1·26	2·4	1·55	2·7
	18—24	1·01	3	0·19	1	1·48	2·7	1·95	2·9
	25—31	2·38	3	..	..	1·28	2·6	1·88	3·2
November ..	1— 7	1·52	2	1·34	4	1·34	2·5	2·00	3·3
	8—14	0·05	..	0·89	2	2·00	2·4	1·85	2·9
	15—21	2·34	4	0·42	1	1·89	2·7	1·56	2·4
	22—28	1·20	2	0·51	1	0·62	1·3	1·07	2·0
November-December.	29—5	0·53	1	..	..	0·69	1·7	1·13	2·1
	6—12	..	..	0·71	1	0·48	0·9	0·66	1·3
	13—19	0·15	1	1·62	1	0·89	1·2	0·68	1.2
	20—26	0·14	1	..	..	0·15	0·4	0·23	0·6
December-January.	27— 3	0·06	..	..	..	0·14	0·5	0·46	0·8
	4—10	2·66	2	..	..	0·90	0·5	0·28	0·9
	11—17	1·74	2	0·01	..	2 8	0·4	0·39	0.8
	18—24	..	..	0·09	..	0 9	0·4	0·13	0·6
	25—31	..	..	..	..	0·20	0·5	0·33	0·6
	Total ..	17·83	29	9·11	16	14·59	26·0	17·89	31·5

Months.	Week.	1953–54. Rainfall in inches.	1953–54. Number of rainy days.	1952–53. Rainfall in inches.	1952–53. Number of rainy days.	Average for ten years ending 1953–54. Rainfall in inches.	Average for ten years ending 1953–54. Number of rainy days.	Average for 47 years ending 1953–54. Rainfall in inches.	Average for 47 years ending 1953–54. Number of rainy days.
				Hot weather period.					
February ..	1— 7	..	..	..	..	0·08	0·2	0·23	0·5
	8—14	..	..	..	..	0·13	0·1	0·20	0·5
	15—21	..	..	0·03	..	0·68	0·5	0·18	0·3
	22—29	..	..	0·16	1	0·41	1·0	0·25	0·6
March ..	1— 7	..	..	0·44	1	0·09	0·5	0·12	0·3
	8—14	0·94	1	..	..	0·14	0·3	0·19	0·5
	15—21	1·45	3	0·02	..	0·44	1·0	0·31	0·7
	22—28	0·88	3	..	..	0·43	0·9	0·34	0·7
March-April	29— 4	0·23	1	0·74	2	0·60	1·6	0·45	1·1
	5—11	..	..	1·64	1	0·54	1·2	0·64	1·3
	12—18	0·76	2	0·60	2	1·73	2·3	1·16	1·8
	19—25	1·67	2	1·94	2	0·77	1·4	0·65	1·4
April-May ..	26— 2	0·52		..	..	0·28	0·7	0·70	1·3
	3—9	2·13	1	1·13	1	0·95	1·1	0·73	1·3
	10–16	2·39	1	..	..	0·68	0·7	0·40	1·1
	17—23	2·05		0·15	1	0·54	0·6	0·48	1·0
	24—30	0·56	1	0·41	1	0·59		0·39	0·4
May-June ..	31—6	..	..	0·12	..	0·03	0·1	0·14	0·4
Total ..		13·78	17	7·38	12	9·11	15·1	7·56	15·9
Grand Total ..		36·77	56	17·13	31	28·54	50·00	30·30	57·8

N.B.—Only rainfalls of ten cents and above counted for rainy days.

The year under report had a total rainfall of 36·77 inches which is higher than the normal rainfall of the station. The average for the past 10 years is 28·54 inches. The increase is due to the heavier rainfall received during the north-east monsoon and hot weather periods. During the south-west monsoon period, the rainfall recorded was 5·16 inches and is almost similar to the average which is 4·84 inches. In the north-east monsoon, a total of 17·83 inches of rain was received as against the average of 14·59 inches. Rainfall during the hot weather period was 13·78 inches as against the average of 9·11 inches. The increased rainfall during the north-east monsoon period was beneficial to the two millet crops Irungu cholam and cumbu. Although the Karunganni cotton was benefited by this rainfall during its early growth, the unusually heavy rains received at its flowering time during the hot weather period (in the months of March and April) caused the plants to shed the flowers and bolls and reduced their yield considerably. The cumbu crop recorded an acre yield of 685 lb. of grain as against the normal yield of 500 lb. per acre. The Irungu cholam gave an acre yield of 3,918 lb. of dry straw as against the normal yield of 5,000 lb. per acre. The cotton crop produced a low yield of 268 lb of kapas as against the normal yield of 450 lb. per acre. Although the year had a heavier rainfall than the normal, the untimely excessive rains received during the hot weather period affected the yield of cotton adversely.

I. Crop Research.

3. *Cotton.*—Breeding work on the rainfed cotton is being done by the Assistant Cotton Specialist, Karunganni Scheme. The existing Karunganni strain K. 2 has a staple length of 15/16 inch and suits the tract well. The strain is spreading rapidly in the Madurai, Ramanathapuram and Tirunelveli districts. Breeding work to improve its quality and yield has resulted in four economic cultures possessing staple length of one inch combining a high ginning percentage of 34. These cultures were tried in the districts during the year under report and two of them 6186–9 and 6874 have given equal yield to the existing strain K. 2 but producing a higher quantity and superior quality of lint.

4. *Vellai Cholam (Irrigated)*—Sorghum subglabrasens—Further trials of Vellai Cholam strain K. 2 in the districts of Ramanathapuram and Tirunelveli have confirmed its suitability to both the districts in *'Thai pattam'* (January sowings) and

'*Chithraipattam*' (April sowings). The yield trial conducted during the summer 1953, consisted of three selections K.S. 285, K.S. 288 and K.S. 296/4 which have been isolated by pure line selection. The control used was the strain Cholam K. 2. Although the three selections gave higher yields, the increase in the yield was not significant. The yield performance is given in Table II.

TABLE II.—*Vellai Cholam—Comparative Yield Trial* (1953–54).

1 Field number	7-B.
2 Variants	Four (K.S. 285, K.S. 288, K.S. 296/4 and K. 2).
3 (*a*) Layout	Randomized plots.
(*b*) Number of replications	Eight.
(*c*) Manure applied	10 tons of Farm Yard Manure per acre.
4 Area of each plot	20 × 15 links (Gross). (0·21 cents) 14 × 15 links (nett).
5 Date of sowing	2nd April 1953.
6 Seed rate	15 lb. per acre.
7 Date of harvest	7th July 1953.
8 Duration	95 days.

Serial number and selection number.	Calculated acre yield of grain replicated yield trial of 1953–54. Yield of grains in lb. per acre.	Percentage over control.
1 K.S. 188	2,900	108
2 K.S. 285	2,719	101
3 K.S. 29 /4	2,690	10
4 K. 2 control)	2 681	100
'F' test	Not satisfied.	
Standard error	228	

Previous performance.

Serial number and selection number.	Replicated yield trial 1949–50.	Replicated yield trial. 1950–51.	Observation tri l 19 1–52.	Replicated yield trial 1952–53.
1 K 2 (control)	3,353	1,118	2,29)	2,521
2 K.S. 285	3,513	00	1 190	3,200
3 K.S. 288	3,114	995	2, .15	2 68
4 K.S. 29 /4	3,684	969	2·375	3,20
5 Co. 12	..	800	1,950	2,52
6 Co. 9	..	..	1,415	2,70
7 A.S. 1155	..	..	1,'50	2,62
8 A.S. 1159	..	..	1,250	3,2 20
'F' Test	Satisfied.	Not sat sfied.	..	Not satisfied.
Standard rror	271	410	..	381
Critical difference	355		..	..

5. *Ragi* (*irrigated*)—Eleusine coracana—*Pure line selection*—The strain Ragi K. 1 has been found to be suitable to Ramanathapuram and Tirunelveli district. Although a good yielder, it has a defect that it lodges at the time of maturity. An economic purple pigmented non-lodging type Ragi K.R. 4 is being compared with Ragi K. 1 from 1950–51 onwards. The new selection Ragi K.R. 4 has continuously maintained its good yield althrough the four years. The yield was equal to Ragi K. 1 in 1950–51 and 1951–52. During the year 1952–53, K.R. 4 had given significantly higher yield than the strain K. 1. During the current year, the selections K.R. 4 and strain K. 1 have given equal yield. The results of this yield trial are given in Table III.

TABLE III.—*Ragi*—(*Irrigated*)—*Comparative Yield Trial* (1953–54).

1 Field number	7-B.
2 Variants	Two K. 1 and K.B. 4).
3 (*a*) Layout	Randomized plot.
(*b*) Number of replications	Twelve.
(*c*) Manure applied	Sun-hemp ploughed in. (15,000 lb. per cent.)
4 Area of each plot	Gross— 0 × 20 links (0·28 cents). Nett—20 × 14 links.
5 Date of sowing nursery	18th August 1953.
6 Transplanted on	15th September 1953.
7 Date of harvest	14th December 1953.
8 Duration	115 days.

Serial number and selection number.	Calculated acre yield of grain replicated yield trial of 1953–54. Yield of grains in lb. per acre.	Percentage over control.
1 K. 1 (control)	2,258	100·0
2 K.R. 4	2 275	100·3
'F' test	Not satisfied.	
Standard errors	374	

Previous performance in replicated yield trials.

Serial number and Selection number.	1949–50.	Percentage.	1950–51.	Percentage.	1951–52.	Percentage.	1952–53.	Percentage.
1 K. 1	2,175	100	2,818	100	2,529	100	2,910	100·0
2 K.R. 76	2,488	114	2,375	97·0	2,837	112·1	3,440	110·4
3 K.R. 4	..	..	2,637	93·6	2,769	109·5	3,635	124·9
4 'F' test	Not satisfied.	..	Not satisfied.	..	Not satisfied.		Satisfied.	..
Standard error ..	106	..	688	..	765		355	..
Critical difference ..	..	..	..	..	..		350	..

The results of the four years of trial clearly show that the Ragi K.R. 4 is equally a good yielder as the strain K. 1 if not better. It has the added advantage that it does not lodge. It was also found to be more resistant to Piricularia than the local or the strain Ragi K. 1. This is being confirmed by the Government Mycologist, Coimbatore. Hence it is proposed to test this economic culture in district trials.

Hybridization.—Although strain Ragi K. 1 was a high yielder its defect namely its lodging at the time of maturity stood in the way of its rapid distribution. This defect was noted as early as 1948 and the strain was crossed with the economic type K.R. 4 which possessed non-lodging habit. After filtration, four economic (botanically pure) cultures representing F. 5 generation were tested in Preliminary Yield Trials along with both the parents. One of the parents, viz., strain Ragi K. 1 was the control. All four of them were found to be pure for non-lodging and for all botanical characters and gave a higher yield than the strain K. 1. But the yield differences were not significant. The results of the Preliminary Yield Trials is given below :—

Serial number.	Selection number.	Calculated acre yield in lb.
1	No. 14	3,800
2	No. K.R. 4	3,866
3	No. 8	3,813
4	No. 9	3,380
5	No 11	3,213
6	K. 1 (Control)	3,146

6. *Cumbu (rainfed).*—Pennisetum typhodies—*Pure line selection.*—Thirty-eight new seed samples were collected from the various taluks of the Madurai, Ramanathapuram and Tirunelveli districts. These would be sown during the ensuing season to study whether they would out-yield the existing strain Cumbu K. 1 and also to study whether they can be used as parents for securing promising hybrids.

During this year also Cumbu strains X. 1 and X. 2 were tested in yield trials with local Cumbu strain K. 1. Strain K. 1 gave the highest yield but the yield differences were not significant. The result of the trial is given in Table IV.

TABLE IV.—*Cumbu—Rainfed—Comparative Yield Trials,* 1953–54.

1 Field number	25-B.
2 Variants	Three (K-1, X-I and X-2).
3 (*a*) Layout	Randomized plots.
(*b*) Number of replications	8.
(*c*) Manure applied	5 tons per acre (Rate).
4 Area of each plot	100 × 25 Links (Gross).
	100 × 18 Links (Nett).
5 Date of sowing	11th October 1953.
6 Date of harvest	16th January 1954.
7 Duration	95 days.

Yield of cumbu in lb. per acre.

Serial number. (1)	Strain number. (2)	Yield of grain in lb. per acre. (3)	Percentage over control. (4)
1	K 1	885·5	100
2	X 1	808·5	91·3
3	X 2	814·0	91·9
	'F' Test	Not satisfied.	Not satisfied.
	Standard error	107·3	12·1

N.B.—During the previous two years the trials were failures due to the drought that prevailed in the tract during those seasons.

To find out the suitability or otherwise of the strains X. 1 and X. 2 for this tract an extensive trial was laid out in 15 centres representing the intensive cumbu growing areas. This trial has been repeated for the third year. During the first year (1951–52) the entire cumbu crop of this tract was a failure due to extreme

drought of that season. During the year 1952–53 the trial gave indications that both the new strains X. 1 and X. 2 cannot out-yield the strain K. 1. This year's trial also has confirmed the previous findings. One interesting feature of this year's trial is that the local has also given equal yield to strain K. 1. This can be explained by the fact that strain K. 1 has a very wide natural spread in the tract and the local in many cases have been only natural spread strain K. 1. The results of the observation plots of X. 1, X. 2, K. 1 and local in this tract are presented in Table V.

TABLE V.—*Results of the observation plots of X1, X2, K1 and Local in the Madurai, Ramanathapuram and Tirunelveli districts during* 1953–1954.

District.	Taluk.	Centre.	Calculated acre yield of grain in lb.			
			X-1.	X-2.	K-1.	Local.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Madurai	Dindigul	Rajakapatti ..	665	625	680	655
Ramanathapuram ..	Sattur	Edirkottai	870	810	845	940
	Aruppukottai ..	Koppuchithanpatti ..	855	865	530	435
		Vadugarkottai ..	415	400	420	420
	Mudukulathur ..	Kammuthi	720	780	870	900
		Mudukulathur ..	700	725	850	910
Tirunelveli	Kovilpatti	A.R.S. Kovilpatti ..	1,005	805	860	1,055
		Nalatinputhur ..	790	1,010	1,270	1,590
		Kayathar	540	600	720	480
		Kurukuchalai ..	200	210	320	480
	Vilathikulam	Pilliarnatham ..	740	780	1,020	920
		Pudur	660	660	605	660
		Sevalarpatti ..	805	790	655	790
	Sankarankoil	Naickerpatti ..	425	450	540	600
	Srivaikundam ..	Mudithanandal ..	15	65	150	85
		Total ..	9,405	9,575	10,335	10,920
		Average of 15 Centres.	627	638	689	728
	Previous year's average for 11 Centres (1952–53)		459	449	484	428

Hybrid vigour.—Trials from 1948 onwards in Cumbu have shown that certain hybrids involving Coimbatore cultures and strain K.1 tended to give higher yield than both the parents. Since hybrid vigour can be easily exploited in the Cumbu crop this line of work has been taken up at this Research Station also.

From previous trials one combination, viz., P.T. 248/3-4 × Co. 1-2 has given significantly higher yield than the strain K. 1 during three consecutive seasons in various stages of Preliminary yield trials. Enough quantity of seeds has been produced in this combination during the season to confirm its high yield in yield trials. In addition to the above, three other combinations, K. 1-1 × P.T. 504-1, P.T. 504-3 × P.T. 827/6-8 and P.T. 819/6-2 × P.T. 835/8-3 have given significantly higher yield than strain K. 1. These combinations have been again made during the season to confirm their high yield.

All the parents of economic hybrids have been selfed and are in various stages of selfed generations.

7. *Irungu Cholam (rainfed) Sorghum dochna.*—Periamanjal Irungu (A.S. 7081) is an extracted type evolved by crossing Periamanjal Cholam of Coimbatore and Irungu Cholam of Tirunelveli district. It has the same duration of Irungu Cholam. Unlike the Tirunelveli Irungu Cholam which has brown grains unsuitable for human consumption this new extracted type has yellow grains which is suitable for food purposes. Trials during the previous years have shown that even during droughty years the new type gives a higher yield of straw than the existing Irungu Cholam strain K. 1. The yield trial conducted during the current year has shown that A.S. 7081 gives a significantly higher yield of dry straw (7,091 lb.) as compared to K. 1 which yielded only 6,072 lb. per acre. The Periamanjal Irungu gave an acre yield of 144 lb. of grain as against Irungu Cholam which yielded 178 lb. of grain. The results of the trial is given in Table VI.

TABLE VI.—*Irungu Colam—Comparative Yield Trial,* 1953–54.

1	Field number	24-A.
2	Number of variants	Two (K-1 and A.S. 7081).
3	(*a*) Layout	Randomized Blocks.
	(*b*) Number of replications	12.
	(*c*) Manure applied	2·5 tons per acre.
4	Area of each plot	25 × 100 links (Nett): 2·5 cents.
5	Date of sowing	10th October 1953.
6	Seed rate	60 lb. per acre.
7	Harvested on	25th and 26th February 1954.
8	Duration	138 days.

TABLE VI—*cont.*

Serial number and Strain number. (1)	Yield of straw in lb. per acre. (2)	Percentage over control. (3)
1. K. 1. (control)	6,040	100
2. A.S. 7081	7,400	122·5
'F' Test..	Satisfied.	Satisfied.
Standard error	140	2·3
Critical difference	124	2·0

Conclusion:— A.S. 7081. K-1.

Variation in grain size was found within the extracted type A.S. 7081. Single plant cultures of bold grains were studied, and eighteen bold grains types were isolated. These cultures were tested in Compact Family Blocks with A.S. 7081 as control. In grain yield all of them were on par with A.S. 7081 and within family analysis also did not give any significant differences. This shows that A.S. 7081 is pure for yield and will not yield itself to further selection for securing higher yield. Judging by grain size 26 cultures giving more than 1·9 gram of hundred grain weight have been isolated.

8. *Minor millets.*—Four minor millets, Samai (*Panicum miliare*), Pani varagu (*Panicum miliaceum*), Kudiraivali (*Echinochola frumentacea*) and Varagu (*Paspalum scrobiculatum*) were tried in black-soils for third time in succession. During the previous two seasons all the four minor millets got dried up as the seasons were droughty. The year under report had a higher rainfall than the normal and even then Panivaragu and Samai were failures showing thereby that these two crops would not suit the black-soils of this tract under rainfed conditions. Six cultures of Kudiraivali received from the Millets and Pulses Specialist, Coimbatore, were tried in two cent plot each. The crop was sown during the second week of October. The yield ranged from 330 to 471 lb. dry grain per acre. Kudiraivali is sown in this tract in the red-soils only and the sowing is done during the months of June-July as the red-soil gets soaked easily with the south-west monsoon rains. Such a crop yields up to 2,000 lb. of grain. Hence it is doubtful whether the black-soil ryot will take up to Kudiraivali cultivation in the rainfed black-soils as the yield is very low. The yield data of the six types are as below :—

Serial number and culture number.		Calculated acre yield in lb.
1	P.C. 383	471
2	P.C. 387	426
3	P.C. 384	414
4	P.C. 389	414
5	P.C. 49	386
6	P.C. 390	330

Five samples of Varagu were grown during this season over an area of two cents. The crop was sown during the second week of October and came up well. The yields ranged from 1,406 to 1,826 lb. of dry grain per acre. This clearly shows that Varagu suits the tract and comes up well during the years of heavy rainfall. The yield data of the five types are as below :—

Serial number and culture number.		Calculated acre yield in lb.
1	P.S. 75	1,826
2	P.S. 68	1,783
3	P.S. 64	1,717
4	P.S. 76	1,652
5	P.S. 1	1,406

II. AGRONOMIC RESEARCH.

9. *General.*—Only four major agronomic experiments were conducted during the current year in the black-soils. The details of these experiments are given in the subsequent paragraphs.

10. *New cultural experiment.*—This experiment was commenced during the year 1948–49 in Field No. 23. The object of the experiment is to determine the optimum preparatory cultivation for the three important rainfed crops of the black-soils of the tract, Karunganni cotton, Cumbu and Irungu Cholam. Rotation was also taken

into consideration side by side with cultural operations. The lay-out is in 'Split-plot' design where rotation forms the main treatment and the various cultural operations form the sub-treatment.

The crops were sown during October 1953. The germination was good and both the cereal crops recorded normal yields. The cotton crop recorded only 50 per cent of the normal yield. In all the three crops, the yield differences between the various treatments were not significant. By a study of the six years trial the following conclusions are arrived at. In millets during all the six years whether droughty or normal the yield differences have never been significant. This confirms the previous finding that no cultivation except weeding is necessary for producing normal yield in Irungu Cholam and Cumbu crops grown under rainfed conditions in the black-soils of the Kovilpatti tract. The cotton crop has responded to the various treatments during two years, where no cultivation and working of R.E. Guntaka has given a significantly poorer yield over the various ploughing operations. This clearly shows that the cotton crop requires ploughing operations (Medium deep cultivation) which can be given either with a Cooper or with a Country ploughs. Since the experiment has given definite conclusions it has been discontinued. The details of the experiment are given in Table VII.

TABLE VII.—*New Cultural Experiment* 1953–54 (*sixth year of trial*).

Crops experimental upon	Cotton K-2. Cumbu K-1. Irrungu Cholam K-1.
Field number	23.
Manure	2½ tons of farm yard manure per acre for Irungu. 5 tons of farm yard manure per acre for Cumbu.
Date of sowing Irungu, Cumbu and Cotton ..	11th October 1953.
Date of harvest—	
Irungu	11th February 1954.
Cumbu	17th January 1954.
Cotton (Picking)	30th March 1954.
Layout	"Split-plot" design.
Replications	4.
Size of plot	Main plot—29·7 cents. Sub-plot —Gross 4·95 Cents. Nett. 3·46 Cents.

Variants.	Main Treatments (Rotation).			
	First year.	*Second year.*	*Third year.*	*Fourth year.*
A	Cumbu.	Cotton.	Cholam.	Cotton.
B	Cotton.	Cholam.	Cotton.	Cumbu.
C	Cholam.	Cotton.	Cumbu.	Cotton.
D	Cotton.	Cumbu.	Cotton.	Cholam.

1. *Sub Treatments* (Cumbu and Irungu crops).—
(*a*) Country plough—3 times.
(*b*) R.E. Guntaka—3 times.
(*c*) No cultivation except weeding.
(*d*) Country plough twice after rains in June-July followed by Cooper No. 11 once after rains in September.
(*e*) Cooper No. 11 twice in June-July and again after rains in September.
(*f*) Cooper No. 11 once after first soaking rains in June to September.

Yield of Cumbu grain and Irungu straw.

Treatments.	Cumbu grain. (Main treatments C).		Irungu straw. (Main treatment).	
	Acre yield in lb.	Percentage over control.	Acre yield in lb.	Percentage per control.
(1)	(2)	(3)	(4)	(5)
(*a*) Country plough—3 times	594	115	6,250	112
(*b*) R.E. Guntaka—3 times	528	102	5,888	105
(*c*) No cultivation (control)	520	100	5,599	100
(*d*) Country plough twice and Cooper once	494	95	5,961	106
(*e*) Cooper 11 twice	463	89	6,372	112
(*f*) Cooper 11 once	506	97	6,054	108
(*g*) Standard error	80·6	15·5	582	10
Significance by 'F' Test	No.	No.	No.	No.

2. Cotton crop :—
Sub-treatments—
(*a*) Country plough 4 times.
(*b*) R.E. Guntaka 4 times.
(*c*) No cultivation except weeding.
(*d*) Country plough twice after rains in April to July followed by Cooper No. 11 once after rains in September.
(*e*) Cooper No. 11 twice once in April to July and again after rains in September.
(*f*) Cooper No. 11 once after first soaking rains in April to September.

TABLE VII—*cont.*

Yield of Kapas.

Treatments.	Cotton after cholam. Main treatment.		Cotton after cumbu. Main treatment.	
	Acre yield in lb.	Percentage over control.	Acre yield in lb.	Percentage over control.
(1)	(2)	(3)	(4)	(5)
(*a*) Country plough 4 times	288	137	286	120
(*b*) R.E. Guntaka 4 times	242	115	241	100
(*c*) No cultivation except weeding	210	100	238	100
(*d*) Country plough twice and Cooper once	264	125	271	114
(*e*) Cooper No. 11 twice	244	116	257	108
(*f*) Cooper No. 11 once	246	117	286	120
Standard error	35·7	17·0	35·7	15·7
Significant by "F" test	No.	No.	No.	No.

Results of the previous years.

A. Cumbu

Treatments.	Acre yield of Cumbu grain-Lb.				
	1948–49.	1949–50.	1950–51.	1951–52.	1952–53.
(*a*) No cultivation (control)	477	443	21	242	49
(*b*) R.E. Guntaka (thrice)	454	430	22	248	63
(*c*) Cooper plough (once)	486	406	58	298	54
(*d*) Cooper plough (twice)	397	468	88	222	89
(*e*) Country plough (twice) and Cooper plough (once).	518	443	81	299	83
(*f*) Country plough (thrice)	478	461	36	278	65
Significant or not	No.	No.	No.	No.	No.
Critica ldifference	..	..	..	..	..

B. Irungu Cholam.

Treatments.	Acre yield of Irungu Cholam straw in lb.				
	1948–49.	1949–50.	1950–51.	1951–52.	1952–53.
(*a*) No cultivation (control)	9,032	5,376	470	3,488	1,590
(*b*) R.E. Guntaka (thrice)	8,829	4,835	995	3,251	1,525
(*c*) Cooper plough (once)	8,562	5,838	906	3,799	2,363
(*d*) Cooper plough (twice)	9,021	5,592	578	3,745	3,208
(*e*) Country plough (twice) and cooper plough (once).	9,306	6,156	547	3,625	2,211
(*f*) Country plough (thrice)	9,108	5,535	560	3,695	2,305
Significant or not	No.	No.	No.	No.	No.
Critical difference	..	..	..	..	..

C. Cotton.

Treatments.	Acre yield of cotton in lb.									
	1948–49.		1949–50.		1950–51.		1951–52.		1952–53.	
	After cumbu.	After Crungu.	After Cumbu.	After Irungu.	After Cumbu.	After Irungu.	After Cumbu.	After Irungu.	After Cumbu.	After Irungu.
(*a*) No cultivation (control).	431	430	478	339	95	245	344	254	107	41
(*b*) R.E. Guntaka (four times,	396	377	527	397	128	259	307	331	81	8
(*c*) Cooper plough (once).	433	396	472	322	252	334	348	302	120	61
(*d*) Cooper plough (twice).	403	412	506	416	192	277	373	322	121	28
(*e*) Country plough (twice) and cooper plough (once).	504	503	605	379	223	298	367	256	82	64
(*f*) Country plough (four times).	495	514	507	374	257	315	348	302	62	52
Significant or not	Yes.	Yes.	No.	No.	Yes.	No.	No.	No.	No.	No.
Critical difference	89	93	..	..	66	..	..	..	..	

11. *Cereal indigo mixture experiment with super-phosphate.*—This is a corrective experiment for 'Cholam-effect' and was started in the year 1948–49. The object is to find out whether the addition of super phosphate at 30 lb. P_2O_5 per acre along with mixed cropping with indigo and Irungu Cholam would increase the efficiency in mitigating the 'Cholam-effect'. Besides ammonium sulphate at 30 lb. N. level per acre is added during next season in one half of each plot to the succeeding crop of cotton to study the cumulative benefit of all these treatments.

The experiment is run on two fields Nos. 17 and 29. During the year under report in Field No. 17, the cereals were raised. An uniform crop of cotton was grown

in Field No. 29 over the entire experimental area where the cereals were raised during the previous season. The various treatments in the Cumbu and the Irungu Cholam crops gave significantly variable results. In all the treatments it was seen that more than pure nitrogen a combination nitrogen $P_2 O_5$ gave higher yields. In cotton also the cumulative effect of nitrogen and phosperous was felt significantly. This year's trial clearly shows that the addition of $P_2 O_5$ is absolutely essential to secure significantly higher yields and would be useful in mitigating 'Cholam-effect'. The details of the experiment and the results are given in Table VIII.

TABLE VIII.—*Cereal indigo mixture experiment with super-phosphate*—1953–54
(*Sixth year of trial*).

Crops experimented upon	Irungu K1 in field No. 17, Cumbu K1 in field No. 17 and cotton K2 in field No. 29.
Field number	Field Nos. 17 and 29.
Previous crops	Irungu and cumbu in field No. 29, as mentioned in the treatments and cotton in field No. 17.
Manure	Super-phosphate at 30 lb. P2 O5 level and in field No. 17 as detailed in the treatments below and ammonium sulphate at 30 lb. N. level in field No. 29 applied to one-half of the each plot.
Date of sowing	Field No. 17, irungu K1, cumbu K1 and indigo, on 10th October 1953. Field No. 29, on 11th October 1953.
Date of harvest	Field No. 17— Cumbu K1 on 9th January 1954. Irungu K1 on 16th January 1954. Field No. 29— Picking of cotton kapas from 2nd April to 3rd July 1954.
Layout	Randomized blocks.
Replications	Four (4).
Size of plot	Gross 4·86 cents. Nett area of each half of the plot—1·01 cents.

Variants—

1 Sorghum + Indigo + 0 lb. P2 O5 per acre.
2 Sorghum + Indigo + 30 lb. P2 O5 per acre.
3 Cumbu + Indigo + 0 lb. P2 O5 per acre.
4 Cumbu + Indigo + 30 lb. P2 O5 per acre.
5 Sorghum only.
6 Sorghum + 30 lb. P2 O5 per acre.
7 Cumbu only.
8 Cumbu + 30 lb. P2 O5 per acre.
9 Ondigo only.
10 Indigo + 30 lb. P2 O5 per acre.

Cereal Legume Experiment (*Cumulative effect on Cotton K_2*).

Yield of Cotton Kapas—Field No. 29.

	Treatments.	Acre yield lb.	Per cent over control.
1	Sorghum + Indigo + 0 lb. P2 O5	213	108
1a	Sorghum + Indigo + 0 lb. P2 O5 (M)	240	121
2	Sorghum + Indigo + 30 lb. P2 O5	255	129
2a	Sorghum + Indigo + 0 lb. P2 O5	305	154
3	Cumbu + Indigo + 0 lb. P2 O5	259	131
3a	Cumbu + Indigo + 0 lb. P2 O5 (M)	271	137
4	Cumbu + Indigo + 30 lb. P2 O5	220	111
4a	Cumbu + Indigo + 30 lb. P2 O5 (M)	232	112
5	Sorghum only (control)	198	100
5a	Sorghum only (control) (M)	201	102
6	Sorghum + 30 lb. P2 O5	289	145
6a	Sorghum + 30 lb. P2 O5 (M)	297	150
7	Cumbu only	227	114
7a	Cumbu only (M)	187	94
8	Cumbu + 30 lb. P2 O5	244	123
8a	Cumbu + 30 lb. P2 O5 (M)	269	135
9	Indigo only	266	134
9a	Indigo only (M)	334	168
10	Indigo + 30 lb. P2 O5	266	134
10a	Indigo + 30 lb. P2 O5 (M)	332	167
	Standard error	101·7	51·1
	Significant by 'F' test	Yes.	Yes.
	Critical difference	75·2	38·0

Conclusion—9a (M), 10a (M), 2a (M), 6a (M), 6, 3a (M), 8a (M), 9, 10, 3, 2, 8, 1a (M), 4a (M), 7, 4, 1, 5a (M) 5, 7a (M).

Yield of cumbu grain, irungu and straw in field No. 17.

Treatment.	Cumbu grain. Acre yield in lb.	Cumbu grain. Per cent on control.	Irungu. Acre yield in lb.	Straw. Per cent on control.
1a Sorghum+Indigo+0 lb. P2 O5	..	..	4,580	89
1b Sorghum+Indigo 00 lb. P2 O5	..	..	4,832	85
2a Sorghum+Indigo+23 lb. P2 O5	..	..	4,777	94
2b Sorghum+Indigo+20 lb. P2 O5	..	..	4,678	92
5a Sorghum only	..	..	5,074	100
5b Sorghum only	..	..	3,515	69
6a Sorghum+30 lb P2 O5	..	..	4,084	80
6b Sorghum+30 lb P2 O5	..	..	5,248	103
3a Cumbu+Indigo+0 lb P2 O5	249	81	..	..
3b Cumbu+Indigo+0 lb. P2 O5	335	109	..	..
4a Cumbu+Indigo 30 lb.	493	101	..	..
4b Cumbu+Indigo 30 lb.	458	149	..	..
7a Cumbu only	306	100	..	..
7b Cumbu only	378	121	..	..
8a Cumbu+30 lb P2 O5 per acre	544	177	..	..
8b Cumbu+30 lb. P2 O5 per acre	433	141	..	..
Standard error	125·5	41·0	537·7	10 4
Significance 'F' test	Yes.	Yes.	Yes.	Yes.
Critical difference	164·6	53·6	664·7	13·1
Conclusion—				

Cumbu—8a, 4a, 4b, 8b, 7b, 3b, 7a. 3a.

Indigo Cholam—6b, 5a 2a, 2b, 1a. 1b, 6a, 5b.

12A. *Cotton mixed cropping trails.*—This experiment was laid out in 1947–48 to study the effect of growing pulses and other short duration crops as mixed crops with cotton. Perior trials indicated that the only coriander, groundnut (bunch variety) and horse-gram affected the yield of cotton the least. From 1950–51 up to the previous year the mixed cropping trials were failures as the rainfall had been poorer than the normal. During the current year as the rainfall was higher than the normal, the mixed crops gave fairly good yield. Unlike the previous years the mixed crops were sown in the same lines of cotton to facilitate intercultivation. The coriander recorded an acre yield of 24 lb. of grain, the horse gram recorded 279 lb. of grain and the bunch groundnut recorded 247 lb. of dry pods per acre. The yield of cotton was analysed statistically and the cotton and horse gram mixture plots gave significantly poorer yields than the other combinations. This year's result clearly shows that horse-gram when sown as a mixture crop with cotton in the same line smothers the cotton in its younger stages and significantly pulls down in yield. The yield of cotton in the other two combinations is on par with pure cotton crop showing hereby that during year of normal and affluent rainfall these mixed crops do not pull down the yield of cotton and produce also fair yields. The results of the trial is given in Table IX.

TABLE IX.—*Chilean nitrate experiment on Cotton K2 (1953–54—second year of trial).*

Crops experimented upon	Cotton K2 (rainfed).
Yield No.	29.
Manure	No. manure except treatments.
Date of sowing	11th October 1958.
Date of harvest	(Picking kapas). From 1st April to 3rd July 1954
Layout	Randomised and replicated plot.
Replications	5.
Size of plot	Size of each plot—1·62 cents. Gross: 1·62 cent. Nett: 0·91 cents.

Variants—

Treatments—

1 Basal dressing of lime 450 lb. + cattle manure 8 tons + super-phosphate to supply 50 lb. P2 O5.
2 Same as No. 1+Ammonium sulphate 40 lb. Nitrogen per acre.
3 Same as No. 1+ammonium sulphate 60 lb. N/acre.
4 Ammonium sulphate alone 40 lb. N/acre.
5 Ammonium sulphate alone 60 lb. N/acre.
6 Same as No. 1+Chilean nitrate 40 lb. N acre.
7 Same as No. 1+Chilean nitrate 60 lb. N/acre.
8 Chilean nitrate alone 40 lb. N acre.
9 Chilean nitrate alone 60 lb. N/acre.

Yield of kapas.

Treatments.	Acre yield in lb.	Per cent of over control.
1 Basal dressing of lime 450 lb.+cattle manure 3 tons+super-phosphate to supply P2 O5 acre. 30 lb.	396	99
2 Same as No. 1+Ammonium sulphate 40 lb. N acre	387	97
3 Same as No. 1+Ammonium sulphate 60 lb. N acre	405	102
4 Ammonium sulphate alone 40 lb N. per acre (control)	398	100
5 Ammonium sulphate+60 lb. N. per acre	428	107
6 Same as No. 1+Chilean nitrate 40 lb. N acre	425	106
7 Same as No. 1+Chilean nitrate 60 lb. N/acre	440	110
8 Chilean nitrate alone 40 lb. N acre	394	98
Chilean nitrate alone 60 lb. N/acre	408	102
Standard error	75·3	13·0
Significant by 'F' test	No.	No.

12B. *Selecting a high yielding bunch groundnut variety suitable for mixed cropping with cotton.*—Cotton pulses mixed cropping trials conducted during the previous years indicated the suitability of the groundnut (bunch variety) in forming an ideal mixture with cotton as it affected the yield of cotton the least. During the year 1949–50, five selections were found to give higher yields than the strain TMV. 2 which is usually grown as a mixed crop at this research station. Due to drought that prevailed from 1950–51 up to the previous year the groundnut crop failed to give any yield. During the year under report, the six types were tried in observation plots occupying three cents each as a mixed crop with cotton. A replicated trial could not be laid out due to dearth of seeds. The yield behaviour of the various cultures during the year are as below :—

	Serial number and selection number	*Calculated acre yield of pods in lb.*
1	A.H. 6179	400
2	A.H. 6279	367
3	A.H. 6481	367
4	A.H. 4111	333
5	A.H. 4218	267
6	A.H. 4515	223
7	TMV. 2 (Control)	223

The high yielding types would be confirmed in replicated plots during the ensuing season.

13. *Chilean nitrate experiment on cotton.*—This experiment was started during the previous year 1952–53, to study whether the application of chilean nitrate gives a better yield than application of ammonium sulphate to the rainfed cotton crop of the blacksoils of this tract. During that year the cotton crop recorded very poor yields and hence no conclusive results could be obtained. During the current year the application of nitrogenous manure either in the form of chilean nitrate or ammonium sulphate failed to increase the yield of cotton. This is presumably due to the unnatural season which prevailed during the year in the receipt of the rains at the flowering time causing shedding of buds and flowers. The experiment will be repeated during the next year. The details and result of the experiment are given in Table X.

TABLE X.—*Cotton mixed cropping trials* 1953–54.

Crops experimental upon	Cotton K2. Coriander No. 731. Groundnut—TMV 2. Horsegram—DB 37.
Field number	Field 21.
Previous crop	Irungu cholam.
Manure	Farm yard manure applied at the rate of 5 tons per acre.
Date of sowing	12th October 1953.
Date of harvest	Horse-gram—27th February 1954. Groundnut—26th January 1954. Coriander—10th February 1954. Cotton—3rd April 1954. (Picking kapas).
Layout	Randomized replicated block.
Replication	Four (4).
Size of plot	Gross—4·7 cents. Nett—2·7 cents.
Variants	1 Cotton pure. 2 Cotton + Groundnut. 3 Cotton + Horse-gram. 4 Cotton + Coriander.

Treatments.	Cotton kapas.	
	Acre yield in lb.	Per cent on control.
Cotton pure	126	100
2 Cotton + Groundnut	136	108
3 Cotton + Horsegram	56	44
4 Cotton + Coriander	139	110
Standard error	19·4	15·4
Significant by 'F' test or not	Yes.	Yes.
Critical difference	41·1	32·5

Conclusion—

4, 2, 1, 3.

III. Miscellaneous Studies.

A. Rainfed Crops.

14. *Safflower.*—Safflower tried during the year 1950–51 gave an indication that it suits the black-soils of Kovilpatti under rainfed condition giving an acre yield of nearly 600 lb. of dressed grain per acre during normal years. To fix high yielding types of safflower suiting Kovilpatti conditions, non-replicated trials have been conducted from 1950–51 onwards. In all the trials, a selection C.T. 66 has given higher yield than the control C.T. 63. The trial during the current year was laid on a replicated basis. Due to the attack of the leaf eating caterpiller and due to untimely rains received at the time of flowering the crop gave poor yields. The difference in yield was not significant but the culture C.T. 66 continued to maintain its high yield. The results of the trial is presented below. The crop was sown during the second week of October and received a basal dose of 5 tons of farm yard manure per acre.

Serial number and selection number.	*Calculated acre yield in lb.*			
	1953–54.	1952–53.	1951–52.	1950–51.
1 C.T. 66	246	137	730	20
2 C.T. 63 (Control)	169	124	415	23
3 C.T. 60	185	97	393	26
4 C.T. 38	277	93	385	29
5 C.T. 11	169	60	450	14

15. *Blackgram.*—Selection No. 212 received from the Millets and Pulses Specialist, Coimbatore, was tried during the current year over an area of 2·40 acres. During the early stages the crop was attacked by the leaf eating caterpiller which was controlled by dusting 5 per cent B.H.C. The crop recorded a total yield of 816 lb. which works out 340 lb. of dressed grain per acre. The black-gram crop of the villages round about Kovilpatti was a complete failure due to the attack of the leaf eating caterpiller and the experience in the current year clearly shows that dusting of B.H.C. is one of the good methods of saving black-gram crop. The crop was sown during the second week of October and received 5 tons of farm yard manure as basal dressing.

16. *Horsegram.*—Two selections of horse-gram D.B. 7 and D.B. 35 were tried in 20 cents bulk each. D.B. 7 gave a calculated acre yield of 733 lb. of grain whereas D.B. 35 yielded 1020 lb. of grain per acre. The crop was manured with farm yard manure at the rate of 5 tons per acre and was sown during the second week of October.

17. *Redgram.*—One selection No. 37 received from the Millets and Pulses Specialist, Coimbatore was grown over an area of 50 cents. The crop was sown during the first week of May and was harvested during the last week of January. It gave a claculated acre yield of 450 lb. of grain per acre. The crop received a basal dressing of five tons of farm yard manure per acre.

18. *Coriander.*—A pure line culture No. 731 has been isolated at this Research Station and has been found to suit this tract. Coriander breeding was proposed to be taken on an intensive scale as per the instructions of the Director of Agriculture. First of all, all the available types (30) from the Lam Farm, Guntur, where corainder work is being done was transferred to this Research Station. Then all the States in India and the countries in the world where coriander is grown were addressed for the supply of samples. In all 15 samples from seven States in India and 12 samples from eight countries outside India were received. A total of 106 single plant cultures were tested in row yields and of them 19 gave higher yield over the control and these cultures have been carried forward. Five local economic cultures which gave higher yield than 731 bulk during the previous years were tested during the current year and one of them No. 53 which maintained its high yield has been carried forward. All the Guntur types were very early and recorded poor yields and have been rejected. Since the types of other States in India and from other countries

outside India were received late, they were raised under irrigation during the month of December. The plants came up well. Many of them failed to produce any yield presumably due to the late sowings. Two of the bold seeded types from Bihar recorded acre yields of 470, 478 lb. of calculated acre yield as against the local selection No. 731 which recorded 424 lb. of grain per acre. It is proposed to try all the extra State and foreign types both under rainfed and irrigated conditions during ensuing season (October sowings).

B. Irrigated Crops.

19. *Sweet potato.*—The twelve (12) types of *sweet potato* which were tried during the previous year were tested again during this year. Due to want of space the trial was laid on a non-replicated basis. Each type occupied an area of two cents and the cuttings were planted on 28th September 1953. Ten tons of farm yard manure per acre was applied. The yield performance of the types are as below :—

Serial number and name of variety.	*Calculated acre yield of tuber in lb.*				
	1949–50.	1950–51.	1951–52.	1952–53.	1953–54.
1 Bhadrakali (light purple)	25,800	11,200	16,200	20,600	15,600
2 Seelanthi chuvalai	28,100	10,100	13,400	16,900	1,200
3 V. 12	..	..	12,000	16,000	6,400
4 V. 6	..	..	7,700	14,200	15,200
5 B. 219	..	8,300	14,700	13,000	7,400
6 Bhadrakali (D. Orange)	21,700	10,300	12,500	12,000	1,400
7 B. 196	..	11,600	9,900	10,900	4,100
8 V. 2	..	..	13,000	10,000	11,000
9 V. 10	..	..	3,900	5,208	1,500
10 I.B. 22	..	..	5,400	4,300	2,100
11 B. 4304	..	3,500	2,400	4,000	1,300
12 B. 4004	..	5,300	1,700	2,400	1,400

20. *Potato.*—Thirty-four new samples of potato types were received from the Director, Central Potato Research Institute, Patna, and were compared with O.N. 2186, a type from Patna which has consistently given the highest yield for the past two years. The control O. N. 2186 recorded an acre yield of 1,452 lb. of tubers per acre whereas the yield of other types ranged from 23 to 726 lb. of tubers. All these types have been rejected.

Seven types which have been isolated for high yield during the year 1951–52 were tested in small observation plots of 0·5 cents each with O.N. 2186 as control. The consolidated yield behaviour for the past three years is given below :—

Serial number and name of the type.	*Calculated acre yield in lb.*		
	1951–52.	1952–53.	1953–54.
1 Voran	14,116	2,123	223
2 O.N. 2186	12,908	3,605	1,955
3 Saskia	11,835	4,745	355
4 Industrie	11,635	1,723	56
5 Alpha	11,093	2,098	28
6 Eigenheimer	10,699	2,416	1,061
7 Erd-Gold	10,689	4,875	1,340
8 Sneew	5,245	1,880	447

The crop was planted on 26th November 1953 and was harvested on 17th February 1954. It received a basal dressing of 20 tons of farm yard manure per acre. A dose of 100 lb. of ammonium sulphate and 150 lb. of superphosphate per acre was also applied by placement near the seed tubers. The crop was planted on ridges 1½ feet apart with a spacing of one foot along with the ridges. The germination was good and the crop was sprayed with bordeaux mixture twice. The poor yield could be traced to the unexpected rainfall which was received during the month of January which made many of the plants to "rot" before they had formed tubers.

In spite of the poor performance of the crop, O.N. 2186 has continued to give the highest yield.

The "President" variety received from the Agricultural Research Station, Nanjanad, was grown over an area of 5 cents recorded only a poor yield of 726 lb. of tubers per acre.

One wild type *S. Chacoense* received from Patna was found to come up well and was found to produce large number of small tubers. It was also found to be free from pests and diseases. Although the yield was 2,400 lb. per acre all the tubers were found to be small, and acrid to taste. In case a selection with non-acrid taste is fixed in this variety it will be possible to grow potato profitably under Koilpatti conditions.

21. *Lab-lab.*—The ten (10) types of lab-lab received from the Millets and Pulses Specialist were tested again during the year under report. The season was adverse for the lab-lab crop and only a third of the normal yield was obtained. Even during this bad year D.L. 244 recorded the highest yield of 35 lb. of tender pods per pandal.

22. *Brinjal.*—Due to a very heavy attack by the epilachna beetle and stem-borer moth the five Delhi types failed to produce flowers. Hence they could not be crossed with each other to study whether the F-1 generation, exhibited hybrid vigour.

23. *Chillies.*—The five types from Guntur were early and recorded only 50 per cent yield as that of the local for the second year in succession, indicating their unsuitability to the tract. The five economic single plant cultures, isolated during the previous years from the local were tested in observation plots. Due to adverse seasonal conditions the yield of chillie crop was poor. The local selection, type-2 was the highest yielder giving 1,210 lb. of dry ripe pods per acre.

A large collection representing sixty types from countries outside India and eighty-seven Indian types from States other than Madras were studied. All the foreign types gave poor yields and were stunted in growth. Many of them were non-pungent. The Indian types were also poor but were better than the foreign types. Among them two types from Assam which had purple-washed fruits, exhibited freedom from thrip and mosaic attack. This character has to be confirmed.

24. *Fodder grasses.*—During the year, the Guinea grass, Australian drought resistant grass, Kolukkattai grass, buffalo grass and the bloe buffel grass were tried under irrigation. The yield behaviour of these grasses including their behaviour during the previous years are given below :—

Years.	*Kolukkattai grass.*	*Buffaloe grass.*	*Guinea grass.*	*Australian grass.*	*Bloe buffel grass.*
1949–50	173,970	89,700	95,245	77,000	..
1950–51	106,860	61,925	53,495	53,300	..
1951–52	92,550	99,625	91,495	61,900	..
1952–53*	43,400	54,600	49,500	41,000	64,800
1953–54*	36,160	42,000	72,230	43,720	80,420

N.B.—* During these years only restricted irrigation could be given.

A sudden drop in the yield of Kolukkattai grass is noted. This may be probably due to the heavy depletion of the soil or due to the restricted irrigation given during the later years. Bloe buffel, the new introduction has a bright future in the tract. It does not set seeds under Koilpatti conditions and has to be propagated by means of slips. Its good yield forecast its bright future in the tract.

25. *Fruit trees.*—Five Sathgudi trees, nine acid limes, one Nepali lemon and one Hawaiian citron were in bearing during the year. These fruit trees were planted during January 1948. The Sathgudi yielded 1,212 fruits, Hawiian citron 241 fruits, acid lime 4,769 and Nepali lemon 1,254 fruits. Jamberi seeds and seedlings are being raised to be used as root-stocks for Sathgudi buds.

26. *Cattle.*—Three breeding bulls, two Sindhi bulls and one Murrah buffalo were maintained throughout the year. The Sindhi bulls Nos. 56 and 337 and the Murrah buffalo No. 38 made a total of 240 services and of these 220 were on outside animals. There were six pairs of work bullocks at the beginning of the year and the same strength was maintained throughout.

27. *Poultry.*—Rhode Island Red breed of poultry was maintained. A small flock of 5 birds, viz. (one cock and four hens) were kept on an average during the period. From these birds, 488 (four hundred and eighty-eight) hatching eggs were distributed in the tract. Although this breed has the advantage of meat-production-*cum*-good laying capacity, it is not suitable for the South Indian conditions due to its fragile nature. Hence a start was made during the year 1951-52 to hybridize the Rhode Island Red breed with Indian game breed. The F-2 generation was raised this year and two hardy birds recorded an average of 98 eggs per bird. The F-3 generation is being raised from these two hardy birds.

AGRICULTURAL RESEARCH STATION,
KOILPATTI,
18*th September* 1954.

B. W. X. PONNAIYA,
Superintendent.

MADURAI,
3*rd January* 1955.

T. S. FRANCIS,
Deputy Director of Agriculture.

TABLE I-A (ACCOUNTS).—*Agricultural Research Station, Koilpatti.*

Details of crops.	Area in acres.	Seed. Yield in lb.	Seed. Value.	Grain. Yield in lb.	Grain. Value.
(1)	(2)	(3)	(4)	(5)	(6)
			RS.		RS
I. Crops—					
(i) Vellai Cholam (irrigated).	2·60	7,417	1,236	..	..
(ii) Ragi (irrigated) ..	1·00	2,394	339	..	..
(iii) Cotton (rainfed) ..	26·83	7,802	2,701	..	..
(iv) Irungu Cholam (rainfed).	..	536	89	..	..
(v) Cumbu (rainfed) ..	1·04	1,088	181	..	..
II. Miscellaneous—					
(i) Diary produce—					
(a) Milk	..	7,154	1,341	..	..
(b) Sale or transfer of cows and calves 10 Nos.	..	10	3,065	..	..
(ii) Poultry	(No.)	1,253	157	..	..
(iii) Sale of seedlings and plants.	..	22,437	59	..	..
Total ..	..	..	9,168	..	..

Details of crops.	Area in acres.	Straw. Yield in lb.	Straw. Value.	Total receipts.	Total receipts for three years. 1951–52.	1952–53.	1953–54.
		(7)	(8)	(9)	(10)	(11)	(12)
			RS.		RS.	RS.	RS.
I. Crops—							
(i) Vellai Cholam (irrigated).	2·60	13,972	116	1,352	730	1,354	1,352
(ii) Ragi (irrigated) ..	1·00	17,675	118	457	333	445	457
(iii) Cotton (rainfed) ..	26·83	..	..	2,701	2,170	580	2,701
(iv) Irungu Cholam (rainfed).	..	32,186	268	357	2,908	1,524	357
(v) Cumbu (rainfed) ..	1·04	1,360	20	201	268	113	201
II. Miscellaneous—							
(i) Diary produce—							
(a) Milk	..	..	..	1,341	1,950	2,185	1,341
(b) Sale or transfer of cows and calves 10 Nos.	..	..	..	3,065	..	2,037	3,005
(ii) Poultry	(No.)	..	..	157	448	340	157
(iii) Sale of seedlings and plants.	..	..	..	59	170	25	59
Total ..	..	..	522	9,690	8,983	8,603	9,690

TABLE I-B (ACCOUNTS).—*Agricultural Research Station, Koilpatti.*

Crop.	Seed. Unsold produce. Quantity.	Seed. Unsold produce. Value.	Seed. Transferred or sold. Quantity.	Seed. Transferred or sold. Value.	Grain. Unsold produce. Quantity.	Grain. Unsold produce. Value.	Grain. Transferred or sold. Quantity.	Grain. Transferred or sold. Value.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	LB.	RS.	LB.	RS.	LB.	RS.	LB.	RS.
(i) Vellai Cholam (irrigated).	153	26	1,614	269	288	48	683	114
(ii) Ragi (irrigated) ..	5,141	857	1,899	317	2,020	337	555	93
(iii) Irungu Cholam (rainfed).	2,440	407	3,356	559	Nil	Nil.	908	151
(iv) Cumbu (rainfed) ..	4,303	717	7,611	1,269	3,114	519	628	105
(v) Cotton (rainfed)—								
(a) Lint	1,728	1,728	969	1,074	..	..	..	..
(b) Seed	..	..	..	..	..	..	..	..
(i) Prosopis seeds ..	259	518	610	1,220	..	..	..	..
Total ..	14,024	4,253	16,059	4,708	5,422	904	2,774	463

Crop.	Straw. Unsold produce. Quantity.	Straw. Unsold produce. Value.	Straw. Transferred or sold. Quantity.	Straw. Transferred or sold. Value.	Total.	Total receipts for three years. 1951–52.	1952–53.	1953–54.
	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
	LB.	RS.			RS.	RS.	RS.	RS.
(i) Vellai Cholam (irrigated).	..	..	..	..	457	239	592	457
(ii) Ragi (irrigated) ..	..	..	..	..	1,604	939	730	1,604
(iii) Irungu Cholam (rainfed).	142,639	2,377	..	..	3,494	3,621	5,081	3,494
(iv) Cumbu (rainfed) ..	17,885	298	..	..	2,908	911	1,087	2,908
(v) Cotton (rainfed)—								
(a) Lint	..	..	..	..	2,802	5,943	5,068	2,802
(b) Seed	..	..	..	..	..	170	826	..
(vi) Prosopis seeds ..	..	..	..	..	1,738	1,478	1,948	1,738
Total ..	160,524	2,675	..	..	13,003	13,301	15,335	13,002

TABLE II.—*Pro forma of cost of cultivation of bulk crops—Agricultural Research Station, Koilpatti.*

Serial number and details of expenditure.	Actual expenditure for three years		
	1951–52.	1952–53.	1953–
	RS	RS.	Rs.
1 Pay and allowances of the staff (one-third of actuals)—Farm manager and maistry orfieldman (there are two Farm managers and no fieldman).	1,188	1,202	1,150
2 Miscellaneous cultivation expenses (one-third of actuals)	2,376	2,328	2,160
3 Working expenses (other than miscellaneous cultivation expenses) ..	13,855	15,742	13,045
4 One-tenth of expenditure on live and deadstock	1 96	270	153
5 Proportionate rent for the land if the station is on leased land; If it is Government farm the normal rental of the tract subject to 15 times the land assessment per acre to be debited as expenditure.	1 ,000	1,025	1 025
6 Unforeseen contingencies	Nil	Nil	Nil
Total ..	18,711	20,567	17,533

TABLE III (ACCOUNTS).—*Statement of abstract expenditure and receipts—Agricultural Research Station, Koilpatti.*

Serial number and particulars.	*Years.*		
	1951–52.	1952–53.	1953–54.
	RS.	RS.	RS.
1 Expenditure	18,711	20,567	17,533
2 Revenue	15,363	13,852	13,252
3 Rainfall	21·24 inches (droughty year).	17·13 inches (droughty year).	36·77 inches

The expenses have been brought down during the current year. Since the produce of the previous year ending is usually sold or transferred during the subsequent year the effect of good rainfall of this year on the receipts would be felt only in the next year's revenue. The normal rainfall of the tract is 30 inches.

APPENDIX I.

STATEMENT OF CHARGES AND RECEIPTS (JULY 1953 TO JUNE 1954).

Receipts.

	RS.
XXIX. Agriculture—Agricultural Receipts—	
Agricultural stations	4,433
Miscellaneous	978
Rent on buildings	31
Recovery of over payment	2
Stationery and printing	35
Veterinary	2,675
Total ..	8,149
Free transfer and book adjustment ..	5,103
Grand total ..	13,252

Charges.

40. C. Agriculture—Agricultural Experimental Farms—A. Agricultural Stations—	
Pay and allowances of staff (permanent)	10,438
Dearness allowances	3,330
Travelling allowances	434
House-rent allowances and other compensatory allowances	349
Total ..	14,551

Contingencies.

Purchase of live and deadstock	1 530
Working expenses	19,526
Dearness allowance to menials	5,022
Other contingencies	979
Petty construction and repairs	2,699
Grand Total ..	29,756

50-d. Civil Works.

Taxes and annual repairs to residential buildings	299

APPENDIX II.

SEEDS AND PLANTS DISTRIBUTED DURING 1953-54.

Description.	Quantity. LB.
Seeds—	
Cotton—	
I. Strain K.2	Nil.
Millets—	
(a) Vellai Cholam K.2	1,614
(b) Irungu Cholam K.1	3,356
(c) Cumbu K.1 (rainfed)	7,611
(d) Irrigated ragi K.1	1,899
Vegetables	1,822
II. Miscellaneous—	
(a) Prosopis seeds	610
(b) Kapok seeds	24
III. Plants—	
Grass slips—	
(a) Guinea grass slips	23,050
(b) Gautimala grass slips	4

APPENDIX III.

INCREASING THE INCOME OF THE STATION.

The Agricultural Research Station, Koilpatti, has been in existence for the past fifty years. It consists of two blocks (black soil—106·20 acres and red soil :— 16·20 acres). Steps taken during the current year for increasing the income for this Research station are given below :—

I. *Improvements of irrigation facilities*—(a) *Red soil.*—A bore-hole has been driven in the high piece near the implements shed at the spot divined by the Director of Agriculture. A depth of 80 feet has been bored. The bore-hole yields 900 gallons of water per hour when worked with a centrifugal pump. The capacity of the bore-hole would be tested with a deep well pump to find out the full capacity of the bore-hole. With the help of this water, two more acres can be brought under irrigation and thus the income will be increased.

(b) *Black soil.*—A trial well has already been dug in the *black soil* area and it commands an area of 1·25 acres. A bore hole has been made near this well at the spot divined by the Director of Agriculture to a depth of 72 feet. When tested with a centrifugal pump it yielded 1,300 gallons of water per hour. With this water additional 3 acres is proposed to be irrigated.

II. *Raising live fence.*—In both the red and black soil area, raising of live fence with Prosopis juliflora was completed. The hedge in the black soil in some places is short as seedlings are just coming up. By next year, a complete hedge with an uniform height of five feet is expected.

III. *Adjusting cropping programme so as to reduce the fallows* .—It was seen that there was continuous cropping throughout the year. In an irrigated area of 12 acres, 36 acres were under crop during the current year.

IV. *Miscellaneous.—Ipomoea carnea* suits the rainfed black soils as a border crop. A total length of 7 miles and 6 furlongs has been completed with this border crop in the 106 acres block during the current year. A quantity of 600,000 lb. of green matter is expected annually from this border crop. This quantity when composted and applied to this area is expected to increase the yield of all the crops grown in the area by 10 per cent.

AGRICULTURAL RESEARCH STATION,
KOILPATTI,
12th December 1954.

B. W. X. PONNAIYA,
Superintendent.

ANNUAL REPORT OF THE PADDY BREEDING STATION, MANGALORE, SOUTH KANARA, FOR FASLI YEAR 1363 (JULY 1953–JUNE 1954).

1. *Season and Rainfall.*—The year under report recorded a rainfall of 141·03 inches on 113 rainy days as against 105 81 inches on 106 days received during the previous year and 135·67 inches on 124 days, the average of the previous ten years. The south-west monsoon set in on the 10th of June. Till the end of June, it was somewhat weak, but during the month of July very heavy showers were received accounting nearly fifty per cent of the total rainfall, and thereby caused some damage to the crop of the low lying areas by inundation. The rains received during the month of August and part of September were precarious and with the result the crop in the single-crop area had suffered to a considerable extent. Slightly heavy showers of north-east monsoon during the month of October retarded the progress of the first crop paddy harvest but facilitated preparation and planting of the second crop area. Excepting for three light showers, dry weather prevailed up to the end of April. The summer showers were received from the beginning of May when the sowing of the first crop lots were taken up.

The data on rainfall are presented in Table I.

TABLE I.—*Statement of rainfall at the Paddy Breeding Station, Mangalore, for the year* 1953–54.

Month.	Week.	1953–54. Quantity in inches.	1953–54. Number of rainy days.	1952–53. Quantity in inches.	1952–53. Number of rainy days.	Average of the previous ten years. Quantity in inches.	Average of the previous ten years. Number of rainy days.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		South-west monsoon.					
June	7–13	2·62	3	3·86	7	10·96	6·7
	14–20	9·01	6	13 07	7	10·77	6·6
	21–27	4·93	6	9·97	7	8·64	5·5
June—July ..	28– 4	16·69	6	15·41	7	8·66	6·5
	5–11	11·17	7	7·19	7	10·19	6·8
	12–18	8·53	7	5·94	7	10·15	7·0
	19–25	14·82	7	7·07	6	9·66	6·5
July—August ..	26– 1	20.28	7	4·01	6	7·14	6·1
	2– 8	5·95	6	4·93	6	5·65	5·8
	9–15	2·65	5	4·75	7	5·97	5·7
	16–22	2·61	4	4·65	7	5·62	6·0
	23–29	1·72	6	6·06	7	4·11	5·1
August—September.	30– 5	2·63	2	0.85	3	3·64	5·2
	6–12	1·55	5	0·77	3	3·30	5·2
	13–19	1.25	2	..	..	2 07	3·2
	20–26	0·57	2	0·03	..	1·98	3·9
Total ..		106·98	81	88·61	87	108·51	91·8

North-east monsoon.

TABLE I.—*Statement of rainfall at the Paddy Breeding Station, Mangalore, for the year* 1953–54—*cont.*

Month.	Week.	1953–54. Quantity in inches.	1953–54. Number of rainy days.	1952–53. Quantity in inches.	1952–53. Number of rainy days.	Average of the previous ten years. Quantity in inches.	Average of the previous ten years. Number of rainy days.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
September—October.	27– 3	0·12	1	1·28	1	2·35	2·9
	4–10	0·36	1	4.17	6	1·78	2·6
	11–17	4·69	4	8·68	4	2·69	2·4
	18–24	1·67	4	0·42	1	1·27	2 4
	25–31	1·95	2	..	..	0·76	1·8
November	1– 7	..	..	..	..	0·86	1·1
	8–14	..	..	..	..	0·72	1·4
	15–21	0·14	1	..	..	0·91	1·3
	22–28	..	..	..	..	0·28	0·7
November—December.	29– 5	..	..	..	..	0·04	0·2
	6–12	..	..	0·07	..	0·32	0·4
	13–19	..	..	0·53	2	0·13	0·5
	20– 6	..	..	..	..	0·10	0·1
December—January.	27– 3	..	..	..	..	..	..
	4–10	0·42	1	0·01	..	0·24	0·2
	11–17	0·02	..	..	..	..	..
	18–24	..	..	..	..	0·07	0·1
	25–31	..	..	..	..	..	..
Total ..		9·37	14	15·16	14	12·52	18·1
February	1– 7	..	..	..	..	..	..
	8–14	..	..	..	..	..	..
	15–21	..	..	..	..	0·05	0·2
	22–28 or–29	..	..	..	..	..	
March	1– 7	..	..	..	..	0·01	0·3
	8–14	..	..	..	..	..	..
	15–21	0·61	1	..	..	0·36	0·2
	22–28	..	..	..	..	0·03	0·1
March—April ..	29– 4	..	..	0·02	..	0·13	0·4
	5–11	0·44	2	0·68	1	0·29	0·4
	12–18	..	..	0·62	2	0·80	1·3
	19–25	3·55	3	0·09	..	0·40	0·5
April—May ..	26– 2	0·01	..	..	..	0·12	0·4
	3– 9	0·13	1	..	..	0 10	0·3
	10–16	1·62	1	..	..	0·66	1·0
	17–23	1·12	1	..		1·65	1·7
	24–30	0·59	3	0·63	2	3·17	3·3
	31– 6	16·61	6	..	..	6·77	4·0
Total ..		24·68	18	2·04	5	14·64	14·1
Grand total ..		141·03	113	105·81	106	135·67	124·0

2. *Cultivation routine.*—The dry sowings of the first crop varieties were taken up during the second fortnight of April under adverse dry weather conditions by soaking plots with lift irrigation. The sowing which was started on 18th April 1953 was continued and completed on 31st May 1953. Excepting early sown lots which germinated with the available moisture, the germination of the

rest was very sparse. With the receipt of showers in June the withering nurseries revived quickly giving rise to uniform seedlings. The transplanting of the first crop was commenced on 20th June 1953 and completed on 15th July 1953. The second crop sowings which were commenced on 13th August 1953 was continued and completed on 8th October 1953. Planting was started on 13th October 1953 and completed on 16th November 1953. An area of 45 cents consisting of 20 cents under bulk, 25 cents under experiments was under third crop from the month of February to May. The sowings of the first crop varieties of 54–55 were taken up towards the end of the month of April and completed by the third week of May 1954. The details of sowings and plantings for the year 1953–54 are furnished below :—

Particulars.	*First crop.*	*Second crop.*	*Third crop.*
(a) *Sowings*—			
1. Period of sowing	18th April to 31st May 1953.	13th August to 8th October 1953	18th and 19th January 1954.
2. Total area sown	5·34 acres.	3·25 acres.	0·09 cents.
(b) *Planting.*—			
1. Period of planting	20th June to 15th July 1953.	13th October to 16th November 1953.	20th to 22nd February 1954.
2. Total area planted	22·53 acres	12·30	30 45
(i) Area under bulk crops.	16·53	8·23	0·20
(ii) Area under experiments.	6·00	4·07	0·25
(iii) Number of experimental lots.	1,099	565	26

iv. Details of experimental lots—

	LOTS.		
Yield trials	196	136	..
Observation lots	432	56	19
Pureline cultures	183	142	7
Hybrid progenies	19	17	—
Manurial experiment ..	224	182	..
Cultural lots	32	32	..
Miscellaneous	13	..	..
	1,099	565	26

The manurial regimen of the paddy fields during the first crop season consisted of the application of cattle-manure or green leaves at 2 tons per acre, Superphosphate at 150 lb. per acre and ammonium sulphate at 100 lb. per acre (50 lb. as basal dressing, 50 lb. as top dressing one month after planting). During the second crop season, the plots received cattle-manure at the rate of 3 tons per acre and ammonium phosphate at 150 lb. per acre. The third crop received a basal dressing of 2 tons of green leaves per acre, ammonium phosphate at 150 lb. per acre, and ammonium sulphate at 224 lb. per acre.

3. *Growth and yield.*—The average acre yield of the station for the first crop works out to 2,388 lb. while that of the second crop works out to 1,567 lb. as against 2 290 lb. and 1,787 lb. recorded during the previous year respectively. The first crop season proved favourable in spite of late setting of the monsoon and its uneven distribution and the average has touched the maximum of 2,388 lb. ever recorded at the station. While the second crop season proved disappointing partly on account of insect damage and failure of irrigation sources, which resulted in a low average care yield. The acre yields recorded by the various strains are presented in table II.

TABLE II.—*Acre yields of bulk crops for the year* 1953–54.

Name of strain.	Acre yields-grain in lb.				
	1953–54.	1952–53.	1951–52.	1950–51.	1949–50
A. First crop.					
MGL. 1 (Guddubolliari) ..	2,431	2,382	2,516	..	..
MGL. 2 (Kayama red)	2,537	2,029	..	..	..
PTB. 9 (Thavalakannan) ..	2,628	2,395	2,743	2,119	1,942
PTB. 11 (Halluga)	2,059	2,556	2,996	2,075	1,203
PTB. 14 (Mascathy)	2,289	2,167	2,079	1,873	1,659
B. Second crop.					
GEB. 24 (Chinna Kichli samba).	1,370	1,326	1,894	1,385	1,927
Co. 3 (Thuluku samba)	1,638	2,084	1,875	1,651	2,074
Co. 25 (Hybrid sirumani) ..	1,885	1,881	..	..	..
PTB. 19 (Athikraya)	1,330	1,681	2,035	1,376	1,325
PTB. 20 (Chitteni)	1,614	1,910	2,071	1,699	1,850

4. *Pureline selection.*—The improvement of paddy of this district by the evolution of high yielding strains in the major first and second crop varieties of the tract by pureline selection method, which was started during previous years, was continued during the year under report. The trials of cultures in the different varieties of the first and second crop are discussed below :—

I. *First crop* (a) *Bilikayama.*—Four cultures 472. 1474, 1535 and 1558 were under yield trials at the station, and the results were significant with culture 472 recording 13·3 per cent increased yield over MGL.1 standard. This culture has also consistently recorded higher yields ranging from 9 to 30 per cent in the district trials. This would be released as a strain after one more year's trial in the district. The results of the trial at the station and the previous years' performance of cultures are presented in Table III.

TABLE III.—*Bilikayama yield trials.*

First crop — 1953–54.

Plot No. E. 10 and 11.
Lay out : 5 × 4 randomized.
Size of strip ; 20′ × 5′.
Planting : Singles bulk.

Date of sowing : 26th April 1953.
Date of planting : 23rd Jun 1953.
Date of harvesting : 14th October 1953.

Details of cultures.	Flowering duration in days.	Acre yield grain in lb.	Percentage on standard.	'Z' test significant or not.	Standard error.	Critical difference P = 0·05.
472	135	3,204	113·3			
1474	133	3,063	108·4			
1535	133	3,034	109·1	Yes.	2·9	8·8
1558	135	3,188	112·8			
MGL. 1	133	2,826	100·0			

Conclusion— 472 1,558 1,535 1,474 MGL. 1

Performance of cultures during previous years.

Culture number.	1952–53.		1951–52.		1950–51.	
	Acre yield.	Percentage on standard.	Acre yield.	Percentage on standard.	Acre yield.	Percentage on standard.
472	2,633	106·2	3,091	133·4	2,565	113·4
1474	2,585	103·7	2,966	119·7	3,014	117·2
1535	2,585	103·7	3,195	133·6	2,607	115·5
1558	2,633	106·2	2,900	121·2	2,576	114·2

(b) *Mascathy.*—Culture 3159 which was a week earlier in duration had recorded increased yields ranging from 7 to 20 per cent in the district trials, and is therefore being proposed for release as strain MGL.5. Fresh selection work of Mascathy was started this year and 205 single plants were selected for further study.

(c) *Halluga.*—Culture 1828 which has recorded higher yields ranging from 10 to 23 per cent over local during the successive seasons in the district is being proposed for release as strain MGL.3. In the reselection work of Halluga, out of 300 single plant selections under observation, 96 cultures were carried forward for further study.

(d) *Kanwa.*—Two cultures 1958 and 3589 were under trial at the station and the results were significant with culture 1958 recording 14·4 per cent increased yield over local Kanwa. In the district trials culture 1958 has recorded increased yields ranging from 7 to 33 per cent and is therefore being proposed for release as strain MGL 4. The results of the trial at the Station and the previous year's performance of cultures are presented in Table IV.

TABLE IV.—*Kanwa yield trials.*

First crop—1953–54.

Plot No. E. 7.
Lay out: 3 × 4 randomized.
Size of strip: 20′ × 8′.
Planting: Doubles, bulk.

Date of sowing: 28th April 1953.
Date of planting: 3rd July 1953.
Date of harvest: 7th October 1953.

Details of cultures.	Flowering duration in days.	Acre yield grain in lb.	Percentage on standard.	'Z' test significant or not.	Standard error.	Critical difference P = 0·05.
1958	131	3,169	114·4			
3589	135	2,816	98·0	Yes.	1·4	3·5
Kanwa standard.	129	2,874	100·0			

Conclusion— 1958 Kanwa standard 3589

Performance of cultures during previous years.

Culture number.	1952-53. Acre yield.	1952-53. Percentage on standard.	1951-52. Acre yield.	1951-52. Percentage on standard.	1950-51. Acre yield.	1950-51. Percentage on standard.
1958	3,064	130·5	3,362	114·9	2,696	123·5
3589	2,549	108·6	3,661	123·5	2,901	119·0

II. *Second crop.*—(a) *Athikraya*—Four cultures, 859, 2482, 3475 and 3507 were under yield trial at the Station and the results of the trial at the Station and the previous year's performance of cultures are presented in table V. Two cultures 859 and 2482 which were under trial in the district, have recorded higher yields ranging from 2 to 57 per cent and 3 to 86 per cent respectively. The performance of culture 2482 was found to be better in the district trials for the second year and is therefore ready for release as a strain.

TABLE V.—*Athikraya yield trials.*

Second crop—1953-54.

Plot No. E. 10 and 11.
Lay out: 6×8 randomized.
Size of strip: 20′×4′.
Planting: Doubles, bulk.

Date of sowing: 21st September 1953.
Date of planting: 27th October 1953.
Date of harvesting: 21st and 29th January 1954.

Details of cultures.	Flowering duration in days.	Acre yield grain in lb.	Percentage or standard.	'Z' test significant or not.	Standard error.	Critical difference P = 0·05.
859	92	1,866	99·1			
2482	88	2,083	110·2			
3475	94	2,121	112·7	Yes.	3·5	10·0
3507	92	1,860	98·8			
Local	91	1,882	100·0			
PTB. 19	93	1,931	102·6			

Conclusion— 3475 2482 PTB. 19 Local 859 3507

Performance of cultures during previous years.

Culture number.	1952-53. Acre yield.	1952-53. Percentage on standard.	1951-52. Acre yield.	1951-52. Percentage on standard.	1950-51. Acre yield.	1950-51. Percentage on standard.
859	2,237	119·9	1,731	123·3	1,817	103·3
2482	2,172	116·4	1,698	134·1	1,921	106·6
3475	2,109	113·0	2,681	135·3	1,517	105·8
3507	1,968	105·5	2,230	112·5	1,598	111·5

5. *District trials.*—Two cultures in each of Bilikayama and Kanwa and one culture of Mascathy for the first crop season and two cultures in each of Athikraya and Kavinginpoothala natural cross for the second crop season were under trial in the district during this year. It is proposed to release Halluga culture 1928, Kanwa culture 1958 and Mascathy culture 3159 as strains MGL.3, MGL.4 and MGL.5 respectively since they have consistently recorded higher yields in the district. Under the second crop conditions, the performance of Athikraya cultures 2482 was found to be better than that of Athikraya culture 859 and therefore is ready for release as a strain. The performance of hybrid culture 8360 (GEB. 24 × PTB. 16) was better than Co.3 in all the seven centres in the district while culture 8448 of the same cross proved better in 5 out of 7 centres. Though the results on the viability of seeds stored in the above trials is yet to be known, these cultures were reported to have kept up their viability during the previous season. The results are presented in tables VI to X.

TABLE VI.—*Performance of Bilikayama cultures in the district.*

First crop—1953–54.

Name of taluk.	Name of centre.	Particulars.	Culture 472.	Culture 1558.	Local kayama.
Mangalore ..	Maroli.	Acre yield	2,600	4,500	3,950
		Per cent	65·8	114·0	100·0
Do. ..	Kullige.	Acre yield	2,900	2,950	2,800
		Percent	103·5	105·3	100·0
Puttur ..	Puttur.	Acre yield	2,060	2,040	1,860
		Per cent	110·8	109·6	100·0

TABLE VII.—*Performance of Mascathy culture in the district.*

First crop—1953–54.

Name of taluk.	Name of Centre.	Particulars.	Cultures 3159.	Local Mascathy.
Mangalore	Derebail	Acre yield	900	750
		Per cent	120·0	100·0
Do.	Muda	Acre yield	2,450	2,275
		Per cent	107·6	100·0
Puttur	Puttur	Acre yield	1,700	1,540
		Per cent	110·4	100·0
Karkala	Marpady	Acre yield	1,415	1,200
		Per cent	117·9	100·0

TABLE .—*Performance of Kanwa Cultures in the District*

First crop.—1953–54.

Name of taluk	Centre.	Particulars.	Culture 1958.	Culture 3589.	Local Kanwa.
Coondapur	Koteswar	Acre yield	2,000	2,300	1,500
		Per cent	133·3	153·3	100·0
Do.	Japte	Acre yield	2,600	2,480	2,100
		Per cent	123·8	118·1	100·0
Do.	Koni	Acre yield	..	2,940	2,610
		Per cent	..	110·1	100·0
Do.	Basur	Acre yield	2,200	..	1,960
		Per cent	112·2	..	100·0
Do.	Barkur	Acre yield	2350	..	2000
		Per cent	117·5	..	100·0
Do.	Gopadi	Acre yield	2,360	..	1,800
		Per cent	131·1	..	100·0
Udipi	Kadekar	Acre yield	3,240	3,360	3,000
		Per cent	108·0	112·0	100·0
Do.	Yennagudde	Acre yield	2,060	2,520	1,860
		Per cent	110·8	135·5	100·0

TABLE IX.—*Performance of Athikraya cultures in the district*

Second crop—1953–54.

Name of taluk.	Name of centre.	Particulars.	Culture 859.	Culture 2482.	Local
Mangalore	Bantwal	Acre yield	988	1,425	925
		Per cent	106·9	154·0	100·0
Do.	Mulur	Acre yield	874	900	806
		Per cent	108·4	111·6	100·0
Do.	Haroli	Acre yield	3,300	3,900	2,100
		Per cent	157·1	185·8	100·0
Do.	Iddya	Acre yield	1,678	1,310	1,271
		Per cent	132·0	103·0	100·0
Kasaragode	Kudlu	Acre yield	1,500	1,670	1,220
		Per cent	122·9	136·9	100·0
Puttur	Puttur	Acre yield	1,200	1,340	1,160
		Per cent	103·5	115·5	100·0

TABLE. X—*Performance of Hybrid cultures (GEB. 24 X PTB. 16) in the district.*

Second crop—1953–54.

Name of taluk.	Name of centre.	Particulars.	Culture 8360.	Culture 8448.	Co. 3 Standard.
Mangalore	Mular	Acre yield	1,600	1,350	800
		Per cent	200·0	168·8	100·0
Karkala	Marcor	Acre yield	2,232	2,150	2,212
		Per cent	103·1	97·2	100·0
Do.	Sanoor	Acre yield	1,400	1,300	1,340
		Per cent	104·5	97·0	100·0
Udipi	Kodavoor	Acre yield	862	712	709
		Per cent	123·1	101·7	100·0
Do.	Kidiyur	Acre yield	1,410	1,530	1,400
		Per cent	100·7	109·3	100·0
Bramahawar	Kadoor	Acre yield	1,900	2,000	1,800
		Per cent	105·5	111·1	100·0
Do.	Peramanjoor	Acre yield	1,600	1,800	1,200
		Per cent	133·3	150·0	100·0

6. *Hybridization.*—(i) *First crop.*—The F2 progenies of MGL. 1 and MTU. 3 and PTB. 11 and MTU. 4 to evolve non-lodging types like MGL. 1 and PTB. 11 respectively were examined and 56 single plants of the former cross and 51 single plants of the latter were carried forward for further study. One hundred and forty single plants of F2 progenies of cross Kasipichodi × PTB. 9 were selected for further study.

(ii) *Second crop.*—The F2 progenies of Ptb. 20 × Co. 3 and Co. 3 × 8448 to evolve a non-deteriorating type resembling Co. 3, were examined and 166 single plants of the former cross and 150 single plants of the latter were selected for further studies. Fresh crosses of Co. 3 × PTB. 20, Co. 3 × Muthusamba, Co. 3 × 8360 were effected.

Seven single plant selections, taken from the four economic progenies of the cross Co. 3 × PTB. 19 found to retain their viability under farm conditions, were under yield trials with Co. 3 as standard at the Station. Culture 89003/ has recorded an increased yield of 16·1 per cent and is a fortnight earlier in flowering duration compared to Co. 3. The results of the trial are presented in Table XI.

TABLE XI.—*Yield trial of non-deteriorating cultures of Co. 3 duration.*

Second crop—1953–54.

Plot No. E-9.
Lay out—8 × 4 randomized.
Size of strip—10′ × 5′
Planting—Doubles, bulk.

Date of sowing—1st October 1953.
Date of planting—13th November 1953.
Date of harvesting—9th February 1954.

Serial number and details of cultures.	Flowering duration in days.	Acre yield grain in lb.	Percentage on standard.	'Z' test satisfied or not.	Standard error.	Critical difference P=0·05.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1. 8897/1 ..	103	1,392	108·0	..	..	..
2. 8897/2 ..	106	1,258	97·6	..	..	..
3. 8897/3 ..	95	1,258	97·6	..	..	..
4. 8899/1 ..	105	1,176	91·5	..	..	..
5. 8900/1 ..	92	1,454	112·8	Yes.	4·4	13·0
6. 8900/2 ..	90	1,330	103·1	..	..	..
7. 8900/3 ..	93	1,496	116·1	..	..	..
8. Co. 3 Std. ..	107	1,289	100·0	..	..	..

Conclusion: 8900/3, 8900/1, 8897/1, 8900/2, 8897/2, 8897/3, 8899/1.

7. *New introductions.*—The study of pureline cultures was continued with an addition of 32 strains and pureline cultures. In the trials of early varieties during the first crop season strains PTB. 22, PTB. 25 and PTB. 28 and a Chinese type CH. 42 were found promising. Under second crop conditions a dozen cultures found promising, were marked out for further trial.

8. *Manurial trials*—(i) *deleterious effects (if any) of the continuous application of ammonium sulphate.*—An experiment consisting of four treatments with green leaf at 2,500 lb. per acre, ammonium sulphate to supply 20 lb. N per acre, applied alone and in combination and with a no manure treatment was laid out during the first and second crop seasons of the year for the third year in succession. While there was no difference in yield between the three manurial treatments, there was good response due to the application of green leaf alone at 2,500 lb. per acre and the addition of ammonium sulphate to green leaf recording no additional response. The results are presented in Tables XII and XIII.

TABLE XII.—*Deleterious effects (if any) of the application of ammonium sulphate.*

First crop—1953–54.

Field No.—F. 13.
Lay out—4 × 6 randomized.
Size of strip—26′ × 10′
Planting—Doubles, bulk.
Variety—PTB. 14.

Date of sowing—1st May 1953.
Date of planting—6th July 1953.
Date of harvesting—6th October 1953.

Serial number and treatments.	Flowering duration in days.	Acre yield grain in lb.	Percentage on general mean.	Percentage on control.
(1)	(2)	(3)	(4)	(5)
1. Leaf at 2500 lb. per acre	135	2,508	104·6	124·8
2. Ammonium sulphate at 100 lb. per acre.	138	2,471	103·7	122·9
3. Leaf at 2,500 lb. per acre plus ammonium sulphate at 100 lb. per acre.	138	2,601	108·5	129·4
4. No manure (control)	136	2,009	83·8	100·0
5. General mean	..	2,397	100·0	119·3
6. Whether 'Z' test satisfied or not.	..	..	Yes.	..
7. Critical difference P. = 0·05 ..	..	..	13·4	11·2

Conclusion: 3. 1. 2. 4.

TABLE XIII.—*Deleterious effects (if any) of the application of ammonium sulphate.*

Second crop—1953-54.

Field No.—F. 13
Layout—4 × 6 randomised.
Size of strip—27′ × 11′
Planting—Doubles, bulk.
Variety—GEB. 24.

Date of sowing—5th September 1953.
Date of planting—13th October 1953.
Date of harvesting—8th January 1954

Serial number and treatments.	Flowering in duration in days.	Acre yield grain in lb.	Percentage on general mean.	Percentage on control.
(1)	(2)	(3)	(4)	(5)
1. Leaf at 2,500 lb. per acre	93	645	114·4	117·3
2. Ammonium sulphate at 100 lb. per acre.	93	556	98·7	101·1
3. Leaf at 2,500 lb. per acre plus ammonium sulphate at 100 lb. per acre.	93	515	91·4	93·6
4. No manure (control)	93	550	97·6	100·0
5. General mean	..	564	100·0	102·4
6. Whether 'Z' test satisfied or not ..		No.		
7. Critical difference P = 0·05 ..	..	..	59·2	..

(ii) *Efficacy of application of lime.*—The residual effects of the application of 0, 1,000, 2,000 and 3,000 lb. of lime with and without green leaf were studied for the past five seasons from 1951-52 onwards. The results furnished in the Table XIV show that no residual effects were observed for the third year in succession and therefore this experiment was concluded.

TABLE XIV.—*Liming—Residual effects of.*

Firts crop—1953-54.

Field No.—G. 2
Layout—Split plot 8 × 4
Size of strip—42′ × 6′
Planting—Doubles, bulk.
Variety—PTB. 13.

Sown on 28th April 1953.
Planted on 29th June 1953.
Flowered on 16th September 1953.
Harvested on 18th October 1953.

1. Leaf at 4,000 lb. per acre and no leaf .. .. Main-plot treatments.
2. Lime doses of 1,000, 2,000 and 3,000 lb. per acre .. .. Sub-plot treatments.

(i) *Leaf* versus *no leaf*.

Serial number and treatments.	Acre yiled grain in lb.	Percentage on general mean.
(1)	(2)	(3)
1. No leaf	1,947	99·5
2. Leaf at 4,000 lb. per acre	1,970	100·7
3. General mean	1,958	100·0
4. Whether 'Z' test satisfied or not	No.	
5. Critical difference P = 0·05	..	23·6

(ii) *Doses of lime.*

Serial number and treatments.	Acre yield grain in lb.	Percentage on general mean.	Percentage on control.
(1)	(2)	(3)	(4)
1. Lime 0	2,009	102·6	100·6
2. Lime at 1,000 lb. per acre	1,926	98·3	96·4
3. Lime at 2,000 lb. per acre	1,948	99·5	97·5
4. Lime at 3,000 lb. per acre	1,952	99·7	97·7
5. General Mean	1,958	100·0	98·0
6. Whether 'Z' test satisfied or not		No.	
7. Critical difference P = 0·05		61·3	

(iii) *Interaction.*

Serial number and treatments.	Acre yield grain in lb.	Percentage on general mean.	Percentage on control.
(1)	(2)	(3)	(4)
1. No leaf lime 0	1,998	102·1	100·0
2. No leaf lime at 1,000 lb. per acre	1,930	98·5	96·6
3. No leaf lime at 2,000 lb. per acre	1,907	97·4	95·4
4. No leaf lime at 3,000 lb. per acre	1,953	99·7	97·7
5. Leaf—Lime 0	2,020	103·1	101·1
6. Leaf, lime at 1,000 lb. per acre	1,921	98·1	96·1
7. Leaf, lime at 2,000 lb. per acre	1,989	101·6	99·5
8. Leaf, lime at 3,000 lb. per acre	1,950	99·6	97·6
9. General mean	1,958	100·0	98·0
10. Whether 'Z' test satisfied or not		No.	
11. Critical difference P = 0·05			

(iii) *Efficacy of phosphates as manure for paddy.*—This experiment started during the first crop season of 1951-52 to compare the relative merits of superphosphate and bonemeal at two levels, viz., to supply 30 lb. of P O. and 45 lb. of P O over a basal dressing of cattle manure or green leaf at 4,000 lb. per acre, was laid out for the third time during the first crop season of the year under report. The results of the trial show that the green leaf is significantly better than cattle manure on equal weight basis and there is not much difference in two levels of the two forms of phosphates. The results are presented in Table XV.

TABLE XV.—*Trials on the efficacy of phosphatic manures.*

First crop—1953–54.

Plot No.—A 2 and 5.
Layout: Split plot (2 × 5 × 4)
Leaf at 4,000 lb. per acre and cattle manure at 4,000 lb. per acre.
Doses of phosphate (refer table below).
Planting: Double, bulk.
Size of strip: 32′ × 6½′.
Variety: PTB. 14.

Sown on 26th May 1953.
Planted on 7th July 1953.
Main plot treatments. Harvested on 16th October 1953.
Sub-plot treatments.

(i) *Leaf* versus *cattle manure.*

Serial number and treatments.	Acre yield grain in lb.	Percentage on general mean.
(1)	(2)	(3)
1. Leaf at 4,000 lb. per acre	2,082	105·0
2. Cattle manure at 4,000 lb. per acre	1,882	95·0
3. General mean	1,982	100·0
4. Whether 'Z' test satisfied or not	Yes.	
5. Critical difference	190·3	9·6

Conclusion: Leaf, cattle manure,

(ii) *Doses of Phosphate.*

Serial number and treatments.	Acre yield grain in lb.	Percentage on general mean.	Percentage on control.
(1)	(2)	(3)	(4)
1. Bonemeal 45 lb. P_2O_5	2,057	103·3	131·1
2. Bonemeal 30 lb. P_2O_5	1,939	97·9	123·5
3. Superphosphate 45 lb. P_2O_5	2,106	106·3	134·1
4. Superphosphate 30 lb. P_2O_5	2,103	106·1	133·9
5. Control	1,705	86·0	108·5
6. General mean	1,982	100·0	126·3
7. Whether 'Z' test satisfied or not		Yes.	
8. Critical difference	223·9	11·3	10·0

Conclusion : 3, 4, 1, 2, 5.

(iii) *Interaction.*

Serial number and treatments.	Acre yield grain in lb.	Percentage on general mean.	Percentage on control.
(1)	(2)	(3)	(4)
1. Leaf at 4,000 lb. per acre, Superphosphate at 45 lb. P_2O_5 per acre.	2,248	113·4	143·2
2. Leaf at 4,000 lb. Superphosphate at 30 lb. P_2O_5 per acre.	2,212	111·6	140·9
3. Leaf at 4,000 lb. bonemeal at 45 lb. P_2O_5 per acre.	2,166	109·2	138·0
4. Leaf at 4,000 lb. bonemeal at 30 lb. P_2O_5 per acre.	1,942	98·0	123·7
5. Leaf at 4,000 lb. per acre	1,840	92·8	117·1
6. Cattle manure at 4,000 lb. per acre, Superphosphate at 45 lb. P_2O_5 per acre.	1,963	99·1	125·0
7. Cattle manure at 4,000 lb. per acre Superphosphate at 30 lb. P_2O_5 per acre.	1,993	100·6	127·0
8. Cattle manure at 4,000 lb. per acre bonemeal at 45 lb. P_2O_5 per acre.	1,948	98·3	124·1
9. Cattle manure at 4,000 lb. per acre bonemeal at 30 lb. P_2O_5 per acre.	1,936	97·7	123·3
10. Cattle manure at 4,000 lb. per acre	1,570	79·2	100·0
11. General mean	1,982	100·0	126·3
12. Whether 'Z' test satisfied or not			
13. Critical difference			

(iv) *Effect of high yielding strains on soil fertility.*—This experiment, to study the effect of high yielding strains on soil fertility under ryot's manuring and farm manuring conditions as main plot treatments and high yielding strain and ryot's bulk as sub-plot treatments, which was started in the first crop season of 1951–52, was repeated during the first and second crop season of the year. Though it is too early to draw any conclusion the results are significant to show that the strains would respond better under farm manuring condition than under ryot's manuring condition. The results are presented in Tables XVI and XVII.

TABLE—XVI.—*Effect of high yielding strains on soil fertility.*

First crop—1953–54.

Field No.—D. 1.
Layout—Split plot (8 × 6).

(i) *Main plot treatments.*

(*a*) Ryots' manuring : 2,000 lb. of cattle manure per acre.

(*b*) Farm manuring: 4,000 lb. of green leaf, 200 lb. of superphosphate and 56 lb. of ammonium sulphate per acre.

(ii) *Sub-plot treatments.*

(*a*) Local Kayama to be followed by local Athikraya.
(*b*) Local Kayama to be followed by Co. 3 high yielders.
(*c*) High yielder MGL. 1 to be followed by local Athikraya.
(*d*) High yielder MGL. 1 to be followed by Co. 3 high yielder.

Size of strip : $16\frac{1}{2}' \times 10\frac{1}{2}'$. Planting : Doubles, bulk.
Sown on 5th May 1953. Planted on 8th July 1953. Harvested on 16th October 1953.
Varieties : Local Kayama and MGL. 1.

(i) *Ryots' manuring* versus *Farm manuring.*

Serial number and treatments.	Acre yield grain in lb.	Percentage on general mean.
(1)	(2)	(3)
1. Ryots' manuring	2,568	88·7
2. Farm manuring	3,212	113·3
3. General mean	2,895	100·0
4. Whether 'Z' test satisfied or not	Yes.	
5. Critical difference P = 0·05.		

Conclusion : Farm manuring, Ryots' manuring.

(ii) *Sub-plot treatments.*

Serial number and treatments.	Acre yield grain in lb.	Percentage on general mean.
(1)	(2)	(3)
1. Local Kayama to be followed by local Athikraya	2,660	91·8
2. Local Kayama to be followed by Co. 3 high yielders	2,540	87·7
3. High yielder MGL. 1 to be followed by Local Athikraya	3,095	106·9
4. High yielder MGL. 1 to be followed by Co. 3 high yielder	3,293	113·7
5. General mean	2,895	100·0
6. Whether 'Z' test satisfied or not	Yes.	
7. Critical difference P = 0·05		7·2

Conclusion : MGL. 1 (Co. 3), MGL. 1 (LA), LK (LA), LK (Co. 3).

(iii) *Interaction.*

Serial number and treatments.	Acre yield grain in lb.	Percentage on general mean.
(1)	(2)	(3)
1. Ryots' manuring—Local Kayama followed by local Athikraya.	2,308	78·1
2. Ryots' manuring—Local Kayama followed by Co. 3 high yielder.	2,158	73·0
3. Ryots' manuring—High yielder MGL. 1 followed by local Athikraya.	2,713	91·8
4. Ryots' manuring—High yielder MGL. 1 followed by Co. 3 high yielder.	3,103	105·1
5. Farm manuring—Local Kayama followed by local Athikraya.	3,012	102·0
6. Farm manuring—Local Kayama followed by Co. 3 high yielder.	2,922	98·9
7. Farm manuring—High yielder MGL. 1 followed by local Athikraya.	3,468	117·4
8. Farm manuring—High yielder MGL. 1 followed by Co. 3 high yielder.	3,485	118·0
9. General mean	2,895	100·0
10. Whether 'Z' test satisfied or not	No.	
11. Critical difference P = 0·05		

TABLE XVII.—*Effect of high yielding strains on soil fertility.*

Second crop—1953-54.

Field No. D. 1.
Layout—Split plot (8 × 6).
Size of strip—15′ × 11′.
Planting—Doubles, bulk.
Varieties—Local Athikraya and Co. 3

Sown on 21st September 1953.
Planted on 2nd November 1953.
Harvested on 3rd February 1954.

(i) *Ryots' manuring Versus Farmmanuring.*

Serial number and treatments.	Acre yield grain in lb.	Percentage on general mean.
(1)	(2)	(3)
1. Ryots' manuring	1,176	89·5
2. Farm manuring	1,453	110·5
3. General mean	1,315	100·0
4. Whether 'Z' test satisfied or not	Yes.	
5. Critical difference P = 0·05		

Conclusion: Farm manuring, Ryots' manuring.

(ii) *Sub-plot treatments.*

Serial number and treatments.	Acre yield grain in lb.	Percentage on general mean.
(1)	(2)	(3)
1. Local Athikraya to be followed by local Kayama	1,251	95·1
2. Local Athikraya to be followed by MGL. 1, high yielder	1,383	105·2
3. High yielder Co. 3 to be followed by local Kayama	1,274	96·9
4. High yielder Co. 3 to be followed by MGL. 1, high yielder.	1,350	102·7
5. General mean		
6. Whether 'Z' test satisfied or not	Yes.	
7. Critical difference P = 0·05		6·3

Conclusion: LA (MGL. 1); Co. 3 (MGL. 1); Co. 3 (LA); LA (LK).

(iii) *Interaction.*

Serial number and treatment.	Acre yield grain in lb.	Percentage on general mean.
(1)	(2)	(3)
1. Ryots' manuring—Local Athikraya followed by local Kayama.	1,169	88·9
2. Ryots' manuring—Local Athikraya followed by MGL. 1, high yielder.	1,193	90·7
3. Ryots' manuring—High yielder Co. 3 followed by local Kayama.	1,136	86·4
4. Ryots' manuring—High yielder Co. 3, followed by MGL. 1, high yielder.	1,205	91·6
5. Farm manuring—Local Athikraya followed by local Kayama.	1,332	101·3
6. Farm manuring—Local Athikraya followed by MGL. 1, high yielder.	1,572	119·6
7. Farm manuring—High yielder Co. 3 followed by local Kayama.	1,411	107·3
8. Farm manuring—High yielder Co. 3 followed by MGL. 1, high yielder.	1,496	113·8
9. General mean	1,315	100·0
10. Whether 'Z' test satisfied or not	No.	
11. Critical difference P = 0·05		

(v) *Efficacy of calcium carbonate slurry and lime as soil corrective.*—A randomized replicated trial, with lime and calcium carbonate slurry at 0, 1, 2, and 3 tons per acre, which was started during the first-crop season of 1952–53 was repeated during the first-crop season and the residual effects of the application were studied during the second-crop season under report. The results show that there is no difference between the two forms of lime during the first-crop season and the residual effects of 3 tons of lime were markedly felt during the second-crop season and thus confirm the previous year's findings. The results are presented in Tables XVIII and XIX.

TABLE XVIII.—*Efficacy of calcium carbonate slurry and lime as soil corrective.*

First crop—1953–54.

Field Nos. E. 21 to 25
Layout—7 × 5 randomized.
Size of strip—39½′ × 9½′.
Planting—Doubles, bulk.
Variety—PTB. 9.

Sown on 10th May 1953.
Planted on 30th June 1953.
Harvested on 10th October 1953.

Serial number and treatments.	Acre yield grain in lb.	Percentage on general mean.	Percentage on control
(1)	(2)	(3)	(4)
1. No lime, no calcium carbonate slurry (control) ..	2,518	100·8	100·0
2. Lime at 1 ton per acre	2,594	103·9	103·0
3. Lime at 2 tons per acre	2,501	100·1	99·3
4. Lime at 3 tons per acre	2,426	97·1	96·3
5. Calcium carbonate slurry at 1 ton per acre ..	2,518	100·8	100·0
6. Calcium carbonate slurry at 2 tons per acre ..	2,466	98·7	97·9
7. Calcium carbonate slurry at 3 tons per acre ..	2,460	98·5	97·7
8. General mean	2,499	100·0	99·2
9. Whether 'Z' test satisfied or not		No.	
10. Critical difference P = 0·05			

TABLE XIX.—*Efficacy of calcium carbonate slurry and lime as soil corrective—Residual effects of*:

Second crop—1953–54.

Field Nos. E. 21 to 25.
Layout—7 × 5 randomized.
Size of strip—39½′ × 9′
Planting—Doubles, bulk.
Variety—PTB. 20.

Sown on 5th September 1953.
Planted on 1st November 1953.
Harvested on 13th January 1954.

Serial number and treatments.	Acre yield grain in lb.	Percentage on general mean.	Percentage on control.
(1)	(2)	(3)	(4)
1. No lime, no calcium carbonate slurry (control) ..	1,685	77·7	100·0
2. Lime at 1 ton per acre	2,169	100·0	128·7
3 Lime at 2 tons per acre	2,395	110·5	142·1
4. Lime at 3 tons per acre	2,807	129 5	166·6
5. Calcium carbonate slurry at 1 ton per acre ..	2,026	93·5	120·2
6. Calcium carbonate slurry at 2 tons per acre ..	2,122	97·9	125·9
7. Calcium carbonate slurry at 3 tons per acre ..	1,927	91·0	117·0
8. General mean	2,169	100·0	129·0
9. Whether 'Z' test satisfied or not		Yes.	
10. Critical difference P = 0·05		16·9	13·1
Conclusion—(Number of treatments)		4, 3, 2, 6, 5, 7, 1.	

(vi) *To study the relative merits of ammonium sulphate and chilean nitrate.*—A randomized replicated trial with Chilean nitrate and ammonium sulphate applied at two levels, viz., 40 lb N and 60 lb. N per acre alone and over a basal dressing of 450 lb. of lime, 3 tons of cattle manure and 30 lb. of P_2O_5 on acre basis in the form of superphosphate, which was started in 1952-53 was repeated during the first and second-crop seasons of the year under report. The results confirming the previous year's findings showed that Chilean nitrate compared favourably with ammonium sulphate though the latter in higher doses had depressing effect over yield during the second-crop season. There are indications to show that Chilean nitrate would be efficacious under the first-crop conditions while ammonium sulphate would be preferred under the second-crop conditions. The results are presented in Tables XX and XXI.

TABLE XX.—*Efficacy of chilean nitrate as manure for paddy.*

First crop—1953-54.

Field Nos. E-2 to 6.
Layout—9 × 5 randomized.
Size of strip—40′ × 6′
Planting—Doubles, bulk.
Variety—MGL. 2.

Sown on 1st May 1953.
Planted on 25th June 1953.
Harvested on 9th October 1953.

Serial number and treatments.	Acre yield grain in lb.	Percentage on general mean.	Percentage on control.
(1)	(2)	(3)	(4)
1. Basal dressing alone (control)*	3,494	113·5	100·0
2. Basal dressing ammonium sulphate at 40 lb. N per acre.	3,172	103·0	90·8
3. Basal dressing ammonium sulphate at 60 lb. N per acre.	3,222	104·7	92·2
4. Ammonium sulphate alone at 40 lb. N per acre.	2,616	84·9	76·7
5. Ammonium sulphate alone at 60 lb. N per acre.	2,704	87·9	79·2
6. Basal dressing Chilean nitrate at 40 lb. N per acre.	3,376	109·7	98·9
7. Basal dressing Chilean nitrate at 60 lb. N per acre.	3,332	108·2	97·6
8. Chilean nitrate alone at 40 lb. N per acre ..	2,774	90·1	81·3
9. Chilean nitrate alone at 60 lb. N per acre ..	2,998	97·5	87·8
10. General mean	3,078	100·0	..
11. Whether 'Z' test satisfied or not		Yes.	
12. Critical difference P = 0·05		7·9	7·0
Conclusion—1 6 7 3 2 9		8 5 4	

TABLE XXI.—*Efficacy of chilean nitrate as manure for paddy*

Second crop—1953-54.

Field Nos. E-2 to 6.
Layout—9 × 5 randomized.
Size of strip—40′ × 6′
Planting—Doubles, bulk.
Variety—PTB. 20.

Sown on 5th September 1953.
Planted on 26th October 1953.
Harvested on 15th January 1954.

Serial number and treatments.	Acre yield grain in lb.	Percentage on general mean.	Percentage on control.
(1)	(2)	(3)	(4)
1. Basal dressing alone (control)*	2,027	126·6	100·0
2. Basal dressing ammonium sulphate at 40 lb. N. per acre.	1,946	124·4	96·0
3. Basal dressing ammonium sulphate at 60 lb. N. per acre.	2,214	138·3	109·2

* Basal dressing consists of 450 lb. of lime ; 3 tons of cattle manure and 30 lb. of P_2O_5 per acre.

Serial number and treatments.	Acre yield in lb.	Percentage on general mean.	Percentage on control.
(1)	(2)	(2)	(4)
4. Ammonium sulphate alone at 40 lb. N per acre.	1430	89·3	70·5
5. Ammonium sulphate alone at 60 lb. N per acre.	1299	81·2	64·1
6. Basal dressing chilean nitrate at 40 lb. N per acre.	1962	122·6	96·8
7. Basal dressing chilean nitrate at 60 lb. N per acre.	1720	107·4	84·8
8. Chilean nitrate alone at 40 lb. N per acre ..	1507	97·0	74·3
9. Chilean nitrate alone at 60 lb. N per acre ..	1657	103·5	83·5
10. General mean	1601	100·0	..
11. Whether 'Z' test satisfied or not		Yes.	
12. Critical difference P = 0·05		22·7	17·9

Conclusion—3 1 6 2 7 9 8 4 5

* Basal dressing consists of 450 lb. of lime, 3 tons of cattle-manure and 30 lb. P_2O_5 per acre.

(vii) *To compare the relative merits between Superphosphate and Kotka phosphate (Semi acidulated phosphate)* — A randomized and replicated trial was laid out during the second crop season of the year under report, with a view to find out the relative merits of two forms of phosphate (Superphosphate and Kotka phosphate) applied at the rate of 60 lb. of P_2O_5 per acre as broadcast and as placement over a basal dressing of cattle-manure at the rate of 5,000 lb. and ammonium sulphate to supply 40 lb. of N per acre with no manure as control. It is seen from the results presented in Table XXII that the performance of Kotka phosphate under broadcast conditions was the best (Treatment No. 4) while not much difference was noticed in the case of superphosphate under broadcast as well as placement conditions even though the treatments were better than the control.

TABLE XXII.—*Kotka phosphate experiment.*

Second crop—1953–54.

Field Nos. D-8 to 12.
Layout—6 × 5 randomized.
Size of strip—21' × 24'.
Planting—Doubles, bulk.
Variety—Culture 859.

Sown on 24th September 1953.
Planted on 3 November 1953.
Harvested on 24th January 1954.

Serial number and treatments.	Acre yield grain in lb.	Percentage on general mean.	Percentage on control.
(1)	(2)	(3)	(4)
1. No manure (control)	961	80·8	100·0
2. Cattle-manure at 5,000 lb. per acre plus ammonium sulphate to supply 40 lb. per acre.	1,198	100·7	124·7
3. Cattle-manure at 5,000 lb. per acre plus superphosphate to supply 60 lb. per acre of P_2O_5 by broadcast.	1,318	110·9	137·2
4. Cattle-manure at 5,000 lb. per acre plus kotka phosphate to supply 60 lb. of P_2O_5 by broadcast.	1,531	128·7	159·3
5. Cattle-manure at 5,000 lb per acre plus superphosphate to supply 60 lb. P_2O_5 by placement.	1,238	104·1	128·8
6. Cattle-manure at 5,000 lb. per acre plus Kotka phosphate to supply 60 lb. P_2O_5 by placement.	1,066	89·6	110·9
7. General mean	1.189	100·0	123·8
8. Whether 'Z' test satisfied or not		Yes.	
9. Critical difference P = 0·05		17·6	21·8

Conclusion—4 3 5 2 6 1

9. *Cultural trials—I To compare the relative merits between Japanese method of cultivation and farm method of cultivation.*—A randomized and replicated trial with two strains as main-plot treatments and the two systems of cultivation as sub-plot treatments was laid out during the first and the second crop seasons of the year under report using the strain MGL. 2 and MTU. 15 under the first crop conditions and PTB. 20 and Co. 3 under the second crop conditions. The results of the first crop have shown that the Japanese method is significantly better than the farm method with the increased yield of 16 per cent and 22 per cent recorded by the strain MGL. 2 and MTU. 15, respectively. The trials during the second crop season were vitiated on account of severe insect attack at different stages and acute water scarcity at the final stage of flowering seriously affecting the setting of grains. The results of the first crop trials have been furnished in Table XXIII. The manurial regimen and the details of cost of cultivation are presented in Table XXIV.

TABLE XXIII.—*Experiment on the Japanese method of cultivation* versus *Farm method of cultivation.*

First crop—1953-54.

Field Nos. D. 13, 15, to 17.
Layout—Split plot—4 × 8

(i) *Main-plot treatments.*

(*a*) MGL. 2.
(*b*) MTU. 15.

(*ii*) *Sub-plot treatments.*

(*a*) Japanese method of cultivation.
(*b*) Farm method of cultivation.

Size of strip — 1 cent (15′ X 25′).

Planting —(i) 4 Seedlings per hole 10″ apart on both sides (Japanese method).
(ii) 2 Seedlings per hole 6″ apart on both sides (Farm method).

Sown on 31st May 1953.
Planted on 28 June 1953.
Harvested on 13th October 1953.

(i) *Varieties MGL. 2 and MTU. 15.*

Serial number and treatments. (1)	Acre yield grain in lb. (2)	Percentage on general mean. (3)
1. MGL. 2	3,221	112·7
2. MTU. 15	2,495	87·3
3. General mean	2,858	100·0
4. Whether 'Z' test satisfied or not	Yes.	
5. Critical difference P=0·05		13·8

Conclusion—MGL. 2 MTU. 15

(ii) *Methods of cultivation—Japanees and Farm.*

Serial number and treatment. (1)	Acre yield grain in lb. (2)	Percentage on general mean. (3)
1. Japanese method	3,203	108 6
2. Farm method	2,613	91·4
3. General mean	2,858	100·0
4. Whether 'Z' test satisfied or not	Yes.	
5. Critical difference P = 0·05		8·0

Conclusion—Japanse method, Farm method.

(iii) *Interaction.*

Serial number and treatment.	Acre yield grain in lb.	Percentage on general mean.
(1)	(2)	(3)
1. Japanese method—MGL. 2	3462	121·2
2. Farm method—MGL. 2	2972	104·2
3. Japanese method—MTU. 15	2743	95·9
4. Farm method—MTU. 15	2247	78·6
5. General mean	2858	100·0
6. Whether 'Z' test satisfied or not	No.	
7. Critical difference P=0·05	..	..

TABLE XXIV.—*Manurial regimen on acre basis in the Japanese* versus *Farm method experiment.*

	Japanese method.	Farm method.
Nursery farm yard manure	40 cart-loads.	
Ash	2,000 lb.	Ash @ 2,000 lb. per acre.
Seived compost	2,000 lb.	
Manure mixture—		
1st dose (on the day of sowing) ..		
Ammonium sulphate		
Superphosphate	150 lb.	
2nd dose (10 days after sowing) ..	150 lb.	
Ammonium sulphate	150 lb.	
Superphosphate	150 lb.	
Seed rate	150 lb.	Seed rate 300 lb.
Transplanted field—		
Basal dressing.		*Basal dressing.*
Farm yard manure	20 cartloads	Green leaves 5,000 lb.
Ammonium sulphate	150 lb.	Superphosphate 200 lb.
Superphosphate	200 lb.	
1st top dressing (15 days later) ..		Top dressing.
Ammonium sulphate	75 lb.	(one month after).
Superphosphate	100 lb.	Ammonium sulphate 150 lb.
2nd top dressing (15 days latter).		
Ammonium sulphate	75 lb.	
Superphosphate	100 lb.	

Cost of cultivation per acre (first crop season).

Expenditure.	Japanese method.	Farm method.
	RS. AS. PS.	RS. AS. PS.
1. Preparatory cultivation	52–11– 9	52–11– 9
2. Manures and manuring including interculture ..	259– 8– 1	130– 1– 3
3. Seeds and sowing	171– 1– 6	120– 6– 7
4. Harvesting, thershing and cleaning	61–11– 6	61–11– 6
Total ..	545– 0–10	365–15– 1
1. Value of sowing	554– 8–11	464– 4– 8
2. Value of produce (straw)	148–11– 2	87– 8– 0
Total ..	703– 4– 1	551–12– 8
Net profit per acre ..	158– 3– 3	185–13– 7

10. *Other crops*—A. *Green manure crops Sesbania speciosa.*—Growing of Sesbania as bulk crop in single crop land and along the periphery of paddy plots both in single and double crop area was continued to find out the optimum conditions under which maximum quantity of green matter and seed could be obtained. A pure crop of Sesbania in the dry and single crop area during the monsoon

season of the year under report gave an average outturn of 20,000 lb. of green matter. Closer planting of seedlings about 6" to 8" along the periphery of paddy fields was adopted in both single and double crop wetlands during both the seasons. The growth of plants was considerably good in the latter type of lands while in the former the growth was stunted on account of low moisture level. The outturn of green matter ranged from 500 to 1,200 lb. per acre under the first crop conditions while it ranged between 300 to 600 lb. under the second crop conditions.

The seedlings of Sesbania planted along the sides of channels and other moist places during November, were found to be the best source for seed production. They grew well with the available moisture and yielded a total quantity of 215 lb. of seeds. Fresh nurseries were raised during the month of April for planting along the periphery of the first crop paddy fields. The germination in all the plots was good and uniform.

Seedlings of Sesbania raised from (i) seeds treated with bacterial culture (ii) untreated seeds, were transplanted along the periphery of the third crop area on 20th February 1954. The plants were harvested and removed on 7th June 1954 when they recorded an yield of 356 lb. and 362 lb. for 319 plants each of treated and untreated, respectively. There was no difference in the performance of seedlings raised from treated or untreated seeds.

(ii) *Sunnhemp.*—Sunnhemp was sown over an area of 6·5 acres during the second fortnight of April 1954 in this year and was ploughed down during the second and third fortnights of June 1954. The crop had grown to an average height of 3½' with the monsoon rains and the yield of green matter ranged from 4 to 8 tons per acre and this was a record yield at the station.

(iii) *Gliricidia maculata* :—The plants along the main road, double bunds, main channel bunds and boundaries have grown well and yielded 20 tons of green matter during the first crop season of 1954. The yield of green matter of the plants ranged from 20 to 50 lb. per plant. A total quantity of 20 lb. of seeds was collected from all the plants during this season and it was entirely used for raising seedlings mainly for planting in the farm and partly for sales. Up to the end of the period under report, a total of 30,000 seedlings and 3,000 cuttings were planted along the bunds, vacant places and boundaries of the farm. A total number of 3,59,000 seedlings and 5,725 cuttings were sold or transferred during this period.

(iv) *Indigofera teysmanii.*—Four plants out of seven belonging to the first batch of sowing (sown on 1st December 1951 and planted on 7th June 1952 around office) were pruned on 8th July 1953 when an average quantity of 17·5 lb. of green matter was obtained. All the fourteen plants, including seven belonging to the second batch of sowing (sown on 26th April 1952 and planted on 2nd September 1952) were in flowers and pods during the month of October. From all there plants a total quantity of 7 lb. of seed was collected during the month of December. Scarifying the seed cost with sand treatment was found to give 60 to 80 per cent germination. Nurseries were raised for getting enough seedlings to be transplanted in between "Glyricidia" of the main road boundaries and main channel bunds during this year.

(v) *Tropical green manures.*—With a view to study the suitability of different species of leguminous and other plants as green manures under the local conditions the seeds of 24 species of annuals and 8 species of perennials were sown in observation plots on 24th May 1954. Three annuals, viz., Crotalaria juncea, Sesbania aculeata and Phaseolus semierectus and three perennials, viz., Crotalaria usaramoensis, Cassia leschenaultiana, Tephrosia Candida so far appear to be promising, though it is too early to decide their merits and demerits.

B. (i) *Pulse crops—Black gram.*—This was grown over an area of 1·06 acres during this year after the first and second crop paddy. Due to severe droughty condition, the crop entirely failed.

(ii) *Horsegram.*—This was grown over an area of 1·20 acres after the second crop of paddy and the crop failed on account of unfavourable seasonal conditions.

(iii) *Greengram black.*—A local variety resembling Cowpea called "Kappu-padangi" was grown over an area of 75 cents after the harvest of the second crop paddy. This was found to be drought resistant and the growth was good. With very short duration of only 2 months, this crop recorded an acre yield of 150 lb.

(iv) *Greengram.*—An yield trial to compare the special variety of green gram called "Mung" with local green gram was laid out in the low-lying area after the second crop. The trial also completely failed since acute droughty conditions prevailed from time of flowering and the crop could not be irrigated.

C. *Sweet Potato.*—The manurial and cultural trials of sweet potato were continued during the first and second crop seasons of the year for the third year in succession.

(i) *Manurial trial.*—In order to find out the best time for the application of manure for sweet potato, an experiment consisting of three treatments, viz., (i) full dose of manure at planting, (ii) full dose of manure one month after planting at earthing up, (iii) half the dose at planting half at earthing up, was laid out during the first and second crop seasons of the year. The two treatments, viz., applying full dose of manure at planting and half the dose at planting and half at earthing up were in par during the first crop season and under the second crop conditions, applying full dose of manure at planting was found to be significantly better than the other treatments. The results are presented in Tables XXV and XXVI. The results of all the three years' trials indicate that applying the full dose of manure at planting is the best.

TABLE XXV.—*Sweet potato manurial trial.*

First crop—1953–1954.

Field No. D. 19.

Layout—3 × 12 randomized.

Size of the strip—12′ long with 2½′ between ridges.

Spacing—9″ apart.
Variety—T.S.T. white.
Planted on 4th July 1953.
Earthed upon 4th August 1953.
Harvested on 19th October 1953.

Treatments.

(A) Applying full dose of manure at planting.

(B) Applying full dose of manure at earthing up, one month after.

(C) Applying half the dose at planting and half the dose at earthing up.

Quantity of manure applied (full Dose).
Superphosphate at 300 lb. per acre.
Groundnut cake at 400 lb. per acre.
Basal dressing of cattle-manure at 3,000 lb. per acre.

Serial number and treatments.	Acre yield in lb.	Percentage on general mean.	Percentage on control.
(1)	(2)	(3)	(4)
1. Full dose at planting—Control (A)	13,370	113·7	100·0
2. Full dose at earthing up (B)	9,301	76·8	67·5
3. Half dose at planting and half at earthing up (C) ..	13,370	109·5	96·4
4. General mean	12,200	100·0	88·8
5. Whether 'Z' test satisfied or not		Yes.	
6. Critical difference P=0·05	..	15·9	13·9

Conclusions—A C B

TABLE XXVI.—*Sweet potato manurial trial.*

Second crop—1953-54.

Field No. L. 13.

Layout—3 × 12 randomised.

Size of strip—7′ long with 2½′ between ridges.

Spacing—9″ apart.
Variety—T.S.T. white.
Planted on 20th October 1953.
Earthed upon 21st November 1953.
Harvested on 30th January 1953.

Treatments.

(A) Applying full dose of manure at planting.

(B) Applying full does of manure at earthing up, one month after.

(C) Applying half the dose at planting and half the dose at earthing up.

Quantity of manure applied (full dose).
Superphosphate at 300 lb. per acre.
Groundnut cake at 400 lb. per acre.
Basal dressing of cattle-manure at 3,000 lb. per acre.

Serial number and treatments. (1)	Acre yield in lb. (2)	Percentage on general mean. (3)	Percentage on control. (4)
1. Full dose at planting—Control (A)	3,473	122·3	100·0
2 Full dose at earthing up (B)	2,716	95·7	78·2
3 Half dose at planting and half dose at earthing up (C).	2,329	87·9	67·0
4 General mean	2,839	100·0	81·8
5 Whether 'Z' test satisfied or not		Yes.	
6 Critical difference P=0·05	..	30·2	24·7

Conclusion—A B C.

(ii) *Cultural trials.*—With a view to find out the best method of planting an experiment consisting of the following four treatments was laid out during both of the first and second crop seasons :—

(i) Long setts 2′ — 3′ long planted flat in singles.

(ii) Long setts 2′ — 3′ long planted flat in doubles.

(iii) Normal setts 9″ long planted erect in singles.

(iv) Normal setts 9″ long planted erect in doubles.

Planting in doubles was found to be better than in singles under the first crop conditions while no difference was noted among the treatments under the second crop conditions. The results are presented in Tables XXVII and XXVIII.

TABLE XXVII.—*Sweet potato cultural trials.*

First crop—1953-54.

Field No. L. 18.

Layout—4 x 8 randomized.

Size of strip—12′ long with 2½′ between ridges.

Spacing—9″ apart for C. and D. Treatments.

Variety—T.S.T. White.

Planted on 5th July 1953.

Earthed upon 4th August 1953.

Harvested on 19th October 1953.

Treatments.

(A) Planting 2′ cuttings horizontally in singles.

(B) Planting 2′ cuttings horizontally in doubles.

(C) Planting 9″ cuttings, 9″ apart in singles.

(D) Planting 9″ cuttings, 9″ apart in doubles.

Manurial regimen :—

I. *Basal dressing*.—Cattle manure at 2500 lb. superphosphate a 3000 lb. and ammonium sulphate at 100 lb. per acre.

II. *At earthing up*—Ash at 2500 lb. per acre.

Serial number and treatments. (1)	Acre yield in lb. (2)	Percentage on general mean. (3)	Percentage on control. (4)
1. Flat singles (A)	15,240	89·0	91·5
2. Flat doubles (B)	16,910	98·8	101·5
3. Erect singles (C.—Control..	16,050	97 3	100·0
4. Erect doubles (D)	18,100	105·7	111·1
5. General mean	16,725	100·0	102·8
6. Whether 'Z' test satisfied or not ..		Yes.	
7. Critical difference P=0·05		9·5	9·3

Conclusion—D B C A

TABLE XXVIII.—*Sweet potato cultural trials.*

Second crop—1953–54.

Field No.—L. 13.

Layout—4 x 8 randomized.

Size of strip—7′ long with 2½′ between ridges.

Variety—T.S.T. White.

Planted on 20th October 1953.

Earthed upon 21st November 1953.

Harvested on 30th January 1954

Treatments.

(A) Planting 2′ cuttings horizontally in singles.
(B) Planting 2′ cuttings horizontally in doubles.
(C) Planting 9″ cuttings, 9″ apart in singles.
(D) Planting 9″ cuttings, 9″ apart in doubles.

Manurial Regimen—

I. *Basel dressing.*—Cattlemanure at 500 lb. ash at 2,000 lb. and ammonium phosphate 200 lb. per acre.

II. *At earthing.*—Ahs at 2,000 lb. per acre.

Serial number and treatments.	Acre yield in lb.	Percentage on general mean.	Percentage on control.
(1)	(2)	(3)	(4)
1. Flat singles (A)	4,211	110·2	122·6
2. Flat doubles (B)	3,758	98·3	109·2
3. Erect ingls (C)—Control	3,435	97·9	100·0
4. Erect doubles (D)	3,883	101·6	113·1
5. General mean	3,882	100·0	111·3
6. Whether 'Z' test satisfied or not		No.	
7. Critical difference P=0·05			

D. *Groundnut.*—The groundnut variety TMV. 2 was grown over an area of 30 cents after the second crop of paddy in the double crop wet land under dry conditions. The crop recorded a low acre yield of 150 lb. mainly due droughty conditions.

E. *Fodder Grasses*—.The seven varieties of grasses, viz., Cumbu napier hybrid grass, Guinea grass, Elephant grass, Thin napier grass, buffalo grass, Australian drought resistant grass and blou-buffel were maintained during this year in the grass plot.

The number of cuttings and yield of green fodder recorded in five varieties are furnished below:—

Variety.	Number of cuttings.	Calculated acre yield.
(1)	(2)	(3) LB.
Cumbu napier hybrid grass	3	33,485
Guinea grass	3	33,333
Elephant grass	3	29,200
Thin napier grass	3	31,333
Buffalo grass	3	38,627

This year, the buffalo grass has recorded the maximum yield of 38,627 lb. closely followed by the Cumbu-napier hybrid grass which recorded the yield of 33,485 lb. The buffalo grass comes up well under both single and double crop wet land conditions. Thin napier is found to be an ideal grass for dry lands, while the other grasses are generally grown where there are facilities for irrigation. A total number of 48,485 grass slips of all the varieties were distributed during the year.

F. *Bananas.*—To the four varieties of bananas, viz., Nendran, Avande (local curry variety) Mauritius and Gros Michael—four more varieties, viz., Surya balai, Chandra balai, Rasa balai and Gaint Governor were added and the crop was maintained from September 1952 to June 1954. During this period a total quantity of 825 lb. of bananas and 376 miscellaneous suckers were sold. Among the

four latter mentioned fruit varieties, 'Rasa Balai' was found to yield within 12 to 14 months and the average weight of the bunch ranged from 24 to 30 lb. The fruit is round having thin yellow peel, creamish white tasty flesh and a very agreeable flavour. This variety would be multiplied from the next season.

G. *Vegetables.*—Miscellaneous vegetables like Cowpea, bendi, cluster beans, snake gourd, bitter gourd, bottlegourd, ash gourd, ribbed gourd and pumpkin were grown over a total area of 1·20 acres during this year. During the third crop season an area of 12 cents under double crop land sown to cucumber in January was harvested in March and a total quantity of 1,351 lb. of ripe fruits was obtained which worked out to 11,253 lb. on acre basis. Fresh sowing of vegetables was taken up towards the end of the period in Kumeri and single crop wet lands.

H. *Brinjals.*—The seedlings of five varieties of brinjal, viz., I.C. 488—Okhala, I.C. 541—Long purple; I.C. 555—Aligarh; I.C. 729—Round and I.C. 789 Benares Giant (the seeds of which were received from the Head of the Division of Botany, Indian Agricultural Research Institute, New Delhi) as parents and five crosses done during the previous year were grown under first crop conditions. It was found that two parents, viz., Aligarh and Benares Giant would be very suitable for the first crop as parents and the crosses, viz., Aligarh Okhla and Okhla × Benares Giant would be the desirable combinations to give good yields under the first crop conditions. On the other hand under the second crop conditions Okhla and Aligarh were found to be the prolific parents while Aligarh x Okhla Aligarh x Round combinations were found to be the desirable ones for yield purposes. Towards the end of the period, five parents and five crosses were planted in the dry area to determine their performance and suitability.

I. *Wheat Trials* —Two varieties of wheat, viz., Agra local and N.P. 4 received from the Plant Pathologist, Indian Agricultural Research Institute were grown from October to January to find out whether any wheat rust would occur. For this, vaseline smeared slides were exposed in the aeroscope periodically and sent to New Delhi for examination. There was no occurrence of wheat rust and the poor yield of the crop has definitely shown that the crop is quite unsuitable for this tract.

J. *Potato Trials.*—The seed material of the variety 'President' received from Nanjanad was sown in a trial plot during the month of October. Low acre yield was recorded at the time of harvest on account of non-uniform germination and maturity of tubers and also due to unfavourable seasonal conditions.

K. *Pisciculture Trials.*—One hundred fingerlings of 'Labeo fimbriatus' supplied by the Fisheries Department were let into a plot grown under the third crop paddy to find out whether paddy-*cum*-pisciculture would be a profitable proposition. The trial had failed owing to the small number of fingerlings and partly due to the presence of watersnakes and fish-eating birds.

L. *Fruit Plants.*—Twenty two mango grafts planted in the new area in August 1952 are progressing satisfactorily. Bennett Alphanso, a mango graft planted in 1947 in 'B' block Kumeri, which yielded last year for the second time, recorded good yield of 105 fruits inspite of adverse seasonal conditions for mango crop.

11. *Pests and diseases.*—There was a mild infestation of caseworm in the first crop paddy and the second crop paddy nurseries in September and October and this was controlled by dusting Hexadole 810. Towards the end of November there was a heavy incidence of a minor pest Atherigona Sp. (rice maggots) both at the station and in the district which caused severe damage to the second crop. Spraying a mixture of Hexadole 950 and Guesarol 550 on equal weight basis was found to be efficacious for controlling the above pest in the initial stage itself.

12. *Miscellaneous Plants*—(i) *Balsa wood.*—Eleven plants of Balsa wood planted in June 1951 have grown to an average height of 21½′ with an average girth (1 foot from the base) of 1′-4½″ at the end of the period under report, the maximum height and girth attained being 34′ and 1′-6″, respectively. During

this year in September four trees (Nos. 2, 3, 5, and 6) have flowered (31 months after sowing) and twentyfive ripe pods (No. 2–11 pods, No. 3–5 pods; No. 5–5 pods; No 6–4 pods) were collected in April (6 to 8 months from the flowering date). The average length and girth of the pod were 15·0 cm. and 13·04 cm. respectively.

(ii) *Kapok.*—Out of the ten plants planted in 1949, excepting plant No. 8, rest of them gave a total number of 445 ripe pods maximum number (179 numbers obtained from plant No. 7 during this year. Fifty pods would be enough to give one pound of seed and one pound of floss as against seventy five numbers in the case of local variety.

(iii) *Oysternuts.*—Out of six seedlings planted during March 1953, in moist situations of the farm only one in 'C' block is growing very vigorously. The vines are allowed to spread over a pandal provided. The plant has not yet flowered.

(iv) *Cover Crops Tropical Kudzu.*—The vines in the A block bund, newly planted ones in 'L' and 'M' block bunds have grown and spread over a wide area. Even during the period of summer the vines were green and healthy. The plants flowered during the month of December and a total quantity of 7 lb. of seeds was gathered during the month of January.

(b) *Calopogonium mucunoides.*—Another cover crop introduced in 1951 is rapidly spreading in the newly acquired area of the farm. The plants flowered in November and a total quantity of 7½ lb. of seeds was collected during the month of December. These plants, though dry up completely in summer, leave behind the disbursed seeds which remain viable till the break of monsoon when they sprout uniformly.

(c) *Centrosema pubescens.*—This is another cover crop introduced in 1952 in this farm. This is shade loving and remains green throughout the year. A small quantity of seeds was gathered for further propagation.

(v) *Cinnamomum camphora.*—Two seedlings received from the Techno Chemical Industries, Calicut and planted in June, 1953 are progressing well.

(vi) *Pepper.*—Seventy pepper vines planted in July, 1953 have established well and the vines have struck roots on the mango tree standards. Just before the commencement of the monsoon one mulching was given to all the plants

13. *Seed distribution.*—The quantities of seed paddy and other produce distributed from this farm are furnished in Table XXIX.

14. The financial statement is given in Appendix I.

15. The cost of cultivation of bulk crops grown during the year under report have been presented in Appendices II, III, IV and V.

TABLE XXIX.—*Quantities of seed paddy and other produce distributed during fasli year* 1363 (1953–54).

	Lb.
Paddy seeds	31,678
Vegetables seeds	20
Pulses	451
Green manure and other seeds	56
Green manure seedlings and cuttings (in numbers) ..	354,900
Vegetable seedlings (in numbers)	3,148
Banana suckers (in numbers)	376
Rooted cuttings of Malta lemon (in numbers)	10
Grass slips (in numbers)	48,425

16. Steps taken to attain self sufficiency in relation to revenue and expenditure at this Station have been presented in Appendix VI.

(Sd.) K. HANUMANTHA ROW.
(28-1-1955.)
Superintendent, Paddy Breeding Station, Mangalore.

(Sd.) K. RAMASWAMY.
(27-12-1954.)
Paddy Specialist, Lawley Road Post, Coimbatore.

APPENDIX—I.

FINANCIAL STATEMENT OF THE PADDY BREEDING STATION, MANGALORE, FOR THE FASLI YEAR 1363 (1953—54).

A. *EXPENDITURE.*

	Rs.	A.	P.
1. Pay and Allowances—			
Pay of Officer	3,577	5	0
Pay of Establishment	7,660	4	0
Dearness allowance	3,740	5	0
Travelling and other compensatory allowances	1,346	1	0
	16,324	1	0
2. Contingencies—			
C.A. 2—Office contingencies—			
Service postage and telegrams	200	0	0
Rates and taxes	4	4	0
Other contingencies	436	9	6
Dearness allowance to menials	3,460	7	0
	4,101	4	6
C.A. 3—Other charges—			
Repairs and repairs	411	0	0
Cost of land, live and dead stock	2,506	5	1
Apparatus and materials	3	0	0
Working expenses	16,731	7	3
	19,451	12	4

B. *RECEIPTS.*

	Rs.	A.	P.
XXIX—Agriculture—			
Agricultural stations	6,464	9	6
Miscellaneous	777	3	0
Rent on buildings	72	0	0
Recoveries of over-payments	26	14	6
Value of seeds and plants transferred	5,948	10	0
	13,289	5	0

APPENDIX II.

YIELD AND VALUE OF SEED, GRAIN AND STRAW.

Particulars.	Paddy.	Miscellaneous sale of seedlings and plants etc.	Total.
(1)	(2)	(3)	(4)
Area in acres	35·28	..	35.28
Seed—			
Yield in lb.	36 889	..	..
Value in rupees	7,407	..	..
Grain—			
Yield in lb.	24,683	..	..
Value in rupees	4,371	..	..
Straw—			
Yield in lb.	86,600	..	..
Value in rupees	1, 32	..	..
Total receipts for the year in Rs.	13,510	..	13,510
Total receipts for three years :—			
1951–52 Rs.	6,092	..	6,092
1952–53 Rs.	9,907	..	9,907
1954–54 Rs.	13,510	..	13,510

APPENDIX III.

QUANTITY AND VALUE OF SEED, GRAIN AND STRAW, RETAINED, TRANSFERRED OR SOLD.

(1) Crop.	(2) Paddy.
Seed—	
Retained on the station—quantity in lb.	5,211
Value in rupees	1,047
Seed—	
Transferred or sold—quantity in lb.	31,678
Value in rupees	6,360
Grain—	
Retained on the station—quantity in lb.	7,789
Value in rupees	1,379
Grain—	
Transferred or sold—quantity in lb.	16,894
Value in rupees	2,992
Straw—	
Retained on the station—quantity in lb.	86,600
Value in rupees	1,732
Transferred or sold	Nil.
Total receipts for the year in rupees	13,510
Total receipts for three years in rupees—	
1951–52	6,092
1952–53	9,907
1953–54	13,510

APPENDIX IV.

Proforma OF COST OF CULTIVATION OF PADDY—BULK.

S.No.	Details of expenditure	Actual expenditure for three years (in rupees). 1951–52	1952–53	1953–54
(1)	(2)	(3)	(4)	(5)
1.	Pay and allowances of the staff (1/3 of actuals) Farm Manager and Maistry or Fieldman.	500	500	500
2.	Miscellaneous cultivation expenses (1/3 of actuals).	1,029	1,199	829
3.	Working expenses (actuals)	16,196	18,740	12,963
4.	One-tenth of expenditure on live and deadstock	1048	982	65
5.	Proportionate rental for the land	3,750	3,750	3,750
6.	Unforeseen contingencies, if any	..	..	..
	Grand total	22,523	25,171	18,107

APPENDIX V.

STATEMENT OF ABSTRACT EXPENDITURE AND RECEIPTS.

(Should be in rupees)

Particulars. (1)	1951–52 (2)	1952–53 (3)	1953–54 (4)
1. Expenditure	22,523	25,171	18,107
2. Revenue	6,092	9,907	13,510

APPENDIX VI.

STEPS TAKEN TO ATTAIN SELF-SUFFICIENCY IN RELATION TO EXPENDITURE AND REVENUE OF THE STATION.

The wide gap of Rs. 15,264 between expenditure and receipts that existed during 1952–53 (vide Appendix V) was considerably narrowed down to Rs. 4,597 during the year. Special efforts were taken to economise expenditure under working expenses partly by reduction in the number of work animals maintained and various other means as a result of which there was a marked reduction in expenditure by Rs. 5,777 over that of previous year. An increase of Rs. 3,600 under revenue was mainly due to the increase in the prevailing market rates of paddy and to some extent due to the sale of a very large number of seedlings of green leaf yielding plants specially raised and sale of vegetables grown during the off-season. As a long range plan, one hundred coconut seedlings were planted all along the sides of channel bund and other suitable places, th oughout the area.

ANNUAL REPORT OF THE AGRICULTURAL RESEARCH STATION, NANJANAD, FOR THE YEAR 1953-54 (FASLI 1363).

I. Season.

A statement of the rainfall received during the year, furnishing weekly totals and the number of rainy days, compared with similar figures for the previous year and those of the preceding ten years, is given in Table I.

Table I.—*Statement of rainfall for fasli* 1363 (1953-54).

Month.	Week.	1953-54. Rainfall in inches.	1953-54. Number of rainy days.	1952-53. Rainfall in inches.	1952-53. Number of rainy days.	Average for the past ten years. Quantity in inches.	Average for the past ten years. Number of rainy days.
South-west monsoon.							
June	7—13	0·57	1	0·11	..	1·47	2·7
	14—20	2·22	5	0·77	3	1·17	3·0
	21—27	11·96	4	0·57	3	3·43	2·6
June-July	28— 4	2·92	4	0·47	2	1·64	3·7
	5—11	6·55	3	0·63	2	3·11	3·8
	12—18	0·26	1	1·30	3	2·51	3·5
	19—25	1·38	2	1·11	2	3·31	4·4
July-August	26— 1	3·62	7	0·88	4	0·97	2·5
	2— 8	1·53	2	0·59	2	1·03	2·0
	9—15	2·30	5	0·96	3	1·89	3·8
	16—22	2·29	3	0·40	..	2·50	4·4
	23—29	1·63	2	0·33	2	1·36	2·8
August-September	30— 5	0·67	3	0·39	2	0·65	1·1
	6—12	1·76	2	0·09	..	1·41	1·7
	13—19	2·77	3	..	..	1·41	1·9
	20—26	2·49	1	0·52	2	1·25	1·8
	Total ..	44·92	48	9·12	30	29·11	45·2
North-east monsoon.							
September-October	27— 3	1·02	2	4·47	5	1·59	3·0
	4—10	4·93	5	2·53	5	1·43	2·5
	11—17	2·13	4	0·56	3	3·08	3·9
	18—24	3·71	4	..	..	1·66	3·5
	25—31	2·66	4	0·16	..	1·21	2·0
November	1— 7	..	..	0·18	1	1·09	1·9
	8—14	..	..	..	..	1·55	3·4
	15—21	0·34	2	..	..	2·12	2·0
	22—28	0·44	1	0·13	1	0·87	1·9
November-December	29— 5	..	..	3·80	2	0·19	0·9
	6—12	..	..	0·76	2	0·36	0·9
	13—19	..	..	0·26	1	0 19	0·7
	20—26	0·01	..	0·01	..	0·11	0·3
December-January	27— 3	0·08	..	..	..	0·53	0·2
	4—10	1·26	3	0·05	..	C 51	1 0
	11—17	0·74	3	..	..	0·25	0·7
	18—24	..	..	0·07	..	0 21	0·5
	25—31	..	..	..	..	0·18	0·5
	Total ..	17·32	28	12· 8	20	17·13	29·8
Dry weather.							
February	1— 7	0·01	..	..	..	0·05	0·1
	8— 14	..	..	..	..	1·20	0·2
	15—21	..	..	..	..	0·21	0·4
	22—28	0·27	1	0·99	1	0·38	0·5
March	1— 7	..	..	..	..	0·04	0·2
	8—14	0·47	1	..	..	0·60	0·4
	15—21	0·41	3	..	..	0·61	1·2
	22—28	0·74	3	0·04	..	0·49	0·9
March-April	29— 4	0·30	2	0·16	1	0·92	1·3
	5—11	0.05	..	1·18	3	0·69	2·6
	12—18	0·78	1	4·72	4	1·64	2·0
	19—25	1·43	3	1·32	4	1·16	2·4
April-May	26— 2	0·23	1	0·32	1	0·89	2·2
	3—9	0·52	3	0·28	1	0·51	1·7
	10—16	1·02	4	..	..	0·53	1·3
	17—23	1·56	3	1·46	5	1·39	1 7
	24—30	..	..	0·40	1	1·62	3·1
May-June	31— 6	2·26	4	1·31	4	1·64	3·7
	Total ..	10·03	29	12·18	25	14·57	25·4
	Grand total ..	72·27	105	84·28	75	60·81	100·4

The receipt of the south-east monsoon rains was in excess of the normal by about 50 per cent. The rains were particularly heavy and torrential during the end of June 1953, and resulted in the displacement of the sprouted main crop tubers before establishment in the higher slopes, and wash-down of the manures and soil. These tubers had to be replanted after repreparing and manuring the land. The total rains on account of the monsoon amounted to 44·92 inches as against the ten year average of 29 11 inches. The north-east monsoon was normal and timely for the second potato crop. Spring and summer showers were in deficit, totalling only 10 03 inches as against the ten-year average of 14·57 inches, and hence the irrigated winter potatoes had to pass through a prolonged dry spell during growth. The drought, besides checking progress, encouraged the incidence of cutworms which were controlled with insecticidal sprays. Water-supply from the streams was, however, sufficient for irrigation. A total of 72·27 inches of rains was received in the *fasli*, as compared to the amounts of 34·28 inches and 60·81 inches, respectively, recorded for the last year and as the mean for the past ten years.

Ground frost was incident from November 1953 and occurred intermittently till the end of February 1954 for 44 days. December registered 17 frosty days, resulting in appreciable damage to the late-planted second potato crop.

The maximum temperature ranged between 56°F and 83°F and the minimum between 58°F and 33°F.

II. Potato (*Solanum tuberosum, L.*).

2. (i) *Seed multiplication.*—The popular commercial variety, Great Scot, was raised for multiplication of seed during the three crop seasons as usual.

The main crop was planted in April and the harvest commenced from August. Torrential south-west monsoon rains, received before sprouting and establishment of seedlings, caused damage by displacing some seed tubers which had to be replanted. The second crop, planted in August-September, grew up well, but ground-frost cut down the late-planted batches. The irrigated crop was raised in January-February and lifted in May-June. Ground-frost in February-March slightly damaged the haulms of the earlier-raised batches by scorching. In general, very satisfactory yields were obtained, mainly due to timely swings and inter-cultural operations.

The average acre yields are presented in Table II.

Table II.—*Average acre yields of Great Scot* (1953–54).

Season.	Area in acres.	Mean acre yield in lb.	
		1953–54.	1952–53.
Main crop	19·39	10,907	11,960
Second crop	11·96	7,975	5,045
Irrigated crop	3·23	14,400	12,316

(ii) *Newly imported certified Great Scot seed.*—The small supply of 1,024 lb. of disease-free certified, class 'A' Great Scot seed, obtained from the United Kingdom during the preceding year and raised in the main and the irrigated crops, was further multiplied over an area of 3·76 acres in the second crop and recorded the very high acre yield of 9,718 lb. The entire seed material was reserved and planted over an area of 9·34 acres in the main crop of 1954, for rapid replacement of the old stock.

A consignment of five tons of certified Great Scot seed was obtained from the United Kingdom and the same was landed at the Madras Port on 2nd May 1954. But the seeds were not released immediately due to the non-arrival of the phyto-sanitary and other certificates from the country of export. A delay of over a month occurred, before the seeds were received on 7th June 1954 and planted over an area of 2·63 acres. Due to this delay, the tubers got damaged very badly by rotting and shrinkage, and only 7,668 lb. of the material were fit for planting. The season for planting was also unfavourable, since the main crop season had already been missed and the seeds were too far gone in condition to allow of their planting to be deferred for the second crop sowing in late July.

3. *Varieties.*—(i) *Type collection.*—A total number of 70 varieties, forming the type collection, was grown in all the three seasons for maintenance of stocks.

(ii) *Varieties received from the Netherlands.*—A total number of 26 varieties, received from the Netherlands during the years, 1951 and 1952, was raised in the main, the second and the irrigated crops during the year and their calculated acre yields are given below :—

TABLE III.—*Varieties received from the Netherlands* (1953–54).

Number and name of variety.	Acre yield in lb.		
	Main (1953).	Second (1953).	Irrigated (1954).
(1)	(2)	(3)	(4)
(a) Early duration.			
1 Bintje	6,400	7,133	22,000
2 Bevelander	11,200	8,300	22,957
3 Bohms	6,400	4,743	20,615
4 Eigenheimer	6,756	9,200	23,889
5 Erdgold	8,533	9,520	25,067
6 Ideaal	6,133	8,000	16,800
7 Ijsselster	4,133	2,800	18,571
8 Meerlander	5,867	7,086	19,692
9 Orion	13,067	*	26,000
10 Profijt	8,533	10,800	15,800
11 Record	6,044	6,900	31,600
12 Saskia	4,933	5,800	18,250
13 Sientje	7,200	6,400	17,333
14 Sirtema	5,067	6,720	17,091
15 Ultimus	10,800	9,364	22,167
16 Urgenta	4,800	10,200	17,091
17 Voran	3,000	4,400	16,471
18 Zeeburger	4,533	7,133	11,619
(b) Medium duration.			
19 Alpha	4,000	4,000	5,500 (*a*) 23,818 (*b*)
20 Art	*	7,280	*
21 Furore	5,778	12,320	21,917
22 Industrie	11,733	8,000	16,545
23 Libertas	6,756	6,400	20,148
24 Moulder S. 22	8,356	*	18,000
(c) Late duration.			
25 Gloria	11,733	7,920	28,905
26 Prudal	*	7,133	*

*Not tried.
(*a*) Raise l from seed of main crop, 1953.
(*b*) Raised from seed of irrigated crop, 1953.

While all the varieties gave very high yields in the irrigated crop, four among the early duration varieties, viz., Bevelander, Erdgold, Profit and Ultimus, and Industries in the medium duration group, recorded consistently good yields in all the three seasons.

The medium duration variety, Alpha, was found to possess a distinctly longer period of dormancy, extending to about eight months after lifting. This is a specific advantage, since the tubers can be stored for very long periods, without appreciable losses due to shrinkage, dryage and sprouting, both as ware and seed potatoes. It was found that seed tubers, lifted from the main crop in August 1953 had not sprouted in storage when they were taken for planting in the irrigated crop in January 1954 nearly five months after, while under Nilgiri conditions, potatoes generally break their dormancy in about two to three months. The come-up from the above seed material was not satisfactory and returned an acre yield of only 5,500 lb. But, seeds of the same variety, lifted from the irrigated crop in May 1953 were in the ideal sprouted condition for planting after storage of about eight months and, when planted in the irrigated crop in January 1954 did excellently well with an acre yield of 23,818 lb. The tuber characters of this variety are also good, being oval-shaped and white with good cooking quality. This and the other varieties are being further multiplied.

(iii) *Varieties and cultures from the Potato Sub-Station, Simla, of the Central Potato Research Institute, Patna.*—A total number of 49 varieties and cultures was received and put undertrials, in accordance with the directions from the Potato

Sub-Station, Simla. The results of the trials, conducted on the main crop, are given below :—

(*a*) *Adaptive trial.*—Among the 42 cultures, seven, viz., S. 156, 284, 537 569, 649, 684 and C.P.S. 472 proved good, yielding the per plant average of eight ounces and over.

(*b*) *Yield trial.*—Three cultures, O. N. 2090, C.P.S. 1075 and S. 269, proved promising out of the five tested.

Variety O. N. 2090 had recorded the very good calculated acre yields of 17,714 lb. in the irrigated crop of 1952 and 19,500 lb. in the second crop of 1953. The entire seed material available was planted out in the main crop of the year under report, for yield comparison against Great Scot, under the A B B A design with 12 replications. The acre yields of O.N. 2090 and Great Scot amounted to 12,700 lb. and 11,367 lb. respectively, but the differences were not statistically significant.

On the inclusion of the station as one of the regional centres in India for research work on the Scheme of Potato Development under the First National Five-Year Plan of the Government of India, an area of 3 acres was transferred to the Central Potato Research Institute, Patna, along with the above cultures, for continuation of the studies till now done under co-operative basis.

In addition, seeds of the following cultures and varieties, raised in co-operation with the Central Potato Research Institute Patna, at the Agricultural Research Station, Koilpatti, as a winter crop under irrigation, during the cold weather of 1952–53, were received for multiplication in the main crop at this station. Eigenheimer, Voran, Industrie, Aloha, Saskia, Erdgold, Sneew 550, Delaware, O.N. 2186 and *Solanum chacoense*. Though the seeds received consisted of extremely small chats, the entire material was sown and the produce sent back to Koilpatti, for raising in the winter of 1953–54. Only two among them, viz., O.N. 2186 and Eigenheimer, proved good, recording the calculated acre yields of 12,533 and 8,500 lb. respectively.

(iv) *Potato—Main crop* (1954–55).—An area of 24·54 acres has been planted to the main crop, consisting of 23·54 acres under Great Scot and one acre under varieties for multiplication of seed.

4. *Cultural trials*—(i) *The influence of mulching the potato crop on yield.*—This trial was under progress in all the three crop seasons since the year 1950 to find out if mulching the land under the crop with dried vegetable refuse, such as Samai straw, had any beneficial effect on the yield of tubers. Mulching helps in smothering weed growth, conserving soil moisture and minimising soil wash-down during heavy rains. The results are given below :—

TABLE IV.—*The influence of mulching the potato crop on yield* (1953–54).

Season.	Main crop, 1953.	Second crop, 1953.
Field number	34	27.
Previous crop	Rye for ergot production	Lupin for green manure.
Layout	Randomized replicated plots (5 × 4).	Randomized replicated plots (5 × 4).
Plot size	1·0 cent.	1·0 cent.
Seed used	Second crop seed of 1952	Irrigated crop seed of 1953.
Number of tubers per plot	256	256.
Date of planting	30th March 1953	29th August 1953.
Date of harvest	7th September 1953	11th December 1953.

Treatments—
A = Unmulched (Control).
B = Mulching at 1,250 lb. per acre.
C = Mulching at 2,500 lb. per acre.
D = Mulching at 8,000 lb. per acre.
E = Mulching at 10,000 lb. per acre.

Summary of results.

	A.	B.	C.	D.	E.	Standard error.	'Z' test satisfied or not.	Critical difference (P = 0·05)
Main crop, 1953—								
Acre yield in lb.	9,100	9,425	9,350	12,725	12,450	1,430	Yes.	3,117
Percentage on control, (A).	100·0	103·5	102·7	139·8	136·8	34·2	..	136·8
Second crop, 1953—								
Acre yield in lb.	11,125	10,200	9,800	9,300	9,550	683	No.	..
Percentage on control(A).	100·0	91·6	88·0	83·5	85·8	6·2	..	..

Conclusion—
Main crop—D, E, B, C, A.

Mulching of the main crop resulted in increased yields, particularly for the two highest levels of mulching. In the absence of availability of samai straw, the stems of a reed (*Juncus glaucus*), commonly growing in swamps, were used for the second crop. This was found unsuitable, since the material did not serve the object by forming a protective matting for the soil and hence the results of the treatments proved inconclusive. Leaving the values for the second crop out of account, the results for the main crop agreed closely with those of the previous three years, when progressive yield increases were evident, particularly with heavier applications of mulch. Thus the yield data were significantly in favour of 8,000 lb. of mulch for the second crop (1950), and for 10,000 lb. of mulch in the irrigated crop (1951). For the second crop (1951), though there were no significant differences among the treatments, it was found that the greater the quantity of mulch used, the higher were the yields. In the irrigated (1952) crop, the two highest levels for mulching, viz., 8,000 lb. and 10,000 lb. had given significantly higher yields respectively than the other treatments. For the period, 1952-53, 8,000 and 10,000 lb. of mulch for the main crop (1952), and 8,000 lb. for the irrigated crop (1953), had recorded significantly higher yields.

(ii) *The influence of spacing on yield.*—A uniform spacing of 27 inches between the rows is being adopted in the area intended for potato seed multiplication to facilitate all the field operations like ridging, covering the seed and manure, earthing-up and harvest by bullock-driven implements. The cultivators, who do all the operations by manual labour, give a spacing of only about 18 inches between rows. Since, previously, no studies had been conducted on the question of row spacing, this trial was started in the previous year to fix the ideal row spacing for optimum yields. Four levels of spacing were adopted, viz., 18 inches, 21 inches, 24 inches and 27 inches between the rows. The results of the trial, which was conducted on the main and the second crops, are given below :—

TABLE V.—*The influence of spacing on yield* (1953-54).

Season.	Main crop, 1953.	Second crop, 1953.
Field number	32	27.
Previous crop	Rye for ergot production.	Lupin for green manure.
Layout	Replicated randomised plots (4 × 5).	Replicated randomized plots (4 × 5).
Plot size	1·0 c nt.	1.0 c nt.
Seed used	Second crop seed of 1952	Irrigated crop seed of 1953.
Date of planting	25th March 1953	24th August 1953.
Date of harvest	27th July 1953	14th December 1953.

Treatments—
A = Row spacing 18″. C = Row spacing 24″.
B = Do. 21″. D = Do. 27″.

Summary of results.

	A	B	C	D	Standard error.	'Z' test satisfied or not.	Critical difference (P = 0·05).
Main crop, 1953— Acre yield in lb.	20,660	20,040	19,160	18,240	632	Yes.	1,890
Percentage on control (D)	113·2	109·8	105·04	100·0	3·5	..	7·6
Second crop, 1953— Acre yield in lb.	14,660	13,960	13,640	12,760	656	Yes.	1,419
Percentage on control (D)	114·8	109·4	106·8	100·0	4·46	..	9·67

Conclusion—
Main crop—A, B, C, D.
Second crop—A, B, C, D.

The lowest level of spacing, 18 inches has given significantly higher yield over spacings of 24 inches and 27 inches in the main crop, and over spacing of 27 inches in the second crop. In the 1952 main crop, row spacings of 18 inches and 24 inches had recorded significantly higher yields than the control (27 inches).

(iii) *The influence of Bordeaux Mixture spray on yield.*—This experiment was started in the year 1950, to investigate the possibilities of increasing the yield of the potato crop by spraying with one per cent Bordeaux Mixture, as it is held that absorption of traces of metallic elements like copper, manganese, etc., through the leaf surface leads to enhanced yields in plants, by stimulating the metabolic processes

In addition, the spray effectively checks the incidence of early blight (*Alternaria solan*) on potatoes. The yield data, obtained from the main and the second crops are given below :—

TABLE VI.—*The influence of Bordeaux Mixture spray on yield* (1953–54).

Season.	Main crop, 1953.	Second crop, 1953.
Field number	84.	27.
Previous crop	Rye for ergot production	Lupin for green manure.
Layout	Randomized replicated plots (4 × 5).	Randomized replicated plots (4 × 5).
Plot size	1.0 cent	1.0 cent.
Seed used	Second crop seed of 1952	Irrigated crop seed of 1953.
Number of tubers per plot	256.	256.
Date of planting	30th March 1953	20th August 1953.
Date of harvest	7th September 1953	9th December 1953.

Treatments—
A = Not sprayed (control)
B = Sprayed once, 45 days after planting.
C = Sprayed twice, 45 and 60 days after planting.
D = Sprayed twice, 60 days and 75 days after planting.
} Bordeaux mixture 1 per cent at 100 gallons per acre per spray.

Summary of results.

	A	B	C	D	Standard error.	'Z' test satisfied or not.
Main crop, 1953—						
Acre yield in lb.	10,500	10,440	10,530	10,180	640	No.
Percentage on control (A)	100·0	99·4	100·5	96·9	6·2	..
Second crop, 1953—						
Acre yield in lb.	11,400	12,260	11,500	11,840	1,000	No.
Percentage on control (A)	100·0	107·5	100·8	103·8	8·8	..

Treatment differences for yield were not significant for both the crops and followed the conclusions of the previous two years. Incidence of the disease was not severe. It was only in the main crop of 1950–51 that treatment D (spraying twice, 60 and 75 days after planting) had recorded significantly higher yields over the other two spray treatments and the unsprayed control.

(iv) *The influence of Copper 'Sandoz' on yield.*—The trial, started in the previous year, of Copper 'Sandoz,' a proprietory preparation manufactured by Sandoz, Limited, of Basle, Switzerland, was continued. This formulation contains 50 per cent metallic copper as cuprous oxide in colloidal form and was claimed to be a plant stimulant and an effective fungicide, leading to both improved yields by foliar absorption of copper and prevention of early blight. The results of the trial on the main and the second crops are give below :—

TABLE VII.—*The influence of Copper 'Sandoz' on yield* (1953–54)

Season.	Main crop, 1953.	Second crop, 1953.
Field number	82	27.
Previous crop	Rye for ergot production	Lupin for green manure.
Layout	Randomized replicated plots (3 × 10).	Randomized replicated plots (3 × 10).
Plot size	0·75 cent.	1.0 cent.
Number of tubers per plot	192	256.
Seed used	Second crop seed of 1952	Irrigated crop seed of 1953.
Date of planting	24th March 1953	22nd August 1953.
Date of harvest	13th August 1953	10th December 1953.

Treatments—
A = Control (not sprayed).
B = Bordeaux mixture.
C = Copper Sandoz 0·4 per cent (1 lb. in 25 gallons of water).

Summary of results.

	A	B	C	Standard error.	'Z' test satisfied or not.
Main crop, 1953—					
Acre yield in lb.	10,330	11,010	11,110	920	No.
Percentage on control (A)	100·0	106·5	107·5	6·7	..
Second crop, 1953—					
Acre yield in lb.	8,050	8,480	7,530	530	No.
Percentage on control (A)	100·0	105·3	93·5	6·6	..

Treatment differences for yield were not significant, as in the previous year. The effects of the spray treatments, in regard to the prevention and control of early blight, could not be guaged as the incidence was very light.

5. *Manurial trials*—(i) *Trial with different forms of nitrogen.*—The total quantity of about 80 lb. of nitrogen supplied per acre by the Nanjanad mixture is made up equally of 200 lb. of ammonium sulphate and 500 lb. of groundnut cake meal. The object of this experiment, which was started in the previous year, is to find out if replacement of the quantum of nitrogen supplied partly by the ammonium sulphate, which is acidic in reaction, by that of a physiologically alkaline nitrogenous fertilizer like Chilean nitrate of soda, or a neutral nitrogenous fertilizer like urea, may prove more acceptable to the potato crop and lead to improved yields. The soils of the Agricultural Research Station, Nanjanad, are highly acidic (pH 4·6). The trial is designed to test the relative efficiencies of the three forms of nitrogen on growth and the yield of the potato crop.

To guard against the natural soil acidity proving as the limiting factor against maximum availability of the two nitrogeneous fertilizers, it was decided to include stipulated doses of slaked lime and green leaf in the different treatments as a corrective. Green leaf would increase the solubility of lime and both lime and leaf would improve the availability of the phosphate applied by minimising reversion.

The results of the trial, which was conducted on the main crop, are given below :—

TABLE VIII.—*Trial with different forms of nitrogen* (1953–54).

Season.	Main crop, 1953.
Field number	12.
Previous crop	Potato.
Layout	Split plot design (4×4×4).
Plot size	Gross : 0·5 cent; Nett : 0·25 cent.
Seed used	Second crop seed of 1952.
Date of planting	20th March 1953.
Date of harvest	21st September 1953.

Treatments—

(A) No lime, no leaf—
(1) Chilean nitrate at 80 lb. N plus P2O5 and K2O of Nanjanad mixture.
(2) Urea at 80 lb. N plus P2O5 and K2O of Nanjanad mixture.
(3) Ammonium sulphate at 80 lb. N plus P2O5 and K2O of Nanjanad mixture.
(4) Control (Nanjanad mixture).

(B) 5,000 lb. green leaf per acre, no lime—
(1) Chilean nitrate at 80 lb. N plus P2O5 and K2O of Nanjanad mixture.
(2) Urea at 80 lb. N plus P2O5 and K2O of Nanjanad mixture.
(3) Ammonium sulphate at 80 lb. N plus P2O5 and K2O of Nanjanad mixture.
(4) Control (Nanjanad mixture).

(C) 5,000 lb. green leaf per acre plus 1,500 lb. lime per acre—
(1) Chilean nitrate at 80 lb. N plus P2O5 and K2O of Nanjanad mixture.
(2) Urea at 80 lb. N plus P2O5 and K2O of Nanjanad mixture.
(3) Ammonium sulphate at 80 lb. N plus P2O5 and K2O of Nanjanad mixture.
(4) Control (Nanjanad mixture).

(D) No leaf, 1,500 lb. lime per acre—
(1) Chilean nitrate at 80 lb. N plus P2O5 and K2O of Nanjanad mixture.
(2) Urea at 80 lb. N plus P2O5 and K2O of Nanjanad mixture.
(3) Ammonium sulphate at 80 lb. N plus P2O5 and K2O of Nanjanad mixture.
(4) Control (Nanjanad mixture).

Summary of results.

(*a*) *Basal dressing* (leaf and lime).

Particulars.	Basal dressing. A	B	C	D	Standard error.	'F' value satisfied or not.	Critical difference (P=0·05)
Main crop, 1953— Acre yield in lb.	12,950	14,600	14,525	14,150	155	Yes.	374
Percentage on control (A) (no leaf, no lime).	100·0	112·7	112·1	109·2	1·2	..	2·8.

Conclusion—B, C, D, A

Applications of 5,000 lb. of leaf only (B) or 5,000 lb. of leaf plus 1,500 lb. of lime (C) were of the same order and gave significantly higher yields over applications of 1,500 lb. of lime only (D) and the control (A).

(*b*) *Sub-plot treatment* (forms of nitrogen).

Particulars.	Sub-plot treatment. 1	2	3	4	Standard error.	'F' value satisfied or not.	Critical difference (P=0·05).
Main crop, 1953—							
Acre yield in lb.	13,100	13,400	14,500	15,225	301	Yes.	900
Percentage on control (4) (Nanjanad Mixture).	86·0	88·0	95·2	100·0	2·3	..	2·3

Conclusion—4, 3, 2, 1

Application of 80 lb. of nitrogen in the form of groundnut cake plus ammonium sulphate as in Nanjanad Mixture (4) gave the highest yield and was significant over all the other three treatments.

(*c*) *Interaction* (Basal dressing × sub-plot treatment).

Particulars	A 1	2	3	4	B 1	2	3	4
Main crop, 1953—								
Acre yield in lb. ..	13,000	12,200	12,400	14,200	13,100	14,800	14,000	16,500
Percentage on control (A4) Nanjanad (Mixture) only).	91·5	85·9	87·3	100·0	92·3	104·2	98·6	116·2

C 1	2	3	4	D 1	2	3	4	Standard error.	'F' value satisfied. or not.	Critical. difference (P=0·05)
14,200	13,200	16,200	14,500	12,100	13,400	15,400	15,500	327	Yes.	1,999
100·0	94·2	114·1	102·1	85·2	94·4	108·4	109·2	2·3	..	14

Conclusion—B4, C3, D4, D 3, B 2, C 4, C 1, A 4, B 3, D 2, C 2, B 1, A 1, A 3, A 2, D 1.

Application of Nanjanad Mixture only gave the maximum yield.

(ii) *Trial with graded doses of nitrogen and phosphoric acid.*—This trial, started in the previous year, to determine the ceilings for the doses of nitrogen and phosphoric acid for optimum potato yield, was conducted on the main crop. The dosages of nitrogen were fixed at four levels, viz., 60, 80, 100 and 120 lb. per acre, in the form of ammonium sulphate, permuted with six levels for phosphoric acid, viz., 30, 60, 120, 180, 200 and 240 lb. per acre supplied as superphosphate. Nanjanad Mixture provided the 'control' for the above 24 graded treatments. In addition, all the treatments including the Control received a basal dressing of 1,500 lb. of slaked lime applied three weeks in advance of planting and 5,000 lb. of green leaf incorporated ten days before planting. The results of the trial are given below :—

TABLE IX.—*Trial with graded doses of nitrogen and phosphoric acid* (1953–54).

Season—Main crop 1953.
Field No. —11.
Previous crop—Potato.
Layout—Randomized blocks (25 × 4).
Plot size—Gross : 0·5 cent ; Nett : 0·25 cent.
Seed used—Second crop seed of 1952.
Date of planting—28th March 1953.
Date of harvest—23rd and 24th September 1953.

Treatments—

1. N 60—P. 30.
2. N. 60—P. 60.
3. N. 60—P. 120.
4. N. 60—P 180.
5. N. 60—P. 200.
6. N. 60—P. 240.
7. N. 80—P. 30.
8. N. 80—P. 60.
9. N. 80—P. 120.
10. N. 80—P. 180.
11. N. 80—P. 200.
12. N. 80—P. 240.

13. N. 100—P. 30.	18. N. 100—P. 240.	23. N. 120—P. 200.
14. N. 100—P. 60.	19. N. 120—P. 30.	24. N. 120—P. 240.
15. N. 100—P. 120.	20. N. 120—P. 60.	25. Nanjanad mixture (Control).
16. N. 100—P. 180.	21. N. 120—P. 120.	
17. N. 100—P. 200.	22. N. 120—P. 180.	

NOTE.—(1) N = Nitrogen as ammonium sulphate; P = P2O5 as super phosphate;
(2) Figures accompanying symbols indicate the quantities in lb. per acre of N or P.
(3) Treatments 1—24 received, in addition, 100 lb. of potash per acre as potassium sulphate.
(4) Basal dressing for all treatments (1—25)—1,500 lb. of slaked lime and 5,000 lb. of green leaf per acre.

Summary of results.

	1	2	3	4	5	6	7
Main crop, 1953—							
Acre yield in lb.	8,400	8,100	9,100	11,050	10,350	11,800	7,500
Percentage on control (25) (Nanjanad mixture).	72·7	70·1	78·7	95·6	88·7	102·1	64·8

	8	9	10	11	12	13	14
Main crop, 1953—							
Acre yield in lb.	9,500	10,550	11,000	12,150	10,750	8,800	9,250
Percentage on control (25) (Nanjanad mixture).	82·2	91·3	95·2	105·1	93·0	76·1	80·1

	15	16	17	18	19	20	21
Main crop, 1953—							
Acre yield in lb.	10,250	11,000	11,500	11,800	8,450	8,700	10,900
Percentage on control (25) (Nanjanad mixture).	88·7	95·2	99·6	102·1	73·2	75·4	94·1

	22	23	24	25	Standard error.	'Z' test satisfied or not.	Critical difference (P = 0·05).
Main crop, 1953—							
Acre yield in lb.	10,300	11,250	12,500	11,550	740	Yes.	1,476
Percentage on control (25) (Nanjanad mixture).	89·2	97·4	108·1	100·0	3·7	..	7·38

Conclusion—No treatments were superior to the control (25).

(iii) *Trial with calcium carbonate sludge ('slurry'), a waste product of the ammonium sulphate industry.*—Application of slaked lime is generally recommended for neutralizing acid soils and for improving the availability of phosphates applied by minimising their reversion. Calcium carbonate sludge, or 'slurry', as it is commercially termed, is a by-product of the ammonium sulphate industry that has no industrial use now and is available in large quantities from Fertilizers and Chemicals, Limited, Alwaye. With the increased development of the production of ammonium sulphate at Sindhri, larger quantities of 'slurry' will be released. It was, therefore decided to try the possibilities of using the 'slurry' as an amendment for the acid soil and to test the relative value of the product against slaked lime on equal calcium oxide basis. The results of the trial, which was started on the second crop of the previous year, and continued on the main crop, are given below :—

TABLE X.—*Trial with calcium carbonate (slurry) sludge* (1953–54).

Season—Main crop 1953.
Field No.—22.
Previous crop—Potato.
Lay out—Split-plot design (5 × 2 × 5).
Plot size—Gross: 1·0 cent; Net: 0·5 cent.
Seed used—Second crop seed of 1952.
Date of planting—26th March 1953.
Date of harvest—19th August 1953

	Green leaf per acre in lb.
Treatments A—	
1. Control (Nanjanad mixture)	Nil.
2. Nanjanad mixture plus 1,500 lb. of slaked lime	,,
3. Nanjanad mixture plus calcium carbonate slurry to supply equivalent amount of CaO as in 1,500 lb. of slaked lime.	,,
4. Nanjanad mixture plus 3,000 lb. of slaked lime	,,
5. Nanjanad mixture plus calcium carbonate slurry to supply equivalent amount of CaO as in 3,000 lb. of slaked lime.	,,
Treatments B—	
1. Control (Nanjanad mixture)	5,000 lb.
2. Same as in A2	,,
3. Same as in A3	,,
4. Same as in A4	,,
5. Same as in A5	,,

Summary of results.

(*a*) *Basal dressing* (Leaf and no leaf).

Particulars.	Basal dressing. A	Basal dressing. B	Standard error	'F' value satisfied or not.	Critical difference (P = 0·05).
Main crop, 1953—					
Acre yield in lb.	12,256	12,344	466	No.	1,523
Percentage on control (A)	100·0	100·7	3·8	..	12·43

(*b*) *Sub-plot treatment* (forms of Calcium oxide).

Particulars.	Sub-plot treatments. 1	2	3	4	5	Standard error.	'F' value satisfied or not.	Critical difference (P = 0·05)
Main crop, 1953—								
Acre yield in lb.	11,740	13,260	12,400	11,800	12,300	1,395	No.	4,088
Percentage on control (1)	100·0	112·9	105·6	100·5	104·7	11·88	..	34·82

(*c*) *Interaction* (Basal dressing X Sub-plot treatment)

Particulars.	(A) No leaf. 1	2	3	4	5
Main crop, 1953—					
Acre yield in lb.	11,360	12,960	13,240	11,800	11,920
Percentage on control (A1)	100·0	114·0	116·5	103·8	104·9

Particulars.	(B) Leaf at 5,000 lb 1	2	3	4	5	Standard error.	'F' value satisfied or not.	C.D. (P = 0·05).
Main crop, 1953—								
Acre yield in lb.	12,120	18,560	11,560	11,800	12,680	1,303	No.	3,820
Percentage on control (A1)	106·6	119·3	101·7	103·8	111·6	11·47	..	33·63

Effect of application of green leaf was not clear.

Significant differences for effect of application of different doses of lime or calcium carbonate slurry were not patent.

Application of Nanjanad mixture with 5,000 lb. of leaf and 1,500 lb. of slaked lime gave the maximum yield.

(iv) *Effect of application of magnesium as magnesium sulphate on growth and yield of potato* —Apart from the three essential plant nutrients, nitrogen, phosphoric acid and potash, certain other elements like chlorine, calcium, magnesium, sodium, iron, manganese and boron have been recorded to exert some beneficial action, either by themselves in minute quantities or by helping to carry the three essential nutrients and in their increased assimilation.

The soils on the Nilgiris are, in general deficient in lime and magnesium deficiency often occurs in the same localities as calcium deficiency In South Carolina, significant increases in yield have sometimes been obtained by adding magnesium to very acid soils.

A scheme of experiment on the magnesium fertilization of potatoes, as per the details given below, was laid out for the first time in the main crop of 1953–54 :—

TABLE XI.—*Effect of application of magnesium on growth and yield of potato* (1953–54).

Field No.—11.
Previous crop—Potato.
Season—Main crop, 1953.
Lay-out—Randomized replicated plots (14 × 4).

Plot size—Gross : 0·5 cent ; Nett : 0·25 cent.
Seed used—Second crop seed of 1952.
Date of planting—12th April 1953.
Date of harvest—22nd September 1953.

Treatments—

1	Nanjanad mixture (Control).	
2	Nanjanad mixture + magnesium sulphate at 10 lb. MgO per acre.	Magnesium applied to the soil at planting.
3	Nanjanad mixture + magnesium sulphate at 20 lb. MgO per acre.	
4	Nanjanad mixture + magnesium sulphate at 30 lb. MgO per acre.	
5	Nanjanad mixture + magnesium sulphate at 10 lb. MgO per acre. + slaked lime at 1,500 lb. per acre.	
6	Nanjanad Mixture + magnesium sulphate at 20 lb. MgO per acre. + slaked lime at 1,500 lb. per acre.	
7	Nanjanad mixture + magnesium sulphate at 30 lb. MgO per acre. + slaked lime at 1,500 lb. per acre.	
8	Nanjanad mixture + slaked lime at 1,500 lb. per acre.	
9	Nanjanad mixture + magnesium sulphate at 10 lb. MgO per acre.	Magnesium applied to the crop as spray when a month old.
10	Nanjanad mixture + magnesium sulphate at 20 lb. MgO per acre.	
11	Nanjanad mixture + magnesium sulphate at 30 lb. MgO per acre.	
12	Nanjanad mixture + magnesium sulphate at 10 lb. MgO per acre. + slaked lime at 1,500 lb. per acre.	
13	Nanjanad mixture + magnesium sulphate at 20 lb. MgO per acre. + slaked lime at 1,500 lb. per acre.	
14	Nanjanad mixture + magnesium sulphate at 30 lb. MgO per acre. + slaked lime at 1,500 lb. per acre.	

Basal dressing of green leaf at 5,000 lb. per acre to all the 14 treatments. Liming three weeks in advance of planting to the treatments, receiving the application.

Summary of results.

Particulars.	Treatments. 1	2	3	4	5	6	7	8
Main crop, 1953—								
Acre yield in lb. ..	11,900	12,650	12,950	12,600	12,700	12,650	11,600	12,450
Percentage on control (1)	100·0	106·2	108·4	105·0	106·7	106·2	97·4	104·6

	Treatment. 9	10	11	12	13	14	Standard error.	'F' value satisfied or not.	C.D. (P = 0·05)
Main crop, 1953—									
Acre yield in lb. ..	12,750	11,600	11,450	12,800	13,450	12,400	520	Yes	1,021·6
Percentage on control (1)	107·1	97·4	96·2	107·5	121·4	104·2	2·6	..	5·103

Conclusion—13, 3, 14, 12, 9, 5, 6, 2, 4, 8, 1, 10, 7, 11

Spray application of magnesium sulphate at 20 lb. MgO plus slaked lime at 1,500 lb. gave the maximum yield.

(v) *Effect of application of (Kotka) semi-acidulated rock phosphate on yield of potato.*—This new trial, started on the second crop, was designed to find out the benefits, if any, of replacement of the superphosphate of the Nanjanad mixture, which is acidic, by a semi-acidulated phosphate like Kotka phosphate, on equal phosphoric acid basis. The results are given below :—

TABLE XII.—*Effect of application of Kotka phosphate on yield of potato* (1953–54).

Season—Second crop, 1953.
Field No.—27.
Previous crop—Lupin for green manure.
Lay out—Randomised replicated plots (3 × 10).

Plot size—Gross : 1·0 cent ; net : 0·5 cent.
Seed used—Irrigated crop seed of 1953.
Date of planting—2nd September 1953.
Date of harvest—12th December 1953.

Treatments—

A : 80 lb. N as ammonium sulphate + 200 lb. P_2O_5 as superphosphate + 100 lb. K_2O as potassium sulphate per acre.
B : 80 lb. N as ammonium sulphate + 200 lb. P_2O_5 as Kotka phosphate + 100 lb. K_2O as potassium sulphate per acre.
C : Nanjanad mixture (Control).

(All treatments received a basal dressing of 2·5 tons of cattle manure per acre).

Summary of results.

Particulars.	A	B	C	Standard error.	'Z' test satisfied or not.	C.D. (P=0·05).
Second crop, 1953—						
Acre yield in lb.	10,440	9,180	10,980	448	Yes.	942
Percentage on control (C)	95·1	86·3	100·0	4·3	..	9·02

Conclusion—C, A, B.

Supply of phosphoric acid in the form of bonemeal and superphosphate, as in Nanjanad mixture, gave significantly higher yields than that supplied in the form of Kotka phosphate.

(vi) *Application of organic matter in the form of green leaf as soil amendment.*—This new trial was laid out on the second crop in observation plots to study the effect of application of organic matter in the form of green leaf on potato yield. Leaves of bracken fern, freshly obtained from the forests, were chopped and applied one month before planting at three levels, viz., 2,500, 5,000 and 7,500 lb. of green matter per acre. The results are given below :—

TABLE XIII.—*Application of organic matter in the form of green leaf* (1953–54).

Season—Second crop, 1953.
Field No.—2.
Previous crop—Lupin for green manure.
Layout—Observation plots.
Plot size—10 cents.
Seed used—Irrigated crop seed of 1953.
Date of planting—28th September 1953.
Date of harvest—21st December 1953.
All treatment received Nanjanad mixture at planting.)

Treatments—
A = No leaf (Control).
B = 2,500 lb. of green leaf per acre.
C = 5,000 lb. of green leaf per acre.
D = 7,500 lb. of green leaf per acre.

Acre yield in lb.
A = 6,820.
B = 7,560
C = 7,020
D = 6,280

(Application of leaf at 2,500 lb. per acre gave the maximum yield.)

(vii) *Comparison of green leaf with cattle manure as soil amendment.*—This new trial was laid out in the second crop in observation plots to compare the effect of application of green leaf and cattle manure, on equal organic matter basis, on potato yield. Details of the treatments and results are given below :—

TABLE XIV.—*Comparison of green-leaf manure with cattle manure* (1953–54).

Season—Second crop, 1953.
Field No.—2.
Previous crop—Lupin for green manure.
Layout—Observation plots.
Plot size—Four cents.
Seed used—Irrigated crop seed of 1953.
Date of planting—28th September 1953.
Date of harvest—21st December 1953.

Treatments—
1 No manure (Control).
2 Green manure at 2,500 lb. per acre.
3 Cattle manure to supply the same quantity of organic matter as contained in (2).
4 No manure (control).
5 Green manure at 5,000 lb. per acre.
6 Cattle manure to supply the same quantity of organic matter as contained in (5).
7 No manure (control).
8 Green manure at 7,500 lb. per acre.
9 Cattle manure to supply the same quantity of organic matter as contained in (8).

Acre yield in lb.—Treatment—

1. 6,100.	4. 5,600.	7. 5,600.
2. 6,200.	5. 5,350.	8. 4,150.
3. 6,050.	6. 5,300.	9. 5,000.

Application of green leaf at 2,500 lb. per acre gave the maximum yield.

6. *Fungicidal trial against Early Blight (Alternaria solani) of potatoes.*—Four brands of fungicide were used in comparison with Bordeau mixture, to test their usefulness in the prevention and control of Early Blight on potatoes and for their effects on yield, if any, during the main crop season. Details of the experiment and the yields are given below :—

TABLE XV.—*Fungicidal trials against Early Blight* (1953–54).

Season—Main crop, 1953.
Field No.—33.
Previous crop—Potato.
Lay out—(7 × 4) Randomised blocks.
Plot size—Five cents.
Variety—Great Scot.
Date of planting—1st/3rd April 1953.
Date of harvest—19th/21st August 1953.
Date of first spraying—18th/19th May 1953.
Date of second spraying—15th June 1953.

Treatments—
1 Wetcol 15.
2 Zinc Cop.
3 Bordeaux mixture plus zinc sulphate.
4 Bordeaux mixture.
5 Dithane Z-78.
6 Perenox.
7 Unsprayed (control).

Summary of results.

Treatment number	Percentage of incidence of early blight	Acre yield in lb.	Percentage of yield increase over control.
1 ..	16·3	9,760	101·7
2 ..	16·9	11,350	118·2
3 ..	12·3	11,130	115·9
4 ..	9·5	11,100	115·6
5 ..	11·6	11,610	120·9
6 ..	16·9	10,980	114·5
7 ..	54·2	9,600	100·0
	Significant.	Not significant.	

S. E. : 2·36

C.D. (P—0·05) : 7·1.

Conclusion—

4, 5, 3, 1, 2, 6, 7

Among the different treatments, spraying with Bordeaux mixture secured the maximum control against the disease. In regard to yield, Dithane Z-78 recorded the highest value. This formulation had given significantly higher yields over all the other spray treatments in the main crop (1952) and the highest yield values for the main and the second crops (1951). Considering its consistent performance in improving yields, the use of this preparation can be recommended to the potato growers as a routine practice.

7. *Trials on sprouting of potato seed tubers.*—On the Nilgiris there is always a dearth of seed for planting the second crop during July-August, as the area under the irrigated crop, which has to supply the seed for the same, is very limited. The early main crop will be under harvest at this period and the seeds obtained from this crop will not be fit for immediate planting, since they would take about two months to sprout. Therefore, the practice is to force-sprout such dormant tubers by fumigation with carbon-di-sulphide. Such force-sprouted seed tubers do not normally yield as much as the naturally sprouted irrigated crop seed, particularly if rainfall is scarce. But if the tubers from the early main crop harvest are sent down to the plains, they break their dormancy and sprout in a month, in view of the higher temperatures prevalent at low altitudes. It was, therefore, decided to find out the relative yield capacities of (1) the irrigated crop seed, (2) force-sprouted main crop seed and (3) the main crop seed taken down to the plains (Mettupalayam) and

brought back after sprouting. The trial, which was conducted on the second crop was laid out in observation plots and the results are given below :—

TABLE XVI.—*Trial on sprouting of potato seed tubers* (1953–54).

Season—Second crop, 1953.
Field No.—25.
Previous crop—Fallow.
Layout—Observation plots.
Plot size—Four cents.
Variety—Great Scot.
Date of planting—18th September 1953.
Date of harvest—8th January 1954.

Treatments—
1 Irrigated crop seed.
2 Force-sprouted main crop seed.
3 Main crop seed sprouted in the plains.

Summary of results.

Treatment.	Acre yield in lb.
1	7,100
2	5,800
3	6,600

Naturally sprouted irrigated crop seed gave the highest yield, followed by the main crop seed sprouted in the plains. Chemically force-sprouted main crop seed returned the lowest yield.

8. *Studies on sprout inhibition of potato tubers during storage.*—In the August, 1953 issue of *Current Science*, it had been recorded that storage of potato tubers in dry neem leaves along with sand successfully retarded sprouting even upto 180 days of storage. To find out if the method would prove good under Nilgiri conditions, a trial was started as detailed below :—

Freshly lifted tubers of Great Scot, of uniform size and weight, were used. Four treatments replicated five times, were adopted, as follows :—

TABLE XVII.—*Studies on sprout inhibition of potato tubers during storage* (1953–54).

Treatments—
A = No sand or neem leaf (control).
B = Stored over a layer of dry sand.
C = Stored in a layer of dry neem leaves.
D = Stored in a layer of dry neem leaves and sand.

Number of replications per treatment—5.
Number of tubers per replication—50.
Started on 16th January 1954.
Completed on 16th June 1954.
Weight of tubers per replication—6·5 lb.

(The tubers were kept in uniform-sized wooden trays, one layer deep·)

The treatments were examined at monthly intervals for estimation of their changes in weight, extent of shrinkage and sprouting. It was found that, in exactly two months of storage, all the tubers in all the treatments had sprouted. This is the time normally taken for freshly lifted tubers to sprout in storage. It was therefore concluded that, under Nilgiri conditions, materials like sand, dried neem leaf or a mixture of both, would not prove useful to inhibit sprouting of stored potato tubers.

III. CEREALS AND FOODGRAINS.

9. *Samai* (Panicum miliare, Lam.).—This is the most important foodgrain crop raised on the Nilgiris and forms the staple diet of the local population. It is grown in rotation with potato. Unlike as in the plains, where its duration is comparatively shorter, the crop stands on the field for about six months. In favourable seasons it yields heavily, benefiting by the residual effects of the rich manuring given to the preceding potato crop. The initial growth of Samai is very slow, the plants hardly attaining a height of six inches in two months. An area of 1·17 acres

under the crop yielded 526 lb. of grain and 4,274 lb. of straw, working at 450 lb. and 3,653 lb. per acre respectively.

10. *Rye for Ergot production.*—An area of 22·65 acres was under rye for ergot production. Sprayings with ergot culture were done from July to October. Though heavy rains in both the monsoons were received, both infection and setting of grain were very poor, resulting in the receipts of 45 lb. 8 oz. of dry clean ergot and 462 lb. of grain, working out at 2 lb. 1 oz. and 21 lb. per acre respectively.

11. *Oats* (Avena sativa, L.).—Seeds of two varieties of oats, Rex and Palu, obtained from Denmark through the Royal Danish Legation in India, were sown over plots of five cents each in April 1953. Germination and after-growth were good. They respectively returned the calculated acre yields of 112 lb. and 275 lb. of clean dry grain. Their duration amounted to about six months, though the variety, Palu, was earlier by two weeks. The varieties will be further multiplied to explore their suitability for extension in the district as fodder.

12. *Barley* (Hordeum vulgare, L.).—Seeds of two varieties of Danish barleys, Herta and Maja, received from the same source, were also put in over eight cents each, along with the local barley to serve as control. They recorded excellent growth and yields as given below :—

TABLE XVIII.—*Trial with Danish barleys* (1953–54).

Variety.	Flowering duration in days.	Acre yield of of cleaned dry grain in lb.
Herta	70	750
Maja	60	600
Local	50	375

The two Danish varieties tillered better than the local and the ears also were more thick-set and compact. No differences could be observed with reference to shattering on thrashing, as all the three varieties shed equally easily. Shape, size and colour of grains were similar in all cases. While the variety, Herta, recorded exactly double the yield of local, Maja gave an increase of more than 60 per cent over the local. The two new varieties proved slightly longer in duration, but the age of the crop is not of any account at all. The seeds will be further multiplied to explore their suitability for extension in the district.

IV. GREEN MANURE CROPS.

13. *Blue bitter lupins* (Lupinus angustifolius).—The crop was sown for seed over an area of 6·91 acres. Due to very heavy rains at the time of flowering, setting was adversely affected, resulting in poor seeding. The yield was 760 lb. of seed, working at 152 lb. per acre. The crop was also sown along field bunds and uncultivated waste lands and gave another 4,340 lb. of seed, raising the overall production of seed to 5,100 lb. which is a record for any year. After picking of the mature pods, the stalks were ploughed down.

An area of 20·49 acres of lupins was sown for green manure for the second and the irrigated potato crops and yielded the averages of 6,000 lb. and 10,000 lb. of green leaf per acre respectively.

An area of 15·99 acres for seed and of 11·33 acres, mixed with rye, for leaf have been put under lupins for 1954–55.

14. *West Australian forage lupins.*—A quantity of 7·5 lb. of a variety of forage lupins, received from the Commonwealth Scientific and Industrial Research Organization, Canberra, Australia, and claimed to be largely grown in Western Australia for providing a rich protein sheep food and for building up humus and nitrogen content of sandy soils, was sown in 10 cents in June 1953. The seeds obtained were very poor in appearance and germination was very low. Probably because

it is a new introduction and the variety was not acclimatized, the crop flowered before it had attained a height of a foot. Branching was very sparse and seed setting indifferent. Only 3 lb. of seed could be gathered and these have been sown again to study progress.

15. *Bitter lupin No. 2 (Trial No. 130).*—The seeds from R. W. Gunson (Seeds), Limited, London, received through the Systematic Botanist and Professor of Botany, Coimbatore, were sown. The crop exactly resembled the blue bitter lupins that are being raised for green manure (item 13 above), except that the skin of the green pods was greener and more glabrous. The seeds collected have been resown.

16. *Other new introductions of legumes.*—Seeds of two new green manure crops, viz., *Phaseolus semi-erectus* and *Cassia leschenaultiana* received from the Systematic Botanist and Professor of Botany, were sown for trial in small plots in June 1954. Stray germination was noted in the former. Further progress of the two introductions will be studied.

17. *Clover varieties.*—Three varieties of clovers, viz., Subterranean clover (*Trifolium subterraneum*, Trial No. 155), Crimson clover (*T. incarnatum*, Trial No. 175) and Ladino clover (Trial No. 176), received from the same source were sown in April 1953. Germination and aftergrowth were good. Observations were completed and the trials given up.

The following seven varieties of clovers, received from the Systematic Botanist and Professor of Botany, Coimbatore, were sown for trial in August 1953 :—

(1) Aberystwythe white clover ;
(2) Cluster clover ;
(3) Ladino clover ;
(4) Subterranean clover ;
(5) White clover (*Trifolium repens*) ;
(6) Aberystwythe red clover SN. 123 (*T. pratens*) ; and
(7) Aberystwythe red clover SN. 151.

The performances of all the above except the subterranean clover, which is the one that grows well naturally in this region, were very poor, even though the soil had been limed and phosphated in advance and the seeds treated with bacterial inoculum. The plots are being maintained.

Two other new varieties of clovers, viz., *Trifolium rupellianum* and *T. tembense*, from the same source, were tried in September 1953, but these made very poor growth and succumbed to ground frost in December.

18. *Effect of sulphur on the growth of clovers.*—To investigate the effect of sulphur on the growth of subterranean clover, pot culture trials were started with the following five treatments, replicated four times :—

Serial number.	*Treatment.*
(1)	100 lb. of soil + 37·5 gr. of hydrated lime.
(2)	As (1) + 8·1 gr. of superphosphate.
(3)	As (1) + 0·9 gr. of sodium sulphate.
(4)	As (1) + 4·0 gr. of gypsum.
(5)	As (2) + 0·9 gr. of sodium sulphate.

The best and maximum growth was recorded in the above treatments (2) and (4).

V.—Forage, Cover Crops and Grasses.

19. *Grasses.*—Small quantities of seeds of the following grasses were received from the Systematic Botanist and Professor of Botany, Coimbatore, and sown in September 1953 after treating the soil with lime and phosphates :—

1 Aberystwythe Rye grass S. 24.
2 Do. perennial.
3 Do. S. 23.
4 Aberystwythe Timothy.
5 Do. meadow fescue.
6 Do. red fescue.

Growth was very poor in all cases and the plants were cut down by ground frost. With the onset of spring showers in May 1954, the plants have again come up and their progress is being watched.

VI.—Oil Seeds.

20. *Italian rape* (*Raphanus rape*).—The seeds collected in the previous year were sown in 2 cents in August 1953. Germination was good, but aftergrowth continued to be poor and ground-frost cut down the plants before flowering.

21. *Mustard varieties.*—Seeds of six new varieties of mustard were received from the Oilseeds Specialist, Coimbatore, and sown in small beds in April 1953, along with the local hill mustard, charlock (*Sinapsis arvensis*) as control. One of them, Tori-2, was very early for flowering. Their flowering durations are given below :—

Table XIX.—*Trial with mustard varieties* (1953-54).

Serial number and variety.	*Flowering duration in days.*
1 Tori-2	30
2 Rye P-23	40
3 Rai T-11	45
4 Sarsons Agh. A	65
5 Laha 101	65
6 Sarsons Muzaffarnagar	65
7 Local (Control)	60

The unusually heavy south-west monsoon rains at the time of flowering led both to their shedding and the rotting of the developing capsules. Hence, no seeds could be collected for comparative assay of yields. Their duration being early, it would be useful to try the varieties again by sowing at the end of the south-west monsoon period, in which case the harvest can be made in dry weather before the setting in of frost in winter.

22. *Ornamental castor.*—Seeds of eight types of ornamental castor, serially numbered from R.C. 1066 to R.C. 1073, were received from the Agricultural Research Station, Tindivanam, and sown in the middle of June 1954 in specially prepared pits supplied with cattle manure. Germination and progress will be recorded to judge their suitability for the tract.

VII.—Economic Plants.

23. *Pyrethrum.*—Splits from the high-yielding clonal strains of Pyrethrum received from the Pomological Station, Coonoor, in 1952 were separated and planted out for extension. These have established quickly and are coming up well.

24. *Bluegum* (*Eucalyptus globulus*).—Seedbeds were raised and a total number of 9,420 seedlings planted out in the uncultivable wastes. These are making steady progress.

25. *Cypress* (*Cupressus macrocarpa*).—A total of 1,000 seedlings of this valuable hedge plant and windbreak was planted.

26. *Pepper* (*Piper nigrum*, L.).—Twenty rooted cuttings of pepper, variety Kalluvalley, were received from the Agricultural Research Station, Taliparamba, and planted under the shade of cypress trees in December 1953. In spite of all care the cuttings withered off. The soil and weather conditions do not appear suitable for their growth.

27. *Medicinal plants.*—Small quantities of seeds of the following six medicinal plants, received from the Drug Research Laboratory, Jammu, were sown in small beds in June 1954 to study their suitability for the Nilgiris :—

1 *Atropha accuminata.*
2 *Hyoscyamus niger.*
3 *Digitalis purpurea.*
4 *D. lanata.*
5 *Pyrethrum.*
6 *Podophyllum emodi.*

VIII.—Vegetables and Fruits.

28. An area of 0·24 acre was grown to red radish for seed and resulted in a yield of 70 lb. of seed.

Seeds of a variety of scarlet runner beans (*Phaseolus multiflorus*, Willd.), found in cultivation along the cuttings of the terraces in the Ketti Valley, were collected and sown to study their value as a vegetable crop and use as a cover against erosion.

Among the standing fruit trees, three of plums (Variety Hale) produced a total of 288 fruits. Five peach trees, consisting of two of Flat China and three of Killikrankie, produced 315 fruits. Other fruits obtained were 73 lb. 4 oz. of strawberry and 9 lb. of cape gooseberry. The areas under these two fruit plants were extended by planting out 250 splits and 300 seedlings respectively.

29. *Work animals.*—Out of the 12 work animals, two unserviceable ones were disposed of by auction sale. The balance of five pairs maintained a satisfactory state of health and worked for 166 days during the year.

30. *Exhibitions.*—Two exhibitions were held at the station, in connection with the *Farmers' Day*, during the year. On both the occasions, outside cultivators were invited to display their home-grown produce and prizes were awarded to the best exhibits. The station also partook in the Annual Spring Flower Show held at the Government Botanic Gardens, Ootacamund, in May 1953 and the All-India Swadeshi Exhibition, Madras, in January 1954. Exhibits were also sent to various shows in different places in and outside the district.

31. *Soil conservation measures.*—A scheme for the implementation of soil conservation measures and contour terracing of the cultivated area of 80 acres of the station was sanctioned by the Government in G.O. Ms. No. 461, Agriculture, dated 17th February 1954. The execution was taken up with two D-4 bulldozers and up to the end of the year, an area of about ten acres was terraced. The work is being continued.

32. *Publications.*—A total of 12 articles was published in various journals as ollows :—

Madras Agricultural Journal.

1 " Potato improvement by multiplication of virus-free seed " (Volume XL, June 1953).
2 " Hairy Vetch—a promising new introduction " (Volume XL, August 1953).

3 " Breaking the rest period of potato seed " (Volume XL, September 1953).

4 " Off-season peaches at the Agricultural Research Station, Nanjanad " (Volume XL, December 1953).

South Indian Horticulture.

5 " Influence of storage period of potato seed on yield " (Volume 2, March 1954).

Farm Supplement of " The Hindu."

6 " Potato—in Hills and Plains " (22nd July 1953).

Villagers' Calendar.

7 " Potato cultivation on the Nilgiris : Work at the Agricultural Research Station, Nanjanad " (1953–54).

8 " Hints of increasing potato yields in the Nilgiris " (1954–55).

9 " Organic manure and compost " (1954–55).

Mezhichelvam, August-September 1953.

10 " Potato cultivation on the plains."

Madras Information, September 1953.

11 " Potato cultivation on the plains."

Horticultural and Economic Plants of the Nilgiris, 1953.

12 " Potato on the Nilgiris."

In addition to the above, 23 articles were prepared for publication in the Grow More-Food journals, Agricultural Newsletter and other publications.

31. The financial statement of receipts and charges, for the *fasli* year is given in Appendix I.

32. The Profit and Loss Account of the different bulk crops is given in Appendix II.

33. Accounts relating to receipts in yield and value from bulk crops (Table I-A), disposals of seeds and other produce (Table I-B), costs of staff, land, live and dead-stock and cultivation (Table II) and abstract of expenditure and receipts (Table III) are presented in Appendix III.

34. Information on the steps for increasing the income of the station is given in Appendix IV.

AGRICULTURAL RESEARCH STATION, NANJANAD,
11th August 1954.

K. SAPTHARISHI,
Superintendent.

M. OBEIDULLAH SHAH,
Deputy Director of Agriculture, Coimbatore.

LAWLEY ROAD P.O., COIMBATORE.

APPENDIX I.

STATEMENT OF CHARGES AND RECEIPTS FOR 1953-54.

Receipts.

	Rs.	A.	P.
By sale of farm produce	23,239	9	0
Miscellaneous receipts	926	3	9
Value of stock transferred	19,159	0	3
Recoveries of overpayments	..	..	
Sales tax	5	8	3
Total ..	43,330	5	3
Deduct—Refunds ..	Nil.		
Net receipts ..	43,330	5	3

Charges.

(40. C. Agriculture—Experimental Farms.)

	Rs.	A.	P.
Pay of officers	3,040	10	0
Pay of establishment (permanent)	6,359	0	0
Pay of establishment (temporary)	534	4	0
Dearness allowance of officers	618	2	0
Dearness allowance of establishment	2,637	13	0
Travelling allowance of officer, travelling and other compensatory allowances of establishment.	3,043	3	0
Petty construction and repairs	1,050	0	0
Other contingencies	4,829	15	9
Purchase of live, deadstock and cost of lands	2,558	14	9
Dearness allowance to menials	4,950	8	2
Working expenses	34,288	11	11
Service postage	350	0	0
Freight charges	230	11	3
Total ..	62,491	13	10

"40. Agriculture—O. Development Schemes—1. Schemes included in the Five-Year Plan—D. Agricultural Engineering—11. Contour bunding"—

	Rs.
Working expenses (labour charges)	251
Total ..	251

APPENDIX II.

COST OF CULTIVATION OF BULK CROPS (1953-54).

Serial number and crop.	Area in acres.	Total cost of cultivation.	Gross receipt.	Profit + or loss (—) for total area.	Profit + or loss (—) per acre.
		Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
1 Potato—					
(a) Main ..	20·67	18,353 5 11	37,217 2 6	+ 18,863 12 7	+ 912 10 0
(b) Second ..	12·74	13,758 0 7	21,043 7 1	+ 7,285 6 6	+ 571 0 0
(c) Irrigated (1954).	4·06	5,506 11 0	12,574 2 4	+ 7,067 7 4	+ 1,740 9 6
2 Cereal—					
Samai ..	1·17	74 8 9	107 10 0	+ 33 1 3	+ 28 3 0
3 Rye for ergot ..	22·65	1,402 6 1	938 3 3	— 764 2 10	— 33 11 0
4 Lupin	6·91	496 10 6	312 4 0	— 184 6 6	— 26 11 0

The main, the second and the irrigated potato crops returned the excellent net profit of Rs. 913, Rs. 571 and Rs. 1,740-9-6 per acre.

The cereal, samai, which was benefited by the good rains, recorded a profit of Rs. 28 per acre.

The yields of ergot and grain from rye were very poor, due to poor infection and unsetting because of heavy rains during flowering. The crop was also attacked heavily by *Helminthos porium.*

Seed setting in lupins was poor due to heavy rains at flowering.

APPENDIX III.

TABLE I (A).

Statement of receipts in yield and value from bulk crops (1953–54).

Serial number and details of crops, etc.	Area in acres.	Seed.		Table.	
		Yield.	Value.	Yield.	Value.
(1)	(2)	(3)	(4)	(5)	(6)
		LB.	RS. A. P.	LB.	RS. A. P.
1 Potato (main crop)	20·67	102,257	23,038 6 0	43,432	8,563 15 0
2 Potato (second crop) ..	12·47	64,340	15,441 10 0	796	159 3 0
3 Potato (irrigated crop) ..	4·06	40,341	9,681 13 0	7,861	1,572 3 0
4 Lupin	6·91	5,975	1,120 5 0	..	..
5 Samai	1·17	638	59 13 0	..	..
6 Rye	22·65	462	92 6 0	..	..
7 Ergot	22·65	45½	546 0 0	..	..
8 Vegetable seed	0·24	70	560 0 0	..	..
9 Vegetables	0·50	556	19 12 0	..	..
10 Eucalyptus leaves	..	..	991 12 0	..	..
11 Firewood	..	19¼ lots.	148 4 0	..	..
12 Fruits	..	80½ dozen. 22¾ dozen.	26 7 0	..	..
13 Ragi	..	..	..	..	..
14 Buckwheat	..	..	..	..	..
			51,726 8 0		10,295 5 0

Serial number and details of crops, etc.	Chats.		Rejected.		Straw.
	Yield.	Value.	Yield.	Value.	Yield.
(1)	(7)	(8)	(9)	(10)	(11)
	LB.	RS. A. P.	LB.	RS. A. P.	LB.
1 Potato (main crop)	28,036	4,896 10 0	24,241	727 4 0	..
2 Potato (second crop)	23,988	4,261 3 0	11,000	440 0 0	..
3 Potato (irrigated crop) ..	8,515	1,703 0 0	4,608	184 5 0	..
4 Lupin	..	..	..	..	..
5 Samai	..	..	..	..	5,000
6 Rye	..	..	..	..	..
7 Ergot	..	..	..	..	..
8 Vegetable seed	..	..	..	..	..
9 Vegetables	..	..	..	..	..
10 Eucalyptus leaves	..	..	..	..	..
11 Firewood	..	..	..	..	..
12 Fruits	..	..	..	..	..
13 Ragi	..	..	..	..	..
14 Buckwheat	..	..	..	..	..
		10,860 13 0		1,351 9 0	

Serial number and details of crops, etc.	Straw—*cont.*	Total receipts for the year 1953–54.	1950–51.	1951–52.	1952–53.
	Value.				
(1)	(12)	(13)	(14)	(15)	(16)
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
1 Potato (main crop)	..	37,226 3 0	18,280 0 0	21,278 13 0	24,918 0 0
2 Potato (second crop) ..	..	20,302 0 0	7,677 1 0	12,204 2 0	14,723 6 0
3 Potato (irrigated crop) ..	..	13,141 5 0	3,365 4 0	5,733 2 0	7,202 8 0
4 Lupin	..	1,120 5 0	270 0 0	944 8 0	835 8 0
5 Samai	50 0 0	109 13 0	428 6 0	137 7 0	354 2 0
6 Rye	..	92 6 0	9 0 0	51 10 0	423 0 0
7 Ergot	..	546 0 0	564 0 0	31 0 0	1,632 12 0
8 Vegetable seed	..	560 0 0	22 14 0	206 4 0	307 11 0
9 Vegetables	..	19 12 0	15 13 6	25 11 0	709 3 6
10 Eucalyptus leaves	..	991 12 0	..	..	..
11 Firewood	..	148 4 0	..	..	..
12 Fruits	..	26 7 0	..	..	..
13 Ragi	..	..	0 14 0	0 11 0	17 8 0
14 Buckwheat	..	..	45 0 0	19 8 0	..
	50 0 0	74,284 3 0	30,678 4 6	40,682 12 0	51,123 10 6

TABLE I (B).

Statement of disposal of seeds and other produce (1953–54).

Serial number and crop.	Seed. Retained in the farm. Quantity.	Seed. Retained in the farm. Value.	Seed. Sales and transfers. Quantity.	Seed. Sales and transfers. Value.	Table. Retained in the farm. Quantity.	Table. Retained in the farm. Value.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	LB.	RS. A. P.	LB.	RS. A. P.	LB.	RS. A. P.
1 Potato (main crop) ..	21,554	5,172 15 0	80,703	17,865 7 0	..	..
2 Potato (second crop).	61,446	14,747 1 0	2,894	694 9 0	..	..
3 Potato (irrigated crop).	40,341	9,681 13 0	..	..	..	..
4 Lupin	2,675	501 9 0	3,300	618 12 0	..	..
5 Samai	148	13 14 0	490	45 15 0	..	..
6 Rye	432	86 6 0	30	6 0 0	..	..
7 Ergot	..	..	45½	546 0 0	..	..
8 Vegetable seed ..	38½	210 0 0	31½	250 0 0	..	..
9 Vegetables	..	..	556	19 12 0	..	
10 Eucalyptus leaves ..	..	..	..	991 12 0	..	..
11 Firewood	..	..	19¾ lots	148 4 0	..	..
12 Fruits	..	..	80½ doz. 22¾ doz.	26 7 0	..	..
13 Ragi	..	..	..	..	..	..
14 Buckwheat	..	..	..	..	..	..
		30,513 10 0		21,212 14 0		

Serial number and crop.	Table—*cont.* Sales and transfers. Quantity.	Table—*cont.* Sales and transfers. Value.	Chats. Retained in the farm. Quantity.	Chats. Retained in the farm. Value.	Chats. Sales and transfers. Quantity.	Chats. Sales and transfers. Value.
	(8)	(9)	(10)	(11)	(12)	(13)
	LB.	RS. A. P.	LB.	RS. A. P.	LB.	RS. A. P.
1 Potato (main crop) ..	43,432	8,563 15 0	..	..	28,036	4,896 10 0
2 Potato (second crop).	796	159 3 0	..	..	23,988	4,261 3 0
3 Potato (irrigated crop).	7,861	1,572 3 0	..	..	8,515	1,703 0 0
4 Lupin	..	..	..	..	..	..
5 Samai	..	..	..	..	..	..
6 Rye	..	..	..	..	..	..
7 Ergot	..	..	..	..	..	..
8 Vegetable seed ..	..	..	..	..	..	..
9 Vegetables	..	..	..	..	..	..
10 Eucalyptus leaves ..	..	..	..	..	..	..
11 Firewood	..	..	..	..	..	..
12 Fruits	..	..	..	..	..	..
13 Ragi	..	..	..	..	..	..
14 Buckwheat	..	..	..	..	..	..
		10,295 5 0				10,860 13 0

Serial number and crop.	Rejected. Retained in the farm. Quantity.	Rejected. Retained in the farm. Value.	Rejected. Sales and transfers. Quantity.	Rejected. Sales and transfers. Value.	Straw.[1] Retained in the farm Quantity.	Straw.[1] Retained in the farm Value.
	(14)	(15)	(16)	(17)	(18)	(19)
	LB.	RS. A. P.	LB.	RS. A. P.	LB.	RS. A. P.
1 Potato (main crop) ..	13,000	390 0 0	11,241	337 4 0	..	..
2 Potato (second crop).	7,972	318 10 0	3,028	121 6 0	..	..
3 Potato (irrigated crop).	2,750	110 0 0	1,858	74 5 0	..	..
4 Lupin	..	..	..	..	..	..
5 Samai	..	..	..	..	5,000	50
6 Rye	..	..	..	..	..	..
7 Ergot	..	..	..	..	..	..
8 Vegetable seed ..	..	..	..	..	..	..
9 Vegetables	..	..	..	..	..	..
10 Eucalyptus leaves ..	..	..	..	..	..	..
12 Firewood	..	..	..	..	..	..
13 Ragi	..	..	..	..	..	..
14 Buckwheat	..	..	..	..	..	..
		818 10 10		532 15 0		50 0 0

TABLE I (B)—*cont.*

Statement of disposal of seeds and other produce (1953–54)—cont.

Serial number and crop.	Straw—*cont.* Sales and transfers. Quantity.	Straw—*cont.* Sales and transfers. Value.	Total value for the year 1953–54.	Total receipt for three years. 1950–51.	1951–52.	1952–53.
	(20)	(21)	(22)	(23)	(24)	(25)
	LB. RS.	A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
1 Potato (main crop) ..	..	..	37,226 3 0	18,280 0 0	21,278 13 0	24,918 0 0
2 Potato (second crop)	..	..	20,302 0 0	7,677 1 0	12,204 2 0	14,273 6 0
3 Potato (irrigated crop).	..	..	13,141 5 0	3,365 4 0	5,733 2 0	7,202 8 0
4 Lupin	..	..	1,120 5 0	270 0 0	994 8 0	835 8 0
5 Samai	..	..	109 13 0	428 0 0	137 8 0	354 2 0
6 Rye	..	..	92 6 0	9 0 0	51 10 0	423 0 0
7 Ergot	..	..	546 0 0	564 0 0	31 0 0	1,632 12 0
8 Vegetable seed ..	..	..	560 0 0	22 14 0	206 4 0	307 11 0
9 Vegetables	..	..	19 12 0	15 13 6	25 11 0	709 3 6
10 Eucalyptus leaves ..	..	..	991 12 0	..	..	..
11 Firewood	..	..	148 4 0	..	..	..
12 Fruits	..	..	26 7 0	..	..	..
13 Ragi	..	..	..	0 14 0	0 11 0	17 8 0
14 Buckwheat	..	..	..	45 0 0	19 8 0	..
			74,284 3 0	30,678 4 6	40,682 12 0	51,123 10 0

TABLE II.

Statement of costs of staff, land, live and deadstock and cultivation.

Serial number and particulars of expenditure.	Actual expenditure for four years. 1950–51.	1951–52.	1952–53.	1953–54.
(1)	(2)	(3)	(4)	(5)
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
1 Pay and allowances of the staff (½ of actuals) Assistants and Fieldman.	2,683 8 8	2,614 2 8	2,349 13 4	2,233 14 8
2 Miscellaneous cultivation expenses (½ of actuals).	1,804 11 0	1,592 12 4	1,798 7 4	1,545 4 0
3 Working expenses (actuals)	24,266 12 10	29,041 0 9	22,649 5 5	27,648 0 0
One/tenth of expenditure on live and deadstock.	207 9 2	229 2 6	152 12 4	255 14 3
5 Proportionate rent for the land if the station is on leased land; If it is Government farm the normal rent of the tract, subject to 15 times the land assessment per acre, to be debited as expenditure .	1,350 0 0	1,350 0 0	1,350 0 0	1,350 0 0
6 Unforeseen contingencies, if any	..	..	..	..
Grand total ..	30,312 9 8	34,827 2 3	28,300 6 5	33,033 0 11

TABLE III.

Statement of abstract expenditure and receipts.

Particulars.	1950–51.	1951–52.	1952–53.	1953–54.
(1)	(2)	(3)	(4)	(5)
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
Expenditure	30,312 9 8	34,827 2 3	28,300 6 5	33,033 0 11
Receipts	30,678 4 6	40,682 14 0	51,123 10 6	74,284 3 0

APPENDIX IV.

Steps taken to increase the revenue of the Station and reducing the expenditure.—For the year under report, the receipts were the highest, as compared to the figures of the preceding three years (Statement of abstract expenditure and receipt, Table III of Appendix III.) This was effected by increasing the area under the main and the irrigated potato crops. The extent will be further enhanced in 1954–55.

By G.O. Ms. No. 461, Agriculture, dated 17th February 1954, a scheme was sanctioned for terracing the entire cultivated area and soil conservation measures taken up for execution from April 1954. An area of nearly 10 acres has been completed and work is in progress. By this measure, the Kikuyu grass will be eradicated from the cultivated area and the recurring expenditure on cultivation in future years greatly reduced. As a result of permanent soil protection thus effected, losses of soil, manures and water will be minimised, leading to increased yields. The fertility of the fields will be improved and maintained thereby and the irrigable area enlarged, helping to improve the income of the station.

ANNUAL REPORT OF THE AGRICULTURAL RESEARCH STATION, PILICODE (NILESHWAR I) FOR THE FASLI YEAR 1363 (1ST JULY 1953 TO 30TH JUNE 1954).

MAIN CROP—COCONUT.

Soil—Laterite Gravel.

Season and rainfall.—During the year a total rainfall of 139·23 inches was received on 103 rainy days as against 114·68 inches on 107 rainy days of the previous year 1952–1953. The average rainfall for the last ten years is 138·06 inches distributed over 118 rainy days.

The south-west monsoon was unusually late and regular rain was received only during the third week of June 1953. The rain received during the south-west monsoon period amounted to 93·32 inches on 66 days as against 90·27 inches on 81 days during the same period last year. The average rainfall for the last 10 years is 106·99 inches distributed over 85 rainy days.

The north-east monsoon commenced on 1st October 1953 and continued up to 31st October 1953. Thereafter the weather was dry up to the end of January 1954. A total rainfall of 13·89 inches was received on 18 rainy days as against 17·47 inches on 14 days during the corresponding period last year. The average rainfall for the past 10 years during this period is 13·74 inches on 17 rainy days.

Fairly good amount of rainfall was received during the summer months of March, April and May 1954. It was beneficial to the coconut trees and facilitated growing of green manure and subsidiary crops. A total rainfall of 32·02 inches was received on 19 rainy days as against 6·94 inches on 12 days during the corresponding period of last summer. The average rainfall for the past 10 years is 17·33 inches on 16 days during the period.

Unlike last year, the south-west monsoon commenced with usual intensity in the wake of summer showers during 1954.

The details of rainfall are furnished in Table I.

TABLE I.—*Rainfall statement—Agricultural Research Station, Pilicode,* 1953–54.

Month.	Week from to.	1953–54. Rainfall in inches.	1953–54. Number of rainy days.	1952–53. Rainfall in inches.	1952–53. Number of rainy days.	Average for the past 10 years. Rasnfall in inches.	Average for the past 10 years. Number of rainy days.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
South-West monsoon period.							
June	7—13	14·7	3	4·05	6	12·43	6·3
	14—20	6·58	5	13·05	7	11.42	6·6
	21—27	4·88	4	11·53	7	7·11	6·0
June-July	28—4	18·56	7	16·70	7	9·27	6·4
	5—11	19·70	7	9·00	6	9·34	6·1
	12—18	3·05	5	5·15	7	10·87	6·5
	19—25	10.64	6	7·97	6	9·81	6·4
July-August	26—1	13·42	6	4·24	5	6·74	5·8
	2—8	3·14	3	5·89	7	6·23	5·7
	9—15	5.13	5	4·04	6	4·31	5·2
	16—22	3·51	6	3·94	7	5·71	5·4
	23—29	1·55	3	3 20	5	3·47	4·1
August-September	30—5	0.88	2	1·29	4	3·03	4·2
	6—12	0·93	3	0·22	1	3·38	4·3
	13—19	0·06	..	..	..	1·73	2·9
	20—26	0·22	1	..	..	2·13	3·3
Total	..	93·32	66	90·27	81	106·99	85·2
North-East monsoon period.							
September-October.	27—3	0·22	1	0·16	..	1·91	2·8
	4—10	1·33	2	10·84	6	2·03	2·2
	11—17	3·86	5	5·00	4	1·99	2·1
	18—24	4·33	6	0·42	..	1·07	1.8
	25—31	3·91	3	..	..	0·77	1·4

Month.	Week. from to.	1953–54. Rainfall in inches.	1953–54. Number of rainy days.	1952–53. Rainfall in inches.	1952–53. Number of rainy days.	Average for the past 10 years. Rainfall in inches	Average for the past 10 years. Number of rainy days.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
November	1—7	..	..	..	..	0·84	1·1
	8—14	..	..	..	..	0·61	1·1
	15—21	0·04	..	..	..	2·86	1.8
	22—28	..	..	..	..	0·37	0·6
November-December.	29—5	..	..	0·35	2	0·15	0.5
	6—12	..	..	0.12	1	0·50	0·6
	13—19	..	..	0.58	1	0·13	0·2
	20—26	..	..	..	..	0·28	0·3
December-1953.	27—3	..	..	..	..	..	..
	4—10	0·20	1	..	..	..	..
January 1954	11—7	..	..	..	..	..	..
	18—24	..	..	..	..	0·23	0·3
	25—31	..	..	..	..	..	..
Total ..		13·89	18	17·47	14	13·74	16·8
	Hot weather period.						
February	1—7	..	..	..	..	..	..
	8—14	..	..	..	..	0·06	0·1
	15—21	..	..	..	..	0·06	0·1
	22—28 or 29	..	..	0·04	..	..	..
March	7—1	..	..	..	..	0·28	0·3
	8—14	0·59	1	..	..	..	..
	15—21	0·76	2	..	..	0·06	0·1
	22—28	..	..	..	..	0·05	0·1
March-April..	29—4	..	..	0·08	..	0·23	0·6
	5—11	..	..	3·52	1	0·37	0·6
	12—18	..	..	0·32	1	0·90	0·8
	19—25	7·91	3	0·23	1	0·34	0·4
April-May	26—2	0·14	1	0.66	1	0·16	0·5
	3—9	0·33	2	0·64	3	0·71	1·1
	10—16	3·18	3	0·46	2	0·47	1·2
	17—23	0·41	1	0·15	1	3·87	2·0
	24—30	0·05	..	0.48	2	2·38	2·8
May-June	31—6	18·65	6	..	..	7·39	5·0
Total ..		30·2	19	6·94	12	17·33	15·7
Grand Total ..		139·23	103	114·68	107	138·06	17·7

The maximum temperature during the year ranged between 99·0°F (February 1954) and 74·0°F (July 1953) and the minimum between 87·0°F (May 1954) and 61·0°F (December 1953).

Soaking summer showers are highly beneficial to the coconut. A total quantity of 13·37 inches of rain was received during March, April and May 1954. The season during the year, in general, is therefore considered very favourable to the coconut crop.

2. *Cultural and manurial operations*—(i) *Cultural operations.*—All the non-experimental (cultural) blocks and blocks without any subsidiary crops were ploughed thrice during the year, in August, September-October and November. The cultivator was worked in December to gather weeds and create soil mulch. All these blocks were ploughed once again in April-May 1954 and seeds of cover or green manure crops were sown. The unploughed areas in the blocks were dug with mammutty in the month of September 1953. The experimental blocks received cultural operations as per schedule.

Manurial operations.—The coconut trees in the non-experimental (manurial) blocks received 3 lb. of ammonium sulphate and 20 lb. ash per tree per year. A green manure crop of *crotalaria striata* was also grown and ploughed *insitu* Ammonium sulphate was applied broadcast and ploughed in along with the green manure crop of *crotalaria striata* in August, while ash was applied in September October and ploughed in. The experimental trees received the scheduled doses of manures.

The graft mango and sapota trees in block 'L' were not manured so as to check the excessive vegetative growth. The South African Oil palm seedlings in block 'N—VIII' were manured with 25 lb. of cattle manure each and the pits dug with mammutty once in September-October.

(iii) *Husk burial.*—Burial of coconut husks in linear trenches 8 feet wide and 15 inches deep in between rows of coconut trees was continued in Block 'J-A'. This operation was taken up as a measure of permanent improvement and completed during the year. A total of 1,14,000 husks and 31,000 coconut leaves was buried so far, in the entire block (area 2·88 acres).

(iv) *Green manure crops*—(*a*) *Crotalaria striata.*—*Crotalaria striata* was sown for green-manure in an area of 20·00 acres in May 1953 in the main blocks. Germination was fairly satisfactory but the stand of the crop was poor. The green leaves were lopped and ploughed in August 1953. An average yield of 5,600 lb. of green leaves was obtained.

(*b*) *Gliricidia maculata.*—Each of the grown up Gliricidia plants (six year-old) gave an average yield of 50 lb. of green leaves per cutting. Two cuttings were taken during the year. A total of 5,500 seedlings and rooted cuttings of this green manure plant was planted all along the borders.

(*c*) *Bauhinia variegata.*—The yield of green material from the five, eleven-year-old Bodantum trees (*Bauhinia variegata*) was 48 lb. per tree per cutting. A total of 720 lb. of green leaves was obtained in three cuttings during the year. The green leaves obtained were used to manure the subsidiary crops.

(*d*) *Indigofera teysmanii.*—Two hundred *Indigofera teysmanni*; *Miq.* seedlings were planted along the border of the different blocks to increase the output of green-leaf manure.

(*e*) *Calapogonium mucunoides.*—*Calapogonium mucunoides* was sown in 10·00 acres before the receipt of summer showers in April 1954 as a green manure-*cum*-cover crop. The seeds germinated with the receipt of summer showers. The crop is progressing well. The seeds sown in about 5·00 acres after the summer showers in May 1954, have also germinated. The stand of the crop is satisfactory.

3. *Harvest.*—Ripe coconuts were harvested every month and detailed harvest notes were recorded for all the bearing trees. A total of 45,081 nuts were harvested from 1,495 bearing trees during 1953 which works out to 30·2 nuts per tree. The number of nuts harvested in different years from 1938, is furnished in Table II.

TABLE II.—*Coconuts—Annual yield of nuts.*

Year.	Total number of nuts harvested.	Number of bearing trees.	Mean yield of nuts per bearing tree.
1938	27,388	980	27·9
1939	38,840	1,229	31·6
1940	32,112	1,250	25·7
1941	40,044	1,327	30·2
1942	45,977	1,413	32·5
1943	53,503	1,411	37·9
1944	41,265	1,408	29·3
1945	70,543	1,422	49·6
1946	41,040	1,432	28·7
1947	71,796	1,451	49·5
1948	94,038	1,469	64.0
1949	47,488	1,473	32·0
1950	62,916	1,491	42·2
1951	26,615	1,322	20·0
1952	69,898	1,483	47·1
1953	45,081	1,495	30·2

The block-wise yield of nuts obtained during 1953 is as follows :—

Coconuts—Block wise yield of nuts—1953.

Block.	Number of nuts harvested during 1953.	Number of bearing trees.	Mean yield of nuts per tree.
A	386	5	77·2
B	394	7	56·3
C	4,967	149	33·3
D	4,773	155	30·8
E	4,506	192	23·5
F	3,906	182	21·4
FA	657	27	31·9

Block.	Number of nuts harvested during 1953.	Number of bearing trees.	Mean yield of nuts per tree.
G	7,370	180	40·9
H	5,181	154	33·6
I	3,774	108	34·9
J	3,793	182	20·8
JA	2,735	79	34·6
K	2,459	75	32·8
Total ..	45,081	1,495	30·2

The low yield of 45,081 nuts when compared with that of last year (69,898 nuts) is partly due to the meagre rainfall received during the summer months (February to April 1952).

4. *Experiments and Research*—(i) *Manurial experiment on adult coconut trees*—(*a*) *Comparison of potassic fertilisers—Object.*—To find out the best potassic fertiliser that could effectively replace ash, sufficient quantities of which are not available locally for manuring coconut trees.

Field.—Block D.

Area.—2·95 acres.

Treatments.—

1 Potassium sulphate
2 Muriate of potash
3 Ash.

} On equivalent K_2O basis to supply 1 lb. of K_2O per tree per year.

The trees received 4½ lb. of ammonium sulphate, 2 lb. of bone meal and green leaves at a uniform rate of 100 lb. per tree in addition to the above treatments. The green leaves were obtained by raising a green manure crop of *Crotalaria striata in situ.*

Layout.—Randomized blocks, replicated six times with two experimental trees per plot.

The experiment was started on 1951, and observations on the yield of nuts and mean number of leaves produced were made and recorded every year. The data gathered in 1953, when statistically analysed have not shown any significant difference between the treatments. The results of analayses are furnished in Table III.

TABLE III.—*Coconut—Manurial experiment—Block D—Yield of nuts and leaf production*—1953.

Treatment number and details of treatment.	Mean yield of nuts per tree during 1953.	Mean number of leaves produced in 1953. (per tree).
T_1 Potassium sulphate	24·7	13·0
T Muriate of potash	30·0	13·3
T_3 Wood ash	24·3	12·8
'Z' test significant or not P= 0·05 ..	No.	No.
Standard error	5·68	0·65

The yield data for the gross number of trees for a combined period of two years, viz., 1952 and 1953 were also analysed. The summary of the results is furnished in Table IV.

TABLE IV.—*Coconut—Manurial experiment—Block D—Yield data for a combined period of two years* 1952 *and* 1953.

Treatments.	Mean yield of nuts per tree (Mean of 1952 and 1953).	'Z' test significant or not (p—0·05).	Standard error.
T_1 Potassium sulphate	34·78	No.	4·22
T_2 Muriate of potash	35·56		
T_3 Wood ash	36·71		

It may be observed from the above table that the differences in the mean yield of nuts for a combined period of two years are also not statistically significant. As the differences between the three treatments have not been significant.

it may be concluded that ash which is difficult to secure, can be substituted by any of the two fertilisers, viz., potassium sulphate and muriate of potash.

(*b*) *Comparison between ammonium sulphate and Chilean nitrate for manuring coconut—Object.*—To find out whether ammonium sulphate could be substituted with chilean nitrate on equal nitrogen basis for manuring the coconut.

Field.—Block F.

Area.—3·50 acres.

Treatments.—

1. Ammonium sulphate. 4 lb. per tree per year.
2. Do. 6 lb. do.
3. Chilean nitrate 5 lb. do.
4. Do. 8 lb. do.
5. Control (without ammonium sulphate or chilean nitrate).

The above treatments will be in addition to 5 tons of cattle manure, 450 lb. of lime, 180 lb. of super-phosphate and 1,200 lb. of ash per acre. Also a green manure crop will be grown *in situ* and ploughed in August-September. The layout will be randomized blocks, replicated six times.

This is a new experiment included in the Three-year Programme for 1954–56. The entire block was divided into six experimental blocks and each experimental block was subdivided into five plots with a minimum number of four adult trees in each plot. The treatment to be a signed to each of the plots was determined at random. The treatments are scheduled to be given during the 1954 season.

Observations on the production of leaves, female flowers, nuts and the number of functioning leaves in the crown will be made and recorded every year for individual trees and the differences in the mean values of these characters will be compared to judge the influence of treatments.

(*c*) *Liming experiment—Object.*—To find out the effect of applying lime to the coconut trees on the latrite soils of the West coast in addition to the application of the general dose of manures.

Field.—Block K.

Area.—1·91 acres.

Treatments.

1. Application of the general dose of manure and slaked lime at 5 lb. pee tree per year.
2. Control—Application of the general does of manure alone without lime.

Layout.—Randomised blocks, replicated 12 times.

The required number of trees of equal bearing capacities have been selected for the experiment.

This is a new experiment included in the Three-year Progamme for 1953–56. The treatments are scheduled to be given during the 1954 season.

(*d*) *Method of application of manures—Object.*—To find out the best methods of applying the usual manures in coconut gardens in laterite gravelly soils.

Field.—Block C.

Area.—2·97 acres.

Treatments.—

Applying of manures in—

1. Circular basins dug round each tree with a radius of 8 feet and to a depth of one foot.
2. Broadcast over the entire area and ploughing in
3. Linear trenches two feet wide and one foot deep in between rows of trees.

Layout.—Ramdomised blocks, replicated five times with two experimental trees per plot.

The experiment was started in 1948 and observations on palm characters were being recorded. The data on the number of leaves produced and yield of nuts during 1953 were analysed. The results are summarised in Table V.

TABLE V—*Coconut—Manurial experiment—Block C—Yield of nuts and leaf production*—1953.

Treatments	Mean yield of nuts per tree.	Mean number of leaves produced per tree.
(1)	(2)	(3)
Applying of manures in circular basin ..	36·2	19·7
Applying broadcast	28·2	12·0
Applying in linear trenches	39 4	12·5
'Z' test significant or not (P 0.05) ..	No.	No.
Standard error	9·74	0 71

The yield data of gross number of trees under the different treatments for a combined period of five years (1949 to 1953) were also analysed statistically during the year under report. The summary of the results is presented in Table. VI.

TABLE VI—*Coconuts—Manurial experiment—Block C—Yield of nuts for a combined period of five years* (1949 *to* 1953).

Treatments	Mean yield of nuts per tree per year average of five years).	'Z' test significant or not P = 0·05.
(1)	(2)	(3)
Applying manures in circular basins ..	36·82	
Applying broadcast	33·48	No.
Applying in linear trenches	38·87	
Standard error	4 35	

The analysis of data relating to yield of nuts for individual years from 1949, has not revealed significant differences between the treatments. It may be observed from the table above, that the analysis of the data on yield for a combined period of five years also has not shown any significant difference. This could, therefore, be taken to indicate that the application of manures to the coconut in gravelly laterite soil could be done by any one of these methods. The broadcast method of application is however the cheapest. The experiment is being continued to obtain more conclusive data.

(ii) *Cultural experiment on adult coconut trees—(a) Ploughing versus digging—Object.*—To find out and compare the effects of ploughing the field and digging the soil, on the yield of nuts.

Field.—Block E.

Area.—3·55 acres.

Treatments.—

1. Ploughing with monsoon plough once—in August–September.
2. Ploughing with monsoon plough twice—in June and September.
3. Ploughing with monsoon plough thrice a year—in June, September and November.
4. Digging with *mammutty* 9 inches deep once—in August–September.

All the trees in the block also received the general dose of manures, namely, 3 lb. of ammonium sulphate, 30 lb. os ash and 100 lb. of green leaves per tree per year.

Layout.—Randomized blocks, replicated five times with two experimental trees per plot.

The experiment was started during the year 1942. The yield data gathered in 1953, when statistically analysed did not show any significant difference between the treatments.

The results of analysis are summarised in Table VII.

TABLE VII.—*Coconuts—Cultural experiment—Block—'E'—yield of nuts.* 1953.

Treatment.	Mean yield of nuts per tree in 1953.	'Z' test significant or not P=(0·05.)
Ploughing with monsoon plough once—in August-September.	21·4	
Ploughing with monsoon plough twice in—June and September.	31·5	
Ploughing with monsoon plough thrice in—June, September and November.	21·3	No.
Digging with *mammutty* once 9 inches deep in—August-September.	25·0	
Standard error	5·93	

It may be stated that this experiment started in 1942 has not so far indicated significant differences in yield of nuts between the treatments. The yield data for a combined period of 11 years (1943 to 1953) of the gross number of trees in each plot under different treatments, were also analysed statistically. The results are presented in Table VIII.

TABLE VIII.—*Coconuts—Cultural experiment—Block E—Yield of nuts for a combined period of* 11 *years* (1943 *to* 1953).

(Average of gross number of trees under each treatment.)

Treatments.	Mean yield of nuts per tree per year.	'Z' test significant or not (P—0·05.)
Ploughing once	33·45	No.
Ploughing twice	34·27	
Ploughing thrice	38·05	
Digging 9 inches deep ..	35·12	
Standard error	2·44	

It may be observed from the table above that the analysis of data on yield for a combined period of 11 years has also not indicated significant differences between treatments. However, the mean yield of the trees is the highest for the plots receiving three ploughings a year. The experiment is proposed to be continued for three more years to see whether conclusive results can be obtained.

(*b*) *Depth of cultivation experiment.*—

Object.—To find out the correct depth to which the soil in a coconut garden has to be cultivated.

Field.—Block J (part).

Area.—3·22 acres.

Treatments.—

1—Ploughing thrice a year 4 inches deep with monsoon or cooper 26—plough in June, August and October.

2—Ploughing thrice a year 6 inches deep with victory or cooper 34 plough in June, August and October.

3—Digging 5 inches deep with *mammutty* and forming mounds in September and levelling them up in December-January.

The trees in the block received the general dose of manures, viz., 3 lb. of ammonium sulphate, 30 lb. of ash and 100 lb. of green leaves per tree per year.

Layout.—Randomized blocks, replicated six times with two experimental trees per plot.

The experiment was started in 1948 and observations on leaf production and yield of nuts were recorded regularly. The data on yield and leaf production gathered in 1953 were analysed. The results are furnished in Table IX.

TABLE IX.—*Coconuts—Cultural experiment—Block J (part)—Yield of nuts and leaf production*—1953.

Treatments.	Mean yield of nut per tree per year.	Mean number of leave produced.
Ploughing thrice 4 inches deep	19·0	12·8
Ploughing thrice 6 inches deep	25·2	13·1
Digging once 5 inches deep and mounding	24·9	12·9
'Z' test significant or not (P = 0·05)	No.	No.
Standard error	7·03	0·45

The yield data of the gross number of trees under the different treatments for a combined period of five years (1949 to 1953) were also statistically analysed The summary of results is presented in Table X.

TABLE X.—*Coconuts—Cultural experiment—Depth of cultivation—Yield data for a combined period of five years* (1949 *to* 1953).

Treatments.	Mean yield of nuts per tree per year.	'Z' test significant or not P—0.05.
Ploughing thrice 4 inches deep	34·59	No.
Ploughing thrice 6 inches deep	34·91	
Digging 5 inches deep, mounding and levelling later ..	38·68	
Standard error	4·19	

The analysis of the data on the mean yield of nuts of individual trees for a combined period of five years, also has not shown significant differences between treatments. The experiment is being continued to get conclusive results.

(iii) *Control of button shedding in the coconut—Object.*—To find out whether spraying the inflorescences of the coconut with "pre-harvest drop control chemicals would be effective in reducing the shedding of buttons.

Treatments—

1 Color set—1,004 of concentration 5 parts per million.
2 Color set—1,004 of concentration 10 parts per million.
3 Color set—1,004 of concentration 50 parts per million.
4 App. L. set of concentration 5 parts per million.
5 App. L. set of concentration 10 parts per million.
6 App. L. set of concentration 50 parts per million.
7 2 : 4 Dicholorophenoxy acetic acid of concentration 5 parts per million.
8 2 : 4 Dicholorophenoxy acetic acid of concentration 10 parts per million.
9 2 : 4 Dicholorophenoxy acetic acid of concentration 50 parts per million.
10 Napthalene acetic acid of concentration 5 parts per million.
11 Napthalene acetic acid of concentration 10 parts per million.
12 Napthalene acetic acid of concentration 50 parts per million.
13 Trees will receive as spray the same quantity of water as the chemical sprays.
14 Trees will not receive any spraying (control).

Of these chemicals, only Napthalene acetic acid is available for the trial. The trees with high shedding percentage were selected for the trial during the year. The sprayings will be done after the cessation of the south-west monsoon rains in 1954.

(iv) *Study of exotic varieties—Object.*—To find out the varieties which are promising with regard to the yield of nuts, copra content and the percentage of oil in copra. Promising varieties will be utilised for propagation and breeding economic types.

Observations on the following palm characters were made on all exotic and indigenous varieties during the year :—

1 Rate of leaf production.
2 Long vity of leafs.
3 Female flower production.
4 Setting percentage.
5 Yield of nuts.

The data gathered in 1953 are furnished in Table XI.

TABLE XI.—*Coconuts—Exotic and indigenous varieties—Mean values of palm characters per tree*—1953.

Serial number and varieties.	Number of palms under study.	Mean number of leaves produced.	Mean longevity of leaves in days.	Mean number of female flowers produced (average of 5 years 1948-53 per tree).	Mean yield of nuts per tree (average of 6 years, 1948-1953).	Setting percentage (average of 6 years 1948 to 1953).
1 Fiji	18	12·4	750·02	181·90	88·87	21·36
2 Strait Settlements ..	8	12·6	773·00	171·73	44·13	25·69
3 Laccadive ordinary ..	7	13·2	779·54	370·17	82·19	22·20
4 Laccadive small ..	9	12·5	832·43	411·13	109·35	26·59
5 Laccadive dwarf ..	1	11·0	650·06	114·50	40·83	35·66
6 Andaman ordinary ..	5	13·5	803·91	224·37	43·50	19·39
7 Andaman dwarf ..	4	12·7	662·00	148·17	32·08	21·65
8 Andaman Giant ..	1	13·0	863·05	227·83	30·33	13·31
9 Philippines	11	13·2	757·13	202·75	45·52	22·45
10 New Guinea	4	13·7	701·10	183·54	37·54	20·45
11 Cochin China	5	13·4	930·62	177·67	41·23	23·21
12 Siam	1	13·0	720·01	231·50	53·33	23·03
13 Java	10	13·0	779·71	168·05	47·48	28·25
14 Bombay	9	12·5	930·02	246·46	48·81	19·80
15 Bengal	2	12·0	631·52	166·42	42·00	25·23
16 Ceylon	4	13·0	843·10	170·25	44·71	26·26
17 Godavari	5	13·0	779·63	193·10	59·70	30·91
18 Tanjore	1	13·0	774·12	162·33	93·33	57·49

NOTE.—Tender nut of the Cochin China variety has plentiful supply of sweet water.

From the observations made so far, the Laccadive ordinary and Laccadive small types of palms, have been found promising in respect of yield of nuts. Among the indigenous varieties, those introduced from Tanjore appeared to be the best.

Nyiur Gading.—This is the only dwarf variety reported to be grown on a plantation scale in Malaya. Eight seedlings of this variety were planted at the station in 1952 out of which three died. The remaining seedlings were under observation and study. The variety is characterised by short leaves with small leaflets and low girth and collar and is similar to the dwarf variety. The details of the measurable characters of the seedlings, gathered in 1953, are presented in Table XII.

TABLE XII.—*Coconuts—Exotic varieties—Study of Nyiur gading—Measurable characters.*

(Age of seedling—One year.)

Seedling number.	Number of functioning leaves.	Girth at collar in inches.	Height of seedlings in inches.
1	8	8·5	62·2
2	6	6·5	49·5
4	11	10·2	83·5
7	7	8·9	73·5
8	7	6·3	55·0
Total ..	39	40·04	323·7
Mean ..	7·80	8·08	64·74

Fresh collections.—Seedlings of four Ceylon varieties, viz., Gonthambili, Thambilli, San Ramon, and Nawasi were planted in March 1954 in Block ' N III '.All of them have established.

The nuts of San Ramon variety are reported to have higher copra content per nut than those of the West Coast Tall variety. Thambilli variety resembles ordinary dwarf. The nuts of Gonthambili are of average size while those of Nawasi are above average with soft husk.

The particulars relating to the measurable characters of individual seednuts, and those of the seedlings obtained from them are presented in Tables XIII and XIV.

TABLE XIII.—*Exotic variety—Ceylon variety—Nut characters.*

Name of variety.	*Serial number of the nut.*	*Volume of nut in C.C.*	*Thickness of husk in inches.*	*Length of the nut in inches.*	*Breadth of the nut in inches.*	*Weight of the nut.* LB. OZ.	*Water content.*	*Shape of the nut.*	*General remarks.*
Gonthambili	1	2,141	0·6	9·0	6·2	3 0	Plenty	Ellipsoid ..	Nuts are of ordinary size.
Do.	2	1,659	0·7	5·8	·1	2 1	Optimum ..	Linear ovoid ..	Do.
San Ramon	1	4,869	1·1	8·8	8·6	3 12	Plenty	Spheroid ..	Very big sized nuts almost as big as Andaman Giant
Do.		5,465	1·3	5·0	8·9	4 6	Do.	Do. ..	Do.
Do.	3	5,060	1·2	9·1	8·2	3 15	Do.	Do. ..	Do.
Do.	4	4,887	·11	5.9	·2	4 3	Do.	Do. ..	D.o
Thambili	1	1,185	0·4	3·2	5·9	1 3	Optimum ..	Ellipsoid ..	Nuts are almost similar to those of ordinary dwarf.
Do.	2	1,659	0·4	8·	5·6	2 2	Do.	Do. ..	Do.
Do.		1,253	0·4	8	5 4	1 14	Do.	Do. ..	Do.
Do.		1,083	0.4	8·8	5·5	1 15	Do.	Do. ..	Do.
Do.	5	1,2·9	0·4	5·	5·6	1 15	Do.	Do. ..	Do.
Do.	6	1,225	0·5	7·1	5·4	2 0	Do.	Do. ..	Do.
Nawasi	1	3,578	1·0	8.7	7·2	3 2	Plenty	Ovoid	Good nut, more than average in size and husk soft.
Do.	2	4,121	1·6	9.	7·4	3 4	Almost full ..	Oblong	Do.
Do.	3	3,262	1·1	8·1	7·2	3 0	Do. ..	Ovoid	Do.
Do.	4	3,571	1·0	9·0	7·0	2 14	Do. ..	Do.	Do.
Do	5	3,509	1·2	8·7	7·5	3 0	Plenty	Do.	Do.
Do	6	3,358	1·4	9·9	7·0	3 4	Almost full ..	Oblong	Do.

TABLE XIV.—*Exotic varity—Ceylon variety—Seedling characters (Planted on 13th March 1954).*

Variety.	Serial number of the nut from which seedling work obtained.	Date of plnting of the nut in the nursery.	Date of germination	Measurement recorded at the time of planting.			Number of roots.	Colour of petiole.
				Girth at collar in inches.	Height of seedlings in inches.	Number of functioning leaves.		
Sonthambili	1	17—10—1952	3— 3—1953	5·5	48·5	4	11	Green.
Do.	2	17—10—1952	2— 3—1953	5·6	48·5	6	9	Do.
San Ramon	1	17—10—1952	30—11—1952	7·0	66·5	4	14	Yellow.
Do.	2	17—10—1952	1— 1—1953	6·7	58·0	4	7	Do.
Do.	3	17—10—1952	26— 2—1953	7·2	64·5	5	10	Green.
Do.	4	17—10—1952	15— 2—1953	6·6	58·5	4	19	Do.
Thambilli	1	17—10—1952	25— 2—1953	5·5	33 0	5	12	Orange.
Do.	2	17—10—1952	18— 1—1953	6·6	44·0	5	14	Do.
Do.	3	17—10—1952	14— 1—1953	5·2	37·5	5	9	Do.
Do.	4	17—10—1952	16—12—1952	6·9	45 2	6	15	Do.
Do.	5	17—10—1952	25— 2—1953	6·1	38·5	6	15	Do.
Do.	6	17—10—1952	25—12—1952	5·5	33·8	6	11	Do.
Nawasi	1	17—10—1952	10— 2—1953	6·9	64·5	5	12	Yellow.
Do.	2	17—10—1952	26— 3—1953	5·5	51·0	6	9	Do.
Do.	3	17—10—1952	12— 2—1953	6·7	61·2	7	14	Do.
Do.	4	17—10—1952	25— 2—1953	6·9	64·2	5	12	Do.
Do.	5	17—10—1952	28— 2—1953	7·0	50·5	6	12	Do.
Do.	6	17—10—1952	26— 3—1953	5·9	55·5	5	12	Do.

Among the four vareties Thambili seedlings are the most vigorous. Next in vigour are the San Ramon and Nawasi while Gonthambili appears to be the poorest. Their performance as adult trees will be studied to draw final conclusions.

(v) *Coconut Breeding*—(*a*) *Tall X Dwarf.*—The results of study for about 17 years have revealed that the hybrid coconut seedlings obtained by crossing the West Coast Tall by the Dwarf variety are very promising. They have the economic characters like early bearing and high yield of nuts with good copra and oil content. This hybrid has become popular with the ryots and is in high demand.

With a view to meeting the demand for the hybrid seedlings, cross pollination of 100 selected West Coast Tall trees with the Dwarf was undertaken at the station. Since sufficient number of high yielding mother palms were not available at the station, 35 selected trees were taken up for this purpose in the neighbouring ryots' garden. In all, 711 inflorescences were pollinated in 1954 season. A total of 2,939 hybrid seednuts was harvested from the 711 inflorescences pollinated during 1953 season as against 1,534 seed nuts harvested during the corresponding period of last year. All the seednuts were transferred to Nileshwar III station for raising seedlings for distribution.

(*b*) *Spikeless X west coast tall.*—Spikeless (var. Spicata) is noted for high female flower production and low setting percentage. The nuts are of poor quality. With a view to inducing high setting, five inflorescences of the spikeless variety were cross pollinated during the 1954 season with pollen from selected West Coast Tall parents with low production of female flowers and high setting percentage. Reciprocal crosses were also effected to study how far the characters of the parents are reflected in the progeny.

(*c*) *Exotic varieties X Gangabondam.*—Crosses were effected between the following exotic varieties and West Coast tall with Gangabondam—a semi tall type of the circars.

1 Laccadive ordinary.
2 Laccadive small.
3 Andaman ordinary.
4 Cochin china.
5 Java.

Forty-eight seedlings of these crosses were planted in 1949 in block K for observation and study. The measurement of the vegetative characters of the progeny seedlings recorded in 1953 are furnished in Table XV.

TABLE XV.—*Coconuts—Progenies of exotic varieties X Gangabondam seedling characters*, 1953.

Details of crosses.			Number of seedlings planted.	Mean number of leaves produced in 1953.	Mean number of functioning leaves in the crown, 1953.	Mean girth at collar in inches.
Laccadive ordinary	X	Gangabondam.	6	10·0	13·8	37·3
Laccadive small	X	do.	6	7·7	11·1	31·0
Andaman ordinary	X	do.	6	9·2	11·5	31·0
Cochin china	X	do.	6	8·8	13·2	28 0
Java	X	do.	6	8·8	14·8	33 8
West Coast Tall	X	do.	18	8·9	12·9	35·8

The seedlings are young and have not flowered. Progenies of some of these crosses are quite vigorous, particularly the seedlings of the crosses of Laccadive ordinary, Java and West Coast Tall. Observations on the palm characters will be continued.

(*d*) *F$_1$ progenies of tall X Dwarf.*—During the year 1950, one hundred and forty selected (natural) progeny seedlings of Tall X Dwarf were planted in Block 'N-I' with a view to finding out, whether the hybrid vigour met with in their parents is reflected in the progenies also. The seedlings are only 4 years old.

The observations made in 1953 on the measurable characters of these young palms, indicate that these progenies are vigorous in thier growth with an average number of 8·6 functioning leaves in the crown and 20·9 inches of girth at collar.

Another set of F_2 progenies of Tall x Dwarf along with the progenies of their back cross and progenies of West Coast Tall (natural), planted in Block 'N-II' during 1952, are under observation and study.

5. *Fresh plantings.*—In all, 12 coconut seedlings were planted at the station as detailed below to fill up gaps caused by the death of trees during the previous years:—

Block E. Pit numbers 79 and 179—West Coast Tall (fresh planting).
Block F. Pit number 129—West Coast Tall (fresh planting).
Block I. Pit numbers 17, 22, 99, 131 and 137—West Coast Tall (fresh planting).
Block H. Pit numbers 92, 112, 114 and 137—Strait Settlements.

In addition, 25 nautral progenies of Chowghat dwarf (10 dwarf green and 15 dwarf orange) were planted in block 'N-VIII' during March 1954. All the seedlings have established.

6. *Pests and diseases.*—(*a*) *Rhinoceros beetle.*—Rhinoceros beetle is a major pest on the coconut. Regular searches were made on the crowns of trees and the beetles extracted and killed. In all, 1,184 beetles were extracted with beetle hook from the crowns of 812 trees. Also, periodical searches were made in the manure pits for the beetle grubs. They were picked and killed as a measure of control.

(*b*) *Bud rot.*—Two trees in Block K (numbers 87 and 99) were attacked by the disease and died inspite of timely treatments given. The neighbouring trees were sprayed with 1 per cent Bordeaux mixture to prevent the spread of the disease.

(*c*) *Shoot rot.*—Fifty-four young palms in block F-A had signs of shoot rot attack. They were operated and sprayed with 1 per cent Bordeaux mixture. There were no casualties.

7. (*a*) *Other crops*—(*a*) *Food crop.*—The following food crops were grown under the coconut on a bulk scale during the year :—

1 Paddy.
2 Ragi.
3 Sweet potato.
4 Tapioca.
5 Groundnut.

The calculated acre yield and profit obtained from different crops are furnished in Table XVI.

TABLE XVI.—*Subsidiary crops—Bulk trials*—1953.

Block.	Crop.	Date of sowing.	Area sown in acres.	Seed sown per acre.	Manures applied in lb. per acre.	
					Cattle manure. lb.	Ash lb.
N-I, N-II, F-A. ..	Paddy ..	28- 5-1953	2·45	60 lb.	..	5,000
N-I	Ragi	3— 7—1953	0·50		..	..
G (part)	Sweet potato ..	12— 6—1953	1·50	560 lb. vine.	..	..
Do.	Tapioca ..	7— 5—1953	0·75	5,000 cuttings.	400	..
H	Groundnut ..	30— 6—1953 27— 8—1953	4·00	100 lb.	5,000	..

Block.	Crop.	Date of sowing.	Manures applied in lb. per acre—contd.		Acre yield lb.		Net profit per acre.
			Green leaves. lb.	Compost. lb.	Grain. lb.	Straw. lb.	RS. A. P.
N-I, N-II, F-A.	Paddy ..	28—5—1953	2,000	1,500	1,121	1,112	26 0 0
N-I	Ragi	3—7—1953	..	..	139	100	1 2 0
G (part)	sweet potato ..	12—6—1953	..	5,000	tubers. 4,470	4,470 vine.	83 10 0
Do.	Tapioca ..	7—5—1953	200	..	82,496 1,160 tuber.	2,433 Nos. setts.	41 11 0
H	Groundnut ..	30—6—1953 27—8—19 3	..	5,000	462½ pods.	525 haulms.	86 2 5

NOTE.—The crops were cultivated in the shade of the coconut and as such normal yield cannot be expected. Further much damage was done to all crops by wild boars and field rats which also resulted in low yield.

Sweet potato as a subsidiary crop under coconut has given the maximum net profit per acre. Tapioca and groundnut are other remunerative crops.

(*b*) *Vegetables* (1) *Bendai.*—This was sown in an area of 10 cents in Block 'A'. The crop was manured with 250 lb. of cattle manure and earthed up, three weeks after germination. A total quantity of 11 lb. of seeds was obtained and distributed.

(2) *New era cowpea.*—This was raised in an area of 50 cents in block 'K—A' with a basal dressing of 1,000 lb. cattle manure. A fortnight after germination, 500 lb. of ash was applied and the plants earthed up. A total quantity of 104 lb. of the seeds and 31 lb. of green pods were obtained from this area.

(3) *Potato.*—An area of 1½ cents was planted to 'President' variety of potato in October 1953 using a seed-rate of 1,666 lb. of tubers per acre. The germination was satisfactory, all the seeds having sprouted by the first week of November. The plants were earthed up a month after planting but the subsequent growth was not satisfactory due, probably, to the high temperature prevailing during the period. All the plants dried up completely by the end of January 1954 when the crop was harvested. It was found that the tuber formation was very poor and even those that had developed were found rotten inside. The crop was a complete failure at the station.

(*c*) *Fodder grass.*—(1) *Thin Napier Grass.*—During the period under report, 73 lb. of seeds and 4,300 slips were collected and distributed. This is the only fodder grass that withstands drought in summer.

(2) *Cumbu X Napier Grass.*—The slips planted in block 'A' near the well established well. Slips from the established clumps were taken and planted in the northern extension. The slips planted in the northern extension during last season completely failed for want of enough moisture in the summer months.

(3) *Guinea grass.*—This grass put on excellent growth during the monsoon period. During the last season, two cuttings were taken in the months of July and October with an average acre yield of 4,000 lb. of green fodder per cutting. This grass also cannot stand severe summer conditions.

(*d*) *Oil bearing trees.*—(1) *African oil palm.*—The 22 oil palms grown along the borders of the blocks K (A) and L and the 27 young palms planted in 1950 in Block 'N-VIII' are in satisfactory condition.

(2) *Other oil bearing trees.*—The other oil bearing trees, viz., Teak (*Tectona grandis*), Neem (*Azadiracta indica*), Punnai (*Calophyllum inophyllum*) and Pungam (*Pongamia glabra*) planted in 1942 in Block 'N-VIII' are stunted in growth due to the shallow nature of the soil.

(*e*) *Fruit plants*—(i) *Graft mangoes.*—Out of 92 mango grafts planted in Block 'L' during 1933–34, ten trees have flowered during the year. The flowering was poor and the setting was not satisfactory. A total quantity of 109 lb. of fruits was harvested and sold.

All the good trees (seven numbers) at the station were utilized for grafting. In all, 270 grafts were produced and distributed during the year.

(ii) *Sapota.*—A total of 24 lb. of fruits was harvested during the year from the existing two trees. The trees were not manured so as to check the excessive vegetative growth.

(iii) *Cashewnut.*—The thirteen year old cashew trees grown along the borders of the station and in Block 'N-v', flowered during this year also. The usufructuary rights of these trees were auctioned for Rs. 40. The cashew seedlings (one year old) in block 'N-VIII' have not put forth satisfactory growth.

(iv) *Malta lemon.*—Cuttings were taken from the six malta lemon plants in Block 'B' and a total number of 1,243 rooted cuttings was produced and distributed during the year.

(v) *Singapore jack.*—The four Singapore jack seedlings planted at the station during the year 1947 have not put forth any satisfactory growth.

(vi) *Cacao.*—One hundred cacao seedlings were planted during the year 1952 in block 'L'. There are 71 seedlings surviving now in the field. They were provided with adequate shade and copious watering during the summer months. The growth of the plants, in general, is not very encouraging.

(vii) *Pepper.*—The pepper vines planted in block 'I' during 1952, have put forth satisfactory growth and some of them have produced spike-bearing lateral branches. The planting was extended to block 'G', where two varieties, viz., *Kalluvalli* and *Balenkotta* were planted during 1953 using fifty coconut trees as standard for each variety of pepper. In percentage of establishment of the vines and subsequent growth, *Kalluvalli* is superior, as 68·2 per cent have established while in *Balenkotta*, the percentage of establishment is only 41·2.

A fresh set of 2,000 rooted cuttings of *Kalluvalli*, obtained from Agricultural Research Station, Taliparamba, was planted in blocks G, H, I and J (part) in June 1954 using coconut trees as standard.

8. *Hay making.*—A total quantity of 14,550 lb. of hay was made at the station from the green grass cut from the northern extension. After meeting the entire requirement of the station, the balance was transferred to Nileshwar II and Nileshwar III stations. No paddy straw was purchased during the year.

9. *Seed supply.*—During the period under report, the following seeds and seedlings were distributed or transferred from the station :—

Seed coconuts	1,207	Nos.
Pollinated nuts	2,939	,,
Mango grafts	270	,,
Rooted malta lemon cuttings	1,257	,,
Custard apple seedlings	42	,,
Tapioca setts.	1,925	,,
Thin Napier grass slips	4,300	,,
Pappaya seedlings	175	,,
Gliricidia seedlings	1,150	,,
New era cowpea seeds	28	lb.
Bendai seeds	11	,,
Groundnut pods	1,009	,,
Thin napier grass seeds	73	,,
Amaranthus seed	1	,,
Paddy seed	135	,,

10. *Inspection.*—Sri M. S. Sivaraman, I.C.S., Director of Agriculture, Madras, inspected the station in January 1954.

11. *Visitors.*—Sri A. K. Das Gupta, Coconut Development Officer, West Bengal and Sri C. M. John, Director, Central Coconut Research Station, Kasaragod, were the distinguished visitors during the year.

12. *Steps taken to increase the income of the station.*—The details of various steps taken to increase the income of the station, the details of the crops grown and the financial statements are appended.

P. M. SAYEED,
Superintendent.

AGRICULTURAL RESEARCH STATION, NILESHWAR,
5th August 1954.

AGRICULTURAL COLLEGE AND RESEARCH INSTITUTE,
LAWLEY ROAD P.O., COIMBATORE,
10*th August* 1954.

C. R. SESHADRI,
Oil Seed Specialist.

APPENDIX I.

STEPS TAKEN TO INCREASE THE INCOME AND REDUCE THE EXPENDITURE OF THE STATION.

(*a*) *Improvement of i rigation facilities.*—Coconut is the main crop of the station and is grown purely under rainfed conditions. Irrigation facility is required for irrigating vegetables, nurseries of economic plants and coconut seedling during summer months. The well dug in the northern extension at the point fixed by the Director of Agriculture, Madras, gives an assured supply of water. A pump-set will be installed for utilizing fully the water available.

(*b*) *Adjustment of cropping schemes.*—All the cultivable area is planted to coconut. The outskirts of the blocks and the office block are utilized to grow vegetables and nurseries of economic plants. In addition to this, pepper has been planted using 600 grown-up trees as standards. Groundnut and paddy are cultivated in two blocks in an area of four acres each, as subsidiary crops. The cultivation of subsidiary crop in coconut garden is an additional source of income and the raising of the crop indirectly benefits the coconut trees also. The production of f uit plants like mango grafts, rooted malta lemon cuttings and papaya seedlings has been intensified to the maximum possible extent.

To reduce the expenditure on purchase of manures the production of organic manures like compost and ash has been intensified. A total quantity of 8,020 lb. of ash was produced by burning coconut leaves and other rubbish and there was no purchase of ash during the year. Planting of green leaf yielding plants like, Indigofera and Giricidia has been taken up on a large scale. Besides, a green manure crop is grown every year and ploughed *in situ*.

Regarding the fodder requirement, the station is self-sufficiant. Green grass is available for feeding the animals during rainy months (July-December). The excess grass is available is converted into hay or silage, for feeding the work animals in summer months. During the year, a total quantity of 7,000 lb. of hay was transferred to Nileshwar after meeting the full requirements of the station.

(*c*) *Raising of live fence.*—The station is provided with boundary mud walls around. The most suitable live fence that can be grown on the mud walls are Agave, and Adath oda and these have been planted all along the mud walls and gaps filled up every year. During the year 2,000 *Prosopis juliflora* seedlings were planted along the mud wall in the northern extension to serve as live fence.

(*d*) *Cost of cultivation.*—The cost of cultivation of the main crop coconut, the details of other bulk crops grown as subsidiary crops in the shade of coconut and the financial statements are given in Appendices II to VI.

APPENDIX II.

COST OF CULTIVATION OF COCONUT PER ACRE OF 56 TREES.

Items.	*Cost per acre.* Rs.	A.	P.
Manures and manuring	21	11	7
After cultivation (pests and cultural)	43	2	5
Harvest	10	13	2
Total cost of cultivation ..	75	11	2

	Rs.	A.	P.
Yield of nuts at 30.1 nut per tree—1,686.			
Value of 1,686 nuts at Rs. 160 per 1,000	219	12	0
Net gain per acre	194	0	0

APPENDIX III.

DETAILS SHOWING THE PARTICULARS OF FARM PRODUCE (BULK CROP) RETAINED AT THE STATION AND DISPOSED OF DURING THE YEAR—AGRICULTURAL RESEARCH STATION, PILICODE.

Serial number and name of crop.	Seed.				Grain.			
	Retained at the station.		Transferred or sold.		Retained at the station.		Transferred or sold.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	LB.	RS. A. P.	LB.	RS. A. P.			LB.	RS. A. P.
1 Paddy ..	480	90 0 0	641	120 8 0	..	..	..	..
2 Ragi	..	..	..	..	..	..	139	17 6 0
3 Sweet potato.	..	..	..	..	..	..	3,249 tubers.	152 4 9
4 Tapioca ..	..	..	..	..	..	..	870 tubers.	54 6 0
5 Groundnut ..	525	114 14	1,325	289 13 0	..	..	..	..
6 Horsegram ..	64	12 0 0	63	11 13 0	..	..	..	..

Serial number and name of crop.	Straw.				Total value.	Total receipts for the last three years.		
	Retained at the station.		Transferred or sold.			1951–52.	1952–53.	1953–54.
	Quantity.	Value.	Quantity.	Value.				
	LB.	RS. A. P.			RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
1 Paddy ..	1,112	33 6 0	..	..	243 9 0	258 11 0	62 8 0	243 9 0
2 Ragi	..	..	..	..	17 6 0	..	53 8 0	17 6 0
3 Sweet potato.	4,470 vines.	22 12 0	..	..	175 0 9	34 3 6	232 14 0	175 0 9
4 Tapioca ..	1,825 cuttings.	9 2 0	..	..	63 8 0	..	..	63 8 0
5 Groundnut ..	2,100	31 8 0	..	..	436 3 0	..	79 13 0	436 3 0
6 Horsegram ..	300	1 8 0	..	..	25 5 0	..	..	25 5 0

APPENDIX IV.

DETAILS ON THE RECEIPT OF BULK CROP GROWN AT THE AGRICULTURAL RESEARCH STATION, PILICODE.

Serial number and crop.	*Area cultivated in acres.*	*Grain.*		*Straw*		*Total receipt for the year.*
		Yield in lb.	*Value.*	*Yield in lb.*	*Value.*	
			RS. A. P.		RS. A. P.	RS. A. P.
1 Paddy	2·45	1,121	210 3 0	1,112	33 6 0	243 9 0
2 Ragi	0·50	139	17 6 0	..	..	17 6 0
3 Sweet potato	1·50	3,249	152 4 9	4,470	22 12 0	175 1 0
4 Tapioca	0·75	870	54 6 0	1,825	9 2 0	63 8 0
5 Groundnut	4·00	1,850	404 11 0	2,100	31 8 0	436 3 0
6 Horsegram	1·00	127	23 13 0	300	1 8 0	25 5 0
7 Sale of fruit plants and other seedlings.	..	..	..	..	..	414 7 0

Serial number and crop.	*Area cultivated in acres.*	*Total receipt for three years*		
		1951–52.	1952–53.	1953–54.
		RS. A. P.	RS. A. P.	RS. A. P.
1 Paddy	2·45	258 11 0	62 8 0	243 9 0
2 Ragi	0·50	..	53 8 0	17 6 0
3 Sweet potato	1·50	34 3 6	232 14 0	175 0 0
4 Tapioca	0·75	..	..	63 8 0
5 Groundnut	4·00	..	79 13 0	436 3 0
6 Horsegram	1·00	..	..	25 5 0
7 Sale of fruit plants and other seedlings.	..	79 15 0	215 14 0	414 7 0

1. The gross receipts obtained from various crops grown at the station are included in the statement.

2. The area under different crops during different years has varied; but the total receipt obtained irrespective of the area cultivated is included.

3. The crops were grown in the standing crop of coconut as subsidiary crops.

4. The increase in receipt in the item 7 is due to the increase in the production of mango grafts.

APPENDIX V.

STATEMENT OF EXPENDITURE AND REVENUE FOR THE AGRICULTURAL RESEARCH STATION, PILICODE.

Serial number and particulars	Financial year. 1951–52.			1952–53.			1953–54.		
	Rs	A.	P.	Rs.	A.	P.	Rs.	A.	P.
1 Expenditure	10,546	0	0	8,932	0	0	6,926	7	6
2 Revenue	7,758	0	0	11,936	0	0	10,476	15	11

NOTE.—The yield of coconut was low during the year when compared with that of previous year and hence less income was obtained, but the difference between receipts of the two years was much reduced due to the cultivation of subsidiary crops and production of fruit plants.

APPENDIX VI

STATEMENT OF EXPENDITURE FOR THE AGRICULTURAL RESEARCH STATION, PILICODE, FOR THE THREE YEARS (FASLIS).

Serial number and details of expenditure	Actual expenditure for the three years. 1951-52.			1952–53.			1953–54.		
	Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.
1 Pay and allowance of the staff (one-third of actuals)—Farm managers and fieldman.	842	0	0	862	0	0	899	10	8
2 Miscellaneous cultivation expenses (one-third of actuals).	615	0	0	468	0	0	818	5	0
3 Working expenses (actuals) excluding miscellaneous cultivation expenses	8,701	0	0	7,528	0	0	4,664	2	8
4 One tenth of expenditure on live and dead stock.	4	0	0	3	0	0	2	0	0
5 Proportionate rent at Rs. 4 per acre for 40·19 acres.	161	0	0	161	0	0	161	0	0
6 Unforeseingencies, if any ..	..			..			..		
Total .	10,324	0	0	9,022	0	0	6,045	2	4

ANNUAL REPORT OF THE AGRICULTURAL (COCONUT) RESEARCH STATION, NILESWAR II, FOR 1953–54 (FASLI 1363) (1ST JULY 1953 TO 30TH JUNE 1954).

1. *Season and rainfall.*—During the year under report, a total rainfall of 165·63 inches was recorded on 121 rainy days as against 120·85 inches on 105 rainy days received during the previous year. The total rainfall during the year was more than the ten-year average by 25·95 inches.

The south-west monsoon commenced late in 1953 and regular heavy rains were received only after the third week of June 1953 and continued till the third week of August 1953. A total rainfall of 109·01 inches was received on 79 rainy days during this period as against 97·58 inches on 87 rainy days during the corresponding period of last year.

The north-east monsoon commenced in October and was very feeble. A total rainfall of 17·45 inches distributed over 22 rainy days was recorded during the period as against 20·97 inches on 15 rainy days received last year.

During the hot weather, a rainfall of 39·17 inches distributed over 20 days was received as against 2·30 inches spread over three days during the corresponding period of last year.

Though maximum rainfall during the hot weather period was recorded in the first week of June 1954, fairly soaking rains amounting to 13·85 inches were also received during the hot months of March, April and May 1954. These rains were highly beneficial to the coconut trees.

The south-west monsoon rains in 1954 commenced early in June and very heavy rains amounting to 60·42 inches were recorded till 30th June 1954.

The season in 1953–54 was, in general, satisfactory particularly for the coconut. The rainfall statement is presented in Table I.

TABLE I.—*Rainfall statement, Agricultural Research Station, Nileshwar II*—1953–54.

Month.	Week.	1953–54. Rainfall in inches.	1953–54. Number of rainy days.	1952–53. Rainfall in inches.	1952–53. Number of rainy days.	Average for 10 years. Rainfall in inches.	Average for 10 years. Number of rainy days.
		South-west monsoon.					
June	7–13	2·85	5	5·96	7	11·29	9·4
	14–20	7·73	5	12·93	7	11·51	8·9
	21–27	5·33	5	11·80	7	7·89	6·2
June–July	28– 4	18·40	5	15·03	7	9·82	6·8
	5–11	19·52	7	12·11	7	9·58	5·8
	12–18	8·67	6	6·32	7	10·56	6·7
	19–25	11·27	7	9·27	7	10·36	6·4
July–August	26– 1	20·14	7	4·23	6	7·42	5·1
	2– 8	8·40	5	5·43	5	6·19	5·7
	9–15	8·98	7	4·71	4	5·31	5·2
	16–22	4·39	6	5·13	7	6·00	6·1
	23–29	1·64	5	8·15	7	8·76	4·6
August–September	30– 5	1·24	6	0·53	3	3·37	4·1
	6–12	1·11	3	0·93	3	3·49	4·7
	13–19	2·47	1	..	..	2·40	3·3
	20–30	1·87	5	..	..	2·44	3·4
Total ..		109·01	79	97·53	87	111·99	88·

Month.	Week.	1954–54. Rainfall in inches.	1954–54. Number of rainy days.	1953–53. Rainfall in inches.	1953–53. Number of rainy days.	Average for ten years. Rainfall in inches.	Average for ten years. Number of rainy days.
		North-east monsoon.					
September-October	27– 3	1·93	3	0·19	1	2·17	2·7
	4–10	1·19	2	10·64	7	2·15	2·1
	11–17	6·04	6	6·58	4	2·06	2·6
	18–24	4·34	3	1·21	1	1·36	2·2
	25–31	3·13	3	..	..	0·79	1·3
November	1– 7	..	..	..	..	0·78	1·6
	8–14	..	..	..	..	0·65	1·2
	15–21	0·52	2	..	..	2·94	1·6
	22–28	..	..	..	..	0·52	0·7
November-December	29– 5	..	..	..	..	0·23	0·4
	6–12	..	..	2·20	2	0·65	0·6
	13–19	..	..	0·96	..	0·30	0·2
	20–26	..	..	..	..	0·11	0·2
December-January	27– 3	..	..	..	..	..	..
	4–10	0·25	1	0·01	..	0·01	01
	11–17	..	..	..	..	..	..
	18–24	..	..	..	..	0·13	0·2
	25–31	..	..	..	..	..	..
	Total ..	17·45	22	20·97	15	14·77	17·3
		Hot weather.					
February	1– 7	..	..	..	..	..	..
	8–14	..	..	..	..	..	..
	15–21	..	..	..	..	0·07	0·1
	22–28	..	..	0·60	..	0·03	..
March	1– 7	..	..	..	..	0·12	0·1
	8–14	0·29	1	0·01	..	0·05	0·1
	15–21	0·91	1	..	..	0·03	0·1
	22–28	..	..	..	..	0·06	0·1
March-April	29– 4	..	..	0·07	..	0·21	0·7
	5–11	..	..	0·01	..	0·45	0·6
	12–18	..	..	0·46	1	0·75	1·0
	19–25	8·50	3	0·35	1	0·46	0·7
April-May	26– 2	0·30	2	..	..	0·32	0·6
	3– 9	0·10	1	0·01	..	0·41	0·6
	10–16	2·69	2	..	..	0·93	1·0
	17–23	0·97	2	0·09	..	1·62	1·2
	24–30	0·15	1	1·17	1	2·20	2·3
May-June	31– 6	25·32	7	0·04	..	7·21	4·1
	Total ..	39·17	20	2·30	3	14·92	13·4
	Grand total ..	165·63	121	120·85	105	141·60	119·1

2. *Coconut—General.*—Except Block II, all the other blocks were ploughed with the monsoon plough during April-May 1953 and *Crotalaria striata* was sown for green manure. In August-September 1953, a second ploughing was given incorporating the green manure crop. A third ploughing was done at the close of the north-east monsoon in November-December 1953. Junior hoe was worked during the summer months in January-February 1954. The unploughed area and corners of blocks were dug with mammutty in August-September 1953.

Block II which was cleared of the poor progeny palms was levelled and terraced with the help of a bull-dozer in January 1954.

The adult coconut trees received 3 lb. ammonium sulphate and 20 lb. ash per tree per year. In addition, a green manure crop of *Crotalaria striata* was raised in all

the blocks where subsidiary crops were not grown and ploughed in during August—September 1953. Ammonium sulphate was applied broadcast and ploughed in along with the green manure crop. Ash was applied in two doses, the first instalment in April-May at the time of sowing the green manure crop and the second one in November-December.

Crotalaria striata was grown as green manure crop using a seed rate of 10–15 lb. per acre. The germination of the seeds and subsequent growth of the crop were satisfactory. The crop in the different blocks gave, on an average, an yield of 8,500 lb. of green material per acre and it was ploughed in.

A total quantity of 126½ lb. of seeds of the green manure plant was also collected at the station.

Ripe coconuts were harvested every month and detailed harvest notes were recorded for all the bearing trees. A total number of 7,831 nuts were harvested from 391 bearing trees during 1953 as against 5,365 nuts from 260 bearing trees in 1952. The details of nuts harvested from different blocks are presented in Table II.

TABLE II.—*Coconut—Block wise yield of Coconuts in 1953.*

Block.	Number of nuts harvested in 1953.	Number of trees from which nuts were harvested in 1953.	Mean yield of nuts per bearing tree in 1953.	Yield of nuts in 1952.	Number of trees from which nuts were harvested in 1952.	Mean yield of nuts per bearing tree in 1952.	Remarks.
I	277	23	12·04	117	15	7·80	The trees have been partly grubbed out.
II	89	8	9·67	12	1	12·00	The block has been cleared of all trees for fresh planting.
III	1,020	65	15·69	290	25	11·60	
IV	373	49	7·61	177	18	9·83	
VI	735	32	22·97	396	24	16·50	
VII	1,853	61	30·37	1,488	55	27·05	
VIII	2,466	72	34·25	2,020	62	32·58	
IX	67	16	4·19	46	5	9·20	
X	865	61	14·17	719	49	14·67	
O.C.	146	9	16·22	100	6	16·67	
Total ..	7,831	391	20·03	5,365	260	20·63	

The mean yield of nuts per bearing tree works out to 20·03 in 1953 as against 20·63 nuts in 1952. The palms are young and have not attained the normal bearing stage. However, it may be seen that the average yields of trees in blocks VI, VII and VIII, where the trees are in full bearing, have markedly improved.

3. *Experiments and research*—(i) *Hybridization in coconut.*—With the object of finding out the possibilities of improving the coconut by controlled pollination, the following four schemes of hybridization were taken up at the coconut stations in 1932–33 and the progenies under the different schemes were planted at the station from 1935–36 :—

(*a*) *Scheme I—Progenies of intra-varietal cyclic crosses* (*Tall* × *Tall*).—From among high yielding palms, five trees were selected, each one to represent one of the following characters and all possible combinations of crosses were effected between the five trees :—

(1) High yield.
(2) High production of female flowers.
(3) High setting percentage.
(4) Thick meat.
(5) Large sized nuts.

The progenies of the different character combinations were being studied for the various seedling and palm characters from the time of planting. The vigour of palms before they come to normal bearing is judged by their vegetative characters, viz., rate of production of leaves, number of functioning leaves, rate of growth of stem and girth at collar. All palms have not come to bearing and those palms that have come to bearing are in their initial stages of bearing.

The performance of the progenies of these intra-varietal crosses, in general, is observed to be not very encouraging even after a period of over 17 years after planting. The cross progenies of the different character combinations have not indicated any striking economic feature. There were also many poor progenies which had not produced any nut so far. All such poor progenies were, therefore, removed during the previous year retaining only those which are observed to possess desirable palm characters. These palms were continued to be observed and studied.

The data gathered during the year on the yield of nuts, female flower production, number of leaves in the crown, rate of growth of stem and girth at crown are presented in Table III. The figures are grouped for the five parental characters mentioned above and are compared with each of them as female or male parent.

TABLE III.—*Coconut—Progenies of cyclic crosses, Scheme I—Palm characters*—1953.

Characters of parent palms.	Number of Progeny palms.		Mean yield of nuts.		Mean female flower production.		Mean number of functioning leaves.	
	As female parent.	As male parent.	Female.	Male.	Female.	Male.	Female.	Male.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
High yield	68	51	4·30	17·60	25·10	85·80	15·60	15·30
High female flower production.	89	46	16·50	17·10	60·40	56·00	16·60	17·30
High setting	65	47	12·50	10·40	30·40	34·10	14·60	15·80
Thick meat	46	55	18·30	21·20	59·10	74·50	16·20	18·50
Big sized nut	58	51	15·40	5·90	49·90	22·60	18·20	14·80

	Mean rate of growth of stem in inches.		Mean girth at collar in inches.		Percentage of trees flowered to the total planted.	
	Female.	Male.	Female.	Male.	Female.	Male.
	(10)	(11)	(12)	(13)	(14)	(15)
High yield	6·40	6·98	23·50	23·10	69·10	51·00
High female flower production.	6·80	8·30	24·30	24·40	76·40	69·10
High setting	7·50	6·30	22·60	24·20	50·80	63·80
Thick meat	6·50	8·10	24·08	25·00	76·10	80·00
Big sized nut	8·10	6·40	25·00	23·50	65·50	62·70

It may be observed from the data presented that the progenies of "*thick meat*" and "*big sized nut*" fared better when these parental characters are possessed by the male and female parents respectively in the scheme of controlled cross pollination.

(*b*) *Scheme II—Progenies of intra-varietal crosses* (*Tall* × *Tall*).—Under this scheme, cyclic crosses were effected between trees producing large number of female flowers and those having maximum setting percentage. The progenies were planted at the station during 1935–36. The majority of the palms under the scheme now in the field have flowered.

The data presented in Table IV are grouped for each of the two parental characters and compared between themselves when each is used as a male or a femael parent.

TABLE IV.—*Coconut-Progenies of intra varietal crosses*, 1953–54—*Scheme II*.

Characters of parent palms.	Number of progeny palms.		Percentage of palms flowered.		Mean yield of nuts.		Mean female flower production.	
	As female parent.	As male parent.	Female.	Male.	Female.	Male.	Female.	Male.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
High female flower production.	27	36	66·70	80·60	3·70	16·30	42·00	60·00
High setting	44	17	81·80	64·70	15·20	3·80	74·00	42·00

	Mean number of functioning leaves.		Mean rate of growth of stem in inches.		Mean girth at collar in inches.	
	Female.	Male.	Female.	Male.	Female.	Male.
	(10)	(11)	(12)	(13)	(14)	(15)
High female flower production.	16·90	17·90	6·90	6·70	24·30	24·10
High setting	17·60	16·40	6·60	6·20	24·20	24·00

It may be seen from the table that the progenies of "HIGH SETTING" are more vigorous when the character is in the female parent than when it is the male parent. Also, the progenies of "HIGH FEMALE FLOWER PRODUCTION" as the male parent have fared better than progenies of the same as female parent.

(c) *Scheme III—Progenies of Intra-varietal Crosses—Tall × Tall—(Regular Bearers × Irregular Bearers)*—The palms under the scheme were grubbed out last year as their performance over several years was found very poor.

(d) *Scheme IV-Progenies of Inter—varietal Crosses—(Tall × Draft)*.—Under this scheme crosses were effected between the West Coast 'Tall' as the female parent and the 'Draft' variety as the male parent. The progenies were planted at the station in 1934–35 and were under observation for the various plam characters. They commenced to flower in four and a half years and most of them were in normal bearing by 1942. The performance of these progenies, in general, continues to be very satisfactory.

The data gathered on the yield of nuts, female flower production and number of functioning leaves on the crown are summarised in Table V.

TABLE V.—*Scheme IV—Progenies of Tall × Dwarf.*

Particulars.	Number planted.	Number flowered.	Mean yield of nuts in.		Mean number of female flowers produced.		Mean number of leaves on the crown.		Rate of growth of stem in inches.	
			1953.	1952.	1953.	1952.	1953.	1952.	1953.	1952.
Progenies of Tall x Dwarf. ..	143	139	28·18	20·70	110·10	91·70	29 60	29·69	7·23	3·59

It has also been found that the copra and oil contents of the nuts of these progenies are as good those of the 'Tall' variety and superior to those of the 'Dwarf' variety.

(e) *Study of Self, Natural and Cross Progenies of Different Yield Groups.*—Progenies obtained by Self, Cross and Natural pollination from parent trees belonging to the following yield groups were planted in 1942 in a randomised block lay out replicated five times with six seedlings per plot.

1	Trees yielding	above ..	120	nuts per tree per year.
2	Trees yielding	between ..	101 to 120	Do.
3	Do.	Do. ..	81 to 100	Do.
4	Do.	Do. ..	61 to 80	Do.
5	Do.	Do. ..	41 to 60	Do.
6	Do,	Do. ..	forty and below	Do.

The seedlings were under observation for the various palm characters, viz., number of functioning leaves, girth at collar, number of leaflets, length of leaf, etc.

The data gathered during the year regarding the rate of production of leaves, mean number of functioning leaves in the crown, mean length of leaf, mean number of leaflets on one side of the leaf and total number so far produced were statistically analysed. The result of analysis are presented in Table VI and VII.

TABLE VI.—*Coconuts—Comparison of progenies of different yield groups—leaf characters in relation to yield group*—1953.

Serial number and leaf characters.	Yield groups						Standard Error.	Whether 'Z' test significant or not P=0·05.
	Above 120 nuts.	Between 101-120 nuts.	Between 81-100 nuts.	Between 61-80. nuts.	Between 41-60 nuts.	40 nuts and below.		
	A	B	C	D	E	F		
1 Mean number of functioning leaves on the crown in 1953.	14·8	14·9	14·4	14·3	13·8	12·2	1·27	No
2 Mean number of leaves produced so far ..	83·7	86 0	85·4	80·6	76·9	74·4	5·05	No.
3 Mean number of leaves produced in 1953 ..	8·6	8·7	8·6	8·5	8·2	7·9	0·58	No.
4 Mean length of leaves in centimeter	410·4	397·2	397·2	381·9	387·1	384·2	13·90	No.
5 Mean number of leaflets on one side of the leaf.	95·5	94·6	95·0	91·5	68·8	90·1	4·02	No.

TABLE VII.—*Coconuts—Comparison of progenies from different method of pollination leaf characters in relation to the method of pollination*—1953.

Serial number and leaf characters.	Natural pollination.	Cross pollination.	Self pollination.	Standard error.	Whether 'Z' test significant or not P=0·05.	Critical difference P = 0·05.
	N	C	S			
1 Mean number of functioning leaves in the crown in 1953.	14·2	14·9	13·1	0·90	No.	..
2 Mean number of leaves produced so far	79·7	83·7	80·7	3 57	No.	..
3 Mean number of leaves produced in 1953	8·4	8·8	8·1	0·41	No.	..
4 Mean length of leaves in centimetres	396·3	401·9	377·5	9·80	Yes.	19·01
5 Mean number of leaflets on one side of the leaf	93·3	95·9	88·6	2·84	Yes.	5·51

Conclusions :—(1) Mean length of leaves. = $\overline{C, N, S.}$

(2) Mean number of leaflets on one side of the leaf. = $\overline{C, N, S.}$

It is seen from Table VI that the differences in values obtained for none of the leaf characters are significant. However, progenies of low yielding parents, in general, are observed to have lower values for the characters studied. As in previous years, the mean values of the various leaf characters is the lowest for the progenies obtained by self pollination but significant differences are observed in respect of "mean length of leaf" and "mean number of leaflets on one side of the leaf". (Vide Table VII).

All the palms under this study have not yet flowered. A few of them flowered earlier, are in their initial stages of bearing. Observation on the production of spathes, female flowers and nuts were being recorded for individual bearing trees. The details of flowering in 1953 under different treatment are given in Table VIII.

TABLE VIII.—*Coconuts—Percentage of flowering of Progeny Palms under Different Yield Groups and Different Methods of Pollination.*

Serial number.	Yield of the parent trees.	Percentage of trees flowered under different *method of pollination. To the total planted.*		
		Natural.	Cross.	Self.
1	Trees yielding above 120 nuts per tree per year. ..	26·7	40·0	46·7
2	Do. 101 to 120 do. ..	46·7	50·0	30·0
3	Do. 81 to 100 do. ..	46·7	43·3	23·3
4	Do. 61 to 80 do. ..	36·7	36·7	36·7
5	Do. 41 to 60 do. ..	36·7	40·6	13·3
6	Do. 40 and below. do. ..	13·3	30 0	16·7

It may be seen from the above table, that the percentage of palms flowered is low among progenies of the two lower yield groups. Also, it is higher among the progenies of cross and Natural pollination.

(*f*) *Progenies of Exotic Variety Crosses.*—With a view to fixing up promising progenies exhibiting maximum hybrid vigour among the crosses between exotic varieties and the Dwarf, progeny seedlings of various exotic variety crosses were planted at the station during 1943 to 1949. Detailed observations on seedling and palm characters were being made and recorded.

The particulars of the seedlings planted, number flowered so far and the mean values of their palm characters are furnished in Table IX.

TABLE IX.—*Coconut—Progenies of exotic variety crosses—Vegetative characters*—1953.

Year of planting and particulars of crosses.	Number of seedlings available.	Seedlings flowered.	Mean girth of trunk in inches.	Mean number of leaves on the crown.	Mean length of leaf in C. M.	Mean number of leaflets on one side.	Mean height of stem in inches.
1943 Tall × Andaman Dwarf	1	..	..	8·75	295·30	71·00	..
1943 Tall × Chowghat Dwarf	1	1	21·00	17· 9	357 30	93·00	12·00
1943 Tall × Laccadive Dwarf	1	..	..	5·50	15·00	53·00	..
1943 Tall × Andaman Giant	10	1	10·50	10·00	364 60	81·20	10·86
1943 Laccadive small × Andaman Dwarf.	7	..	4·00	10·60	356·40	81.20	0·90
1944 Laccadive × Chowghat Dwarf.	4	1	12·00	11·90	345·90	92·30	17·30
1944 Straits Settlement × Andaman Dwarf.	1	1	27·00	23·30	410·70	100·30	80·00
1945 Tall × Andaman Dwarf	4	..	..	9·40	320·30	82·40	..
1945 Andaman Giant × Laccadive Pink	2	..	..	10·10	252 30	76·40	..
1945 New Guinea × Laccadive Pink	2	..	..	8·00	295·50	74·00	..
1947 Straits Settlement × Andaman Dwarf.	2	..	..	5·80	162·40	49·20	..
1949 Laccadive ordinary × Gangobondam.	1	..	..	5·30	252·30	59·30	..
1949 Laccadive small × Ganga ondam.	3	..	..	6·60	220·40	55 10	..
1949 Andaman Ordinary × Ganga ondam.	3	..	..	7·50	207·50	55·20	..
1949 Java × Gangabondam	3	..	..	7·70	235·20	65·60	..
1949 Cochin China × Gangabondam.	3	..	..	79·0	220 80	57·10	..

The following crosses are found to be promising as judged from these vegetative characters :—

(1) Tall × Chowghat Dwarf.
(2) Tall × Andaman Giant.
(3) Laccadive × Chowghat Dwarf.
(4) Straits Settlements × Andaman Dwarf.
(5) Andaman Giant × Laccadive Pink.

(*g*) *Production of tall × dwarf seed material* —With a view to meeting the high demand for the hybrid seedlings of tall × dwarf, all available inflorescences of selected mother palms at the station were pollinated with pollen from dwarf trees during January to May 1954. A total of 34 inflorescences consisting of 517 female flowers was cross pollinated during the year under report Also 279 pollinated seed nuts of the previous years pollination were harvested and sent to the Agricultural Research Station, Nileshwar III, for rasing seedlings for distribution.

(*h*) *Studies on the progenies of exotic and indigenous varieties.*—Natural progenies of exotic and indigenous varieties of coconut were planted at the station from 1945. They were under observation and study for the various palm characters.

The particulars of seedlings planted and the mean values for the vorious palm characters are presented in Table X.

TABLE X.—*Cocounts—Particulars of progenies of exotic and indigenous Varieties—Mean values for negetative characters in* 1953.

Serial number and particular of variety planted.	Number of seedlings planted.	Year of planting.	Mean values for: Length of leaf in C.Ms.	Number of leaves on the crown.	Number of leaflets on one side of the leaf.	Height of seedlings in C.Ms.	Girth of seedlings in C.Ms.
1 Jaffna	3	1945	298·60	7·30	78·80	855·70	59·70
2 Kappadam	2	1945	146·60	4·25	43·00	183·00	33·00
3 Adhampatnam	3	1945	194 40	5·60	53·40	248·30	35·70
4 Howrah	14	1945	227·80	6·30	57·40	277·50	42·07
5 Cochin China	3	1949	232·96	8·10	53·70	295·30	47·70
6 Java	2	1949	186 80	4·60	36·90	230·50	4 · 0
7 Siam	3	1949	139·90	6·25	28·40	201·00	24·50
8 Laccadive Small	4	1949	261·50	6·90	58·90	305·00	41·00
9 Laccadive Micro	4	1949	181·30	6·10	32·80	220·00	34·30
10 Laccadive ordinary	3	1949	181·70	6·80	33·30	220 00	33·70
11 Andaman ordinary	3	1949	157 60	7·90	37 30	217 70	38·30
12 Andaman Dwarf	1	1949	146·70	6·25	31·30	178·00	30 00
13 Andaman Giant	3	1949	189·80	7·00	44·90	222·70	32 70
14 Tall × Dwarf	4	1949	260·60	9·50	57·20	344·50	57 50
15 Spikeless	4	1949	151·20	7·00	27·70	199·30	31 00
16 Chowghat Dwarf green	2	1949	214 90	12·88	60·40	295·00	55·50
17 Bombay	2	1949	231·70	6·25	60 50	286·50	43·50
18 Indupalli	3	1949	155·70	4·80	31·80	201·30	23·30
19 Omalur	4	1949	177·00	5·50	35·30	217·50	32 00
20 Aloomaculata	1	1950	81·30	5·30	20·70	60 00	14·00
21 Philippines Laguna	3	1951	122 00	5·25	31·50	162·50	21 00

It may be seen from the above table that among the progenies of exotic varieties, the progenies of Cochin-China, Laccadive Small, Jaffna and Andaman Ordinary are promising as judged by the vegetative characters of the seedlings.

Among the indigenous varieties, the progenies of Chowghat Dwarf, Tall × Dwarf and Bombay are quite vigorous.

(*i*) *Spraying trials with guesarol* 550 *against rhinoceros beetle attack.*—The crowns of 25 adult coconut trees were sprayed with Guesarol 550—one pound in 12 gallons of water—during the summer months of the previous year to find out the effect of Guesarol 550 in controlling the incidence of the rhinoceros beetle on coconut. It was observed in the previous year that Guesarol 550 was effective in reducing the incidence of the pest. The observations on the incidence of the pest were continued during this year to study the lasting effect of the chemical sprayed. It was found that the effect of the chemical persisted even after a lapse of 12 months as can be seen from the following :—

Number of beetles caught from the sprayed trees—1953 .. 21
Number of beetles caught from the control (not sprayed) trees—1953. 65

4. *Other crops*—(*a*) *Foodcrops.*—The following food crops were raised on a bulk scale at the station during the year :—

1 Paddy.
2 Ragi.
3 Sweet potato.
4 Tapioca.
5 Horsegram.
6 Groundnut.

The details of the crops grown are presented in Table XI.

TABLE XI.—*Subsidiary crops—Bulk trials.*

Block number and crop.	Area sown acres.	Date of sowing.	Seed rate per acre.	Manures applied per acre. Cattle manure.	Lime.	Ash.
			LB.	LB.	LB.	LB.
II Paddy	1·13	25- 5-53	60	2,000	..	1,000
I and II Ragi	0·50	19- 6-53	12	5,000	..	..
V Horse gram	0·66	8-10-53	32	..	..	..
II and VI Tapioca	0·50	14- 6-53	17,260 setts.	5,000	..	2,000
V Sweet potato	1·25	19- 6-53	..	8,500	..	2,000
II Groundnut (T.M.V. 1) ..	0·10	7- 6-53	80	5,000	..	1,000
II Do.	0·10	14- 7-53	80	5,000	300	1,000
II Do.	0·10	26- 8-53	80	5,000	300	1,000
II Do. (T.M.V. 2) ..	0·30	14- 7-53	105	5,000	270	1,000
II Do.	10·30	25- 7-53	105	5,000	270	1,000
II Do.	0·30	6- 8-53	105	5,000	270	1,000
II Do.	0·25	13- 8-53	105	5,000	270	1,000

Block number and crop.	Manures applied per acre —*cont.* Ammonium sulphate.	Superphosphate.	Date of harvest.	Yield per acre. Grain.	Straw.	Net profit per acre.
	(9)	(10)	(11)	(12)	(13)	(14)
	LB.	LB.		lb.	lb.	RS. A. P.
II. Paddy	70	100	26th September 1953.	500	292	5 0 0
I and II. Ragi	..	..	15th September 1953.	1,088	488	72 4 11
V. Horsegram	..	..	30th January 1954.	116	270	8 8 4
II and VI. Tapioca	..	..	29th December 1953.	8,484	14,400 setts.	104 8 0
V. Sweet Potato	..	..	6th October 1953.	2,189	1,452	48 15 0
II. Groundnut (T.M.V. 1)	..	..	13th November 1953.	2,550	2,650	349 11 0
II. Do.	..	..	13th December 1953.	1,750	2,000	156 9 0
II. Do.	..	..	26th December 1953.	1,100	2,000	59 6 0
II. Groundnut (T.M.V. 2)	..	..	2nd November 1953.	2,400	1,200	421 8 0
II. Do.	..	..	19th November 1953.	2,340	1,200	372 7 0
II. Do.	..	..	12th December 1953.	1,758	1,080	267 9 0
VI. Do.	..	..	13th December 1953.	1,120	480	62 6 0

Groundnut has given maximum net profit per acre during the year. Early sowing of groundnut in June-July was found to be more advantageous than sowing in August. Tapioca also has given good profit.

(*b*) *Vegetables*—(i) *Bendai.*—This was grown in an area of 25 cents in June 1953 in Block I. The crop was manured with cattle manure at the rate of 5,000 lb. and ash at 1,000 lb. per acre. The crop was earthed up in July. A total quantity of 55 lb. of seeds was obtained and sold.

(ii) *Brinjal.*—This was raised in 5 cents in the office block. A total quantity of 20 oz. of seeds was obtained and distributed.

(iii) *Cluster beans.*—Seeds of C.P. 387 and C.P. 78 variety of cluster beans were sown in June 1953 in 7 cents in block I. The crop was manured with 5,000 lb. of cattle manure and 1,000 lb. of ash per acre. The performance of the crop was, in general, poor particularly in the case of C.P. 387 as it could not withstand the heavy rains. A total quantity of 3 lb. 14 oz. of seeds was collected and distributed.

(iv) *New Era cowpea.*—An area of 20 cents in block I was sown to New Era cowpea. The crop was manured with 3,000 lb. of cattle manure and 1,000 lb. of ash per acre. The germination of seeds and subsequent growth of the plants were satisfactory but the crop had a set-back due to severe attack of *Epilachna* beetles. A quantity of 19 lb. of seeds was collected.

(v) *Chillies.*—Two varieties of chillies from Guntur, viz., G.I. and 1402 were raised in 10 cents each in block I. The seeds were sown in the nursery in June 1953 and the seedlings were planted in July. Harvesting of ripe pods commenced in October 1953 and continued up to January 1954. The variety G.I. appeared to be better than 1402 in all respects. The yield of dry pods obtained was as follows :—

G.I.	250 lb. per acre.
1402	196 lb. per acre.

(vi) *Potato.*—The " President " variety of potato was raised in 1½ cents in block I using a seed rate of 1,666 lb. of tubers per acre. Manuring with 5,000 lb. of cattle manure and 3,300 lb. of ash per acre was done as basal dressing. The seeds were sown in October 1953. The germination and subsequent growth were satisfactory. The crop was harvested in January 1954 and a calculated acre-yield of only 565 lb. of small tubers was obtained.

(c) *Fodder crops*—(i) *Thin napier grass.*—The 20-cent plot of thin Napier grass in block VI was maintained during the year for collection of seed and for supply of slips.

A total of 19,710 slips and 49 lb. of seeds were collected and distributed during the year.

(ii) *Guinea grass.*—This grass grows luxuriantly during the monsoon period and a total of 1,600 slips were collected and distributed during the period under report.

(iii) *Other grasses.*—The following grasses were under trial in observation plots :—

(1) Water grass.
(2) Giant Star grass.
(3) Cumbu × Napier grass.
(4) Amphidiploid.
(5) Sorghum Sudanense (S. 283).
(6) Sorghum Sudanense (S. 243).

It was observed that both the types of Sorghum Sudanense could not stand the drought and both of them dried during the summer period of 1954. The Amphidiploid is found to withstand the drought during January to April 1954 to a marked extent. The growth of the other grasses is poor.

(d) *Green manure crops*—(i) *Gliricidia maculata.*—During the period under report 3,033 rooted cuttings and 580 seedlings of this green manure plant were planted at the station along the borders of blocks and footpaths. All the plants have established well.

A total quantity of 12,000 lb. of green leaves was obtained from the plants planted in the previous years. During the year 10,575 cuttings and 900 seedlings of this plant were distributed for planting. A quantity of one pound and thirteen ounces of seeds was collected for further multiplication.

(ii) *Indigofera teysmanii.*—The 15 grown up plants in the office block, raised in the year 1952 have put on satisfactory growth. Each of the plants gave about 30 lb. of green leaf during the year. A total quantity of 12 lb. 13 oz. of seeds was also collected and distributed during the period under report. A total number of

1,872 seedlings were planted along the borders of blocks and foot-paths in between the Gliricidia plants. Also 2,000 seedlings were transferred to other stations for planting.

(iii) *Thespesia.*—The six plants planted in 1950 in block VI have established well and have given an average yield of 18 lb. of green leaf per plant during the year.

(e) *Cover crops*—(i) *Calapogonium mucunoides.*—*Calapogonium mucunoides* raised in observation plot gave an estimated acre-yield of 5,000 lb. of dry organic matter. The crop dries off in February and leaves a thick mulch of dry leaves on the soil. This not only protects the soil from excessive heat during the summer months but also supplies plenty of organic matter. Seeds were collected from the self-sown crop and a quantity of 80 lb. of seeds was obtained for further multiplication.

The seeds of Calapogonium were sown in about 16 acres at the station with the receipt of summer showers in May 1954 as a green manure-*cum*-cover crop. The germination of the seeds and subsequent growth of the plants are satisfactory.

(ii) *Pueraria phaseoloides.*—Growth of *Pueraria phaseoloides* is not as rapid as that of *Calapogonium mucunoides* though the former does not dry off during summer months. From a 5 cent plot of Pureraria in block VI, 2 pounds of seeds were collected.

(f) *Fruit plants*—(i) *Malta lemon.*—The six grown-up plants were utilized for the production of rooted cuttings. A total of 743 rooted cuttings were produced and distributed.

(ii) *Mango.*—During the season 1954, a total number of 15,800 mango stones was collected and planted in the nursery for producing root stock.

During the year, a total of 100 graftings was attempted from which 41 good grafts were obtained for distribution.

(iii) *Cashewnut.*—The usufructuary rights of collecting cashewnut seeds from 35 trees at the station were auctioned for a sum of Rs. 51.

(iv) *Indian gooseberry.*—During the year 46 gooseberry seedlings were distributed for planting.

(v) *Tamarind.*—During the year, 62 tamarind seedlings were distributed from the nursery raised in 1953.

(vi) *Jack.*—During the season in 1954, 860 jack seeds were collected from trees of known quality and sown in the nursery. A total number of 481 jack seedlings was distributed during the year.

(vii) *Yellow passion fruit.*—The five cuttings of passion fruit vines received from Coonoor were planted in the office block in July 1953. All of them have established. The plants flowered profusely in January 1954, but there was no setting.

(viii) *Singapore cherry.*—The condition of the tree planted in the office block is satisfactory. Flowering is profuse and the setting of fruits is quite good.

(g) *Miscellaneous crops*—(i) *Kapok.*—From the 33 kapok trees, a total quantity of 300 lb. of pods was collected. Also, 204 kapok seedlings were produced and distributed.

(ii) *Ochroma lagopus.*—The rate of growth of the plant is not satisfactory. They were manured with 20 lb. of compost per plant and earthed up. The trees are about 13 feet high with an average girth of 6·1 inches.

(iii) *Bastard sago.*—The seeds sown in June 1952 and 1953 failed to germinate.

(iv) *Rattan cane.*—The twelve seedlings of rattan cane planted in block VIII in 1952 are coming up well.

(v) *Pepper.*—The "*Kalluvalli*" variety of pepper vines planted in June 1952 in block VI using coconut as standard, have put on satisfactory growth.

(vi) *Flemingia congesta* (*Indian corn*).—Seeds of this corn received from the Government Lecturing and Systematic Botanist, Coimbatore, were sown in September 1953 in the office block. The initial rate of growth of the plants was not

satisfactory for about three months. Subsequently the growth was found to be very vigorous. All the plants have set pods but the pods were found invariably attacked by borers. A small quantity of seeds has been collected for further multiplication.

(vii) *Hibiscus subdariffa* (*Red gogu*).—An area of 3 cents was sown to this crop in the office block in June 1953. The crop was earthed up once in July. A total quantity of 9 pounds of seeds was collected for distribution.

(viii) *Oyster nut.*—The seedlings of the Oyster nut planted on 14th January 1953 could not stand the severe drought that prevailed during the period under report. Out of the twelve plants, ten died. The condition of the remaining two plants is also poor.

(ix) *Desmanthes virgatus.*—The seeds of *Desmanthus virgatus* received from Government Lecturing and Systamatic Botanist, Coimbatore, were sown in the nursery on 14th April 1953. The five seedlings obtained were transplanted along the boundary mud wall. Their growth is very poor.

5. *Pest and diseases*—(*a*) *Rhinoceros beetle.*—Regular searches were made on the crowns of coconut trees for the rhinoceros beetles and the beetles removed and killed. In all, 907 beetles were destroyed. The manure pits were periodically searched for beetle grubs and the grubs picked and destroyed.

(*b*) *Nephantis serinopa.*—There was no serious incidence of the pest during the period under report. Eulophid and Bethylid parasites reared at the Parasite Breeding Station, Kasaragod, were released in blocks where a mild incidence of the pest was noticed. The pest was completely brought under control.

(*c*) *Bud rot.*—One tree in block X (Tree No. 567) and another in block VIII (Tree No. 92) died of bud rot disease in spite of timely treatment. As a prohpylactic measure, the trees in these two blocks were sprayed with 1 per cent bordeaux mixture.

6. *Seed supply.*—The following seeds and seed materials were supplied during the year under report :—

Serial number and particulars of seeds.	Quantity supplied.	
	LB.	OZ.
1 *Leucaena glauca* seed	10	0
2 *Peuraria phaseoloides* seeds	2	0
3 Brinjal seeds	1	2
4 Hyptis	12	8
5 Cluster bean	3	1
6 Silk cotton seeds	17	0
7 Gliricidia seeds	0	8
8 New Era Cowpea seeds	3	4
9 Thin Napier grass seeds	49	0
10 Horsegram seeds	24	0
11 Bendai seeds	53	14
12 Castor seeds (Co. 1)	0	12
13 Red gogu seeds	3	6
14 Sesbania seeds	1	0
15 *Indigofera teysmanii* seeds	12	13
16 Papaya seeds	0	2
17 *Crotalaria striata*	170	8
18 Ragi	18	0
19 Groundnut pods (T.M.V. 1)	476	0
20 Groundnut pods (T.M.V. 2)	77	0
21 Guinea grass slips	1,600	Nos.
22 Mango grafts	41	,,
23 Brinjal seedlings	282	,,
24 Thin Napier grass slips	19,700	,,
25 Gliricidia seedlings	900	,,
26 Gliricidia cuttings	10,575	,,

Serial number and particulars of seeds.	Quantity supplied LB.	OZ.
27 Silk cotton seedlings	204	,,
28 Papaya seedlings	132	,,
29 Jack seedlings	481	,,
30 *Inguadulce* seedlings	250	,,
31 Drum stick (Jaffna) seedlings	78	,,
32 Tamarind seedlings	62	,,
33 Malta lemon rooted cuttings	743	,,
34 *Indigofera teysmanii* seedlings	2,000	,,
35 Neem seedlings	360	,,
36 Goose berry seedlings	46	,,

7. *Inspection.*—The Director of Agriculture, Madras, inspected the station in January 1954.

8. *Visitors.*—The following were among the prominent visitors to the station :—

(i) Sri U. Krishna Rao, Minister for Industries, Labour and Co-operation, to the Government of Madras.

(ii) Sri C. M. John, Director, Central Coconut Research Station, Kasaragod.

(iii) Sri A. K. Das Gupta, Coconut Development Officer, West Bengal.

(iv) Sri A. K. D. Bala Rama Raja of Rajapalayam.

9. *Steps taken to increase the income of the station.*—The details of the various steps taken to increase the income of the station, the financial statement and the cost of cultivation of the crops grown are appended.

AGRICULTURAL RESEARCH STATION, NILESHWAR,
10*th August* 1954.

P. M. SAYEED,
Superintendent.

AGRICULTURAL COLLEGE AND RESEARCH INSTITUTE,
LAWLEY ROAD POST, COIMBATORE,
16*th August* 1954.

C. R. SESHADRI,
Oilseeds Specialist and Vice-Principal.

APPENDIX I.

STEPS TAKEN TO INCREASE THE INCOME OF THE STATION.

(*a*) *Improvement of irrigation facilities.*—The station is planted to coconut which is grown under rain-fed conditions. Facilities for irrigation are required watering nurseries of economic plants, vegetable and coconut seedlings during the summer months. The water in the existing wells is insufficient during the summer months to work a pumpset with engine. During the year attempts were made to install a filter point in one of the blocks. Though water was met with at a depth of about 25 feet, the flow of water was not sufficient to work an engine. As such the existing wells will be deepened to prove greater supply of water for irrigation in summer.

(*b*) *Adjustment of cropping programme.*—All available area at the station is utilized for planting coconut. Block II which was cleared of all unproductive trees was fully utilized for growing annual crops of Groundnut, Paddy, Ragi and other remunerative crops. Vegetables and nurseries of economic and other plants were raised in the outskirts of block and in the office block. Also, crops like sweet potato and Tapioca were raised under the coconut as subsidiary crops. The growing of subsidiary crops under the coconut besides giving an additional income benifits the main crop also. The production of fruit plants like mango, grafts, rooted mataleon cuttings, seedlings of other fruit and various economic plants like Neem, Tamarind and green manure plants has been taken up on a large scale for sale.

All attempts are being made to reduce the expenditure on the purchase of manures by intensifying the production of organic manures like compost, ash and green leaves. In all blocks where subsidiary crops are not grown, a green manure crop is grown and poughed *in situ*. Green-leaf yielding plants like *Gliricidia maculata* and *Indigofera teysmanii* have been raised all along the boarders of blocks and foot-paths to make the station self-sufficient in its requirement of organic manures.

Regarding the requirement, of fodder for the work animals at the station, it may be stated that all attempts were made to produce fodder to the maximum possible extent by cutting green grass from outskirts of the blocks and converting the same into haversiage. As there is no sufficient area to be set apart for a growing grass alone, the station is short in its requirements by about 3,000 lb. fodder. This was obtained from the Agricultural Research Station, Paiyode. No fodder has, however, been purchased form outside during the year.

(*c*) *Raising of live fence.*—The station is provided with boundary mud walls alround. Adathoda and Agave have been planted all along the mud walls to prevent cattle trespass. In blocks where there are no mud walls, casarina and *Prosopis juliflora* were planted during the previous year but they failed to establish properly. Gliricidia cuttings were planted to serve as support in blocks where there is barbed wire fence. Plants like Kalli, Acacia, etc., will also be tried as live fence.

(*d*) *Cost of cultivation.*—Cost of cultivation of the main crop (coconut) and the details of other bulk crops grown under the coconut and the financial statments are given in Appendices II to VI.

APPENDIX II.

COCONUT—COST OF CULTIVATION PER ACRE OF 56 TREES, 1953—AGRICULTURAL RESEARCH STATION, NILESHWAR II (BLOCK VII).

	RS.	A.	P.
1 Manures and manuring	72	15	10
2 After cultivation (includes the cost of treating for pests and diseases) ..	29	4	9
3 Harvesting	10	7	9
Total cost of cultivation ..	112	11	10
Cost of coconut at 20·0 nuts pet tree or 1,120 nuts per acre at As. 3 each ..	210	0	0
Net gain per acre ..	107	0	6

APPENDIX III.

STATEMENT OF EXPENDITURE FOR THE AGRICULTURAL RESEARCH STATION, NILESHWAR II, FOR THREE FINANCIAL YEARS.

Serial number and details of expenditure	Actual expenditure for three years.		
	1951–52.	1952–53.	1953–54.
	RS. A. P.	RS. A. P.	RS. A. P.
1 Pay and allowances of staff (one-third of actuals)—Farm Manager and Field-man.	846 2 8	844 15 4	909 9 8
2 Miscellaneous cultivation expenses (one-third of actuals).	296 1 11	693 13 8	485 2 1
3 Working expenses (actuals) less miscellaneous cultivation expenses.	9,822 6 0	7,496 11 9	4,046 8 6
4 One-tenth of expenditure on dead-stock and live-stock.	8 8 11	2 11 9	58 15 2
5 Proportionate rent for the land for 39·68 acres at Rs. 15 per acre.	595 3 2	595 3 3	595 3 2
6 Unforeseen expenditure	..	..	..
Total ..	11,563 7 8	9,633 7 8	6,095 6 7

APPENDIX IV.

DETAILS ON THE RECEIPT OF BULK CROPS AT THE AGRICULTURAL RESEARCH STATION, NILESHWAR II.

Serial number and details of crop.	Area in 1953–54 (acres).	Seeds.		Grain.	
		Yield in lb.	Value.	Yield in lb.	Value.
(1)	(2)	(3)	(4)	(5)	(6)
			RS. A. P.		RS. A. P.
1 Paddy	1·12	150	28 2 0	415	77 13 0
2 Ragi	0·50	25	3 2 0	519	64 14 0
3 Sweet potato	1·25	..	..	2,736 tuber.	170 0 0
4 Tapioca	0·50	7,220	36 1 6	1,742 tuber.	108 14 0
5 Groundnut (T.M.V. 1)	0·30	526	115 1 0	26	5 11 0
6 Groundnut (T.M.V. 2)	1·15	475	103 14 6	1,970	430 15 0
7 Horsegram	0·66	25	4 11 0	52	9 12 0
8 Vegetables	0·95	129–1 oz.	191 3 0	..	..
*9 Seedlings, cuttings and grafts, etc.	0·33	..	345 1 0	..	..

Serial number and details of crop.	Straw.		Total receipts for the year.	Total receipts for three years.		
	Yield in lb.	Value.		1951–52.	1952–53.	1953–54.
	(7)	(8)	(9)	(10)	(11)	(12)
		RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
1 Paddy	292	13 3 0	119 2 0	..	51 4 0	119 2 0
2 Ragi	240	7 3 0	75 3 0	..	56 4 0	75 3 0
3 Sweet potato	1,815	18 0 0	188 0 0	25 6 6	206 3 10	188 0 0
4 Tapioca	..	..	144 15 6	48 4 0	354 15 6	144 15 0
5 Groundnut (T.M.V. 1)	867	26 0 0	146 12 0	..	109 0 0	146 12 0
6 Groundnut (T.M.V. 2) ..	1,377 (dry haulms).	41 4 0	576 1 6	..	..	576 1 0
7 Horsegram	180	5 6 4	19 13 4		13 10 0	19 13 4
8 Vegetables	353 (green vegetables).	39 11 0	230 14 0	70 0 0	152 8 0	230 14 0
*9 Seedlings, cuttings and grafts, etc.	..	..	345 1 0	90 0 0	174 8 0	345 1 0

NOTE.—(1) The gross receipts obtained from various bulk crops grown at the station are included in the statement.

(2) The area under different bulk crops during different years has varied but total receipts obtained from the crops irrespective of the area, are included.

(3) The crops are grown as subsidiary crops under the coconut in the case of sweet potato, tapioca and horsegram.

* The last item includes the seeds and seedlings of economic plants which are not included in the other items.

APPENDIX V.

STATEMENT SHOWING THE PARTICULARS OF FARM PRODUCE, RETAINED AND DISPOSED OFF AT AGRICULTURAL RESEARCH STATION, NILESHWAR II.

Serial number and crops.	Seed.				Grain.			
	Retained at the station.		Transferred or sold.		Retained at the station.		Transferred or sold.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	LB.	RS. A. P.	LB.	RS. A. P.	LB.	RS. A. P.	LB.	RS. A. P.
1 Paddy	150	23 2 0	..	..	..	..	415	77 13 6
2 Ragi	7	0 14 0	18	2 4 0	..	..	519	64 14 0
3 Sweet potato	..	..	..	..	..	..	2,736 tubers.	170 0 0
4 Tapioca	7,220 setts.	36 1 6	..	..	..	..	1,742 tubers.	108 14 0
5 Groundnut (T.M.V. 1)	50	10 15 0	476	104 2 0	..	..	26	5 11 0
6 Groundnut (T.M.V. 2).	400	87 8 0	75	16 6 6	..	..	1,970	430 15 0
7 Horsegram	25	4 11 0	..	..	..	..	52	9 12 0
8 Vegetables	17-13 oz.	15 6 0	111-4 oz.	175 13 0	..	..	353 greens.	39 11 0
9 Seedlings, cuttings and grafts, etc.	..	..	..	345 1 0	..	..	..	..

Serial number and crops.	Straw.				Total value.	Total receipts.		
	Retained at the station.		Transferred or sold.			1951-52.	1952-53.	1953-54.
	Quantity.	Value.	Quantity.	Value.				
	LB.	RS. A. P.	LB.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
1 Paddy	292	13 3 0	..	..	119 2 0	..	514 4 0	119 2 0
2 Ragi	240	7 2 0	..	..	75 3 0	..	56 4 0	75 3 0
3 Sweet potato	1,815	18 0 0	..	..	188 0 0	25 6 6	206 3 10	188 0 0
4 Tapioca	..	..	..	..	144 15 6	48 4 0	354 15 6	144 15 6
5 Groundnut (T.M.V. 1.)	867	26 9 0	..	..	146 12 0	..	109 0 0	146 12 0
6 Groundnut (T.M.V. 2).	1,377	41 4 0	..	..	576 1 6	..	.	576 1 6
7 Horsegram	180	5 6 4	..	..	19 13 4	..	13 10 0	19 13 4
8 Vegetables	..	..	..	..	230 14 0	70 0 0	152 8 0	230 14 0
9 Seedlings cuttings and grafts, etc.	..	..	..	..	345 1 0	90 0 0	174 0 0	345 1 0

APPENDIX VI.

STATEMENT OF EXPENDITURE AND REVENUE FOR THE AGRICULTURAL RESEARCH STATION, NILESHWAR II.

Serial number and particulars.	Financial years.		
	1951-52.	1952-53.	1953-54.
	RS. A. P.	RS. A. P.	RS. A. P.
1 Expenditure (working expenses) ..	11,958 0 0	9,510 0 0	5,498 4 9
2 Revenue (including transfer within the section).	3,578 0 0	3,663 0 0	5,046 13 1

ANNUAL REPORT OF THE AGRICULTURAL RESEARCH STATION, NILESHWAR III, FOR THE FASLI YEAR 1363 (1ST JULY 1953 TO 30TH JUNE 1954).

MAIN CROP—COCONUT.

Soil—Sandy.

Season and Rainfall.—The station is not provided with a rain gauge. The seasonal conditions at this station are almost similar to those at Nileshwar II Station which is situated only a mile and a half away to the south-east of the station.

Delayed outbreak of the south-west monsoon rains by about two weeks and the receipt of three to four soaking rains during the period March–May 1954 were the main features of the seasonal condition during the year under report. The summer showers are highly beneficial to the coconut.

2. *Coconut—General.*—All the non-experimental blocks received one ploughing in May–June 1953 at the time of sowing the green manure crop of *Crotalaria striata* and a second ploughing in September–October at the time of incorporating the green manure. Junior hoe was worked once in December 1953.

All the bearing coconut trees in Blocks I to VII received 3 lb. ammonium sulphate and 20 lb. ash per tree during the year. The under-planted young palms, planted in 1948 in Block II, received half the above dose. In addition, a green manure crop of *Crotalaria striata* was raised in blocks where subsidiary crops were not grown. Ammonium sulphate was applied broadcast in September and ploughed in along with the green manure. Half the dose of ash was applied at the time of sowing *Crotalaria striata* and the other half in October.

Ripe coconuts were harvested every month and detailed harvest notes were recorded for all the bearing trees. A total of 8,045 nuts were harvested in 1953 as against 4,889 nuts harvested during the previous year. The details of nuts harvested from 1941 onwards are furnished in Table I.

TABLE I.—*Coconuts—Number of nuts harvested in different years.*

Year.	Total number of trees harvested.	Total number of trees flowered.
1941	5,059	1,207
1942	11,451	1,207
1943	5,392	1,257
1944	7,779	1,273
1945	4,508	1,291
1946	13,067	1,303
1947	9,114	1,368
1948	27,369	1,386
1949	9,525	1,392
1950	6,964	1,392
1951	2,331	1,394
1952	4,889	1,394
1953	8,045	1,394

The block-wise yield of nuts obtained in 1953 are furnished in Table II.

TABLE II.—*Coconut—Block-wise yield of nuts*—1953.

Blocks.	Year of planting.	Number bearing trees.	Yield of nuts in 1953.	Yield of nuts in 1952.	Remarks.
I	1918	90	633	220	Surface planted trees.
II	1918	219	2,523	890	Do.
III	1919	204	1,293	897	Do.
IV	1922–23	173	972	386	Surface planted and lowered trees.
V	1925–32	55	336	226	One foot deep planted trees of known parents.
VI	1928	160	2,228	2,236	Do.
VIII	1930	1	2	1	Six feet deep and 3 feet deep planted trees.
O.C.	1919	8	58	38	Surface planted.

The yield of nuts during 1953 in Blocks I, II and III is high. The increase in yield in Blocks I and II is partly due to the fact that coconut nurseries were raised in these blocks and flood irrigation afforded to the nursery beds during the summer months of 1952 and 1953 benefited the trees to a considerable extent.

3. *Experiments and Research*—(i) *Depth of Planting Experiment—Object.*—To find out the proper depth of planting coconut seedlings in pure littoral sandy soil.

Field—Block VII.

Treatments—

(*a*) 3 feet deep planting.
(*b*) 6 feet deep planting.

Layout.—Paired plots AB, BA replicated 6 times with 12 seedlings per plot.

The planting was done in 1939. The seedlings were under observation for the measurable palm characters, viz., the rate of production of leaves and the number of functioning leaves in the crown. The data gathered during the year 1953 in respect of the two characters were statistically analysed. The results of analysis are presented in Table III.

TABLE III—*Coconut—Depth of planting experiment—palm characters*—1953.

Palm characters.	Treatments. 3' deep Planting (T1).	Six feet deep planting (T2).	'Z' test significant or nor P=0·05.	Standard error.	Critical difference. P=0·05.
Mean number of functioning leaves ..	11·97	9·20	Yes.	0·26	0·668
Mean number of leaves produced ..	6·6	5·1	Yes.	0·129	0·332

Conclusions.—(*a*) Mean number of functioning leaves—T_1, T_2.
(*b*) Mean number of leaves produced.—T_1, T_2.

In respect of both the characters the seedlings planted three feet deep are significantly superior to those planted in six feet deep pits. The results obtained in 1953 are in conformity with the findings of previous years.

All the palms under study have not commenced flowering. The number of palms that have flowered is as follows :—

Treatment.	Number of palms flowered.	Percentage of palms that have flowered.
(1) 3 feet deep planting	22	30·6
(2) 6 feet deep planting	3	4·2

It may be observed that the number of trees that have flowered is more in the 3 feet deep planting than in 6 feet planting. The effect of the treatments will however, be finally judged by the yield performance of the trees when all the palms come to normal bearing.

(ii) *Depth of cultivation Experiment—Object.*—To find out the proper depth to which the soil has to be ploughed or cultivated in coconut gardens, in sandy soils.

Field—Block III.
Area—5·00 acres.

Treatments.—(*a*) Ploughing in the months of July, September and November with cooper plough No. 26 to a depth of 4 inches.

(*b*) Ploughing with cooper No. 34 in the months of July, September and November to a depth of 6 inches.

(*c*) Digging 5 inches deep with Mammutty and forming mounds in September and levelling them up in December–January.

Layout.—Randomized blocks replicated six times with two experimental trees per plot.

The experiment was started in 1948 and the trees have been observed for the various palm characters. No significant differences in the values for the characters studied have been noticed between the treatments.

The data gathered in 1953 were statistically analysed and the results are summarised in Table IV.

TABLE IV.—*Coconut—Depth of cultivation experiment—Palm characters*—1953.

Characters.	Treatments. Ploughing 4" deep (T1).	Plouging 6" deep (T2).	Digging 5" deep (T3).	'Z' test significant or not. P—0·05.	Standard error.
Mean number of functioning leaves.	18·0	17·8	19·4	No.	1·39
Mean number of female flowers produced.	17·5	23·5	27·0	No.	9·40
Mean yield of nuts.	6·1	7·4	8·8	N0.	3·52

As in the previous years, the differences between the treatments in respect of the values for the various characters studied are not significant. The experiment has been discontinued.

(iii) *Pre-Root Formation aud establishment of coconut seedings—Object.*—With the germination of the seed coconut, root production commences in the nursery and increases with the age of the ssedling. The object of the experiment is to find out the relationship between the root formed in the nursery (pre-root formation) and establishment of coconut seedlings subsequent to transplanting.

Field.—Block V.

Treatments.—(*a*) First year (i) One year seedlings 40.
(*b*) Second year (i) One year old seedings 40.
(ii) Two year old seedlings 40.
(*c*) Third year (i) One year old seedlings 40.
(ii) Two year old seedlings 40.
(iii) Three year old seedlings 40.

Twenty seedlings out of 40 under each age group are to be removed from the nursery with all the roots in tact, while in the other set of twenty, the roots are to be cleanly cut off flush with the husk. All the seedlings are to be planted in July-August in pits 3′ × 3′ × 1′ and the seedlings to be removed from the pits when signs of establishment are noticed. Observations on the number of roots newly formed after planting, number of old roots that are surviving or dead and the number of days taken for establishment are to be made and recorded.

Layout.—AB. BA method for the first year and randomised blocks replicated four times in the second and third years. Each plot will have five seedlings planted six feet apart.

Details of work done.—The first set of 40 one year old seedlings planted in September 1952 were under observation for emergence of leaves and subsequent growth. The date of emergence or the second leaf after planting was reckoned as the date of establishment of the seedling. The seedlings were removed from the pits in September 1953 and the number of functioning leaves, number of roots girth at collar and height of the seedlings were recorded. The number of old roots living at the time of removal from the pits in respect of the seedlings planted with roots was also recorded. It was found that most of the old roots were dried up.

The data regarding the period taken for the establishment of the seedlings and the number of new roots formed were analysed statistically. The results of analysis are presented in Table V.

TABLE V.—*Coconut—Pre-root formation—Seedling characters*—1953.

Treatments.	Mean number of days taken for the establishment of seedlings.	Mean number of new roots formed after planting.
One year old seedlings planted with roots	125·50	10·1
One year old seedlings planted with the root cut off ..	127 55	10·6
'Z' test significant or not P=0·05	No.	No
Standard error	15·60	2·84

The differences between treatments in the mean values of the characters studied, are not significant indicating that the roots formed in the nursery are not useful for the establishment of the seedlings after planting.

For the second year, 40 one-year old and 40 two-year old seedlings were removed from the nursery. Twenty seedlings under each age group were planted with all the roots intact while the remaining seedlings were planted with their roots cut off flush with the husk. Planting was done in September 1953 in block V in randomised blocks, replicated four times with five seedlings planted six feet apart in each plot. Observations on the seedling characters were recorded before planting.

The experiment has been discontinued under orders of the Director of Agriculture, Madras, as it is intended mainly to find out the usefulness of planting older seedlings as practiced in the delta area of the circras (Andhra State).

(iv) *Effect of applying cattle manure to cashewnut crop—Object.*—To find out the effect of applying cattle manure to cashewnut trees an observation trial was started.

Two sets of ten bearing trees aged about fifteen years and having almost similar yielding ability were selected for the trial. One set of ten trees received 100 lb. of cattle manure per tree. The manure was applied in September 1953 in circular basins dug round each tree. The second set of 10 trees received no manure but circular basins were dug round the trees and covered as in the case of the manured trees to eliminate the difference due to trenching. The latter served as control. Observations on flowering and yield of nuts of individual trees were made.

During the season in 1954 the flowering was very feeble and none of the trees under the experiment gave any yield.

(v) *Liming experiment—Object.*—To find out the effect of applying lime to the coconut trees in sandy soils of the West Coast.

Field.—Block IV.

Area.—2·50 acres.

Treatments.—(i) Application of general dose of manures and powdered raw shell lime at 5 lb. per tree per year.

(ii) *Control*: Application of general dose of manures without lime.

Layout.—Randomized blocks replicated twelve times.

The required number of trees of similar yielding capacities have been selected for the experiment.

This is a new experiment and the treatments are scheduled to be given during the season in 1954.

(vi) *Irrigation trials—Object.*—To find out the optimum interval of flood irrigation to be given during summer months to improve the condition of poor trees in sandy soils.

Treatments.—Irrigating—

(i) once in seven days
(ii) once in 14 days
(iii) once in 21 days
(iv) once in 30 days.

The required number of trees were selected and the block divided into four plots leaving border trees around. Irrigation will be provided from the main filter point. The irrigations will be started during 1955 from January to May and the effect observed subsequently.

(vii) *Coconut breeding—Tall X dwarf.*—With a view to meeting the demand for Tall X Dwarf hybrid seedlings, cross pollination of 25 selected West Coast Tall trees with the Dwarf was done at the station. In all, 77 inflorescences were pollinated in 1954 season. A total of 183 hybrid seed nuts was harvested from the inflorescences pollinated during the season in 1953. All the seed nuts were sown at the station for raising seedlings for distribution.

4. *Fresh planting.*—A total of 221 selected one-year old coconut seedlings of the West Coast Tall variety were planted in June 1954 in the vacant area of 2·13 acres in block VII where coconut nurseries were raised in previous years. The seedlings were planted in 3' × 3' × 2' pits, 20 feet apart by the square method of planting.

5. *Other crops*—(*a*) *Food crops.*—The following food crops were grown at the station during the year as subsidiary crops :—

(1) Sweet potato.

(2) Groundnut.

The details of the crops raised are given in Table VI.

TABLE VI.—*Subsidiary Crops—Bulk Trials*, 1953.

Block and crop.	Date of sowing.	Area sown in acres.	Seed rate per acre.	Manures applied in lb. per acre.		
				Cattle manure.	Ash	Compost.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
			LB.	LB.	LB.	LB.
X. Sweet potato (local) ..	15th June 1953 ..	0·60	450	5,000	1,000	..
1. Groundnut, T.M.V. 2 ..	1st July 1953 and 15th July 1953.	0·80	100	..	725	2,800

	Acre yield in lb.		Net profit per acre.	Remarks.
	Grain.	Straw.		
	(8)	(9)	(10)	(11)
	LB.	LB.	Rs. A. P.	
X. Sweet potato (local) ..	1943 (tubers) ..	1,233	48 0 0	Profit.
1. Groundnut, T.M.V. 2 ..	316 (pods) ..	504	5 9 0	Loss.

Sweet potato has given a net profit of Rs. 48 per acre while raising of groundnut in the littoral sandy soil at the station is observed to be not remunerative.

(*b*) *Vegetables*—(1) *New erea cowpea.*—This was raised in an area of 2 acres in block I under the coconut. The crop came up well in tne early stages but for want of sufficient moisture in the soil during August-September there was a set-back after flowering, and consequently the pod formotion was poor. A quantity of 18½ lb. of seeds was collected from the crop.

(2) *Cucumber.*—The local variety of cucumber was raised in 20 cents on block X in July 1953. Manuring with 5,00 lb. of compost and 2,500 lb. of ash per acre was done as basal dressing. The crop was earthed up in the last week of August when 1,000 lb. of Gliricidia leaves and 1,500 lb. of cattle manure per acre were applied. The crop was harvested in the second week of October and an acre-yield of 3,400 lb. of fruits was obtained.

(3) *Potato.*—Twenty-five pounds of President variety of potato was sown in 1 cent in October 1953. A basal dressing of 10,000 lb. of cattle manure and 5,000 lb. of ash per acre was given to the plot. The germination was satisfactory. The crop was earthed up one month after planting. It was observed that this crop could not stand the severe sun, in spite of mulching and shading. The crop was harvested in third week of January 1954. A very poor yield of 250 lb. of potato tubers per acre was obtained. The tubers were of very small size.

(*c*) *Fruit plants*—(1) *Margo.*—The graft mango trses in block VII were manured with 20 lb. of cattle manure per tree. Out of 94 trees, only 18 trees flowered during the year and yielded a total quantity af 360 lb. of fruits.

During the year under report, mango grafting was done on selected high yielding trees. A total of 400 grafting was attempted from which 169 grafts were obtained. During the season in 1954, 4,330 mango stones were collected locally and sown in the nursery for raising seedling for grafting.

(2) *Papayas.*—Seeds were collected from selected papaya trees at the station and sown in the nursery beds. A total number of 269 seeding was produced. They were distributed during the season. A tatal quantity of 76 lb. of fruits from seven yielding trees was harvested and sold after collecting seeds.

(3) ***Malta lemon.***—The fourteen plants in the office block were utilized for preparing rooted cuttings. A total of 613 rooted cuttings were produced and distributed to the public during the year.

(4) *Cashewnuts.*—The usufructuary right of collecting cashewnuts at the station was auctioned for a sum of Rs. 606.

A total quantity of 86 lb. of seeds was collected and distributed from 20 selected trees reserved for the purpose.

(*d*) *Greenmanure plants*—(1) *Gliricidia maculata.*—During the year under report, a total of 2,525 cuttings and seedlings of Gliricidia was planted in June 1954 along the borders of blocks and footpaths. The cuttings have started sprouting and the seedlings have established.

(2) *Indigofera teysmanii.*—A total number of 2,500 Indigofera seedling was planted in June 1954 along footpaths and borders of blocks in between Gliricidia plants. The seedlings are coming up well.

(3) *Sesbania speciosa.*—From the Sesbania plants raised along the borders of coconut nurseries during 1953, a total quantity of 10 lb. of seeds was collected. These seeds have been sown during the season in 1954 for multiplication of seeds.

(*e*) *Cover crops*—(1) *Peuraria Phaseoloides.*—The crop of Peuraria raised in 1952 in block VI has established and is coming up well after withstanding the summer of 1953 and 1954.

(2) *Calapogonium mucunoides.*—During the year 1953, attempts were made to raise a crop of Calapogonium from cuttings. Due to the severe drought that prevailed after the cessation of the south-west monsoon rains, the crop failed to establish. The seeds were again sown in blocks II,IV and V in a total areea of about 18 aeres at the commencement of south-west monsoon rains in 1954. Germination was satisfactory, but the subsequent growth is observed to be very much stunted.

(*f*) *Miscellaneous*—(1) *Bastard sago.*—One pound of seeds of bastard sago sown at the commencement of the south-west monsoon rains in 1952 and 1953 did not germinate.

(2) *Velvet beans.*—A total quantity of 2½ lb. of seeds collected in 1952 was sown in an area of 20 cents in the office block and block X. The crop did not come up well and no seeds could be obtained.

(3) *Oil palms.*—Out of the 60 oil palms planted at the station in 1932, eight died and the remaining trees have not yielded any nuts so far. Their condition, in general, is very poor. These palms do not appear to be suitable for being grown in the sandy soil of this station.

(*g*) *Fodder crops.*—The following grasses were under trial at this station in observation plots of about two cents each :—

(i) Sorghum sudanense S. 263.

(ii) Sorghum sudanense S. 243.

(iii) Eleusine indica.

(iv) Eragrostis gangetica.

(v) Eragrostis superba.

(vi) Setaria verticillata.

(vii) Napier grass.

It was observed that the two types of Sorghums and Eleusine indica germinated well ; but they could not withstand the drought in the sandy soil with the cessation of rains and they dried up by December 1953. The two types of *Eragrostis* and *Setaria verticillata* failed to germinate. Napier grass planted in 1952 gave two cuttings in August and October 1953 with a calculated acre yield of 2,671 lb. of green fodder.

6. *Coconut nursery.*—The station is important for coconut nursery work. The seed nuts of the following varieties were procured and planted in the nursery in 1954 season :—

1. Tall × Dwarf hybrids	3,401
2. Exotic varieties	903
3. Dwarf natural	275
4. West Coast tall	2,901

Comprehensive Coconut Nursery Scheme.—During 1953 season, 50,773 nuts were planted in the nursery and 40,000 seedlings are expected to become available for distribution during 1954 season. As in the previous year, the nurseries were raised in the main blocks in between the rows of coconut trees. Flood irrigation was afforded to the nursery beds during the summer months in 1954 with water drawn from the filter points newly installed during the year. Flood irrigation given to the nurseries has also been found to be beneficial to the coconut trees in the nursery area. Perceptible improvement is noticed in the general condition of the trees in the nursery block.

7. *Pests and diseases*—(i) *Rhinoceros beetle.*—The crowns of coconut palms were regularly searched for the beetle. During the year, a total of 758 beetles was caught and killed. The manure pits were periodically searched for bettle grubs. The grubs were picked and destroyed.

(ii) *Nephantis serinopa.*—No serious infestation of Nephantis was noticed during the year under report either on seedlings in the nursery or on adult trees at the station.

(iii) *Ploecaederous ferrugineus.*—This is a serious beetle pest on cashewnut The borer tunnels through the root and stem and ultimately causes the death of the trees. The beetles and grubs were searched for on all the trees at the station. During the year under report, a total of 23 beetles and 20 grubs were collected from the trees and killed. Pyrocone E was injected into three of the affected trees as a trial for the control of the pest. Though the chemical is observed to be effective in killing the grub, the process of injecting the chemical into the beetle holes is found to be difficult as the attack is not confined to trunk alone but also spread over all the parts including the roots under the soil. A detailed trial is proposed to be taken up in collaboration with the Government Entomologist, Coimbatore, to find out an effective control measure against this pest.

8. *Seed supply.*—The following seeds and seed materials were supplied during the year under report :—

1 Coconut seedlings	3,109 Nos.
2 Malta Lemon rooted cuttings	613 ,,
3 Papaya seedlings	269 ,,
4 Mango grafts	147 ,,
5 Sesbania seedlings	200 ,,
6 Neem seedlings	134 ,,
7 Custard apple seedlings	9 ,,
8 Cashew seeds	86 Lb.
9 Thin Napier grass seeds	10 ,,

9. *Tree planting week.*—During the Vanamahotsava week in July 1953, the following seed materials were distributed to the public for planting :—

1 Coconut seedlings	99
2 Papaya seedlings	28
3 Malta lemon cuttings	225

10. *Inspection.*—Sri M. S. Sivaraman, I.C.S., Director of Agriculture, Madras, inspected the station in January 1954.

11. *Steps taken to increase the Revenue of the Station.*—The details of the crops grown and steps taken to increase the income of the station and the financial statement are appended.

P. M. SAYEED,
Superintendent.

AGRICULTURAL RESEARCH STATION, NILESHWAR,
6th August 1954.

C. R. SESHADRI,
Oilseeds Specialist
and
Vice-Principal.

AGRICULTURAL COLLEGE AND RESEARCH INSTITUTE,
LAWLEY ROAD (POST), COIMBATORE,
12th August 1954.

APPENDIX I.

STEPS TAKEN TO INCREASE THE INCOME OF THE STATION.

(*a*) *Improvement of irrigation facilities.*—The station is planted to the perennial crop of coconut which is grown purely under rainfed condition. Irrigation facilities are required to irrigate the coconut nursery and nurseries of economic plants and vegetables. Further, raising of coconut nurseries in the main blocks during 1952 and 1953 has indicated the possibility of improving the yield of the coconut trees as they are indirectly benefited by the irrigation given to the nursery. The discharge of 6,000 gallons of water per hour obtained from the 3 inches filter point tube-well installed at this station in 1952 was not sufficient to bring larger areas under irrigation. Therefore, attempts were made during the year to install two 4 inches filter points side by side and to work them with one oil engine, after coupling the two points as instructed by the Director of Agriculture, Madras. The two 4 inches filter points when coupled and worked with a 7–10 h.p. oil engine pumpset gave very encouraging results with a discharge of 15,000 gallons of water per hour. With the help of this increased supply of water, 8 acres of coconuts in the main blocks were brought under irrigation towards the end of the summer months in 1954. Considerable increase in the yield of coconuts during the next year is expected in the areas irrigated.

(*b*) *Adjustment of cropping programme.*—All the available area at the station has been planted to coconut, cashewnut, mangoes and oil palm. The vacant area available is very limited. This is being fully utilized for growing coconut nurseries, vegetables and other economic plants. Also the inter-space between the coconut in the main blocks was being utilized for raising subsidiary crops like cowpea, groundnut, etc. The soil at this station is extremely poor and as such raising of the various crops has not been quite remunerative. The conditions of the main crop of coconut also is very poor. The soil, however, is ideally suited for coconut nurseries. The production of coconut seedlings of Tall × Dwarf hybrid, Dwarf and other exotic varieties has been intensified to the maximum possible extent during the year. The open area of 2·13 acres which was being utilized for raising coconut nurseries has been planted to coconuts during the year. The cropping programme is adjusted to raise coconut nurseries in the main blocks and also irrigated summer crops like groundnut so that the irrigation given to the coconut nurseries and other crops would indirectly benefit the coconut trees.

In all blocks where subsidiary crops and coconut nurseries are not grown, a green manure crop of *Crotalaria striata* is grown and ploughed *in situ* to improve the soil conditions. In addition, growing of green leaf producing plants of *Gliricidia maculata* and *Indigofera teysmanii* is intensified to a considerable extent by planting them along the foot-paths and borders of blocks. The production of compost from all available plant materials was also intensified during the year under report, with a view to attain self-sufficiency in the requirements of organic manures.

As regards the fodder requirements of the station it may be mentioned that the growth of the indigenous types of grass is very poor due to the very poor nature of the soil. Attempts were made during the year under report to raise different varieties of grasses with a view to fix up suitable types of fodder grass for growing at the station. The fodder requirements of the station s being met during the rainy season from June to December by obtaining grass from borders of locks and odd corners at the station. During the year under report, 2,420 lb. of hay was prepared at the station and 4,000 lb. of hay was got on transfer from Agricultural Research Station, Pilicode. Thus there was no expenditure on the purchase of fodder during the year.

(*c*) *Raising of live fence.*—The station is provided with wire fence alround. Cashewnut trees form the live fence for most of the blocks. In addition, casuarina and gliricidia are planted every year to serve as live fence.

(*d*) *Cost of cultivation.*—The cost of cultivation of the main crop coconut, the details of other crops grown and the financial statement are given in Appendices II to VI.

APPENDIX II.

COCONUT—COST OF CULTIVATION PER ACRE OF 55 TREES, 1953—AGRICULTURAL RESEARCH STATION, NILESHWAR III—(BLOCK II).

	RS. A. P.
After cultivation	17 4 7
Manures and manuring	39 8 6
Harvesting	4 1 11
	60 15 0

	ACS.	RS. A. P.
Yield of nuts per acre	505	
Cost of nuts 505 at Re. 0-3-0 per nut ..		94 11 0
Profit per acre		33 12 0

NOTE.—The trees in the purely sandy soil at this station are very poor.

APPENDIX III.

STATEMENT OF EXPENDITURE FOR THE AGRICULTURAL RESEARCH STATION, NILESHWAR III, FOR THREE FINANCIAL YEARS.

Serial number and details of expenditure.	Actual expenditure for three years.		
	1951-52.	1952-53.	1953-54.
	RS. A. P.	RS. A. P.	RS. A. P.
1 Pay and allowance of staff (one/third of actuals). Assistant in charge.	572 0 0	468 0 0	571 0 0
2 Miscellaneous cultivation expenses (one-third of actuals).	335 9 9	488 4 8	538 12 3
3 Working expenses (actuals) less miscellaneous cultivation expenses.	6,528 8 10	6,080 1 1	3,456 11 0
4 One-tenth of expenditure on live stock and dead stock.	27 0 0	70 8 0	464 1 0
5 Proportionate rent for the land for 43.50 acres at Rs. 7-8-0 per acre.	326 0 0	326 0 0	326 0 0
6 Unforeseen contingencies, if any	..	..	..
Total ..	7,789 2 7	7,432 14 9	5,356 8 3

APPENDIX IV.

Details on the Receipts of Bulk Crops at the Agricultural Research Station, Nileshwar III.

Serial number and details of Crop.	Area in 1953-54 (acres).	Seeds. Yield in lb.	Seeds. Value.	Grain. Yield in lb.	Grain. Value.
			Rs. A. P		Rs. A. P.
1 Sweet potato	0·60	..	..	1,106 tubers.	69 3 0
2 Groundnut	0·80	..	..	253	55 5 0
3 New era cowpea	2·00	181	9 4 0	..	..
4 Cucumber	..	..	..	680 fruits.	47 8 0
5 Sale of seedlings, cuttings and grafts.	..	..	..	..	..
6 Sale of coconut seedlings	..	..	..	..	..

Serial number and details of Crop.	Straw. Yield in lb.	Straw. Value.	Total receipts for the year.	Total receipts for three years. 1951-52.	1952-53.	1953-54.
		Rz. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
1 Sweet potato	740 vines.	9 4 0	78 6 0	38 2 0	40 5 0	78 6 0
4 Groundnut	403	4 0 0	59 5 6	..	16 10 6	59 5 0
3 New era cowpea	..	..	9 4 0	14 0 0	24 8 0	9 4 0
4 Cucumber	..	..	27 8 0	..	..	27 8 0
5 Sale of seedlings, cutting and grafts.	..	..	244 10 0	98 0 0	130 0 0	244 10 0
6 Sale of coconut seedling	..	..	1,897, 2 0	1,613 10 0	941 6 0	1,897 2 0

NOTE.—(1) The gross receipts obtained on various crops grown at the station are included in the statement.
(2) The total receipts obtained from different crops in different years are given irrespective of the area.
(3) The crops were grown as subsidiary crops in the standing crop of coconut.

APPENDIX V.

Statement Showing The Particulars of farm Produce Retained and proposed off at Agricultural Research Station, Nileshwar III.

Serial number and crop.	Seed. Retained at the station. Quantity.	Seed. Retained at the station. Value.	Seed. Transferred or sold. Quantity.	Seed. Transferred or sold. Value.	Grain. Retained in the station. Quantity.	Grain. Retained in the station. Value.	Grain. Transfered or sold. Quantity.	Grain. Transfered or sold. Value.
	Lb.	Rs. A. P.	Lb.	Rs. A. P.	Lb.	Rs. A. P.	Lb.	Rs. A. P.
1 Sweet potato	..	..	..	..	..	..	1,100 tubers.	69 2 0
1 Groundnut	..	..	..	..	..	..	253	55 5 6
3 New are cowpea	18½	9 4 0	..	..	..	..	..	..
4 Cucumber	..	..	..	..	..	..	680 fruits.	27 8 0
5 Sale of seeds, cuttings and grafts.	..	..	..	..	..	..	..	..
6 Sale of coconut seedling.	..	..	..	..	..	..	..	..

Serial number and crop.	Straw. Retained at the station. Quantity.	Straw. Retained at the station. Value.	Straw. Transferred or sold. Quantity.	Straw. Transferred or sold. Value.	Total valu.	Total receipt. 1951-52.	1952-53.	1953-54.
	Lb.	Rs, A, P,	Lb,	Rs, A, P,	Rs, A, P,	Rs. A, P,	Rs, A, P,	Rs. A.P.
1 Sweet potato	740	9 4 0	..	..	78 6 0	38 2 0	40 5 0	78 6 0
2 Groundnut	403	4 0 0	..	..	59 5 6	..	16 10 6	59 5 6
3 New era cowpea		..	..	..	9 4 0	14 0 0	24 8 0	9 4 0
4 Cucumber		..	..	..	27 8 0	98 0 0	..	27 8 0
5 Sale of seeds, cult tings and grafts,		..	..	..	244 10 0	..	130 0 0	244 10 0
6 Sale of cocount seedlings.	..	..	..	..	1,897 2 0	1,613 10 0	941 6 0	1,897 2 0

APPENDIX VI.

STATEMENTS OF EXPENDITURE AND REVENUE FOR THE AGRICULTURAL RESEARCH STATION, NILESHWAR III.

Serial number and particulars.	Financial years.		
	1951-52.	1952-53.	1953-54.
	Rs. A. P.	Rs. A. P.	Rs. A. P.
Expenditure (working expenses) ..	7,533 7 0	7,544 15 0	5,072 0 0
Revenue (including transfers within)			

ANNUAL REPORT OF THE AGRICULTURAL RESEARCH STATION, PALUR, FOR 1953–54 (FASLI 1363).

Season.—A total rainfall of 44·02 inches was received in 55 rainy days as against 29·90 inches in 36 rainy days recorded last year. The average rainfall for the previous ten years was 47·13 inches and that for the previous 48 years since the inception of the station was 49·72 inches. The rainfall was normal during the year and was evenly distributed in all the three seasons, viz., south-west monsoon, north-east monsoon and hot weather. In general the season was favourable. The heavy rains received in the second fortnight of August and during the month of September were helpful for pushing through the preparatory cultivation and planting of Samba paddy. Due to the receipt of normal rain, water was received in the channel from the end of August to March and this water was useful for irrigating the Samba and the Navarai paddy in the early stages. The whole of the Kuruvai crop and the last stages of Navarai paddy had to be maintained completely by pumping out water from the tube-wells. There was a heavy rainfall in December 1953 and this affected to some extent the GEB. 24 and MTU 19 paddy crops which were getting ready for harvest. Severe incidence of blast affected the Thaladi (second crop) and Navarai and hence the yields of paddy during these seasons were very poor.

The maximum temperature during the year ranged from 80°F to 107°F and the minimum from 62°F to 89°F. The highest maximum temperature of 107°F was recorded on 11th, 12th and 13th June 1953 while the lowest minmum temperature of 62°F was recorded on 7th December 1953. The average relative humidity ranged from 72·8 per cent in May 1954 to 89 per cent in October 1953. The highest relative humidity of 98 per cent was recorded on 19th June 1953 and the lowest of 49 per cent was recorded on 29th June 1953 and 9th November 1953. The statements of rainfall and meteorological readings recorded are furnished in *Tables I and II.*

TABLE I.—*Statement of rainfall*—1953–54.

South-west monsoon.

Month.	Week.	1953–54 (F. 1363). Rainfall in inches.	1953–54 (F. 1363). Number of rainy days.	1952–53 (F. 1362). Rainfall in inches.	1952–53 (F. 1362). Number of rainy days.	Average for the last 10 years. (F. 1353–1362). Rainfall in inches.	Average for the last 10 years. (F. 1353–1362). Number of rainy days.	Average for the last 48 years. (F. 1315–1362). Rainfall in inches.	Average for the last 48 years. (F. 1315–1362). Number of rainy days.
June	7–13	..	..	0·04	..	0·04	0·4	0·31	0·98
	14–20	0·94	..	0·49	2	0·60	1·3	0·44	0·19
	21–27	3·95	2	0·47	1	0·12	0·4	0·50	1·19
June-July	28–4	..	..	0·11	1	0·16	0·7	0·33	1·00
	5–11	0·11	1	1·82	2	0·94	1·1	0·57	1·41
	12–18	..	..	0·96	2	0·76	1·7	0·55	1·50
	19–25	0·56	2	0·19	1	1·03	2·1	0·83	1·69
July-August	26–1	0·87	2	..	..	0·82	1·0	0·84	1·57
	2–8	..	..	0·27	1	0·99	1·5	0·93	1·9
	9–15	0·39	1	0·34	1	0·78	1·4	1·36	2·3
	16–22	0·21	1	1·83	3	0·98	1·5	1·22	2·41
	23–29	4·38	3	2·39	3	1·66	2·7	1·10	2·12
August-September	30–5	0·77	2	..	..	0·93	1·4	0·77	1·86
	6–12	2·00	2	..	..	2·27	1·9	1·05	1·66
	13–19	3·90	4	..	..	0·46	1·0	1·19	2·14
	20–26	0·92	1	..	..	0·53	1·1	1·20	1·66
	Total ..	18·10	21	8·91	17	13·07	21·2	13·19	25·78

North-east monsoon.

September-October	27–3	..	..	..	..		2·2	1·47	2·15
	4–10	..	..	1·85	1	1·70	1·4	1·50	2·78
	11–17	3·06	4	1·18	3	0·96	1·6	1·87	2·32
	18–24	4·59	4	2·05	2	1·81	2·1	2·17	3·27
	25–31	5·16	4	0·05	..	1·15	1·4	3·08	3·04
November	1–7	..	..	..	..	1·80	2·1	3·97	3·33
	8–14	0·91	1	..	..	2·08	2·1	2·60	2·84
	15–21	1·27	1	..	..	3·71	2·2	3·15	2·21
	22–28	1·82	4	0·15	1	1·51	2·0	1·62	27·81

TABLE I.—*Statement of rainfall*—1953–54.

North-east monsoon—*cont.*

Month.	Week.	1953–54 (F. 1363). Rainfall in inches.	1953–54 (F. 1363). Number of rainy days.	1952–53 (F. 1362.) Rainfall in inches.	1952–53 (F. 1362.) Number of rainy days.	Average for the last 10 years. (F. 1353–1362). Rainfall in inches.	Average for the last 10 years. (F. 1353–1362). Number of rainy days.	Average for the last 48 years. (F. 1315–1362). Rainfall in inches.	Average for the last 48 years. (F. 1315–1362). Number of rainy days.
November-December	29–5	0·05	..	3·40	3	3·37	1·9	2·41	2·12
	6–12	..	..	3·02	4	2·45	1·9	1·19	1·74
	13–19	1·17	3	0·59	1	3·06	2·4	1·10	1·59
	20–26	0·08	..	1·00	1	1·10	1·0	1·10	1·49
December-January	27–3	0·44	2	0·02	..	0·99	1·0	0·97	1·08
	4–10	1·95	4	0·69	1	0·81	0·9	0·72	0·90
	11–17	0·78	2	0·08	..	0·26	0·2	0·87	0·78
	18–24	..	..	..	..	0·74	0·7	0·38	0·59
	25–31	..	..	..	..	0·11	0·5	0·38	0·49
Total ..		21·28	29	19·08	17	28·84	27·6	30·55	35·40
Hot Weather.									
February	1–7	0·57	1	..	..	..	..	0·80	0·89
	8–14	..	..	..	..	..	..	0·59	0·20
	15–21	..	..	..	..	0·22	0·5	0·18	0·29
	22–28	..	..	..	..	0·16	0·4	0·18	0·39
March	1–7	..	..	..	..	0·44	0·6	0·20	0·39
	8–14	3·47	2	..	..	0·32	0·3	0·38	0·20
	15–21	..	..	..	..	0·09	0·2	0·20	0·20
	22–28	..	..	..	..	0·02	0·1	0·11	0·29
March-April	29–4	..	..	..	..	0·02	0·2	0·18	0·29
	5–11	..	..	0·92	1	0·44	0·6	0·26	0·39
	12–18	..	..	..	..	0·39	0·9	0·51	0·69
	19–25	0·54	2	..	..	0·12	0·1	0·10	0·29
April-May	26– 2	..	..	..	..	0·32	0·5	0·11	0·29
	3–9	..	..	0·99	1	0·29	0·4	0·44	0·51
	10–16	..	..	..	..	0·58	0·8	0·23	0·49
	17–23	..	..	..	..	0·28	0·7	0·85	0·69
	24–30	0·06	..	..	..	1·07	0·9	0·29	0·49
June	31–6	..	..	..	..	0·46	0·8	0·39	0·29
Total ..		4·64	5	1·91	2	5·22	8·0	5·98	6·69
South-west monsoon		18·10	21	8·91	17	13·07	21·2	13·19	25·73
North-east monsoon		21·28	29	19·08	17	28·84	27·6	30·55	35·40
Hot weather		4·64	5	1·91	2	5·22	8·0	5·98	6·69
Grand total ..		44·02	55	29·90	36	47·13	56·8	49·72	67·82

TABLE II.—*Statement showing meteorological observations recorded during* 1953–54.

Name of the month.	Maximum temperature. Highest. °F	Maximum temperature. Lowest. °F	Maximum temperature. Average. °F	Minimum temperature. Highest. °F	Minimum temperature. Lowest. °F	Minimum temperature. Average. °F	Mean relative humidity.	Number of cloudy days.
			1953.					
June	107	92·5	96·5	81	68	77·2	77	12
July	101	86	97·1	76	71	73·5	82·9	12
August	101	86	97	78	68	73	81·5	16
September	100	83	94·4	75	67	73	81	17
October	98	80	91·4	77	68	71·7	85	11
November	98	81	90·5	76	63	69	81	4
December	94	83	89·9	71	62	65	83	5
			1954.					
January	98	85	89·9	73	65	69	86	9
February	96	88	92·2	75	67	70·8	87	1
March	99	88	93·3	80	67	75	85	4
April	103·5	90	97·8	83	78	80	81·9	2
May	105	95	100·6	89	81	85	76·8	7

I. Paddy.

2. Paddy was grown in four seasons, Kar, Samba (single crop) and Thaladi (second crop) and Navarai (hot weather crop). The total area in which paddy was grown was 24·06 acres as against 25·44 acres in the previous year. The details are furnished below :—

	Acs.
Kuruvai season	4·50
Samba season—single and second crops	16·10
Navarai season	3·46
Total ..	24·06

The average yields of paddy for the different seasons are furnished below :—

TABLE III.

Season.	*Grain yield in lb. per acre.*
Kar—(June to September)	2,862
Samba—single crop (July to January)	3,055
Samba Thaladi (second crop) September to February	1,564
Navarai (December to April)	1,743

The yields of strains grown on a bulk scale for seed multiplication were as follows :—

TABLE IV.

Season.	Strain.	Area in acres.	Date of sowing.	Date of harvest.	Average grain yield in lb. per acre.
Kar	PLR. 2 ..	0·50	16— 5—1953	18— 9—1953	2,986
	Co. 18 ..	0·90	16— 5—1953 and 24— 6—1953	29— 9—1953 and 17—10—1953	2,454
	TKM. 3 ..	1·00	21— 5—1953 and 11— 6—1953	3— 9—1953 and 23— 9—1953	3,108
Samba—Single crop	GEE. 24 ..	0·50	10— 7—1953	19—12—1953	2,300
	MTU. 19.	0·50	10— 7—1953	18—12—1953	2,978
	Co. 25 ..	2·65	14— 7—1953 and 29— 7—1953	22— 1—1954 and 10— 2—1954	3,473
	SR. 26B ..	0·10	10— 9—1953	12— 2—1954	1,770
	PTB. 15 ..	0·07	10— 9—1953	12— 2—1954	2,471
	Culture 10022 ..	0·10	10— 9—1953	12— 2—1954	2,280
	,, 10034 ..	0·10	10— 9—1953	12— 2—1954	1,760
Thaladi—Second crop	ASD. 5 ..	0·68	7—10—1953	25— 3—1954	1,565
Navarai	PLR. 2 ..	0·30	29— 1—1954	27— 5—1954	1,542
	Co. 13 ..	0·15	29— 1—1954	17— 5—1954	1,380
	SW. 7 ..	0·19	29— 1—1954	25— 5—1954	2,047
	SW. 1251.	0·25	29— 1—1954	24— 4—1954	2,968
	TKM. 6 ..	0·18	29— 1—1954	15— 5—1954	2,038

The yields of Kuruvai and Samba were satisfactory. Due to severe incidence of blast the yields of Thaladi and Navarai were below normal. In the Kar season TKM. 3 (Sornawari) has recorded the highest yield of 3,186 lb. per acre, while Co. 25 (Blast resistant Sirumani) in Samba, ASD. 5 (Karthigai samba) in Thaladi and SW. 1251 (Sornawari) in Navarai have recorded the highest acre yields of 3,656 lb. 1,613 lb. and 2,968 lb. respectively.

A. COMPARATIVE YIELD TRIALS OF STRAINS AND CULTURES.

3. (*a*) *Kar season.*—Eleven Sornawari pureline cultures from Tirurkuppam were compared against Sornawari strain TKM. 3 and the local strain SW. 7 in randomized and replicated plots. It was found that all the 11 cultures gave increased yields over SW. 7. The results are presented in Table V.

TABLE V.—*Sornawari yield trials—Kar season.*

Field No. 65-66-W.
Previous crop—Sunnhemp.
Manures—
Greem leaf—4,000 lb. per acre.
Super phosphate—100 lb. per acre.
Ammonium sulphate—100 lb. per acre.
Varieties—No. S.W. 7 (Standard), T.K.M. 3, 1691, 1768, 1886, 1888, 8812, 8834, 3876, 8 888 8897, 8924 and 8929.
Layout—Randomized blocks.
Replications—Four.
Size of plot—10′ × 4′.
Date of sowing—8th June 1953.
Date of planting—7th July 1953
Date of harvest—25th September 1953.

Particulars.	S.W. 7 (standard).	TKM. 3.	1691.	1768.	1886.	1888.	8812.	8834	8876.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Grain yield per acre in lb.	2,853	3,774	4,049	3,659	4,178	3,702	3,702	3,400	3,674
Grain yield percentage on standard.	100	132·3	141·9	127·9	146·4	129·7	129·7	119·2	128·8
Flowering duration.	85	81	74	75	75	67	68	73	74

Particulars.	8888	8897.	8924.	8929.	General mean.	Stadard error.	Fisher's 'Z' test satisfied or not.	Critical difference P = 0·05
	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Grain yield per acre in lb.	3,977	3,919	3,977	3,501	3720·4	..	Yes.	409·4
Grain yield percentage on standard.	139·4	134·3	139·4	122·8	130·4	3·75	Yes.	14·35
Flowering duration.	73	67	73	71	..	..	..	..

Conclusion—

1886, 1691, 8888, 8924, 8897, TKM. 3, 1888, 8812, 8876, 1768, 8929, 8834, SW. 7.

Results of the previous work done.

1952-53—All the cultures gave significantly increased yields over SW. 7 though five cultures gave higher yields while six cultures gave lower yields than TKM. 3.

(*b*) *Samba season*—(Single) crop (i) *Varietal yield trials.*—Eight Samba strains, viz., PLR. 1 (Garudan samba). Co. 25 (Blast resistant Sirumani), PTB, 15 (Kavunginpoothala), MTU. 19 (Sanna kusuma), GEB. 24 (Kichili samba), BAM. 3 (Bayahunda), Co. 26 (Blast resistant Molagolukulu) and Co. 19 (Chengleput sirumani (were under yield trials in randomized and replicated plots to find the best strain suitable for the tract. It was seen that Co. 25 has recorded the highest yield significantly above all the rest. Co. 19, PLR. 1. and Co. 26 come next and are on a par among themselves. PTB. 15 which comes next is on a par with Co. 26, while MTU. 19, GEB. 24 and BAM. 3 are on a par among themselves and have recorded significantly poor yields. The details of the experiment and the results are presented in *Table VI.*

TABLE VI.—*Varietal yield trials—Samba season*, 1953-54.

Field No. 62-M.
Privious crop—Sesbania.
Manures—
Green leaf 6,000 lb. per acre.
Super phosphate 100 lb. per acre.
Ammonium sulphate 100 lb. per acre.
Varieties—PLR. 1 (standard), Co. 19, GEB. 24, Co. 25, Co. 26, BAM. 3, MTU. 19 and PTB. 15.
Layout—Randomized blocks.
Replication—Four.
Size of the plot—12' × 4'.
Date of sowing—20th August 1953.
Date of planting—24th October 1953.
Date of harvest—
GEB. 24, BAM. 3 and MTU. 19 on 29th January 1954.
Co. 19, Co. 25, Co. 26, PLR. 1 and PTB. 15 on 27th February 1954.

Particulars.	PLB. 1. (standard)	Co. 19.	GEB. 24.	Co. 25.	Co. 26	BAM. 3.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Grain yield per acre in lb	3,557	3,799	1,198	4,659	3,292	58·1
Grain yield percentage on standard.	100	106·8	33.7	131·6	92·6	16·3
Grain yield percentage on general mean.	133.4	142·4	44·9	174·6	123·4	21·8
Flowering duration in days ..	144	145	100	137	145	100

Particulars.	MTU. 19.	PTB. 15.	General mean.	Standard error.	Fisher's 'Z' test satisfied or not.	Critical difference P—0·05.
	(8)	(9)	(10)	(11)	(12)	(13)
Grain yield per acre in lb.	1,597	2,650	2,666·5	330·50	Yes.	964·50
Grain yield percentage on standard.	44·9	74·5	74·9	9·929	Yes.	27·11
Grain yield percentage in general mean.	59·9	99·4	100	12·40	..	36·11
Flowering duration in days ..	108	134	..	..	..	..

Conclusion—

Co 25 Co. 19, PLR. 1, Co. 26, PTB. 15, MTU. 19, GEB. 24, BAM. 3.

(ii) *Trials of blast resistant strains.*—ADT. 25 was compared with Co. 25 under yield trials in ABBA. fashion repeated twelve times. Co. 25 recorded significantly higher yield than ADT. 25 and the results are presented in *Table VII.*

TABLE VII.—*Trials of Blast resistant strains—Samba season*—1953-54.

Field No. 62-M.
Previous crop—Sesbania.
Manures—
Sesbania leaf at 6,000 lb. per acre.
Super phosphate 100 lb. per acre.
Ammonium sulphate 100 lb. per acre.
Varieties—Co. 25 and ADT. 25.

Layout—ABBA fashion.
Replications—Twelve.
Size of the plot—12'+4'.
Date of sowing—20th August 1953.
Date of planting—24th October 1953.
Date of harvesting—1st March 1954.

Particulars.	Co. 25 (Standard).	ADT. 25.	General Mean.	Standard error.	Students 't' test satisfied or not. P=0·05.	Critical difference P=0·5.
Grain yield per acre in lb.	4,356	3,300	3,828	223·50	No.	..
Grain yield percentage on standard.	100	75·8	87·9	5·13	No.	..
Flowering duration in days ..	140	139	..	..	..	..

(iii) *Trial of culture from Buchireddipalem.*—Culture No. 2092 from Buchireddipalem was compared with Co. 25 under yield trials in ABBA. fashion repeated twelve times. Summary of results is presented in Table VIII and it is seen that Co. 25 has recorded significantly higher yield than culture No. 2092.

TABLE VIII.—*Trials of Blast resistant strains—Samba season*—1953-54.

Field No. 62-M.
Previous crop—Sesbania.
Manures—
Sesbania leaf at 6,000 lb. per acre.
Super phosphate—100 lb. per acre.
Ammonium sulphate—100 lb. per acre.
Varieties—Co. 25 and culture No. 2092.

Layout—ABBA fashion.
Replications—Twelve.
Size of the plot—12'—4'.
Date of sowing—20th August 1953.
Date of planting—24th October 1953.
Date of harvest—1st March 1954.

Particulars.	Co. 25 (standard).	2092.	General Mean.	Standard error.	Students 't' test satisfied or not.	Critical difference P=0·05.
Grain yield per acre in lb.	4,780	3,958.	4,369	54·01	No.	119·5
Grain yield percentage on standard.	100·0	82·8	91·4	1·13	No.	2·50
Flowering duration in days	135	139	..	..	..	..

(c) *Thaladi (second crop.)*—Karthigai samba culture 5108 which is a cross between Kavunginpoothala and ASD. 5 was compared with ASD. 5 anb Co. 2 in randomized and replicated plots. Summary of results presented in Table IX shows that culture 5108 has given significantly higher yields over Co. 2 and ASD. 5,5108 giving 23 per cent increased yields over Co. 2 and 10 per cent over ASD. 5.

TABLE IX.—*Comparative yield trials—Thaladi season*—1953-54.

Field No. 65—66E.
Previous crop—Paddy.
Manures—
Green leaf at 6,000 lb. per acre.
Super phosphate at 100 lb. per acre.
Ammonium sulphate—100 lb. per acre.
Varieties—Co. 2, ASD. 5 and culture No. 5108.

Layout—Randomized blocks.
Replications—Eight.
Size of the plot—20' × 4'.
Date of sowing—7th October 1953.
Date planting—21st November 1953.
Date of harvesting—11th March 1954.

Particulars.	Co. 2	ASD. 5.	5,108.	General mean.	Standard error.	Fisher 'z' test satisfied or not.	Critical difference P=0·05.
Grain yield per acre	2,930	3,295	3,605	3,276·7	88·20	Yes.	268·60
Grain yield percentage on standard.	100·0	112·5	123·0	111·8	2·69	Yes.	8·16
Flowering duration in days ..	108	107	103	..	..	..	..

Conclusion—5108, ASD. 5, Co. 2.

Result of the previous work done :—

1952-53— Results showed that ASD. 5 was superior to culture No. 5108.

(*d*) *Navarai season*—(i) *Varietal yield trials*.—Fifteen Kar and Kuruvai duration strams, vix., TKM. 6 (Sanna Sornawari), ADT. 18 (Vellakurvai), Co. 18 (Vellakar), Sornawari culture 1251' Co. 23 (Rangoon samba), Co. 22 (Arupatham samba), TKM. 3 (Sornawari), Co. 13 (Arupatham kodai) ADT. 16 (Konakuruvai) ADT. 20 (Hybrid kuruvai), ADT. 3 (Kuruvai) and PLR. 2 (Chitrakali) were under yield trials. The experiment was vitiated by the incidence of blast. But the observations revealed that GEB. 24 and TKM. 6 were not affected by blast, where as ADT. 18, PLR. 2, Co. 13, Co. 20 and Co. 22 suffered badly and th e rest of the strains were moderately affected.

In the year 1951–52, seven short duration strains were tried and of these SW. 7 and SW. 1251 gave the best yields while TKM. 3, ADT. 20 and ADT. 16 recorded significantly poor yields. In 1952-53 TKM. 6 was included in the trials and the results showed that TKM. 6 recorded the highest yield and was on a par with ADT. 18. Co. 11 and SW. 1251, while ADT, 15, ADT. 20, Co. 13, and TKM. 3 again recorded significantly poor yields. The strain SW. 7 was eliminated from the yield trial since SW. 1251 which was an improved strain over it (SW. 7) was used in the t rial instead.

(ii) *Mottakar yield trials*.—Three Mottakar cultures from Tirurkuppam, 7521, 10169 and 10178 were compared with Co. 18 (Vellakar), PLR. 2 (Chitrakali) and Mottakar ryot's unselected bulik as standard in randomized and replicated plots for the third year. The experiment was vitiated by the incidence of blast, though the attack was only moderate.

In 1951–52 Mottakar cultures 10169 and 10178 recorded significantly higher yields over Mottakar standard and Co. 18 but were on a par with ADT, 18. while culture No. 7521, recorded poor yield. PLR. 2 was the earliest in duration but gave the poorest yield. In 1952–53, Mottakar cultures 7521, 10169 and 10178 recorded significantly increased yields over Mottakar standard.

(iii) *Vellakar yield trials*.—Three Vellakar cultures from Tirurkuppam 10115, 10047 and 10077 were compared with ADT. 18 (Vellakuruvai), PLR. 2 (Chitrakali) and Co. 18 (Vellakar) in randomized and replicated plots for the third year. The experiment was vitiated by the incidence of blast. The observations revealed that culture 10077 was most susceptible to blast where as the attack in the other two cultures was only moderate.

In 1951–52, culture No. 10077 gave significantly higher yield over Co. 18 standard while the other two cultures were on a par with the standard and in 1952-53 the Vellakar cultures 10115 and 10047 recorded significantly increased yields over Co. 18.

B. Hybridization.

(*a*) *Japonica X Indica crosses*.—(i) F 3 progenies of the following 10 crosses in Japonica X Indica from the Central Rice Research Institute, Cuttack, were grown during the Samba season to isolate and select economic plants useful to the locality and also earlier than GEB. 24.

1. Norin. 6×GEB. 24.
2. GEB. 24×Asahi.
3. Norin. 18×GEB. 24.
4. GEB. 24×Ricku. 132.
5. Asahi×GEB. 24.
6. Ricku. 132×GEB. 24.
7. GEB. 24×Norin. 1.
8. GEB. 24×Norin. 23.
9. GEB. 24×Taichu. 6.
10. GEB. 24×Taichu. 65.

Two hundred and one progenies were studied both under normal and heavy manurial conditions, and 27 apparently pure progenies were carried forward for preliminary yield trials and 138 single plant selections were made for purification.

(ii) Study of the following seven F_2 progenies in Japonica X Indica (ADT. 12) crosses from Cuttack to isolate and select early plants of economic importance useful to the locality was made :—

1. Asahi×ADT. 12.
2. Norin.×ADT. 12.
3. Ricku. 132×ADT. 12.
4. Norin. 18×ADT. 12.
5. Taichu. 65×ADT. 12.
6. Norin. 20×ADT. 12.
7. Norin. 6×ADT. 12

Seven sets of F_2 progenies totalling 7137 plants were studied in detail during Kuruvai season of 1953–54. One hundred promising plants were carried over for purification and further selection.

(*b*) *Interstrain cross progenies.*—To obtain a strain better yielding than GEB. 24 with the same quality, cultures of interstrain crosses 1246 and 4388 from Maruteru were compared against GEB. 24 in randomized and replicated blocks during the Samba season of 1953–54 for the first time. Though the two cultures gave increased yields over GEB. 24, the yield differences were not significant. The trials will be continued. The summary of results is presented in Table X.

TABLE X.—*Comparative yield trials—Samba season*—1953–54.

Field No. 19—S.
Previous crop—Fallow.
Manures—
Green leaf 6,000 lb. per acre.
Super phosphate—100 lb. per care.
Ammonium sulphate—100 lb. per acre.
Varieties—GEB. 24, culture Nos. 1246 and 4388.

Layout—Randomized blocks.
Replications—Ten.
Size of the plot—16′ × 4′.
Date of sowing—10th July 1953.
Date of planting—20th August 1953.
Date of harvest—8th December 1953.

Particulars.	GEB. 24.	1,246.	4,388.	General mean.	Standard error.	Fisher's 'z' test satisfied or not.	Critical difference P=0·05.
Grain yield per care in lb. ..	3,715	3,927	3,997	3,879·7	124·5	No.	369 7
Grain yield percentage on standard.	100·0	105·8	107·6	104·5	3·35	No.	9·95
Flowering duration in days ..	110	123	113	..	..	..	..

Conclusion—4388, 1246, GEB. 24.

(*c*) *Trial of hybrid strain from Madhyapradesh.*—Gurmatia × Luchai × Burma cross strain from Madyapradesh which was claimed to have given very high yields was compared against Co. 13 and Co. 18 in randomized and replicated plots to study the yield during the Kuruvai season of 1953–54. The yield of this strain was very poor when compared with the local strains. Further the duration also was longer by 55 to 60 days. The results are presented in *Table XI.*

TABLE XI.—*Comparative yield trials—Kuruvai season*—1953–54.

Field No. 65-66-M.
Previous crop—Sunnhemp.
Manures—
Green leaf—4,000 lb per acre.
Super phosphate—100 lb. per acre.
Ammonium sulphate—100 lb. per acre.
Varieties—Co. 13, Co. 18, Gurmatia X Luchai X Burma.

Layout—Randmized blocks.
Replications—Eight.
Size of the plot—20′ × 4′.
Date of sowing—8th June 1953.
Date of planting—10th July 1953.
Date of harvest—
Co. 13 and Co. 18 on 8th September 1953.
Gurumatia X Luchai X Burma on 11th November 1953.

Particulars.	Co. 13 standard.	Co. 18.	Gurmatia X Luchai X Burma cross.	General mean.	Standard error.	Fisher's 'z' test satisfied or not.	Critical difference P=0·45.
Grain yield per acre in lb. ..	3,410	2,653	2,051	2,705	172·9	Yes.	525·2
Grain yield percentage on standard.	100·0	77·8	60·2	79·3	5·07	Yes.	15·40
Flowering duration in days ..	70	84	119	..	..	..	..

Conclusion—Co. 13 standard, Co. 18, Gurmatia X Luchai X Burma.

(*d*) *Alkaline resistance.*—Ninety-five cultures from the progeny of the following five sets of crosses to evolve alkaline resistant strains suitable to the tract were studied during the Samba season and 34 pure cultures were selected and carried over for further tests during the next season in the typical alkaline area in the district.

Cross.	Number selected. NOS.
1. PTB. 15 × T. 892	8
2. Co. 10 × Bairuvadlu	5
3. Co. 23 × T. 892	5
4. Co. 2 × T. 892	4
5. ADT. 22 × T. 892	12

Thillainayagam, a local variety grown in the typical alkaline area in Vridhachalam taluk was obtained and was planted during the Samba season of 1953–54 for making single plant selections. One thousand three hundred and sixty-five plants were studied in detail for economic characters and 200 single plant selections were carried over for further selection.

(e) *Quality improvement.*—To improve the quality and test for resistance to blast one hundred and one hybrid cultures of F_5^s from the progeny of the following three crosses were put under preliminary yield trials during the Samba season with PLR. 1, Co. 19 and Co. 25 as standards. ADT. 10 was planted all round for favouring the incidence of blast. The area was manured with 10,000 lb. of green leaf and 500 lb. of ammonium sulphate to induce blast incidence. Twenty promising cultures which appeared resistant to blast were selected and carried forward for preliminary yield trials and 54 single plant selections were made for purification.

	Pure lots.	*Single plant selections.*
1. PLR. 1 × Co. 19	5	24
2. PLR. 1 × Co. 4	9	24
3. Co. 26 × Co. 19	6	6

4. *Manurial experiments*—(i) *Organic matter requirements of the paddy soil.*—The object of the experiment is to determine the organic matter requirements of the soil. The organic matter was supplied in the shape of cattle manure, green manure and compost. The experiment was conducted with ten treatments during the Samba season with Co. 25 in randomized and replicated plots. The results are not statistically significant. But the trend of the yield figures indicates that the treatment receiving 2,500 lb. of cattle manure and green leaf equivalent to the organic matter contained in cattle manure has recorded increased yield over no manure plots. Details of the experiment and the results are presented in *Table XII.*

TABLE XII.—*Organic matter requiremets of Paddy—Samba season*—1953–54.

Field No. 63-W.
Previous crop—Fallow.
Variety—Co. 25.
Layout—Randomized blocks.
Replication—Four.
Size of plot—18′ × 24′.
Date of sowing—29th July 1953.
Date of planting—23rd and 24th September 1953.
Date of harvest—5th February 1954.

1. No manure—Organic.
2. Cattle manure at 2,500 lb. per acre.
3. Cattle manure at 5,000 lb. per acre.
4. Cattle manure at 7,500 lb per acre.
5. Green leaf (daincha) equivalent to 2 organic matter basis.
6. Green leaf (daincha) equivalent to 3 on organic matter basis.
7. Green leaf (daincha) equivalent to 4 on organic matter basis.
8. Compost equivalent to 2 on organic matter basis.
9. Compost equivalent to 3 on organic mattr basis.
10. Compost equivalent to 4 on organic matter basis.

Particulars.	Treatments.									
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Grain yield per acre in lb.	3,209	3,306	3,241	3,106	3,393	2,674	3,3024	3,235	3,128	3,176
Grain yield percentage on standard.	100·0	103·0	100·9	96·8	105·7	83·3	94·2	100·8	97·5	98·9
Grain yield percentage on general mean.	101·4	105·0	102·9	98·6	107·7	85·0	96·0	102·7	99·3	100·8

Particulars.	General mean.	Standard error.	Fisher's 'z' test satisfied or not.	Critical difference P = 0·05.
	(12)	(13)	(14)	(15)
Grain yield per acre in lb.	3,149·2	19·57	Not.	....
Grain yield percentage on standard.	98·1	0·61	Not.	....
Grain yield percentage on general mean.	100·0	0·62	....	....

Results of the previous work done :—

1952–53— Z ' test was not satisfied for grain yield while for straw yield all the manurial treatments recorded nificantly increased yields over no manure.

(ii) *Permanent manurials.*—The object of the experiment is to find out the direct manurial value of organic manures and in-organic fertilizers to paddy crop and to find out the necessity to lime the paddy soils for correcting acidity. The experiment with the following five main treatments and eight sub-treatments in split plot design randomized and replicated four times was conducted during the Thaladi season with the strain Co. 2.

Treatments—Main plots :—

(1) No nitrogen.
(2) 60 lb. nitrogen per acre as ammonium sulphate.
(3) 60 lb. nitrogen per acre as compost.
(4) 60 lb. nitrogen per acre as cattle manure.
(5) 60 lb. nitrogen per acre as green manure.

Sub-plots :—

0 lb. and 60 lb. P_2O_5 per acre .. ..
0 lb. and 60 lb. K_2O per acre .. .. } Combination totalling 8 sub-plots.
0 lb. and 1,500 lb. of lime per acre ..

Due to severe attack of blast the experiment failed and hence no conclusion could be drawn. During 1952–53 also the experiment was a failure due to heavy incidence of mealy bug and the floods.

(iii) *Nutrient requirement of paddy.*—The object of the experiment is to find out the economic dose of nitrogen and phosphoric acid required for paddy. Treatments consisted of 0 lb., 30 lb., 45 lb. and 60. lb. nitrogen per acre as ammonium sulphate and 0 lb., 30 lb., 45 lb., and 60 lb., P_2O_5 per acre as super phosphate alone and in combination. The experiment with 16 treatments randomized and replicated four times was conducted during the Samba season with Co. 25. Details of the experiment and summary of results are presented in Table XIII. Though the treatments receiving 60 lb. nitrogen and 30 lb. of P_2O_5, per acre have recorded increased yields over the control, the 'Z' test was not satisfied.

TABLE XIII.—*Nutrient requirement of paddy—Samba season*—1953–54.

Field No.—61.
Previous crop—Fallow.
Lay out—Randomized blocks.
Replication—Four.
Plot size—32' × 10'.
Variety—Paddy Co. 25
Treatment—10.
Aim of the experiment—To find out the economic dose of nitrogen and P_2O_5 required for paddy.
Date of sowing—14th July 1953.
Date of planting—5th September 1953.
Date of harvest—2nd, 3rd February 1954.

Treatments—

1. No manure.
2. N. at 30 lb. per acre as ammonium sulphate.
3. N. at 45 lb. per acre as ammonium sulphate.
4. N. at 60 lb. per acre as ammonium sulphate.
5. N. at 30 lb. per acre at ammonium sulphate and P_2O_5 at 30 lb. as super phosphate.
6. N. at 30 lb. per acre as amonium sulphate and 45 lb. as super phosphate.
7. N. at 30 lb. per acre as ammonium sulphate and 60 lb. as super phosphate.
8. N. at 45 lb. per acre as ammonium sulphate and 30 lb. as super phosphate.
9. N. at 45 lb. as ammonium sulphate and P_2O_5 at 45 lb. as super phosphate.
10. N. at 45 lb. as ammonium sulphate and P_2O_5 at 60 lb. as super phosphate.
11. N. at 60 lb. as ammonium sulphate P_2O_5 at 30 lb. as super phosphate.
12. N. at 60 lb. as ammonium sulphate and P_2O_5 at 46 lb. as super phosphate.
13. N. at 60 lb. ammonium sulphate and P_2O_5 at 60 lb as super phosphate.
14. P_2O_5 30 lb. alone as super phosphate.
15. P_2O_5 at 45 lb. alone as super phosphate.
16. P_2O_5 at 60 lb. alone as super phosphate.

Particulars.	Treatments. 1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Grain yield per acre in lb.	3,589	3,470	3,620	3,611	3,651	3,744	3,880	3,474	3,651	3,468	3,680
Grain yield percentage on standard.	100	96·2	99·9	97·7	97·4	100·0	103·6	92·8	97·4	92·5	98·3
Grain yield percentage on general mean.	103·3	99·3	103·2	100·8	100·7	103·3	106·9	95·9	100·7	95·6	101·6

Particulars.	Treatments—*cont.* 12.	13.	14.	15.	16.	General mean.	Standard error.	Fisher's 'Z' Test satisfied or not.	Critical difference P = 0·05.
	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
Grain yield per acre in lb.	3,575	3,606	3,503	3,489	3,503	3,595·3	200·3	No.	..
Grain yield percentage on standard.	96·5	92·6	93·8	93·2	93·8	96·8	5·58	No.	..
Grain yield percentage on general mean.	98·6	99·4	96·8	96·8	96·8	100	5·76	..	..

Results of the previous work done :—

1952–53—'Z' test was not satisfied for grain yield, while for straw yield, treatments with 30, 45 and 60 lb. P_2O_5 per acre have recorded the highest yields.

(iv) *Application of phosphate to paddy through green manure crop.*—To determine the effect on the yield of paddy following the green manure crop which has been manured with super phosphate, a replicated experiment with the following treatments in randomized blocks was conducted during the samba season of 1953–54.

Green manure crops.—Wild Indigo, Pillipesara, Sunnhemp, Daincha and sesbania.

Treatments—

1. Sowing the green manure with 45 lb. P_2O_5 per acre and paddy transplanted without P_2O_5.

2. Sowing the green manure without P_2O_5 but applying 45 lb. P_2O_5 to paddy.

3. Sowing green manure without P_2O_5 and paddy planted without P_2O_5.

The results did not show any difference between the different treatments. Details of the experiment and summary of results are presented in *Table XIV*.

TABLE XIV.—*Experiment on application of Phosphatic manure to Green manure crop—Samba season*—1953–54.

Field No. 60.
Previous crop—Fallow.
Variety—PLR. 1.
Layout—Randomized blocks.
Replication—Four
Size of plot—17′ × 28′.
Date of sowing—20th August 1953.
Date of planting—20th October 1953.
Date of harvest—25th February 1954.

Treatments—

1. 45 lb. P_2O_5 to sesbania alone.
2. No. P_2O_5 to sesbania and to paddy.
3. No. P_2O_5 to sesbania and 45 lb. P_2O_5 to paddy
4. 45 lb. P_2O_5 to pillipesara alone.
5. No. P_2O_5 to pillipesara and to paddy.
6. No. P_2O_5 to pillipesara and 45 lb. P_2O_5 to paddy.
7. 45 lb. P_2O_5 to wild indigo alone.
8. No. P_2O_5 to wild indigo and paddy,
9. No. P_2O_5 to wild indigo and 45 lb. P_2O_5 to paddy.
10. 45 lb. P_2O_5 to Daincha alone.
11. No. P_2O_5 to Daincha and to paddy.
12. No. P_2O_5 to Daincha and 45 lb. P_2O_5 to paddy.
13. 45 lb. P_2O_5 to Sunnhemp alone.
14. No. P_2O_5 to Sunnhemp and paddy.
15. No. P_2O_5 to Sunnhemp and 45 lb. P_2O_5 to paddy.

Particulars.	Treatments. 1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Grain yield per acre in lb.	2,400	2,498	2,529	2,861	2,735	2,420	2,280	2,353	2,720	2,736	2,654
Grain yield percentage on general mean.	92·9	96·8	98·0	110·9	105·9	93·8	88·3	98·9	105·4	106·0	102·8

Particulars.	Treatments—*cont.* 12.	13.	14.	15.	General mean.	Standard error.	Fisher's 'Z' test satisfied or not.	Critical difference P = 0·05.
	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
Grain yield per acre in lb.	2,595	2,466	2,702	2,647	2,579·7	148·1	No.	..
Grain yield percentage on general mean.	100·6	95·5	104·7	98·7	100·0	5·74	No.	..

(v) *Japanese method of paddy cultivation.*—To compare the Japanese method of cultivation as practised by Kora Gramodyog Kendra, Bombay, with the farm method, an experiment in split plot design was conducted during the Samba season of 1953–54.

Main treatments.—Two strains Co. 25 and Co. 19.

Sub-treatments.—Two. Japanese method *vs.* farm method.

The Japanese method of paddy cultivation recorded significantly increased yield of grain over the farm method but there was no interaction between strains and methods. This shows that both Co. 19 and Co. 25 have responded almost equally to the method. With regard to straw, the results are significant for the methods, varieties and the interaction between the methods and varieties. Even though the yield in the Japanese method is much higher than the yield in the farm method, the net profit obtained per acre was only Rs. 30 more than the farm method, as the cost of cultivation in the Japanese method is very high. Details of the experiment and summary of results are presented in *Table XV.*

TABLE XV.—*Japanese method* vs. *Farm method of paddy cultivation—Samba seaon*—1953–54.

Field No. 63-E.
Previous crop—Fallow.
Size of the sub-plot—8′ × 32′.
Layout—Split plot design.
Replications—Eight.

Treatments—
Main—Strains. Co. 19 and Co. 25.
Sub-Methods.—Farm method and Japanese method.
Date of sowing—5th August 1953.
Date of planting—18th September 1953.
Date of harvesting—13th February 1954.

Summary of conclusions (for methods.)

Grain yield.

Particulars.	General mean.	Standard error.	'Z' test satisfied or not.	(For methods). Critical difference (P = 0·05).
Acre yield in lb.	3,531·5	140·3	Yes.	41·29
Percentage on general mean ..	100·0	3·98	Yes.	11·69

Conclusion—Japanese method, Farm method.

Straw yield.

Particulars.	General mean.	Standard error.	'Z' test satisfied or not.	(For methods). Critical difference (P = 0·05).
Acre yield in lb.	4,951·5	107·40	Yes.	326·7
Percentage on general mean ..	100·0	2·17	Yes.	6·60

Conclusion—Japanese method, Farm method.

Summary of conclusions (for varieties.)

Straw yield.

Particulars.	General mean.	Standard error.	'Z' test satisfied or not.	Critical difference (P = 0·05).
Acre yield in lb.	4,951·5	138·7	Yes.	465·9
Percentage on general mean	100·0	2·80	Yes.	9·41

Conclusion—Co. 19, Co. 25.

Summary of conclusions (for interaction).

Straw yield.

Particulars.	General mean.	Standard error.	'Z' test satisfied or not.	Critical difference (P = 0·05).
Acre yield in lb.	4,951·5	151·9	Yes.	461·8
Percentage on general mean	100·0	3·07	Yes.	9·33

Conclusion—Co·19J, Co. 25J, Co. 19F, Co. 25F.

Economics of cultivation—

Particulars.	Kora method. Co. 25.	Kora method. Co. 19.	Farm method. Co. 25.	Farm method. Co. 19.
Yield of grain in lb. per acre	3,914	3,831	3,303	3,078
Yield of straw in lb. per acre	4,832·5	5,905·0	4,384·0	4,684·5
	RS. A. P.		RS. A. P.	
Value of produce per acre	820 14 6		678	
Cost of cultivation	443 9 6		331	
Profit per acre	377 5 0		347	

(vi) *Increase in yield experiment.*—(*a*) *Kuruvai season.*—The experiment with six treatments randomized and replicated four times was conducted during the Kuruvai season with ADT. 20.

All the five treatments have recorded significantly increased yields over the ryots' method. Treatment 3 which received 10,000 lb. green manure and 300 lb. super phospate which recorded the highest yield gave 45·2 per cent increased yield over the ryots' method. Details of the experiment and the results are presented in the *Table XVI.*

TABLE XVI.—*Increase in Yield Experiment—Kuruvai season*—1953-54.

Field No. 56-57.
Previous crop—Fallow.
Layout—Randomized blocks.
Replication—Four.
Size of the plot—Gross 19' × 46'.
Variety—ADT. 20.
Date of sowing—31st May 1953.
Date of planting—30th June 1953.
Date of harvest—17th September 1953.

Treatments—
1. Ryots method—No manure—control,
2. Green leaf at 5000 lb. + super phosphate 150 lb, + ammonium sulphate 150 lb. per acre.
3. Green leaf at 10,000 lb. + super phosphate 300 lb. per acre.
4. Same as 3 + ammonium sulphate 100 lb. per acre.
5. Same as 3 + lime at 1,000 lb. per acre.
6. Same as 4 + lime at 1,000 lb. per acre.

Particulars.	Treatments.						General mean.	Standard error.	Fishers 'Z' test satisfied or not (P = 0·05)	Critical difference
	1.	2.	3.	4.	5.	6.				
Grain yield per acre in lb.	2,878	3,545	4,179	4,020	3,913	4,096	3,772	166·9	Yes.	502·7
Grain yield percentage on standard.	100·0	123·1	145·2	139·6	135·9	142·3	131·0	5·80	Yes.	17·47
Grain yield percentage on general mean.	76·3	94·0	110·9	103·5	103·7	108·6	100·0	4·43	..	13·29

Conclusion—3, 6, 4, 5, 2, 1.

(*b*) *Samba season.*—The experiment with six treatments was repeated with Co. 19.

Though treatment 3 has recorded 10·6 per cent increased yield over the control the yield differences were not statistically significant. Details of the experiment and the results are presented in the *Table XVII.*

TABLE XVII.—*Increase in Yield Experiment—Samba season*—1953-54.

Field No. 18.
Previous crop—Fallow.
Variety—Co. 19.
Lay out—Randomized blocks.
Replications—Four.
Size of Plot—Gross 15' × 73'.
Date of sowing—29th July 1953.
Date of planting—5th, 6th October 1953.
Date of harvest—10th and 11th February 1954.

Treatments—6.
1. Ryots method—2,000 lb. green leaf—control.
2. Green leaf at 5,000 lb. + super phosphate 150 lb. + ammonium sulphate 150 lb. per acre.
3. Green leaf at 10,000 lb. + super phosphate 300 lb. per acre.
4. Same as 3 + ammonium sulphate 100 lb. per acre.
5. Same as 3 + lime at 1,000 lb. per. acre.
6. Same as 4 + lime at 1,000 lb. per acre.

Particulars	Treatments.						General mean.	Standard error.	Fisher's 'Z' test satisfied. or not. (P = 0.05)	Critical difference
	1.	2.	3.	4.	5.	6.				
Grain yield per acre in lb.	3,050	3,219	3,581	3,231	3,037	3,154	3,219.3	..	No.	..
Grain yield percentage on standard.	100	105.4	117.9	105.9	101.9	103.4	105.4	..	No.	..
Grain yield percentage on general mean.	94·75	99·91	111·30	102·00	95·92	98·00	100	..	..	..

(*c*) *Thaladi season.*—The experiment with two treatments was conducted with ASD. 5.

The treatment 2 has recorded significantly higher yield with 47·7 per cent increased yield over no manure plots. Details of the experiment and the results are presented in Table XVIII.

TABLE XVIII.—*Increase Yield experiment—Thaladi season* 1953-54.

Field No. 59-57
Previous crop—Paddy.
Layout—ABBA.
Replication—Twenty-four.
Size of the plot—Gross 19' × 23'
Variety—ASD.5.
Date of sowing—7th October 1953.
Date of planting—12th November 1953.
Date of harvest—8th and 9th March 1954.

Treatments—
1. No. manure.
2. Sesbania leaf 2,000 lb. + ammonium sulphate 100 lb. + super phosphate 100 lb. per acre.

Particulars.	Treatment. 1.	Treatment. 2.	General mean.	Standard error.	Student's 't' test satisfied or not.	Critical difference = 0·65
Grain yield per acre in lb. ..	1,979	2,924	2,451·5	200·5	Yes.	136·8
Grain yield percentage on standard.	100·0	147·7	123·8	10·14	Yes.	6·91
Flowering duration in days ..	98	100	..	..	..	..
Conclusion—2, 1.						

II. Cotton.

5. *Cotton—Bulk crop.*—P. 216F was grown on an area of 1·40 acres. Dibbling of seeds was done on 14th April 1953 and the picking was completed by 24th September 1953. It has recorded an acre yield of 900 lb.

6. *Breeding trials.*—The cotton breeding trials at the Agricultura Research Station, Palur, are a part of the scheme for the evolution of long staple cotton in Madras State financed by the Indian Central Cotton Committee under the control of the Cotton Specialist and are attended to by one Assistant and a fieldman stationed in the farm. The object of the scheme is to evolve and isolate a Barbadense type of hybrids equivalent to the average imported Egyptian types and suitable for cultivation in the coastal regions of South Arcot district.

A short summary of the work done under the scheme is furnished.

(*a*) The time of sowing experiment conducted in small p ots during 1950–52 to study the possibility of raising cotton successfully in winter season showed that August sowing gave higher yields. To confirm this finding the same experiment was repeated in bigger plots of two cents with four dates of sowings, viz., August, September, December and March. Three varieties, viz., 0734, MCU. 2 and MCU .1 were sown in the trials. Results in 1953 proved to be contrary to the previous findings. Due to heavy rains and flood in the north-east monsoon period, August and September sowings failed to give good yields. January sowings gave the maximum yield in 1953. The experiment was repeated in 1953–54. August and September sown plots have again given poor yields during 1954. Harvest in December and March sown plots are in progress and data will be available after he completion of harvest.

(*b*) Ten long linted hirsutum cultures were sown in bulk yield trials with MCU 1 and MCU 2 as controls. Culture 119, derivative from a cross between MCU 2 × Giza 36 is early and has given highest yield in 1953 and 1954 seasons as well. The following cultures, viz., 3–4, 3–8, 0603, MCU 2–446-E, 80–5 and 119 are promising for yield and other economic attributes.

(*c*) One hundred and twenty-eight progenies mostly from inter-specific crosses were tested in the progeny row trials in 1953 summer. After field examination only 68 were picked and analysed for economic characters. From the promising cultures 100 single plants were selected and they were sown again in progeny row trials during 1954. After examination in the field the progenies have been selected for picking.

(*d*) During 1953, 70 inter-specific crosses were studied in the F2 generation in replicated blocks. Of these only 29 were found desirable for further study. From the promising crosses 92 single plants were selected and sown in the F3 generation for study in 1954. Field examination of lint length and productivity of the progenies revealed that only 48 selections were desirable for further trial and hence these alone are being picked.

(*e*) Forty-eight hybrids from 29 crosses were sown in the second generation at Palur during 1954. Of these 23 combinations were found desirable on the point of yield and staple length and these alone are being harvested. The pickings are in progress.

(*f*) As the climatic conditions at Palur are not conducive for proper setting of seeds in cotton, part of the work which was continued at Palur was also shifted to Srivilliputhur during this year.

7. *Cotton in rice fallows—(a) Bulk crop.*—P. 216F was dibbled in fields 20, 54-S and 67–69 totalling an area of 2·10 acres on 18th, 20th and 21st March respectively. The picking of kapas started from the 1st week of July 1954.

(*b*) *Study of residual effect in rice crop.*—To study the residual effect of growing cotton in rice fallows, an experiment was laid out in randomized blocks with three treatments.

The strain Co. 5 paddy was grown in the Samba season. 'Z' test was not satisfied for grain yield while for straw yield treatments 1 and 3 have recorded significantly increased yields over treatment 2. Summary of results is presented in the *Table XIX*.

TABLE XIX.—*Study of Residual effect on Rice Crop—Samba season*—1953–54.

Field—17.
Previous crop—Cotton and fallow.
Layout—Randomized blocks.
Replications—Twelve.
Size of the plot—24′ × 35′.
Date of sowing—10th September 1953.
Date of planting—2nd and 3rd November 1953.
Date of harvesting—22nd February 1954.

Treatments—
1. Cotton stalks ploughed in + green leaf 6,000 lb. + super phosphate 100 lb. + ammonium sulphate 100 lb. per acre.
2. Cotton stalks ploughed in + super phosphate 100 lb. + ammonium sulphate 100 lb. per acre.
3. Fallow—Green leaf 6,000 lb. + super phosphate 100 lb. + ammonium sulphate 100 lb. per acre.

Particulars.	Treatment. 1.	2.	3.	General mean.	Standard error.	Fisher's 'z' test satisfied or not.	Critical difference P = 0·05.
Grain yield per acre in lb. ..	2,384	2,218	2,291	2,298	78·1	..	227·5
Grain yield percentage on control.	104·1	96·8	100	100·0	3·4	No.	9·9
Grain yield percentage on general mean.	104·1	96·8	100·0	100·0	3·4	No.	9·9
Straw yield per acre in lb. ..	2,897	2,233	2,833	2,654	100·9	..	294·5
Straw yield percentage on control.	102·3	78·8	100	93·7	3·56	Yes.	10·4
Straw yield percentage on general mean.	109·1	84·1	106·8	100·0	3·8	Yes.	11·1

Conclusion for straw—1, 3, 2.

8. *Cotton mixed cropping trials.*—The object of the experiment is to assess the economics of growing crops of ragi, cotton and groundnut as pure crops and as mixed crops. The experiment was laid out with six treatments randomized and replicated five times.

Ragi was planted on 3rd February 1953, cotton was dibbled in rows 3 feet apart n the field 10 days after planting ragi and groundnut was dibbled on 4th April 1953 and 5th April 1953 just before the flowering of ragi. The results show that growing of cotton or groundnut as a mixture with ragi does not adversely affect the yield of ragi. The mixed crop of ragi + groundnut, and ragi + groundnut + cotton gave significantly higher returns than the mixed crop of ragi and cotton or pure crops of ragi, cotton or groundnut.

The summary of results is furnished in *Table XX*.

TABLE XX.—*Mixed Cropping Experiment—December season*—1953–54.

Field No. 28–34.
Previous crop—Sunnhemp.
Layout—6 × 5 randomized blocks.
Size of plot (sub)—50L × 40L (2 cents).
Date of sowing of ragi—4th January 1953.
Date of planting of ragi—3rd February 1953.
Date of dibbling of cotton—12th February 1953.
Date of dibbling of groundnut—4th April 1953.

Treatments—
1. Ragi P.1 pure.
2. Cotton P 216F pure.
3. Groundnut TMV.4 pure.
4. Ragi + cotton. 5. Ragi + groundnut.
6. Ragi + cotton + groundnut.

Date of harvest of ragi—2nd May 1953.
Date of pulling out of cotton—30th September 1953.
Date of harvest of groundnut—7th September 1953.

Particulars.	Treatments. 1	2	3	4	5	6	General mean.	Standard error.	'z' test satisfied or not.	Critical difference. P = 0·05
Money value of produce in rupees per acre.	190	331·14	380·14	384·4	516·4	574·4	396·4	24·81	Yes.	73·18
Percentage on control ..	100	174·7	200·9	202·8	271·7	302·3	208·3	13·04	Yes.	38·47

Conclusion—6, 5, 4, 3, 2, 1.

Figures of yields in lb. are furnished below for the mixed cropping experiment.

Particulars.	Treatments. 1. Ragi.	2. Cotton.	3. Ground-nut.	4. Ragi + cotton.	5. Ragi + Ground-nut.	6. Ragi + cotton + ground nut.
Acre yield in lb.	1,144	758	1,149	1,208 419	1,286 910	1,296 289
	RS. A.	RS. A.	RS. A.	RS. A. P.	RS. A. P.	RS. A. P.
Cost of cultivation per acre.	175 0	180 0	215 0	230 0 0	265 0 0	320 0 0
Nett profit	15 0	151 14	165 14	154 4 0	251 4 0	254 4

III. Millets.

9. *Ragi* (Eleusine coracana).—(*a*) Bulk-ragi was grown in two seasons May to September and December to March. The following strains were grown for observation and for multiplication of seed and their yields are furnished below :—

May to September season.

Strain number.	Area in acres.	Date of sowing.	Date of planting.	Date of harvest.	Acre yield in lb.
Ragi P. 1	1·55	24th May 1953.	6th July 1953.	3rd October 1953.	989
Ragi AKP. 1	0·05	19th May 1953.	12th June 1953.	24th September 1953.	1,400
Ragi AKP. 7	0·05	Do.	Do.	Do.	1,440
(EC. 4573) Co.5	0·05	Do.	Do.	Do.	1,420
(EC. 4310) Co. 6	0·05	Do.	Do.	Do.	360
Local	0·05	Do.	Do.	Do.	1,300

December to March season.

Ragi AKP. 1	0·40	7th December 1953.	6th January 1954.	17th March 1954.	950
Ragi AKP. 7	0·50	25th December 1953.	1st February 1954.	5th April 1954.	1,052
Ragi P. 1	0·10	Do.	Do.	Do.	1,020
Ragi Co. 5	0·60	Do.	8th January 1954.	23rd March 1954.	1,422
Ragi Co. 6	0·10	Do.	1st February 1954.	5th April 1954.	410
Local	0·10	Do.	Do.	Do.	730

It is observed that AKP. 7 and Co. 5 have yielded well in both the seasons (May and December). Due to the paucity of timely rains, the ragi crop was maintained almost entirely by lift irrigation.

(*b*) *Varietal study and selections.*—Five short duration ragi selections of about 90 days duration were compared with a similar duration strain AKP. 1 during May to September and December to March seasons but none of the selections out-yielded the standard. The results are presented in *Tables XXI and XXII.*

TABLE XXI.—*Ragi Yield Trials* 1953-54—*May to September season.*

Field No. 28-34.
Previous crop—Sweet potato.
Layout—Randomized blocks.
Replications—Four.
Plot size—54 L × 10 L.
Varieties—AKP.1 (standard) AKP.2, Culture, R.948, R.949, R.951 and R.952.
Date of sowing—29th May 1953.
Date of planting—26th June 1953.
Date of harvest—29th August 1953.

Particulars.	AKP·1 standard.	AKP.2	R.948	R.949	R.951	R.952	General mean.	Standard error.	Fisher's 'z' test satisfied or not.
Grain acre yield in lb.	855·00	885·00	970·00	927·00	911·00	822·00	892·00	8·12	No.
Grain yield percentage on general mean.	95·59	98·91	108·40	103·60	101·80	91·94	10·00	0·91	No.
Grain yield percentage on control.	100·00	103·50	113·40	108·40	106·50	96·18	104·70	0·95	..

TABLE XXII.—*Ragi Comparative Yield Trial—December–March season.*

Field No. 13–15–W.
Previous crop—Sunnhemp.
Layout—Randomized blocks.
Size of plot—35′ × 7′.
Replications—Four.
Varieties—AKP.1, AKP.2, Cultures 948, 949, 951 and 952.

Date of sowing—7th December 1953.
Date of planting—31st December 1953.
Date of harvesting—21st March 1954.

Particulars.	AKP.1	AKP.2	948	949	951	952	General mean.	Standard error.	Fisher's 'z' test satisfied or not.
Grain acre yield in lb.	2,443	2,289	2,368	2,401	2,498	2,368	2394·5	9·39	No.
Grain yield percentage on general mean.	102·1	95·61	98·93	100·3	104·3	98·93	100	0·39	No.
Grain yield percentage on control.	100	93·67	96·90	98·26	102·1	96·90	97·97	0·38	..

Seventy-eight selections made from the single ear-heads selected from the ryot's bulk grown in 1952–53 were grown in XABCDX fashion for further selection in December 1953 as well as in May 1954 seasons for selecting the best cultures suitable for the respective seasons. In the December season crop 17 promising selections were made and the crop sown in May is still on the field.

(*c*) Eight long duration selections and the strains AKP. 6 and AKP. 7 were compared with P.1 strain during May to September season. It was found that AKP. 6 recorded significantly increased yield over P. 1. The results are presented in *Table XXIII.*

TABLE XXIII.—*Ragi yield trials* 1953–54—*May–September season.*

Field No. 28–34.
Previous crop—Sweet potato.
Layout—Randomized blocks.
Replication—Four.
Plot size—54 links × 10 links.
Sown on 29th May 1953.
Planted on 26th June 1953.
Harvested on 29th August 1953.
Varieties—P.1 (standard), AKP.6, AKP.7, R.582, R.961, R.967, R.968, R.969, R.970, EC.2985, EC.4190.

Particulars.	P.1.	AKP.6.	AKP.7.	R 582.	R 961.	R 967.	R 968.	R 969.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Grain acre yield in lb. ..	829	1,629	1,196	106·8	1,047	832	993	1,013
Grain percentage on general mean.	80·32	157·8	115·9	103·5	100·9	80·63	96·14	98·11
Grain yield percentage on control.	100	196·4	144·3	128·8	125·7	100·4	119·8	122·2

Particulars.	R 970.	EC. 2985.	EC. 4190.	General mean.	Standard error.	Fisher's 'z' test satisfied or not.	Critical difference. P = 0·05.
	(10)	(11)	(12)	(13)	(14)	15)	(16)
Grain acre yield in lb. ..	898	970	868	1,040	55·08		162·7
Grain percentage on general mean.	87·00	93·97	84·12	100	5·42	Yes.	15·64
Grain yield percentage on control.	108·3	117·0	104·7	124·05	6·73		19·38

Conclusion—AKP.6, AKP.7, R.582, R.961, R.967, R.968, EC.2985, R. 970, EC.4190, R.969, P.1.

10. *Ragi—Manurial experiments—Chilean nitrate experiment.*—The object of the experiment is to find out the relative merits of ammonium sulphate and chilean nitrate applied alone and in combination with lime, compost and super phosphate. The experiment was conducted with P.1 ragi during May to September and December to March seasons in randomized blocks.

During 1953–54 May to September season, it was found that both chilean nitrate at 60 lb. nitrogen and ammonium sulphate at 40 lb. and 60 lb. nitrogen with the basal dressing of the other manures were on a par and gave better yields than the four treatments, viz., ammonium sulphate alone at 40 lb. nitrogen, chilean nitrate alone at 40 lb. nitrogen and 60 lb. nitrogen per acre and control. During

1953–54, December to March season the control which received a basal dressing of lime at 450 lb. + compost 3 tons + 30 lb. P_2O_5 as super phosphate, and the treatment with chilean nitrate alone at 60 lb. nitrogen per acre gave significantly lower yields than the other treatments which did not show significant differences between themselves. The results are presented in *Tables XXIV and XXV.*

TABLE XXIV.—*Ragi—Chilean Nitrate Experiment—May,-September season*—1953–54.

Field No. 28–34.
Previous crop—Ragi.
Layout—Randomized blocks.
Replications—Five.
Size of sub-plot—20′ × 32½′.
Date of sowing—29th May 1953.
Date of planting—24th June 1953.
Date of harvest—26th September 1953.

Treatments—
1. Basal dressing of lime 450 lb. + cattle manure 3 tons + super phosphate to supply 30 lb. of P_2O_5 per acre.
2. Basal dressing of lime 450 lb. + cattle manure 3 tons + super phosphate to supply 30 lb. of P_2O_5 + ammonium sulphate at 40 lb. nitrogen per acre.
3. Basal dressing of lime 450 lb. + cattle manure 3 tons + super phosphate to supply 30 lb. of P_2O_5 + ammonium sulphate at 60 lb. nitrogen per acre.
4. Ammonium sulphate alone at 40 lb. nitrogen per acre.
5. Ammonium sulphate alone at 60 lb. nitrogen per acre.
6. Same as No. 1 + Chilean nitrate at 40 lb. of nitrogen per acre.
7. Same as No. 1 + Chilean nitrate at 60 lb. of nitrogen per acre.
8. Chilean nitrate alone at 40 lb. of nitrogen per acre.
9. Chilean nitrate alone at 60 lb. of nitrogen per acre.

Particulars.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Grain yield per acre in lb.		378	585	620	462	491	502	586
Grain yield percentage on general mean.		76·96	119·1	126·2	94·21	100·3	102·2	119·2
Grain yield percentage on control ..		100·00	154·7	167·8	122·4	130·0	132·8	155·0

Particulars.	8	9	General mean.	Standard error.	Fisher's 'z' test satisfied or not.	Critical difference. P = 0·05.
	(9)	(10)	(11)	(12)	(13)	(14)
Grain yield per acre in lb.	429	366	491	14·10	Yes.	93·6
Grain yield percentage on general mean.	87·28	74·64	100·0	6·61	Yes.	19·0
Grain yield percentage on control ..	113·3	96·99	130·33	8·62	..	24·8

Conclusion—3, 7, 2, 6, 5, 4, 8, 1, 9.

TABLE XXV.—*Chilean Nitrate Experiment—December-March season*, 1953–54.

Field No. 28–34.
Previous crop—Ragi.
Layout—Randomized blocks.
Replication—Five.
Size of sub-plot—20′ × 32½′.
Date of sowing—7th December 1953.
Date of planting—4th, 5th January 1954.
Date of harvest—31st March 1954.

Treatements—
1. Basal dressing of lime 450 lb. + cattle manure 3 tons + super phosphate to supply 30 lb. of P_2O_5 per acre.
2. Same as No. 1 + ammonium sulphate at 40 lb. of nitrogen per acre.
3. Same as No. 1 + ammonium suplphate at 60 lb. of nitrogen per acre.
4. Ammonium sulphate alone at 40 lb. nitrogen per acre.
5. Ammonium sulphate alone at 60 lb. nitrogen per acre.
6. Same as No. 1 + chilean nitrate at 40 lb. of nitrogen per acre.
7. Same as No. 1 + chilean nitrate at 60 lb. of nitrogen per acre.
8. Chilean nitrate alone at 40 lb. of nitrogen per acre.
9. Chilean nitrate alone at 60 lb. of nitrogen per acre.

Particulars.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Grain yield per acre in lb.		998·2	1835·0	2178·0	175·9	1795·0	1919·0	2045·0
Grain yield percentage on general mean.		58·1	106·8	126·7	102·1	104·4	111·6	119·0
Grain yield percentage on control ..		100·0	184·0	218·2	175·7	179·9	192·3	204·

Particulars.	(9)	(10)	General mean. (11)	Standard error. (12)	Fisher's 'z' test satisfied or not. (13)	Critical difference. P = 0·05. (14)
Grain yield per acre in lb.	1627·0	1387·0	1727·9	9·2	Yes.	264
Grain yield percentage on general mean.	94·6	76·8	100·0	5·3	Yes.	15·30
Grain yield percentage on control ..	162·9	132·2	177·8	9,43	Yes.	27·10

Conclusion—3, 7, 6, 2, 5, 4, 8, 9 1.

11. *Cumbu* (Pennisetum typhoides).—Co. 3 cumbu was sown on an area of 2·10 acres on 22nd June 1953 and it was harvested in stages from 6th September to 12th October 1953. It has recorded a poor yield of 535 lb. per acre due to paucity of timely rains.

12. *Varagu* (Paspalum scrobiculatum).—Varagu strain P. 1 was grown as a mixed crop with redgram No. 37 for seed multiplication. The redgram crop was completely infested by pod borers and it has recorded an acre yield of only 67 lb. The P. 1 Varagu crop has given an acre yield of 600 lb.

IV. Oil Seeds.

13. Groundnut TMV. 2 was grown in an area of one acre as a rainfed crop. Sowing was done on 10th September 1953 and harvesting was done on 25th December 1953 and it has recorded a very poor yield due to paucity of timely rains.

14. *Groundnut trials.*—Four selections of short duration irrigated groundnut from the Agricultural Research Station, Tindivanam, AH. 4111, AH. 4218, AH. 4515 and AH. 6481 were compared with TMV. 2 standard. Culture AH. 6481 has given poor yield while cultures AH. 4218, AH. 4515 and AH. 4111 are on a par and have given better yields than TMV. 2. Summary of results is presented in *Table XXVI.*

TABLE XXVI.—*Groundnut comparative yield trials*—1953–54.

Field No.—1—3.
Layout—Randomized blocks.
Replication—Six.
Plot size—Gross 36′ × 9′.
Net 33′ × 7½′.
Varieties—TMV. 2 (standard), cultures AH. 4218, AH. 4111, AH. 4515 and AH. 6481.

Date of sowing—23rd February 1953.
Date of harvest—29th June 1953.

Particulars.	TMV. 2. (standard).	AH. 4218.	AH. 6481.	AH. 4111.	AH. 4515.	General mean.	Standard error.	Fisher's 'Z' test satisfied or not.	Critical difference. P=0·0.5
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Yield of groundnut pods per acre in lb.	867·4	1053·0	473·1	966·3	986·5	870·0	86·56	Yes.	255.8
Groundnut pods yield of percentage on general mean.	99·68	121·6	54·37	111·0	113·3	100 0	9·95	Yes.	27·34
Groundnut pods yield of—percentage on control.	100·0	122·0	54·54	111·4	113·7	100·3	12·56	..	37·04

Conclusion—A.H. 4218, AH. 4515, AH. 4111, TMV. 2, AH. 6481.

15. *Groundnut irrigation experiment.*—An experiment to find out the optimum frequency of irrigation required for the groundnut crop was laid out in randomized replicated plots with TMV. 4 groundnut with four treatments.

Life irrigation, second irrigation after ten days and third irrigation at the time of first flowering were common for all the four treatments.

It was seen from the yields recorded in the different treatments that the crop that received irrigation at more frequent intervals gave better yields. The plots irrigated once in ten days from the date of flowering gave the highest yield and there is gradual reduction in the yields in plots which received irrigation at longer intervals, the longer the interval, the lower was the yield. The results are presented in the *Table XXVII.*

TABLE XXVII.—*Groundnut irrigation experiment.*

Field No.—1—3.
Layout—Randomized blocks.
Replication—Six.
Size of plot—Gross 36′ × 10′.
Net 32′ × 8′.
Date of sowing—23rd Febuary 1953.
Date harvest—11t August 1953.

Treatments.

1 Irrigation in intervals of every 10 days from the date of first flowering.
2 Irrigation in intervals of every 15 days from the date of first flowering.
3 Irrigation in intervals of every 20 days from the date of first flowering.
4 Irrigation in intervals of every 25 days from the date of first flowering.

Particulars.	10th day.	15th day.	20th day.	25th day.	General mean.	Standard error.	Fisher's 'Z' test satisfied or not.	Critical difference. P = 0·05.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Groundnut pods yield per acre in lb.	1672·0	952·3	460·2	312·7	849·0	154·8	Yes.	465·6
Groundnut pods yield of percentage on general mean.	196·9	112 1	54·19	36·82	100·0	28·24	Yes.	54·95
Groundnut pods yield of percentage on control.	100·0	56·97	27·70	18·70	50·8	9·26	..	27·92

Conclusion—10th day, 15th day, 20th day, 25th day.

B. Gingelly.

16. Gingelly TMV.3 was grown on an area of one acre in garden land. The crop was coming up well in the initial stages, but later it was affected by pod borders, and it has given an acre yield of only 265 lb.

C. Coconut.

17. *Coconut* (Tall X dwarf).—Five Hybrid coconut seedlings were received from the Agricultural Research Station, Nileshwar III. They were planted on 26th August 1953. They are coming up well and periodical measurements of growth are being taken.

D. Palms.

18. *Doum palm* (Hyphaene coriacea).—The plant which was planted on 3rd June 1950 was coming up well and attained a height of 9 feet.

19. *Malayan oil palm or African oil palm* (Elaeis guineesis).—Five old trees and the one seedling which were planted on 3rd July 1950 were coming up well. Out of the six seedlings which were received from Nileshwar only two survived. The five old trees were in bearing.

V. Tuber Crops.

20. *Sweet potato* (Ipomea batatas).—Yield trials with the following varieties of sweet potato compared with local were laid out in two series in randomized replicated plots for the second year.

Fisher's 'Z' test was satisfied for the first series only and variety I.B. 22 has recorded significantly higher yield than local while varieties, Ranger, Nancy Hall and V.6 are on a par with the local. The results are presented in the *Tables XXVIII and XXIX.*

TABLE XXVIII.—*Sweet Potato Yield Trials I Series.*

Field No.—43·44.
Previous crop—Groundnut.
Layout—Randomized blocks.
Replication—Four.
Plot size—18′ × 12′.
Date of planting—18th November 1953.
Date of harvest—10th to 13th February 1954.
Varieties—Local standard IB. 22, V. 6, B. 219, Nancy Hall, Ranger, Orange little stem and V. 12.

Particulars.	Local (standard).	IB. 22.	V. 6.	B. 219.	Nancy hall.	Ranger.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Acre yield in lb.	6,151	9,076	4,690	2,345	6,101	6,302
Percentage on general mean ..	123·1	181·7	93·89	46·93	122·1	126·2
Percentage on control	100·0	147·6	76·26	38·13	99·19	102·4

Particulars.	Orange little stem.	V. 12.	General mean.	Standard error.	Fisher's 'Z' test satisfied or not.	Critical difference. P = 0·05.
	(8)	(9)	(10)	(11)	(12)	(13)
Acre yield in lb.	1,690	3,604	4,995	664·3	Yes	1,954·0
Acre yield on general mean ..	33·82	72·16	100·0	13·3	Yes	39·12
Acre yield percentage on control ..	27·47	58·61	81·21	10·80	..	31·78

Conclusion—
I.B. 22, Ranger, Local, Nancy Hall, V. 6, V. 12, B. 219, Orange little stem.

TABLE XXIX.—*Sweet Potato Yield Trials II Series.*

Field No.—43-44.
Previous crop—Groundnut.
Layout—Randomized blocks.
Replication—Four.
Plot size—18′ × 12′.
Date of planting—18th November 1953.
Date of harvest—14th to 16th February 1954.
Varieties—Local (standard) BW. 304, Unit portorico, Pelican progressor, V. 10, B. 196, 4004, Jercy big stem.

Particulars.	Local (standard).	BW. 304.	Unit Portorico.	Pelican progress.	V. 10.	B. 196.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Acre yield in lb.	3,430·0	6,253·0	6,756·0	705·8	4,210·0	1,361·0
Percentage on general mean ..	101·8	185·7	200·5	20·95	124·9	40·41
Percentage on control	100·0	182·4	197·0	20·58	122·7	39·70,

Particulars.	4004.	Jercy big stem.	General mean.	Standard error.	Fisher's 'Z' test satisfied or not.
	(8)	(9)	(10)	(11)	(12)
Acre yield in lb.	2,823·0	1,412·0	3,369·0	176·9	No
Percentage on general mean ..	83·81	41·91	100·0	5·25	No
Percentage on control	82·33	41·17	98·0	5·14	..

21. *Tapioca* (Manihot utilissima).—(*a*) Valenca wa s grown on an area of 1·40 acres in Field No. 22–27. The setts were planted on 17th January 1953 and harvesting of tubers was done from 31st October to 16th November 1953. It has recorded an acre yield of 10,215 lb.

(*b*) *Comparative yield trials.*—Six varieties of tapioca, namely, Elamoriyan, Kamkoil vellai, Neelam, Rottikappa, Valenca and Vellarotti were compared with local in randomized and replicated plots. Variety Valenca recorded the highest yield and the local recorded the lowest yield, while the other varieties which recorded higher yield than local and lower than Valenca are on a par. The results are presented in *Table XXX*.

TABLE XXX.—*Tapioca yield trials.*

Field No.—13–15.
Previous crop—Sunnhemp.
Layout—Randomized replicated four times.
Plot size—36′ × 25′.
Date of planting—4th October 1952.
Date of harvest—3rd and 4th August 1953.
Varieties—Local (standard), Elamorian, Kamkoil Vellai, Neelam, Rottikoppa, Valenca and Vellarottt.

Particulars.	Local (standard).	Elamorian.	Kamkoil vellai.	Neelam.	Rotti koppa.	Valenca.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Acre yield in lb.	3,110·0	5,578·0	5,687.0	6,243.0	5,154.0	7,816.0
Percentage on general mean ..	33·35	59·82	60·99	66·95	55·29	83·83
Percentage on control	100.0	179.4	182.9	200.7	165.8	251.4

Particulars.	Vellarotti.	General mean.	Standard error.	Fisher's 'Z' test satisfied or not.	Critical difference. P = 0·05.
	(8)	(9)	(10)	(11)	(12)
Acre yield in lb.	6,232·0	5,689·0	37	..	1,114
Percentage on general mean ..	66·83	100·0	6·59	Yes.	19·57
Percentage on control	200·4	183·0	12·06	..	35·82

Conclusion—6, 4, 7, 3, 2, 5, 1.

22. *Potato* (Solanum tuberosum).—A consignment of 100 lb. seed potato of the variety President was received from the District Agricultural Officer, Coonoor, on 17th September 1953 and they were sown on 13th October 1953. Only 111 plants came up as the major portion of the crop was damaged by the heavy rains received during the period. The tubers were found to have been attacked with some pests and the yield obtained from this crop was very poor. Another consignment of 100 lb. was received on 23rd November 1953 and was sown on 9th December 1953. A slight attack of blight was noticed. Perenox was sprayed at 1. oz. in 8 gallons of water as a control measure. This crop came up very well and a total quantity of 145 lb. of tubers was harvested from an area of 8 cents.

VI. Vegetables and Fruits.

23. An area of 2·50 acres was allotted for growing vegetables. Out of this area, two acres were utilized for growing vegetables, such as Lab-lab, Lady's finger, tomato, cluster beans, potato, cowpea, brinjal, ribbedgourd, pumpkin, radish, and roselle. A total quantity of 4,445 lb. of vegetables and 356 lb. of vegetable seeds were produced.

24. *Banana.*—Field No. 12 was allowed for ratoon crop. A total quantity of 1,088 lb. of fruits and 1,874 leaves were harvested.

25. *Roselle* (Hibiscus sabdariffa).—The seeds obtained during last year were sown in a separate field. The crop was having good growth and a total quantity of 27 lb. 3 oz. of seed was obtained.

26. *Pumpkin.*—Four seeds of Devagummudi, a variety of pumpkin, were received from Deputy Director of Agriculture, Tanjore. They were sown on 2nd August 1953. The seeds germinated on 5th August 1953 and the plants flowered on 16th August 1953. Nineteen fruits were harvested and the fruits were round with reddish orange colour.

Seeds of another type were received from the Agricultural Demonstrator, Tanjore and were sown on 2nd August 1953. The crop came up well and a total quantity of 599 lb. of vegetable was harvested. The fruits were extra big in size and maximum weight of a pumpkin recorded was 60 lb.

27. *Orchard.*—An area of two acres was continued to be maintained as orchard. The few citrus trees and mango trees which were planted in the poultry run in field Nos. 22 to 27 outs and Field Nos. 28 to 34 outs were also maintained.

Sunnhemp which was sown in the orchard was incorporated in situ. Cowpea plants after the harvest of pods were composted. Groundnut TMV 4, Sunnhemp, cowpea 419 and New Era were grown as cover crops or catch crops in the orchard in the intervening space between the fruit trees. In the outskirts of the fruit trees nurseries of different types of fruit plants and vegetables were also grown. Thus the orchard was kept clean and the weeding was found easy and economical.

28. *Citrus.*—Citrus trees of different varieties, Sathgudi, Washington Navel, Valencia late, grape fruit, pummelo red and white, Lemons—Malta, Italian, Rajahmundry lemon, Citrus Hawaian and acid lime are coming up well. In addition to these, three sathgudi budded plants and a pummelo budded plant were planted in the orchard. The Citrus trees were manured with sunnhemp grown as a cover crop and incorporated in situ. The plants were periodically pruned and sprayed with perenox whenever necessary.

The yield data of the plants are given below :—

Name of the variety.	*Total number of trees in the station.*	*Number of trees in bearing.*	*Weight in lb.*
Sathgudi	28	9	156
Washington Navel	3	3	36
Valencia late	3	3	12
Pummelo	5	5	154
Lemons	27	15	721
Lime (Acid lime)	10	8	266
Grape fruit	3	3	217
Citrus Hawaian	1	1	145

Layering by tongue method was taken up and five hundred and fifty layers were prepared for distribution.

29. *Mango* (Mangifera indica).—There are mango trees of different varieties and are in good condition. Mango hopper was found this year also on the trees and control measures were taken by spraying Gueserol 550. During this year flowering

in mango trees was not satisfactory. Flowering in Padiri was very poor and consequently the fruiting was also not satisfactory. Very good vegetative growth was observed in Padiri and Alphonso.

Propagation work was taken up in an intensive manner in the varieties, Jehangir, Neelum, Bangalora, Himmayudhin and Padiri. Nine hundred and five grafts were made. Due to sudden breaking of branches 315 grafts failed to establish. No grafts were made in Alphonso as the trees were not bearing well. A total quantity of 5,054 mango seedlings were raised. The following table gives the yield of mangos obtained :—

Variety.	*Number of trees.*	*Weight in lb.*
Neelum	8	780
Bangalora	1	242
Jehangir	2	25
Himmayuddin	2	17
Kader	1	3
Padiri	3	85

30. *Sapota* (Achrus sapota).—Fruit bearing was not uniform throughout the year. A total quantity of 735 lb. of fruits was harvested from eight trees.

31. *Guava* (Pasidium guafava).—Two guava trees, one Allahabad variety and the other smooth white guava and two seedlings of Allahabad variety which were trained as cordon are coming up well. A total quantity of 60 lb. of fruits was harvested layering by ring and tongue method was taken up and 200 layers were done.

32. *Jack* (Artocarpus integrifolia).—Bearing of jack trees was better than in the previous years and there was also improvement in the taste of the fruit. A total number of 48 fruits weighing 562 lb. was harvested from 10 trees. Still there are 3 trees which have not yet commenced to bear though they were planted in 1940.

One fruit of a reputed tree from the Pannikuppam church yard was purchased and 64 seeds obtained from the fruit were sown on 10th June 1954. By the end of June 1954, seven seeds germinated. There are four trees of Singapore jack on the station planted in 1947 and the maximum height was 27½ feet. They have not yet commenced bearing.

Five hundred jack seedlings were raised on the station and 418 distributed.

33. *Papaya* (Carica papaya).—The Honey-dew variety which was planted during last year commenced bearing. A total quantity of 321 lb. of fruits was harvested from 51 trees and 1 lb. 8 oz. of seeds were obtained.

34. *Pine-apple* (Anonas sativus).—Suckers of Kew pine-apple were first planted in the interspace between the banana suckers but the growth was found to be unsatisfactory. The pine-apple suckers were lifted and planted in the orchard during December 1953. A few plants flowered and a total number of nine fruits, though small in size was harvested.

35. *Passion fruit* (Passiflora edulis).—Five rooted cuttings were received from Assistant Fruit Specialist, Coonoor and they were planted on 27th August 1953. Only one came up and the rest died due to white-ant attack. The vine flowered during March, but there was no fruit setting.

VII. Green Manure Crops.

36. (*a*) *Gliricidia maculata.*—This green manure plant was propagated on a very large scale on the farm all along the field bunds, road margins and in all vacant paces by means of rooted cuttings and seedlings. During the year cuttings and seedlings were distributed and 1,950 cuttings, 2,006 seedlings were planted bringing the total number of plants on the station to 12,256.

(*b*) *Sesbania speciosa*.—The seedlings were planted four inches apart all along the paddy field bunds and in roguing lines and also along the irrigation channels in wetland area and gardenland. The plants grew up well and there was profuse flowering and pod formation. A total quantity of 885 lb. of seed was collected. Sesbania was grown on a bulk scale in field Nos. 55, 62 and 68-B in 1·33 acres. The growth was good and a total yield of 72,000 lb. of green leaf was obtained, the acre yield working out to 54,000 lb. 67,850 seedlings were distributed.

(*c*) *Indigofera teysmanii*.—The seedlings which were planted on 31st March 1951 and 31st March 1952 were coming up well. A first consignment of pods was harvested on 25th January 1953 and the second harvest was done on 29th November 1953. A total quantity of 11 lb. of seed was collected from 40 plants. Maximum height of the plant was 21 feet. Small nurseries were raised and seedlings were planted on the farm.

(*d*) *Daincha*.—This was grown on an area of 2·90 acres. The total yield of green matter obtained was 23,400 lb. which works out to 8,069 lb. per acre. The green manure was applied to paddy nurseries and transplanted fields.

(*e*) *Sunnhemp*.—This was cultivated on area of 4·20 acres. The total yield of green matter obtained was 55,910 lb. the acre yield working out to 13,265 lb. The green manure obtained was ploughed *in situ* in the garden lands.

(*f*) *Cover crops and green manure crops Sword bean* (Canavalia species).—The growth of *Canavalia ensiformis*, *Canavalia gladiata* and *Canavalia virosa* was not satisfactory as cover crops and hence the trials were discontinued.

(*g*) *Pueraria phaseoloides*.—The seeds were sown on 11th January 1953. The plants came up well and showed promise as a cover crop and flowered on 1st November 1953. The crop appeared to be resistant to drought. A total quantity of five ounces of seed was collected during the year.

(*h*) *Calapogonium muconoides*.—The seeds were sown on 11th January 1953 and the plants flowered on 2nd October 1953. The crop was spreading very well but it did not appear to be drought resistant. There was profuse pod setting and 4½ lb. of seed were collected.

(*i*) *Centrosema pubescens Benth*.—The seeds were sown on 11th January 1953 and the plants flowered on 1st December 1953. The vines were not spreading like other plants. A small quantity of seed was collected.

(*j*) *New green manure seeds*.—Four varieties of green manure seeds were received from Systematic Botanist and Professor of Botany. They were sown on 6th December 1953 and they all germinated. *Desmodium gyroides* (from Ceylon) and *Cassia lescheanultiana* (from Indonesia) have not yet flowered while the other green manure plants *Tephrosia nectiflora* and *Phaseolus semierectus* flowered and seeds were collected from them.

(*k*) *Sesbania macrocarpa* (U.S.A.).—A small quantity of 35 seeds was received from the Systematic Botanist and Professor of Botany, Coimbatore. They were sown on 14th April 1954. Twenty-one seeds germinated and the plants flowered on 21st May 1954. The growth was found to be comparatively quicker than *Sesbania speciosa* in the initial stages. Collection of dry pods is in progress.

VIII. Fodder Crops.

37. *Fodder crops*.—Fodder grasses like Guinea grass, Napier grass, cumbu hybrid grass, Buffalo grass and Thin Napier grass were grown on an area of 90 cents in field No. 21 and outskirts of field No. 13-15. The crops were given mammuty hoeing and irrigations, occasionally. The following quantities of green grass were obtained and fed to cattle :—

Variety.	*Area in acres.*	*Quantity in lb. per plot.*	*Quantity in lb. per acre.*
Guinea grass	0·36	5,380	16,060
Napier grass	0·26	7,806	31,224
Thin Napier grass	0·20	3,505	17,525
Cumbu hybrid	0·08	1,880	23,500

IX. Other Miscellaneous Crops.

38. *Palms*—(*a*) *Sago palm.*—Ten seedlings were raised from seeds on this station and 12 seedlings were received from Assistant Fruit Specialist, Coimbatore. They were planted in the orchard and along the path way. Only eleven out of the 22 planted survived and these attained a height of 3′ 10″.

(*b*) *Date palm.*—The date palms which were planted on 3rd October 1950 were coming up well. There were 20 plants and the maximum height of the plant was six feet.

39. *Balsa or Aeroplane wood.*—(Ochroma lagopus) Fifty more seedlings were planted on the station and 12 seedlings were sold. The seedlings which were near the water source have come up well. One plant attained a maximum height of 23½ feet.

40. *Eucalyptus.*—Out of the six seedlings of *Eucalyptus citriodora* raised on the station, four were planted in the orchard on 19th September 1953. Out of these three were coming up well, while the fourth wilted away. Among the remaining 3 seedlings, 2 seedlings attained a height of 7 feet.

41. *Rattan cane* (Calàmus rotang).—One sucker planted in the corner of the fish pond was coming up well. Two *Calamus digitatus* seedlings in the pots were coming up well. During this year also 50 rattan cane suckers were obtained from Banana Research Station, Aduturai and of which only 3 sprouted and these suckers were coming up well.

42. *Pepper* (Pepper nigrum).—Twenty rooted cuttings received from Taliparamba were planted on 7th January 1954 at the foot of jack and drumstick trees. Thirteen cuttings established and were coming up well and one of them had grwon to a height of 3 feet 10 inches.

43. *Live fence* (Prosopis juliflora).—The useful fence plant has established well on the farm. Gap-filling was done by sowing seeds and planting seedlings. The plants around the Western Block of the Farm are tall and have produced pods. During the course of the year 602 lb. of pods were gathered.

X. Poultry.

44. Throughout the period only Rhode Island Red breed was maintained. The opening balance at the beginning of the year was 25 Rhode Island Red chicks. Out of these three died due to normal causes, 16 were sold and of the remaining six left over, five turned out to be cocks and the other a hen. One cock died due to fatty degeneration. As the breed was found to be impure 3 cocks and one hen were auctioned, leaving a balance of one cock. A fresh consignment of eight chicks were received from the Poultry Development Officer, Teynampet and of these four turned out to be cockrels and four pullets. The closing balance at the end of the year was five cocks, one hen and three pullets. During this year 38 eggs were received and all of them were sold for table.

XI. Pisciculture.

45. *Gourami.*—During April 1948 a fish pond was dug with 50′ × 40′ and 12 gourami, 6 stocksize and 6 fingerlings, supplied by the Inspector of Fisheries, Cuddalore on 23rd July 1948 were let in the pond. Two died on the date of stocking.

A number of fish appeared to have been carried away along the current in the floods of 1952. On 30th January 1954 Inspector of Fisheries inspected the pond and conducted trial nettings and netted 10 gourami as shown below :—

One-foot size	4
16 inches size	2
18 inches size	4
	10

The quantity of fish caught since the opening of the pond is furnished below :—

Year.	Number of fish.	Weight.
		LB. OZ.
1951-52 ..	4	8 12
1953-54 ..	4	13 0

XII. Apiculture.

46. *Bee-Keeping.*—Two hives were maintained during the year and a total quantity of seven pounds of honey was extracted.

XIII. Miscellaneous.

47. *Sinking of tube-wells.*—Sinking of tube-wells in the Farm was continued during this year also. Out of five, only two dug in the garden land are successful and both of them are functioning well.

48. *Seed distribution.*—The particulars of seeds and plants distributed during the year are furnished in Annexure I.

49. *Finance.*—A statement of receipts and expenditure during the fasli year is furnished in Annexure II.

AGRICULTURAL RESEARCH STATION,
PALUR.

W. R. NARGUNAM,
Senior Assistant in charge.

Endorsement—A. No. PDL. 57/54, *dated 29th March* 1955.
Countersigned.

TANJORE,
29th March 1955.

A. MUHAMMAD ALI,
Deputy Director of Agriculture, Tanjore.

ANNEXURE I.

STATEMENT OF SEEDS AND PLANTS DISTRIBUTED DURING 1953–54.

Paddy	30,217 lb.
Ragi	1,687 „
Cumbu	22 „
Varagu	84 „
Redgram	30 „
Oilseeds	992 „
Sesbania	500 „
Mango grafts	199 Nos.
Lemon layers	600 „
Prosopis pods	299 „
Sesbania seedlings	67,850 „
Vegetable	222 „

ANNEXURE II.

STATEMENT OF RECEIPTS AND EXPENDITURE FOR THE YEAR ENDING 30TH JUNE 1954 (FASLI 1363).

Receipts.

	RS. A. P.	RS. A. P.
Agricultural Station receipts	6,212 11 0	
Agricultural miscellaneous receipts	1,026 4 9	
Rent on building	30 0 0	
Value of seeds transferred to district staff on free transfer.	8,685 1 0	
Total receipts		15,954 0 9

Expenditure.

1. 40·0. Agricultural Experimental Farm—		
Pay of Officer	3,343 15 0	
Pay of Establishment	8,306 5 0	
Travelling allowance of officer and establishment.	922 10 0	
Dearness allowance	3,882 15 0	
Purchase of Live and Dead Stock	300 8 0	
Working expenses	21,055 7 9	
		37,711 12 9
2. Contingencies—		
Other contingencies	37 12 0	
Service postage	353 0 0	
Petty construction and repairs	27 0 0	
Dearness allowance to menials	4,798 12 0	
		5,213 8 0
Grand total		42,925 4 9

ANNEXURE III.

Steps taken to increase the Revenue of the Farm.

Two more tube wells were successfully sunk in the garden land area with assured water-supply. This has greatly relieved the irrigation problem and aided the cultivation of cotton crop to considerable extent. The area under P. 216 F cotton crop in rice fallows during the year under report was 2·00 acres as against nil acre during last year. In garden land area it was extended over 4·00 acres from 1·40 acres of last year. The area under Tapioca cultivation in garden lands has been increased to 2·40 acres to augment the increase of revenue to the station.

The area under groundnut in rice fallows has also been increased from nil acre of last year to 1·00 acre during this year. In garden lands the area under groundnut was increased to 4·40 acres from 2·23 acres. Even though the water facility has improved, the cost of lifting by oil-engines is very high and so if electric power is made available for the Farm expenses on this account will be reduced to a great extent. Proposals have already been submitted for sanction for the supply of electric power and for installing electric motor pump-sets. Kiluvai cuttings have been planted all along the vegetable area as a live fence replacing the old Erythryna fence. All along the boundary of the farm prosopis seedlings were planted in large numbers along the existing fence. Planting of Gliricidia stumps and seedlings were taken up extensively during this year along channel bunds, on alternative bunds in wet land fields and in road margins. The target of 10,000 plants has already been reached, and a progressive total of 12,256 plants are surviving in the station now. Sesbania grown under bulk scale has increased to 1·33 acres during the year under report that has increased the output of organic manure considerably giving an acre yield of 54,000 lb. per acre of green matter.

Intensive seed collection of pods from older plants of Indigofera teymanii was taken up and the seeds were distributed to other stations. Nurseries were raised and seedlings were planted in all available places. Seven hundred and fifty plants are surviving now. A new unit of poultry with Rhode Island Red Breed has been started during the year under report.

APPENDIX I.

STATEMENT SHOWING THE EXPENDITURE AND RECEIPTS OF THE AREAS IN WHICH BULK CROPS HAVE BEEN RAISED IN AGRICULTURAL RESEARCH STATION, PALUR.

Field number.	Area.	Name of the crop.	Receipts per acre.	Expenditure per acre.	Profit per acre.	Loss per acre.	Remarks.
	ACS.		RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	
Paddy—Kuruvai season—							
57-E ..	0·50	Co. 18	351 2 10	190 12 0	160 6 10	..	
58-W ..	0·50	Co. 18	653 5 0	294 0 0	359 5 0	..	
58-E ..	0·50	PLR. 2	609 11 6	295 3 0	314 8 6	..	
59-E ..	0·50	TKM. 3	670 10 6	420 8 0	250 2 6	..	
59-W ..	0·50	TKM. 3	668 12 2	198 7 0	470 5 2	..	
Samba season—							
20-N ..	0·50	GEB. 24 ..	536 0 0	195 0 0	341 0 0	..	
20-S ..	0·50	MTU. 19 ..	677 0 0	268 0 0	389 0 0	..	
64 ..	0·90	Co. 25	846 1 0	235 1 0	611 0 0	..	
54 ..	1·75	Co. 25	765 12 6	256 4 0	509 8 6	..	
Thaladi season—							
57-E ..	0·50	ASD. 5	318 8 0	193 6 0	125 2 0	..	
65-66 W.	0·30	ASD. 5	378 9 0	193 12 0	184 13 0	..	
Navarai season—							
55-W ..	0·07	SW. 7	444 11 0	349 8 6	95 2 6	..	
55-W ..	0·18	TKM. 6	471 1 3	286 13 9	184 3 6	..	
55-M ..	0·25	SW. 1251 ..	630 11 0	254 15 0	375 12 0	..	
63-E ..	0·30	PLR. 2	338 7 6	334 1 6	4 6 0	..	
63-E ..	0·15	Co. 13	315 5 3	439 4 3	..	123 15 0	Due to severe attack of blast.
65-66-M.	0·12	SW. 7	460 0 0	339 1 6	130 15 6	..	
65-66-M.	0·18	SW. 1251 ..	247 3 6	214 9 9	32 9 9	..	
Green manure crops—							
55-E ..	0·25	Sesbania speciosa.	480 0 0	138 0 0	342 0 0	..	
62 ..	1·00	Do.	307 8 0	118 7 0	189 1 0	..	
68-B ..	0·10	Do.	100 0 0	43 12 0	56 4 0	..	
53 ..	0·50	Daincha	96 0 0	25 4 0	70 12 0	..	
47-48 ..	1·00	Do.	72 0 0	26 12 0	46 4 0	..	
38-40 ..	1·00	Do.	74 0 0	43 4 0	31 12 0	..	
41-42 ..	1·00	Sunnhemp ..	136 0 0	25 13 0	110 3 0	..	
35 ..	0·33	Do. ..	24 4 0	41 5 0	..	17 1 0	
28-34-W.	1·80	Do. ..	120 0 0	30 6 0	89 10 0	..	
28-34-E.	0·50	Do. ..	66 10 0	39 2 0	27 8 0	..	
13-15-E.	0·90	Do. ..	182 0 0	25 5 6	156 10 6	..	
Millets—							
53 ..	0·50	Co. 5 Ragi ..	409 14 6	217 10 0	192 4 6	..	At Re. 0–3–0 per lb.
41-42 ..	1·00	P. 1 Ragi ..	165 1 0	150 10 0	14 7 0	..	Do.
35 ..	0·33	AKP. 1	289 9 6	148 2 0	141 7 6	..	Do.
13–15 E.	0·60	Varagu P-1 and Redgram No. 37.	50 9 6	73 0 0	..	16 6 6	Varagu at Rs. 0–1–3 per lb., Redgram at Re. 0–2–0 per lb.
Oil seeds—							
49-50 ..	1·00	Gingelly TMV. 3.	133 6 0	102 7 0	30 15 0	..	At Re. 0–8–0 per lb.
43–44 ..	1·00	Groundnut TMV. 2.	249 3 0	146 15 0	102 4 0	..	At Re. 0–5–4 per lb. of seed at Re. 1–0–0 per 100 lb. of haulm.
Tuber crops—							
43-44 ..	1·00	Sweet potato ..	79 2 0	79 6 0	..	0 4 0	At Re. 0–0–6 per lb.
22-27E.	1·40	Tapioca Valenca.	638 7 0	262 8 0	375 15 0	..	At Re. 0–1–0 per lb. tubers.
Fibre crops—							
22-27W.	1·40	P. 216. F. Cotton.	327 3 6	163 13 0	163 6 6	..	At. Re 0–6–0 per lb. of kapas cotton stalks at Rs. 2–0–0 per 1,000 lb.

NOTE.—Samba paddy at Re. 0–3–4 per lb. and Kar paddy at Re. 0–3–1 per lb., green leaf at 100 lb. per rupee.

APPENDIX II.

TABLE I-A.—(*Bulk crops*).

Details of crops (1)	Area. (2)	Seed. Quantity. (3)	Seed. Value. (4)	Grain. Quantity. (5)	Grain. Value. (6)
	ACS.	LB.	RS. A. P.	LB.	RS. A. P.
Paddy	8·31	19,965	3,687 9 5	2,169	288 7 4
Ragi	3·60	3,955	758 14 6	689	104 13 4
Redgram and varagu	0·60	691	5 15 0	..	..
Gingelly	1·00	244	122 0 0	21	7 14 0
Cotton	1·40	900 (Kapas)	387 8 0	..	..
Tapioca	1·40	14,301 (Tubers)	893 13 0	..	..
Green manures	8·43	151,300 (Green matter)	1,513 0 0	..	..
Fodder	0·96	18,571 (Green fodder)	185 11 0	..	..
Miscellaneous.					
Dairy produce	..	..	....	..	..
Poultry	..	59	82 10 0	..	..
Sale of seedlings and plants, etc.	..	902	680 13 0	..	..
Total	..	..	8,317 13 11	..	401 2 8

Details of crops.	Straw. Quantity. (7)	Straw. Value. (8)	Total receipts for the year. (9)	Total receipts for two years. 1951–52. (10)	Total receipts for two years. 1952–53. (11)
	LB.	RS. A. P.	RS.. A. P.	RS. A. P.	RS. A. P.
Paddy	31,160	556 14 2	4,532 14 11	6,569 11 6	6,523 9 10
Ragi	6,749	68 6 9	962 10 1	586 15 0	116 8 0
Redgram and varagu	650	6 5 0	39 9 0	..	22 14 0
Gingelly	350	3 8 0	133 6 0	112 8 0	186 0 0
Cotton	2,500	25 0 0	412 8 0	..	375 3 6
Tapioca	79,200 (Setts.)	198 0 0	1,091 13 0	..	186 0 0
Green manures	..	..	1,513 0 0	267 15 6	381 0 0
Fodder	..	..	185 11 0	71 0 0	253 0 0
Miscellaneous.					
Dairy produce	..	..	..	..	..
Poultry	..	..	82 10 0	143 0 0	210 0 0
Sale of seedlings and plants, etc.	..	..	680 13 0	706 4 0	652 0 0
Total	..	858 1 11	9,634 15 0	8,457 6 0	8,906 3 4

APPENDIX III.

TABLE I-B.

Crop.	Seed. Retained on the station. Quantity.	Seed. Retained on the station. Value.	Seed. Transferred or sold. Quantity.	Seed. Transferred or sold. Value.	Grain. Retained on the station. Quantity.	Grain. Retained on the station. Value.	Grain. Transferred or sold. Quantity.	Grain. Transferred or sold. Value.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	LB.	RS. A. P.	LB.	RS. A. P.	LB.			
1 Paddy	1,850	317 15 6	37,420	6526 3 0	..	..	..	..
2 Ragi	826	159 2 10	1,531	295 0 7	..	..	..	..
3 Varagu and redgram.	272	20 1 6	122	10 7 4	..	..	..	..
4 Gingelly	..	..	244	122 0 0	..	..	..	..
Green manures.								
Seed	1,510	415 9 0	500	125 0 0	..	..	..	..
Green manure ..	151,300	1,513 0 0	..	..	..	..	..	..
Fodder	18,571	185 11 0	..	..	..	..	..	..
Cotton	..	..	900	393 12 0	..	..	..	..
Poultry	..	..	59	82 10 0	..	..	..	..
Seedlings	..	..	902	680 13 0	..	..	..	..
Topioca	20,000	50 0 0	59,200	148 0 0	..	..	..	..

Crop.	Straw. Retained on the station. Quantity.	Straw. Retained on the station. Value.	Straw. Transferred or sold. Quantity.	Straw. Transferred or sold. Value.	Total. Value.	Total receipts for two years 1951–52 and 1952–53. 1951–52.	Total receipts for two years 1951–52 and 1952–53. 1952–53.
	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	LB.	RS. A. P.			RS. A. P.	RS. A. P.	RS. A. P.
1 Paddy	31,160	556 14 2	..	..	7,401 0 8	6,569 11 6	6,523 9 10
2 Ragi	6,749	68 6 9	..	..	522 10 2	586 15 9	116 8 9
3 Varagu and redgram.	..	..	..	..	30 8 10	..	22 14 0
4 Gingelly	..	..	..	..	122 0 0	112 8 0	186 0 0
Green manures.							
Seed	..	..	..	..	540 9 0	..	..
Green manure ..	..	..	..	..	1513 0 0	267 15 6	381 0 0
Fodder	..	..	..	..	185 11 0	71 0 0	253 0 0
Cotton	..	..	..	..	393 12 0	..	375 3 6
Poultry	..	..	..	..	82 10 0	143 0 0	210 0 0
Seedlings	..	..	..	..	680 13 0	706 4 0	652 0 0
Topioca	..	..	..	..	198 0 0	..	186 0 0
					11,670 10 8	8,457 6 0	8,906 3 4

NOTE.—The difference of figures in the stocks of seeds between Table I a and I b is due to the stock of seeds accounted for under free transfers during the period ending 30th June 1954, but brought forward from the previous year stocks.

ANNUAL REPORT OF THE AGRICULTURAL RESEARCH STATION, PARAMAKUDI, FOR 1953–54 (FASLI 1363).

This is the first annual report of the station, covering a complete period of one year. Since the station started functioning on and from 1st April 1953, the previous report covered a period of three months only (April, May and June 1953).

2. *Season.*—There was a total rainfall of 35·48 inches, distributed over 61 rainy days during the year under report as against 17·77 inches in 40 rainy days in 1952–53 and 29·88 inches in 45·40 rainy days, the average of the past ten years. During the year under review, the rains during the south-west monsoon were more than in the previous year by 0·86 of an inch and less than the average of the past ten years by 1·80 inches; the rains in the north-east monsoon were more than in 1952–53 and the past ten-year average by 14·34 and 6·05 inches respectively; similarly, the rains in the hot weather season also were more than in the previous year and the past ten-year average by 2 51 inches and 0·49 of an inch respectively. Though the north-east monsoon started a bit late, the rainfall and the season for the (fasli) year 1953–54 can be said to be normal. The rainfall data recorded during the year are presented in Table I below.

TABLE I.—*Rainfall Statement.*

Month	Week.	1953–54.		1952–53.		Average of past 10 years.	
		Rain in inches.	Rainy days.	Rain in inches.	Rainy days.	Rain in inches.	Rainy days.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
South-west monsoon.							
June	7—13	..	..	..	..	0·13	0·3
	14—20	0·79	2	..	..	0·03	0·2
	21—27	0·12	1	..	..	0·04	0·1
June-July	28—04	..	..	0·14	1	0·06	0·2
	5—11	0·15	1	0·56	3	0·56	1·0
	12—18	0·22	1	0·07	..	0·39	1·0
	19—25	1·21	2	..	..	0·14	0·4
July-August	26—01	..	..	..	..	0·43	0·8
	2—08	..	..	..	..	0·45	0·5
	9—15	0·42	1	0·29	1	0·33	0·8
	16—22	..	..	2·40	3	0·56	0·8
	23—29	1·43	4	..	..	1·25	1·1
August-September	30—05	..	..	1·62	3	1·21	1·2
	6—12	1·91	3	..	..	0·54	0·6
	13—19	..	..	0·06	..	0·57	0·7
	20—26	..	..	0·25	2	0·49	1·2
Total for south-west monsoon ..	..	6·25	15	5·39	13	7·19	10·9
North-east monsoon.							
September-October	27—03	..	..	0·21	1	1·19	1·6
	4—10	2·66	2	1·13	2	0·63	1·6
	11—17	3·83	4	0·02	..	1·39	2·2
	18—24	1·63	3	..	..	0·94	1·7
	25—31	0·15	1	0·12	1	1·12	1·5
November	1—07	1·23	2	0·67	2	1·20	1·8
	8—14	0·15	1	..	..	2·12	2·5
	15—21	2·78	4	2·58	2	1·80	2·4
	22—28	1·49	3	0·31	1	0·53	1·1
November-December	29—05	1·36	2	0·18	1	0·76	1·4
	6—12	..	..	0·65	1	0·94	1·1
	13—19	0·32	2	0·04	..	0·61	0·8
	20—26	0·42	2	0·26	1	0·15	0·3
December-January	27—02	..	..	..	..	0·51	0·7
	3—09	1·98	4	..	..	0·18	0·7
	10—16	2·72	2	..	..	0·06	0·3
	17—23	..	..	..	..	0·24	0·6
	24—31	..	..	0·21	1	0·30	0·4
Total for north-east monsoon ..	..	20·72	32	6·38	13	14·67	22·7
Hot weather period.							
February	1—07	..	..	..	..	0·01	..
	9—14	..	..	..	..	0·03	0·1
	15—21	..	..	1·33	1	1·12	0·9
	22—28/29	..	..	0·23	1	0·50	0·8

Month.	Week.	1953–54. Rain in inches.	1953–54. Rainy days.	1952–53. Rain in inches.	1952–53. Rainy days.	Average of past 10 years Rain in inches.	Average of past 10 years Rainy days.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Hot wheather period—*cont.*					
March	1—07	..	..	0·48	1	0·16	0·6
	8—14	2·70	2	..	..	0·04	0·2
	15—21	..	..	..	..	0·17	0·4
	22—28	1·69	3	..	..	0·78	0·8
March-April	29—04	..	..	0·15	1	1·04	1·8
	5—11	..	..	1·96	3	0·57	0·9
	12—18	0·35	1	0·67	2	1·70	1·9
	19—25	1·95	3	0·74	3	0·47	0·7
April-May	26—02	0·39	1	0·22	1	0·05	0·2
	3—09	0·30	1	..	..	0·12	0·3
	10—16	0·50	1	0·19	1	0·52	0·7
	17—23	0·63	2	..	..	0·33	0·6
	24—30	..	..	..	..	0·37	0·8
May-June	31—06	..	..	0·03	..	0·05	0·1
Total for hot weather period .	..	8·51	14	6·00	14	8·03	11·8
Grand total for the year ..		35·48	61	17·77	40	29·88	45·4

3. *Crops.*—The various crops raised and the area devoted for each are presented in Table II.

TABLE II.—*Area devoted for different crops.*

	ACS.	ACS
Paddy, semi dry	3·73	
Paddy, wet (main season)	9·21	
Paddy, wet (navarai season)	1·95	
Total under paddy ..	..	14·89
Ragi, dry (Co. 1)	2·63	
Ragi irrigated (Co. 2)	0·18	
Total under ragi ..	..	2·81
Cumbu, dry (Co. 3)	1·49	
Cumbu, dry (X. 1)	1·32	
Total under cumbu ..	..	2·81
Green gram (Co. 1)	0·40	0·40
Groundnut (TMV. 2)	0·40	0·40
Cholam, irrigated (Co. 9)	0·87	0·87
Cotton, irrigated (M.U. 1)	0·72	
Cotton, irrigated (P. 216-F)	0·29	
Total under cottons ..	..	1·01
Grand total under crops ..	..	23·19

4. *Paddy*—(*a*) *Drought resistant strains under observation.*—Nine strains from other research stations, TKM. 1, TKM. 2, Bairuvadlu 2999, MTU. 17, MTU. 18, BAM. 3, AKP. 1, ADT. 22 and ASD. 4 were raised under rain-fed condition (sown on 14th September 1953) to see their relative ability to withstand drought. From the observations and the yield figures recorded, it was seen that ASD. 4 was the best performer followed by TKM. 1 and ADT. 22. But ADT. 22 was longer in duration than the rest of them.

(*b*) *Drought resistant hybrid progenies under observation.*—Sixty-nine selections from among these sets of crosses, effected with the object of isolating drought-resistant strains and got from the Paddy Breeding Station, Coimbatore, and Rice Research Station, Tirurkuppam, were in observation plots (sown on 27th August 1953) to study their performance. From among the first three sets, 31 selections were found to do better than the rest, with durations equal to those of Co. 1, Co. 2 or GBE. 24 as the case may be and more than their respective parents.

Co. 1 × *T.* 162
Co. 1 × *T.* 1702
Co. 1 × *T.* 740
G.E.B. 24 × *T.* 260

that of the standard ASD. 4. From the fourth set, three selections (9754, 9761 and 9776) were found to do better than the rest.

(*c*) *Puludhipiratti.*—With the object of isolating a pure line strain from this drought-resistant variety of paddy, usually grown as a dry or semi-dry crop, 100 good single plants were selected from a bulk crop grown on the station out of seeds supplied by the Agricultural Demonstrator, Nanguneri, for further work.

(*d*) *Kuliadichan.*—From a bulk crop raised on the station out of seeds supplied by the Agricultural Demonstrator, Mudukulathur, 200 good single plants were selected for further selection work with the idea of isolating a drought-resistant strain of paddy in this variety.

(*e*) *Ramanathapuram varieties under yield trial.*—Sixteen selections from among these varieties, in which work was being done at Coimbatore, were transferred here for further work. These selections together with their respective standards were put under replicated yield trials with four replications, under typical tank-fed conditions (sown on 29th October 1953 and planted on 4th December 1953). Due to severe incidence of insect pests in the earlier stages and water scarcity in the later stages no reliable yield figures could be recorded during this year and the yield trial will have to be repeated during the coming season.

Muthuvellai (3 selections)
Kattaivellai (3 selections)
Varagumilagi (3 selections)
Nariyan (3 selections)
Vadakathikar (1 selection)
Sirumani (3 selections)

(*f*) *Introduction of exotic varieties.*—With the object of seeing whether any variety from outside can be successfully introduced in the tract, 28 strains of paddy released from the breeding centres of the department and 45 types from the collection of types from the Paddy Breeding Station, Coimbatore, were tried in observation plots in the main season under tank-fed conditions. Although there were definite variations and differences among the strains and varieties compared, due to unusually severe incidence of pests in the earlier stages and water difficulty in the later stages, no reliable conclusions could be drawn during this season and the observations have to be repeated in the coming season.

(*g*) With the same object as mentioned in the above paragraph 20, short duration strains of paddy from other breeding centres, were observed in unreplicated plots in the *Navarai* season under tank-fed conditions. Here also, no definite conclusions were possible due to water difficulty in the later stages. But indications were there to show that some of them (ADT. 16, ADT. 20 and MTU. 4) were not suitable for the season. The observations will be repeated in the coming season also.

(*h*) *Short duration blast resistant selections.*—Thirteen selections from these three sets of crosses, effected with the object of isolating blast resistant short duration strains, and got from the Paddy Breeding Station, Coimbatore, were grown in observation plots with belts of Co. 13 allround. Though blast did not appear in a large scale, from the few spots that appeared on the leaf blades, it was seen that the progenies showed greater resistance than their respective blast susceptible parents.

Co. 4 × *Co.* 13 (2 selections)
Co. 4 × *Co.* 9 (3 selections)
Co. 4 × *Co.* 22 (8 selections)

5. *Millets*—(*a*) *Cumbu.*—Cumbu, (Co. 3 and X. 1) were grown as rain-fed crops over 1·48 and 1·32 acres respectively (sown on 12th August 1953 and 13th August 1953). The yield of Co. 3 varied from 823 to 1,041 lb. per acre and that of X. 1 varied from 314 to 334 lb. per acre.

(*b*) *Ragi.*—Ragi (Co. 1) was raised as a rainfed crop over an area of 2·63 acres (sown on 13th September 1953, 6th October 1953 and 10th October 1953). The crop came up well and the yield varied from 635 to 1,365 lb. per acre.

Ragi (Co. 2) was raised as an irrigated crop, under the brackish water from the well in the yard, in an area of 18 cents. The crop was sown on 29th March 1954 and planted on 12th May 1954. Harvest was not over during the year to which this report relates.

(c) *Cholam.*—Cholam (Co. 9) was sown in an area of 87 cents in the wet land block after a crop of paddy. For want of sufficient irrigation facilities, with the exception of the first irrigation given immediately after the sowing, the crop was treated as a dry crop. The stand of the crop was sparse and flowering uneven. The crop was not harvested within the year for which this report relates.

6. *Cotton.*—In an area of 43 cents, M.C.U. 1 cotton was raised (sown on 3rd and 4th November 1953) as an irrigated crop with the brackish water from the small well in the yard. On account of inadequate supply of water in the well, the irrigation given could not be considered quite ample for the crop. The crop was pulled out in the month of July and the yield of the crop works out to 491 lb. of kapas per acre.

M.C.U. 1 and P. 216-F cottons in rice fallow.—In the wet land block of the station, after a crop of paddy, in an area of 50 cents, M.C.U. 1 and P. 216-F cottons, each in 25 cents, were sown on 3rd March 1954. Here also, for want of sufficient water, the crops had to be treated as dry crops, with the exception of the irrigation given immediately after sowing. Till the close of the year M.C.U. 1 has given an yield of 28 lb. per acre and P. 216-F has given 212 lb. per acre. The crop is in the field.

7. *Pulses.*—In the wet land block of the station, after a crop of paddy, in an area of 40 cents, greengram (Co. 1) was sown on 13th March 1954. Immediately after sowing, there were some good rains and the field could not be drained effectively and the result was the stand of the crop was very sparse with only a few plants here and there in elevated places. These plants came up very well and gave an yield which can be considered very satisfactory. A rough estimate of the yield of the crop will be 150 lb. an acre.

8. *Oil seeds.*—In another field in the wet land block of the station, after a crop of paddy, TMV. 2 (groundnut) was dibbled in an area of 20 cents on 23rd March 1954. The germination was satisfactory. But subsequent growth was very poor on account of excessive weeds (chiefly nut grass and hariali) and hardening of the soil. In spite of two weedings the crop failed completely.

9. Ninety-nine coconut seedlings from Nileshwar were planted along the boundary on the inner side of fence, in the dry land block, and maintained by pot watering. At the close of the year, 66 seedlings are alive.

Miscellaneous.

10. *Bananas.*—With the object of comparing the performance of some special varieties of plantains, suckers in *Poovan, Rasthali, Peyan, Ayiramkai rasthali Monthan, Gros Michael* and *Mauritius* got from the Central Banana Research Station, Aduthurai, were planted on 16th May 1953. With the exception of *Mauritius*, all the others gradually established themselves well. Local variety also was planted on 8th July and 3rd August 1953. In the earlier stages, these were maintained by pot-watering. Later on all these showed definite symptoms of intolerance of brackish water from the well nearby. Till the close of the year, none of them has thrown out bunch. But it is quite clear that the local ones are earlier than the special varieties.

11. *Mangoes.*—A batch of six grafts, two in each of *Mulgoa, Banishan* and *Pairi* was received from the Pepper Specialist, Taliparamba, and planted on 22nd August 1953. Another batch of six grafts, two in each of *Himayuddin, Neelam* and *Bangalora* was obtained from the Fruit Specialist, Coimbatore, and planted on 31st December 1953. Out of these, with the exception of one *Bangalora*, the others are coming up well.

12. *Acid limes.*—Fifteen seedlings from the Fruit Specialist, Coimbatore, and four from the Agricultural Research Station, Aduthurai, were planted by way of initial planting and replacement of casualties. Ten of them are surviving.

13. *Malta lemon.*—Six rooted cuttings from the Superintendent of Wynaad Colonisation Scheme and six from the Agricultural Research Station, Aduthurai,

were planted on 10th July and 3rd August 1953. Ten out of these twelve are suriving.

14. *Jamberi seedlings.*—Six seedlings were got from the Fruit Specialist, Coimbatore, and planted on 23rd July 1953. Of these, two are alive at the close of the year.

15. *Sour oranges.*—One seedling in this was obtained from the Agricultural Research Station, Koduru, and planted on 23rd August 1953. The plant is surviving.

16. *Pomello.*—Two seedlings in this, one seedless and one seeded, were got from the Agricultural Research Station, Koduru, and planted on 23rd August 1953. Of these two, the seedless variety has dried up and the other is alive.

17. *Seville limes.*—Six seedlings in this were got from Sivakasi through the Agricultural Demonstrator, Virudhunagar and planted on the station on 25th October 1953. Out of them four are surviving.

18. *Guava.*—Two seedlings in this (white smooth) were got from the Agricultural Research Station, Koduru, and planted on 26th August 1953. One of the two has died and the other survives.

19. *Sapota.*—Two grafts in this, from the Agricultural Research Station, Koduru, were planted on 23rd August 1953.

20. *Vegetables.*—The following vegetables were grown in very small areas for seed production :—

Snake gourd, bitter gourd, bottle gourd, ribbed gourd, ash gourd, pumpkin, cucumber, water melon, lab lab, bendai, cluster beans, brinjals, cowpea, tomato, spinach, sword beans and amaranthus.

Among these, tomato, brinjal, sword bean, bendai, cowpea and water melon did not fare well.

21. *Potato.*—Upon the instructions from the Director of Agriculture, Madras, a small area, 2·5 cents in extent, was put under potato (Variety 'President'). The crop did not fare well and it was subjected to a serious attack by Epilachna beetles. With 22 per cent germination it recorded an acre yield of 1,360 lb.

Green Manures.

22. *Gliricidia maculata.*—In order to ensure a perennial supply of green leaf for manure, about 1,500 seedlings and cuttings in this were planted along the boundaries of the two blocks of the station, on either side of the main foot paths and also upon the bunds of the fields in the wet land block. With occasional replacement of casualties, all of them have established themselves. But the stand of them is decidedly better in the dry land block of the station than in the wet land block.

23. *Sesbania speciosa.*—This was raised as a pure crop in an area of 4·50 acres. The produce from 0·80 acre, with an average acre yield of 9,000 lb. was cut and composted for use in October in the main season. The crop in another 3·80 acres stands in the field.

From the plants grown along the margins of fields, in the wet land area, 1,467 lb. of seeds were collected. This works out to a little more than 100 lb. per acre.

24. *Indigofera teysmanii.*—Around the office building and also along some of the footpaths, about 150 plants were planted and all of them are coming up gradually and steadily.

25. *Exotic green manures.*—Towards the close of the year, nine varieties of exotic green manure seeds, got from the Director of Agriculture, Madras, were sown in mud pots for recording their performance. The varieties sown are :—

(i) *Crotalaria retusa,* (ii) *Crotalaria brownii,* (iii) *Crotalaria usaramoensis,* (iv) *Crotalaria orixensis,* (v) *Desmanthus virgatus,* (vi) *Phaseolus lathyroides,* (vii) *Phaseolus semierectus,* (viii) *Aeschymone americana* and (ix) *Cassia leschenaultiana.*

Live Fence.

26. *Prosopis juliflora.*—The live fence of *Prosopis juliflora* has come very well in the dry land block and with occasional trimming, it presents a very good appearance, besides serving as a very effective barricade against trespass. But the stand of the plants in the wet land block is not so good as this.

Ornamental Plants.

27. A dozen ornamental tapioca cuttings from the Agricultural Research Station, Kovilpatti, and two dozens crotons from the Fruit Specialist, Coimbatore, have established themselves well on the station.

28. *Farmers' Day.*—The first 'Farmers' day' of the station was celebrated in February 1954 for which the Paddy Specialist, the Millets Specialist, the Entomologist and the Mycologist from Coimbatore and the Deputy Director of Agriculture, Madurai, and the District Agricultural Officer, Sattur, were present.

29. *Production and distribution of seed materials.*—The following figures give the production and distribution of the various seed materials from the Agricultural Research Station, Paramakudi, during the year 1953–54 :—

Table 3.—*Production and Distribution of Seed materials.*

Varieties.	Production.	Distribution.
	LB. OZ.	LB. OZ.
Paddy—		
Co. 2	1,573 0	740 0
Co. 13	1,473 0	535 0
ASD. 4	1,453 0	1,240 0
ASD. 5	2,361 0	1,840 0
Total of paddy seeds ..	6,860 0	4,355 0
Cumbu—		
Co. 3	1,158 0	..
X. 1	306 0	..
Ragi—		
Co. 1	1,544 0	..
Total of millet seeds ..	4,008 0	..
Vegetables—		
Bendai	20 12½	15 15¾
Cluster beans	13 11	12 13
Lab lab	8 4	7 13
Roselli hemp	11 15	5 0
Spinach	1 4	0 2
Amaranthus	3 0	2 12½
Snake gourd	12 2⅝	9 ⅞
Ribbed gourd	1 2	1 0
Bottle gourd	4 4	0 10
Ash gourd	0 3	0 3
Pumpkin	0 10½	0 10½
Water melon	0 1¼	0 1¼
Cucumber	0 12	0 12
Total of vegetable seeds ..	78 1⅞	56 13⅞
Green manure—		
Sesbania speciosa	1,467 0	800 0
Total of green manure seeds ..	1,467 0	800 0
Total of seed materials ..	12,413 1	5,211 13
	NOS.	NOS.
Tamarind seedlings	600	600
neem seedlings	50	50
Total number of seedlings ..	650	650

	LB. OZ.	LB. OZ.
Greens, vegetables and miscellaneous—		
Spinach greens	**744 8**	**744 8**
Roselli calyx	**85 0**	**85 0**
Amaranthus greens	**83 0**	**83 0**
Tapioca tubers	**30 0**	**30 0**
Potato tubers	**34 0**	**34 0**
Pumpkin	**226 0**	**226 0**
Ash gourd	**143 0**	**143 0**
Water melon	**20 0**	**20 0**
Cucumber	**101 0**	**101 0**
Tomato	**16 0**	**16 0**
Papaya	**81 0**	**81 0**
M.U. 1 cotton kapas	218 0	218 0
P. 216F cotton kapas	53 0	53 0
Total of miscellaneous ..	1,834 8	1,834 8
	NOS.	NOS.
Banana leaves	225	225
Rose flowers	18	18
Total ..	243	243

R. H. KRISHNAN,
Assistant-in-charge

8th September 1954.

MADURAI,
11th September 1954.

T. S. FRANCIS,
Deputy Director of Agriculture.

APPENDIX I.

STATEMENT OF RECEIPTS AND CHARGES FOR THE YEAR 1953–54 (FASLI 1363).

Receipts.

	Rs.	A.	P.
XXIX. Agriculture—Agricultural Receipts—			
Agricultural stations	179	5	6
Miscellaneous	..		
XIII. Other taxes and duties—Sales tax	0	4	3
Total receipts ..	179	9	9

Charges.

40. Agriculture—C. Experimental Farms—A. Agricultural Research Stations —6. Scheme for the opening of an Agricultural Farm at Paramakudi—			
1. Pay of establishments—Temporary	3,016	1	0
Travelling allowance	212	14	0
Dearness allowance	1,119	5	0
House-rent allowance	140	12	0
Total of pay and allowances ..	4,488	6	0
2. Office contingencies	317	6	0
3. Other charges—			
Petty constructions and repairs	..		
Capital outlay—Purchase of live and dead stock	1,318	7	6
Working expenses	5,667	8	3
Dearness allowance to menials	381	1	0
Total of other charges ..	7,367	0	9
Grand total of charges ..	12,173	5	9

APPENDIX II.

A SHORT NOTE ON THE ORIGIN AND OBJECTIVE OF THE AGRICULTURAL RESEARCH STATION, PARAMAKUDI.

The bulk of the area in the district of Ramanathapuram, barring the two ayan taluks of Sattur and Srivilliputtur, is comprised in the two zamin estates of Ramanathapuram and Sivaganga, which have been taken over by the Government under the Zamindari Abolition Scheme. Agriculture in this extensive zamin area is in a very backward condition when compared to that in the two ayan taluks, partly due to the ryots' ignorance of advanced and scientific methods of agriculture and partly due to their indifference and lack of interest in land development, as a consequence to the systems of tenure obtaining in the zamin area. Now that the zamin area has passed into the hands of the Government, the Government consider that it is their duty to see that these lands are brought in line with the more developed and advanced tracts in Srivilliputtur and Sattur taluks. Actually many tracts in Sivaganga and Ramanathapuram zamin areas contain fertile lands and ample resources, which, if properly harnessed and developed, will yield very good results. At present, those extensive area depend for irrigation only on the tanks (and in few places on canals from the river Vaigai) which get filled up only in the rainy season. These tanks will function as sources of irrigation only in years of normal rainfall. Thus, they are uncertain sources of irrigation. Wells can usefully become a very good supplementary source of irrigation, assuring enough water for lands even in bad years. Thus, if there is failure of water supply from the tanks, the ryots could bring the crops to maturity by irrigating them with well water. The ryots could also raise more crops in the same year under well irrigation. Besides the ayacuts under tanks, there are large extents of fertile punja lands in the zamin area which depend entirely on rains. If these lands are irrigated by wells, they would also yield good crops. Well irrigation in Sattur and Srivilliputtur is well known and thousands of wells have sprung into existence under the well subsidy scheme. But this practice is mostly unknown in Ramanathapuram and Sivaganga zamin areas. It was therefore considered that the ryots of these areas must be made well irrigation minded and that mere propaganda about well irrigation and importance of wells will not bear much fruit and that some practical methods must be adopted to demonstrate the benefits and advantages of well irrigation. With this end in view, an Agricultural Research Station was opened at Paramakudi, a place centrally situated in the said zamin area, where agriculture will be carried on by the Department by means of well irrigation with the aid of pumping sets, etc., and rotation of crops adopted in order to get the maximum yield throughout the year. Incidentally, crop improvement work also has been taken up in a small scales and the Station started functioning on and from 1st April 1953.

APPENDIX III.

Cost of cultivation of Bulk Crops grown in 1953-54 and the returns from there per acre.

	Semi-Dry Paddy.	*Wet paddy in the main season.*	*Wet paddy in the Navarai season.*	*Dry ragi.*	*Dry cumbu.*
Total area grown	1·58 ac.	6·61 ac.	1·00 ac.	2·62 ac.	2·79 ac.
Number of fields that go to make up the above total.	3	13	2	5	55
Varieties grown	ASD-4	CO-2 and ASD-5.	CO-13	CO-1	CO-3 and X-1.
Preparatory cultivation ..	13 2 2	33 5 9	29 0 0	8 6 4	8 6 9
Manures and manuring ..	10 10 1	35 7 9	24 6 6	Nil.	Nil.
Seeds, sowing and planting.	22 6 8	34 8 10	39 14 4	9 0 1	5 5 5
After cultivation	14 6 5	15 4 9	Nil.	17 12 0	6 5 10
Harvest, threshing, cleaning, etc.	11 3 9	20 5 0	25 12 0	30 12 6	24 11 0
Total cost ..	71 13 1	139 0 1	119 0 10	65 14 11	44 13 0
Seed grain produced ..	572 lb.	705 lb.	1140 lb.	1071 lb.	672 lb.
Cattle threshed grain produced.	100 lb.	135 lb.	320 lb.	Nil.	Nil.
Straw produced	785 lb.	1205 lb.	2043 lb.	1563 lb.	1219 lb.
Value of seed grain ..	95 5 9	117 9 2	190 0 0	107 1 7	67 3 3
Value of cattle threshed grain.	12 8 0	22 12 8	40 0 0	Nil.	Nil.
Value of the straw	15 10 9	24 1 5	40 13 9	22 5 3	17 7 2
Total return ..	123 8 6	164 7 3	270 13 9	129 6 10	84 10 5
Net profit ..	51 11 5	25 7 2	151 12 11	63 7 11	39 13 7

Seed paddy valued at	6 lb.	per rupee.
Seed cumbu and ragi valued at ..	10	,,
Cattle threshed paddy valued at ..	8	,,
Paddy straw valued at	50	,,
Cumbu and ragi straw valued at ..	70	,,

(Sd.) R. H. KRISHNAN,
Assistant-in-charge, Agricultural Research Station, Paramakudi.

ANNUAL REPORT OF THE AGRICULTURAL RESEARCH STATION, PATTAMBI, 1953–54 (FASLI 1363).

I. *Season and rainfall.*—1 (i) *South-west monsoon*, 1953.—The south-west monsoon commenced on 7th June but was mild in intensity through the month. Heavy and continuous downpour was however received during the first week of July. It was only with the rains received in June that preparation of the first-crop nurseries and successful sowing of the modern varieties could be taken up, since the summer showers received were quite inadequte.

There was a total rainfall of 55·66 in 66 rainy days. The total was 6·15 inche; below normal. Besides, the distribution of the rainfall was uneven, half the total precitation being received during July itself. As a result of poor precipitation in June the planting of cost crop was delayed which in turn also delayed the transplantation of the succeeding crop.

(ii) *North-east monsoon*, 1953.—A total rainfall of 16·65 inches was recorded in 13 rainy days as against a normal of 16·91 inches. There was no rainfall from November onwards. As a result, the second-crop paddy suffered acutely for want of water. Lift irrigation was taken up wherever possible and about one-third of the crop was saved. In addition to the water scarcity, there was widespread and unprecedented attack of stem-borer bringing down the yield of the crop considerably.

(iii) *Hot weather*, 1954.—There was a total rainfall of 14·84 inches in 18 days as against a normal of 14·89 inches. This year pre-monsoon showers were good and well distributed. The rains helped in the timely preparation of the 'modan' and wet lands. As the rains were adequate and well distributed, the germination and subsequent growth of 'modan' and broadcast paddy were good. Nursery sowings for first-crop paddy could also be taken up in May with the help of the rains.

(iv) *South-west monsoon*, 1954.—The monsoon commenced at the proper time on 7th June 1954. The rains were well distributed and were very useful to all crops especially to 'modan' and broadcast paddy. Transplanting of first crop could also be taken up during the second week of June. A rainfall of 25·39 inches was recorded by the end of the *fasli*, which was 3·48 inches in excess of the decennial average.

Statement of rainfall is given in Table I.

TABLE I.—*Statement of rainfall* 1953–54.

Month and week.	Rainfall in 1953–54.		Rainfall in 1952–53.		Average for the past ten years.		Average for the past 26 years.	
	Quantity in inches.	Number of rainy days.	Quantity in inches.	Number of rainy days.	Quantity in inches.	Number of rainy days.	Quantity in inches.	Number of rainy days.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
			A. South-west monsoon.					
953—								
June—								
7–13	4 54	5	1·33	4	7·27	5·1	6·67	5·6
14–20	3 15	3	6·22	6	6·16	4·7	6·01	5·5
21–27	2·63	6	8·81	7	5·70	4·8	6·12	5·5
June–July—								
28– 4	11·57	7	4·69	7	5·83	5·5	7·44	5·8
5–11	13·68	7	0·34	1	6·70	3·5	6·68	5·6
12–18	0·76	3	3 31	6	4·54	5·4	5·61	5·6
19–25	4·87	5	6·04	6	6·14	4·5	4·93	5·7
July–August—								
26– 1	7·55	7	5·70	7	5·05	4·7	4·19	4·7
2– 8	2·48	3	3·66	7	4·21	4·0	4·39	5·2
9–15	1·28	4	3·49	5	2·92	4·5	3·68	4·0
16–22	3·28	7	1·71	4	3·20	3·1	2·79	4·0
23–29	1·15	2	1·71	2	1·99	2·0	2·14	2·8
August–September—								
30– 5	1·01	2	1·10	2	1·38	2·4	1·60	2·5
6–12	0·30	1	..	..	1·60	2·2	1·95	2·8
13–19	0·51	1	..	..	0·67	2·7	1·02	2·3
20–26	..	..	0·06	..	1·45	2·2	1·42	2·3
Total ..	58·66	66	47·17	64	64·81	613	66·64	69·9

Month and week.	Rainfall in 1953–54. Quantity in inches.	Rainfall in 1953–54. Number of rainy days.	Rainfall in 1952–53. Quantity in inches.	Rainfall in 1952–53. Number of rainy days.	Average for the past ten years. Quantity in inches.	Average for the past ten years. Number of rainy days.	Average for the past 26 years. Quantity in inches.	Average for the past 26 years. Number of rain days.
(1)]	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
B. North-east monsoon.								
1953—								
September–October—								
27– 3	0·02	..	3 27	1	1·91	1·8	2·20	2·7
4–10	5·43	3	5·73	6	2·21	2·6	1·94	2·8
11–17	2·17	3	1·07	3	1·65	1·5	2 57	2·9
18–24	6·39	3	0·56	1	4·24	2 6	2 91	2·6
25–31	1·79	2	1·35	1	1·54	1 2	2·77	2·7
November—								
1– 7	..	..	0·79	1	1·21	1·6	1·31	2·1
8–14	0·02	..	..	..	1·14	1·1	1·44	1·7
15–21	0·72	1	..	..	1 04	1 2	1·18	1·6
22–28	0·01	..	0·50	1	0·45	0·9	0 60	0·9
November–December—								
29– 5	..	..	1·61	2	0·74	0·9	0·66	0·8
6–12	..	..	0·10	1	0·49	0·1	0·38	0·5
13–19	..	..	0·97	1	0·16	0·2	0·08	0·2
20–26	..	..	..	..	0·02	0·1	0 06	0·2
December–January—							0·03	0·1
27– 3	..	..	..	..	..	..	0·14	0 1
4–10	..	..	..	..	..	..	..	..
11–17	..	..	..	..	0·07	0·3	0·03	0·1
18–24	..	..	..	..	0·04	0·1	0·04	0·1
25–31	..	..	..	..	..	..	..	..
Total ..	16·55	13	16·04	18	16·91	16·1	18·36	22·1
C. Hot weather period.								
1954—								
February—							0·16	0·3
1– 7	..	..	..	..	..	..	0·05	0·1
8–14	..	..	..	..	..	..	0·21	0·2
15–21	..	..	..	..	0·54	0·3	0·12	0·2
22–28	..	..	..	..	0·27	0·5	..	..
March—							0·02	0·1
1– 7	..	..	..	..	0·03	0·1	0·13	0·2
8–14	..	..	..	..	..	..	0·25	0·3
15–21	1·85	2	..	..	0·39	0·5	0·26	0·4
22–28	0·73	1	1·37	1	0·36	0·4	0·54	0·6
March–April—	0·96						0·77	1·3
29– 4	..	..	6 11	1	0·54	0·9	1·02	1·1
5–11	..	..	0·29	1	0·39	1·5	0·67	1·0
12–18	0·76	2	6·04	..	1·45	1·3	..	..
19–25	0·96	2	6 34	1	0·28	0·4	..	..
April–May—							0·50	0·8
26– 2	3·18	1	..	..	0·51	0·7	0·64	0·8
3– 9	0·28	1	1·95	1	0·64	0·5	1·01	1·4
10–16	0·40	1	..	..	0·48	1·0	2·07	2·0
17–23	0·25	1	0·03	..	1·07	1·6	3·96	2·8
24–30	0·54	2	0·16	1	3·16	3·0	..	..
May–June—							4·30	4·0
31– 6	5·80	5	0·61	3	4·78	4·8	..	..
Total ..	14·84	18	5·22	9	14·89	17·5	16·68	17·8
Total rainfall for the year.	90·05	97	68·43	91	96·61	94·9	101·68	109·8

Statement of monthly mean maximum, mean minimum temperature and mean relative humidity is given in Table II.

TABLE II.—*Statement of Monthly mean maximum, mean minimum temperature and mean Relative Humidity.*

Month. (1)]	Mean maximum. (2)	Mean minimuum. (3)	Mean humidity percentage. (4)
1953—			
July	82·8	72·4	95
August	85·1	74·2	92
September	87·1	73·4	90
October	88·5	75·0	92
November	92·2	72·1	79
December	93·1	69·7	68
1954—			
January	93·8	71·8	70
February	97·4	70·8	78
March	97·3	74·5	84
April	94·9	77·8	82
May	92·1	76·4	88
June	65·1	73·2	96

II. *Paddy—Bulk*—2. *First-crop season*—(*a*) *Broadcast crop.*—(i) '*Modan*'.—The 1953-crop was sown early in May with the summer showers, but due to the failure of rains afterwards the germination and growth were very poor. So resowing had to be done in an area of 2·57 acres. For want of rains during the early stages of the crop, the yield obtained from this was very poor. PTB. 28, PTB. 29 and PTB. 30 recorded an average yield of only 260 lb., 168 lb. and 425 lb. respectively.

In 1954, timely sowings could be done in May itself as pre-monsoon showers received were adequate. An area of 8·31 acres was sown with 'modan' varieties including 60 experimental units. The 'modan' area was manured with 10 cart-loads of cattle manure per acre applied to the preceding gingelly crop and wood ash at 1,000 lb. per acre at the time of sowing.

(ii) *Single-crop and double-crop lands.*—The broadcast crop of 1953, covering an area of 2·07 acres in single crop lands and 8·42 acres in double-crop lands did not fare very well for want of adequate rains during the growth period. The crop was poor in germination and sparse in stand. The average yield per acre came to 1,255 lb. in single-crop lands and 1,652 lb. in double-crop lands.

In 1954, 1·64 acres were sown broadcast to PTB. 32 and PTB 2 in single crop lands and 11·57 acres to PTB. 22, PTB. 23, PTB. 24, PTB. 25 and PTB. 31 in double-crop lands during April. The crops are having good stand and growth. The plots were manured with 10 cart-loads of cattle manure per acre at the time of broadcasting.

(*b*) *Transplanted crop*—(i) *First crop*, 1953—*Single crop and double-crop lands.*—The transplanting commenced only on 24th June 1953 and extended up to 11th August 1953, the total area planted being 60·08 acres, 41·06 acres in double-crop lands including 3,055 experimental units and 19·02 acres in single-crop lands. The crop was uniform in growth and flowering and the average acre yield came to 1,700 lb. in double-crop lands and 1,459 lb. in single crop lands.

During 1954, the transplanting commenced on 13th June 1954 and was finished by 30th June 1954 covering an area of 15·62 acres including 79 experimental units in double-crop lands by the end of the *fasli*. The plots were manured with green leaves at 4,000 lb. per acre or cattle manure at 10 cart-loads per acre as basal dressing and 75 lb. ammonium sulphate per acre as top dressing.

(ii) *Second crop*, 1953.—As the transplanting of first crop was delayed for want of adequate rains, the transplanting of second crop was also correspondingly delayed. Commencing on 15th September 1953, it could be finished only by 27th November 1953 and the area covered was 49·52 acres inclusive of 1,134 experimental units. The bulk plots were manured with 4,000 lb. green leaf per acre. A top dressing of 75 lb. ammonium sulphate was given about a month after planting. Practically no rain was received during the growth phase of the crop and a major portion of the crop dried up. It was also very badly affected by stem-borer. The yield consequently was unprecedently low. The plots which were transplanted early in September gave comparatively better yield than the others, the average being 1,264 lb. per acre.

(iii) *Third crop* ('*punja*').—Only a very small area could be put for third crop for want of adequate water in the wells consequent on the failure of north-east monsoon showers. PTB. 10 was raised in an area of 1·04 acres and it yielded 1,674 lb. grain per acre.

The acre yields of different strains are presented in Table III.

TABLE III.—*Bulk yields of Paddy Strains, Agricultural Research Station, Pattambi.*

Particulars.	Acre yield in pounds.		
	1950–51.	1951–52.	1952–53.
(1)	(2)	(3)	(4)
First crop—Transplanted—			
PTB. 1 Aryan	1,664	1,957	2,418
PTB. 2 Ponnaryan	2,623	2,475	2,467
PTB. 5 Velutharikayama	1,024	2,125	1,649
PTB. 8 Thavalakkannan (Red Rice) ..	1,425	927	1,235
PTB. 9 Thavalakkannan (White Rice) ..	1,861	1,806	1,600
PTB. 26 Chenkayama	1,771	2,015	2,052
PTB. 31 Elapapoochampan	893	1,015	1,671

First crop—Broadcast—

Particulars.	Area yield in pounds.		
	1953—54	1951—52	1952—53
(1)	(2)	(3)	(4)
PTB. 22 Veluthavattan	2,063	1,034	952
PTB. 23 Cheria aryan	1,916	1,405	1,011
PTB. 24 Chuvanna vatten	1,406	1,113	707
PTB. 25 Thonnooran	1,223	1,075	869
PTB. 32 Aruvakkari	1,629	..	..
Second crop Transplated—			
PTB. 4 Vellari	329	1,826	1,581
PTB. 12 Chitteni	2,157	2,404	2,287
PTB. 15 Kevunginpoothala	1,121	1,799	2,060
PTF. 18 Eravapandy	2,190	2,274	2,491
PTB. 20 Vadakkan chitteni	657	1,218	1,735
PTB. 21 Thekkan	1,825	1,951	957
PTB. 27 Kodiyan	56	..	911
Third crop—			
PTB. 10 Thekkan cheera	1,748	1,558	808
Modan (dry paddy)—			
PTB. 28 Kattamodan	260	986	300
PTB. 29 Modan black	168	223	288
PTB. 30 Modan dirty	425	1,375	654
Single crop lands—			
PTB. 7 Parambu vattan	1,356	1,077	1,701
PTB. 10 Thekkan cheera	1,596	1,709	1,071

III. *Paddy experiments*—3. *Pure line selection*—(*A*) *Release of strains—Second crop—Arikirai.*—This is a popular variaty of Chirakkal and Tellicherry taluks covering an area of 10,000 acres. Pure line selection work was taken up during 1940–41 and yield trial commenced from 1941–42. Culture 6,027 was tried in two centres in Chirakkal taluk and this was found to give 31·4 per cent increased yield over ryots' bulk in district and 8.75 per cent increased yield at this station. Hence this promising culture is awaiting release as strain, PTB. 33.

TABLE IV.—*Arikkirai cultures—Results of trials on this station and in the district.*

Farm.		District.	
Year.	Per cent of increased yield over ryots bulk.	Year.	Per cent of increased yield over ryots bulk.
(1)	(2)	(3)	(4)
1945–46	12·2	1950–51	39·8
1946–47	5·3	1951–52	22·9
Average	8·75	Average	31·4

(*B*) *Cultures under yield trial*—(*a*) *First crop*—(i) *Chornali.*—The yield trial with four selected cultures in this variety was repeated for the fourth time along with PTB. 2 and the ryots' bulk of *chornali* as controls. Though the results satisfied the 'z' test since the cultures were found to be erratic and not better than the standard in their performance both at the station and in the district. This item of work was discontinued as per orders of the Headquarter Deputy Director of Agriculture (Research).

TABLE V.

Field Fo.—A. 5c.
Plot size—4' - 25'.
Lay-out—6 × 4 randomized blocks.

Date of sowing—21st May 1953.
Date of planting—30th June 1953.
Date of harvest—29th September 1953.

Cultures.

1. 8778.
2. 8786.
3. 8792.
4. 8799.
5. PTS1 2.
6. Standard (Chornali bulk).

Particulars.	8776	8785	8792	8799	PTB. 2. Standard.		General mean
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Acre yield in lb.	1,906	2,178	1,951	2,108	2,464	1,875	2,080
Percentage on standard	101·81	116·86	10·486	131·80	131·68	100·00	111·00

Particulars.	Standard error.	'Z' test.	Critical difference. P=0·05.
(1)	(2)	(3)	(4)
Acre yield in lb.	206·26	Satisfied.	441·55
Percentage on standard	11·07	..	23·57

Conclusion, 1953–54—PTB. 2, 8786, 8799, 8792, 8778, Standard.

PREVIOUS YEARS' RESULTS.

Particulars.	8778	8786	8792	8799	PTB. 2.	Standard.	General mean.	Standard error.	Standard 'C' test.	Critical difference P : 0·05e
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Acre yield in lb. 1950–51.	2,791	2,852	2,920	2,403	3,205	2879	28,41	181·82	Satisfied.	387
Acre yield in lb. 1952–53.	2,763	2,930	2,836	2,849	4,514	2,792	3,112	62·0	Satisfied.	187
Percentage on standard.	98·99	104·9	101·7	101·9	163·8	100·0	11·86	2·23	..	6·71

Conclusions—

1950–51 .. PTB. 2, 8792, Standard. 8786, 8778, 8789.

1951–52 .. PTB. 2, 8788, 8799, 8792, 8778, Standrad.

1952–53 .. PTB. 2, 8786, 8799, 8792, Standard, 8778.

(ii) *Valiachampan.*—Four promising cultures in this variety were under yield trial and all the four were carried forward for further trial. Two cultures, namely, 8,905 and 8,910 yielding on an average, more than 17 per cent over ryots' bulk were sent for district trial during the year in two centres in Palghat taluk.

TABLE VI.

Filed No.—A 5 a.
Plot size—4' — 25'.
Lay-out—5 × randomized blocks.

Date of harvest—21st May 1953.
Date of planting—25th June 1953.
Date of harvest—9th September 1953.

Cultures.

8904.
8906.
8907.
8910
Valiachampan standard.

Summary of results.

Particulars.	8905	8906	8907	8910	Standrad.	General mean.	Standard error.	'Z' test
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Acre yield in lb.	1,647	1,586	1,605	1,661	1,409	1,582	104·4	Not satis-fied.
Percentage on standard.	117·3	112,7	114,4	117,9	100·0	112·4	7·4	

(iii) *Velutharikayama.*—Six cultures in this popular white rice variety of Palghat taluk selected last year were compared against three cultures selected previously of which four cultures which recorded 11 to 21 per cent increased yield over culture 8817 were carried forward for further trial.

TABLE VII.

Field No.—A. 5 a.
Plot size—4' × 25'.
Lay out—9 × 4 randmoised blocks.

Date of sowing—21st May 1953
Date of planting—24th June 1953.
Date of harvest—6th September 1953.

Cultures.

1 8914.
2 8916.
3 8919.
4 8921.
5 8924.
6 8925.
7 8817.
8 8820.
9 8821.

Summary of results.

Particulars	8,914	8,916	8,919	8,921	8,924	8,925	8,817	8,820	8,821
Acre yield in lb.	2,525	2,294	2,226	2,443	2,021	2,443	2,043	2,336	2,382
Percentage on general mean ..	109·7	99·7	96·7	106·2	87·9	106·2	88·7	101·4	103·5

Particulars.	General mean.	Standard error.	'Z' test.	Critical difference. P=0·05
Acre yield in lb.	2,305	89·7	Satisfied.	185
Percentage on general mean	100·0	3·09	..	8·03

Conclusion—

8914, 8921, 8925, 8821, 8820, 8916, 8919, 8817, 8924.

(*b*) *Second crop—Chuvanna vellakoli.*—This is a popular variety of Ernad taluk in South Malabar. The yield trial was repeated for the third time with seven selected cultures against PTB. 4 and ryots' bulk of *vellakoli*. The trial during the year was a failure and so, on the basis of the three previous years' trial, four cultures 8853, 8875, 8878 and 8880 were carried over.

(*c*) *Single plant selections and preliminary yield trial*—(*a*) *First crop.*—Fresh selections were made in *Vadakkan* Cannanore, *Vadakkan* Tellicherry and *Allikanan*; the popular varieties of North Malabar and 99 cultures in each were carried forward.

(*b*) *Annachampan.*—Fresh selection work was taken up in this variety which is largely grown in Palghat taluk. Twenty-eight best plants were selected for further study.

4. *Inter varietal trial.*—(*a*) Hybrid culture of a cross between Luchaix gurmatia Burma received from Paddy Specalist, Coimbatore, during May 1953, was compared against PTB. 9 for yield. It was found that PTB. 9 was a better yielder than the culture, the percentage increase being 74·1 per cent. But the straw yield was more in the culture than in PTB. 9 by 41·0 per cent. The culture was also songer in duration by about 30 days. Trial is to be continued with two long duration strains PTB. 1 and PTB. 5 in the first crop season and PTB. 16 in the second-crop season.

TABLE VIII.—*Burma Cross versus PTB. 9—Inter Varietal trial,* 1953–54 *First crop.*

Field No.—A. 5 c.
Plot size—4′ × 25′.
Lay out—A B B A method.
Lay out—A B B A method.

Date of sowing—28th June 1953.
Date of planting—26th June 195
Date of harvest—(PTB.9)—8th October 1953.
Date of harvest—(Burma cross)—1st November 1953.

Cultures.

A. Burma cross.

B. PTB. 9.

Summary of results.

For grain yield—1953–54.

Particulars.	A	B	General mean.	Standard error.	'Z' test.	Critical difference P=0·05.
Acre yield in lb.	563	2,171	1,367	1,476	Satisfied.	135
Percentage on control	25·9	100·0	62·9	6·79	..	14·48

Conclusion :—A, B.

For straw yield—1953–54.

Particulars.	A	B	General mean.	Standard error.	'Z' test.	Critical difference. P=0·05.
Acre yield in lb.	8,793	6,234	7,514	143·5	Satisfied.	306
Percentage on control	141·0	100·0	120·5	2·3	..	4

Conclusion—A, B.

(*b*) *Observation plot of Swaziland variety D.S.* 1.—D.S. 1, the Swaziland variety is reported to be a very high yielder. This can be raised as a ratoon crop also. Seeds were received from the Paddy Specialist, Coimbatore, for trial at the station. This was compared with Co. 13 and PTB. 10 in observation plots in the first-crop season and it gave an increased yield of 20·3 per cent over PTB. 10 and 76·3 per cent over Co. 13. The crop was allowed to ratoon but due to severe attack of *leptispa*, no seeds could be gathered. The trial will however be continued during next season.

5. *Types.*—A live collection of 141 types in the first and second-crop seasons was maintained.

6. *Hybridization*—(*a*) *Yield trial*—(i) *First crop.*—Five progenies selected from inter-strain crosses between PTB. 7 and PTB. 22, PTB. 14 and MTU. 9, were

compared for yield against parents. Out of these three promising ones, namely 1/1, 1/5, and 11/6 in the crops between PTB. 7 and PTB. 22 were carried forward for further trial.

TABLE IX.—*PTB. 7 × PTB. 22 and PTB. 14 × MTU. 9 Cross progenies Comparative yield trial 1953–54 First crop.*

Field No.—A. 5 b.
Sub plot—4′ × 25′.
Lay out—8 × 4 randomized blocks.

Sown—21st May 1953.
Planted—25th June 1953.
Harvested—11th September 1953.

Progenies.

V × P 1/1	7847/2	PTB. 14.
V × P 1/5	7847/5	PTB. 22.
V × P 11/6	PTB. 7.	

Summary of results.

Particulars.	V × P. 1/1.	V × P. 1/5.	V × P. 11/6.	7847/2.	7847/5	PTB. 7.	PTB. 14.
Acre yield in lb. ..	1,558	1,423	1,892	531	1,974	1,776	1,538
Percentage on General mean.	105·7	92·5	123·0	34·5	128·3	115·5	100·0

Particulars.	PTB. 22.	General mean.	Standard error.	'Z' test.	Critical difference P=0·05.
Acre yield in lb.	1,552	1,530	71·9	Satisfied.	150
Percentage on general mean	100·9	100·0	4·7	..	9·8

Conclusion—7847/5, V × P 11/6, PTB. 7, V × P 1/1, PTB. 22, PTB. 14, V × P 1/5, 7847/2.

(ii) *Second crop.*—Three cultures selected from a cross between 00.3 and PTB. 19 with the object of obtaining a Co. 3 type with better storage qualities of PTB. 19 were under yield trial for the third year against Co. 3. The crop was very badly affected by drought and hence no reliable results could be obtained. Available seeds however were gathered for next year's trial.

(*b*) *Fresh crosses and preliminary yield trial*—(i) *First crop*—1653 X PTB. 10.—Two hundred and fifty F2 progenies of the cross made between 1,653, a dormant variety of Brazil and PTB. 10, received from the Paddy Specialist, Coimbatore, for inducing dormancy in PTB. 10, were under study and 14 promising progenies were carried forward.

Krasnodar x Kattamodan.—F2 progenies of the cross between Krasnoder x *Kattamodan* were grown for evolving a strain with the drought resistant character of Krasnodar—a Russian paddy, and 47 progenies were selected for further study.

PTB. 2 x MTU. 3.—Cross between these two were made with the object of obtaining a PTB. 2 type with non-lodging quality of MTU. 3 and seeds were collected.

7. *Manurial experiments*—(*a*) *Preseason manuring for broadcast first crop.*—The experiment designed to find out if heavy manuring of transplanted second crop would obiviate the necessity of basal manuring for the following broadcast crop of paddy and would maintain the fertility of the soil, was continued during the first-crop season. The second-crop was manured with heavy doses of cattle manure and green leaf as two separate treatments along with 'no manure' as control in split plot design. From the results, it is seen that in the second-crop season, the results satisfied the 'Z' test, cattle manure recording the maximum yield of 25·1 per cent increase over no manure and 2·0 per cent over green leaf. In the following first-crop season treatment differences were significant only for main plot treatments (manure and no manure). Manuring recorded 39·0 per cent increase over no manure.

Combined analysis of the three years' results presented in Table XII shows that cattle manure recorded 11·2 per cent increase as residual effect over no manure and 8·0 per cent increase over green leaf. The experiment is concluded.

The results bring out the following points :—

(i) For swamp rice, a dose of about 10 tons of cattle manure per acre have to be applied to equal the effect of 5,000 lb. of green leaf for direct effect.

(ii) Cattle manure at this dose has remarkable residual effect which benefit the following broadcast crop of paddy which, in Malabar, usually goes without manuring :—

TABLE X.—*Preseason manuring*, 1952–53, *Second crop.*

Field No.—A 10 b c, 11 b c.
Plot size—36½' × 32½'.
Lay out—3 × 4 split plot design.

Sown—13th September 1952.
Planted—30th October 1952.
Harvested—28th January 1953.

Variety—PTB. 20.

Summary of results.

Particulars.	1	2	3	General mean.	Standard error.	'Z' test.	Critical difference. P=0·05.
Acre yield in lb. ..	1,915	1,946	1,556	1,806	36·3	Satisfied.	89
Percentage control.	132·1	125·1	109·0	116·06	3·3	..	4·9

Conclusion—Cattle manure, green leaf, no manure.

Broadcast first crop—1953–54.

Variety—P.T.B. 2.
Sown—7th May 1953.
Harvested—9th October 1953.

Summary of results for main plots.

Particulars.	Manure.	No manure.	General mean.	Standard error.	'Z' test.	Critical difference. P=0·05.
Acre yield in lb.	2,077	1,490	1,784	130·2	Satisfied.	278
Percentage on control	139·0	100·0	119·5	8·72	..	18·64

Conclusion—Manure, no manure.

Summary of results for sub-plot treatments residual effect.

Particulars.	Green leaf.	Cattle manure.	No manure.	General mean.	Standard error.	'Z' test.	Critical difference P=0·05.
Acre yield in lb. ..	1,830	2,019	1,777	1,875	166·9	Not satisfied.	..
Percentage on control.	102·9	113·6	100·0	105·5	9·4	..	..

Summary of results for interaction.

Particulars.	Manure Green leaf.	Manure Cattle manure.	No manure.	Green leaf.	No manure cattle manure.	No manure.
Acre yield in lb.	2,102	2,047	2,084	1,349	1,763	1,854
Percentage on control	155·2	151·2	153·9	99·6	130·2	100·0

Particulars.	General mean.	Standard error.	'Z' test.
Acre in yield in lb.	1,783	226·4	Not satisfied.
Percentage on control	131·7	16·73	..

Combined analysis of the three second crop seasons results.

Particulars. ..	Green leaf.	Cattle manure.	No manure.	General mean.	Standard error.	'Z' test.	Critical difference P=0·05.
Acre yield in lb. ..	2,003	1,936	1,544	1,828	29·98	Satisfied.	61
Percentage on control.	129·7	125·4	100·0	118·3	1·94	..	3·93

Combined analysis of the three first crop seasons—Residual effect of preseason manuring.

Particulars.	Green leaf.	Cattle manure.	No manure.	General mean.	Standard error.	'Z' test.	Critical difference. P=0 05.
Acre yield in lb. ..	1,749	1,885	1,695	1,776	69·2	Satisfied.	138
Percentage on control.	103·2	111·3	100·0	104·8	4·08	..	

For interaction.

Particulars.	Green leaf.	Manure Cattle manure.	No manure.	Green leaf.	No manure Cattle manure.	No manure
Acre in yield in lb.	2,057	2,114	2,038	1,441	1,655	1,353
Percentage on control	152·0	156·3	150·7	106·5	122·4	100·0

Particulars.	General mean.	Standard error.	'Z' test.	Critical difference. P=0·05.
Acre yield in lb.	1,776	98·04	Satisfied.	196
Percentage on control	131·3	7·24	..	14·48

(*b*) *Dicalcium phosphate trial.*—The experiment was continued during the first-crop season to compare the efficacy of dicalcium phosphate containing 30·3 per cent P205 with superphosphate at a rate to supply 80 lb. P205 per acre over a basal dressing of groundnut cake to supply 40 lb. N. The fertilizers were applied both by broadcasting and placement. The results satisfied the 'Z' test and indicate that both the dicalcium phosphate and superphosphate contributed to maximum yield in combination with groundnut cake whether the phosphates were applied broadcast or placed, confirming the previous years' results.

TABLE XI.—*Dicalcium phosphate experiment*, 1953–54 *First crop.*

Field No.—A 2 b c.
Size—32' × 27'.
Lay out—6 × 5 randomized blocks.

Sown—10th June 1953.
Transplanted—25th July 1953.
Harvested—26th October 1952.

Variety—PTB. 2.

Treatments—
1 Control (no manure).
2 Groundnut cake at 40 lb. N. per acre.
3 Groundnut cake at 40 lb. N./acre + super to supply 80 lb. P. 205 (broadcast).
4 Groundnut cake at 40 lb. N./acre + dicalcium phosphate 80 lb. P. 205 (Broadcast).
5 Groundnut cake at 40 lb. N./acre + super to supply 80 lb. P. 205 (placed).
6 Groundnut cake at 40 lb. N./acre + dicalcium phosphate 80 lb. P. 205 (placed).

Summary of results 1953–54.

Particulars.	1	2	3	4	5	6	General mean.	Standard error.	'Z' test.	Critical difference P=0·05.
Acre yield in lb.	1,634	1,976	2,339	2,319	2,188	2,369	2,138	1,411	Satisfied.	294
Percentage on control.	100·0	120·9	143·2	141·9	133·9	145·1	130·8	9·52	..	18·01

Conclusion—6, 3, 4, 5, 2, 1.

Previous years' results.

Particulars.	1	2	3	4	5	6	General mean.	Standard error.	'Z' test.
Acre yield in lb.— First crop, 1951–52 ..	1,266	1,544	1,506	1,443	1,481	1,392	1,439	116·56	Not satisfied
Percentage on control ..	100·0	122·0	119·0	114·0	117·0	110·0	113·7	9·2	..
Acre yield in lb.— Second crop, 1951–52	1,101	1,402	1,323	1,129	1,159	1,311	1,237	146·12	Not satisfied.
Percentage on control ..	100·0	127·3	120·1	102·5	105·3	119·1	112·4	13·27	..

Particulars.	1	2	3	4	5	6	General mean.	Standard error.	'Z' test.	Critical difference P=0·05.
Acre yield in lb.— First crop 1952–53.	1,885	2,420	2,540	2,490	2,580	2,510	2,414	62·76	Satisfied.	265
Percentage on control.	100·0	128·6	134·8	132·1	137·0	136·8	128·2	3·3	..	13·97
Acre yield in lb.— Second crop 1952–53.	1,139	1,513	1,775	1,865	1,764	1,755	1,637	159·7	Satisfied.	468
Percentage on control.	100·0	132·9	155·5	163·8	154·9	154·1	143·5	13·91	..	41·04

Conclusion, 1952–53.—
First crop: 5, 6, 3, 4, 2, 1.
Second crop: 4, 3, 5, 6, 2, 1.

(c) *Studies on laterite soils.*—The experiment designed to find out how far paddy crop will respond to the phosphatic manure in laterite soils in the presence of iron and alumina, was continued both in the first and second-crop seasons and concluded. In the first-corp season, leaf at 5,000 lb. + 60 lb. P205+3,000 lb. lime recorded the maximum yield of 75·2 per cent increase over control (no manure) while in the second-crop season, leaf at 7,500 lb. + super 45 lb. P205+lime at 1,500 lb. per acre recorded 69·4 per cent increase over no manure. In the previous first-crop leaf at 5,000 lb. + 60 lb. P205 + lime 3,000 lb. recorded the best yield of 139·8 per cent over no manure and 7,500 lb. leaf + 60 lb. P205+lime 3,000 lb. gave 204·8 per cent increase in the second-crop. It will thus be found that phosphates react favourably in the above trials in combination with green leaf and lime. (The details of three years results will be available in the report of the Government Agricultural Chemist, Coimbatore.)

TABLE XII.—*Laterite soil studies*, 1953–54, *First crop.*

Treatments—
1 No manure.
2 Leaf 5,000 lb. per acre.
3 Leaf 7,500 lb. per acre.
4 Super 30 lb. P. 205 per acre.
5 Super 45 lb. P. 205 per acre.
6 Super 60 lb. P. 205 per acre.
7 Lime at 1,500 lb. per acre.
8 Lime at 3,000 lb. per acre.
9 Leaf 5,000 lb. + super 30 lb. per acre.
10 Leaf 5,000 lb. + super 45 lb. per acre.
11 Leaf at 5,000 lb. + super 60 lb. per acre.
12 Leaf 5,000 lb. + lime 1,500 lb. per acre.
13 Leaf 5,000 lb. + lime 3,000 lb. per acre.
14 Super 30 lb. + lime 1,500 lb. per acre.
15 Super 30 lb. + lime 3,000 lb. per acre.
16 Super 45 lb. + lime 1,500 lb. per acre.
17 Super 45 lb. + lime 3,000 lb. per acre.
18 Super 60 lb. + lime 1,500 lb. per acre.
19 Super 60 lb. + lime 3,000 lb. per acre.
20 Leaf 5,000 lb. + Super 30 lb. + lime 1,500 lb. per acre.
21 Leaf 5,000 lb. + super 45 lb. + lime 1,500 lb. per acre.
22 Leaf 5,000 lb. + super 60 lb. + lime 1,500 lb. per acre.
23 Leaf 5,000 lb. + super 30 lb. + lime 3,000 lb. per acre.
24 Leaf 5,000 lb. + super 45 lb. + lime 3,000 lb. per acre.
25 Leaf 5,000 lb. + Super 60 lb. + lime 3,000 lb. per acre.
26 Leaf 7,500 lb. + super 30 lb. per acre.
27 Leaf 7,500 lb. + super 45 lb. per acre.
28 Leaf 7,500 lb. + Super 60 lb. per acre.
29 Leaf 7,500 lb. + lime 1,500 lb. per acre.
30 Leaf 7,500 lb. + lime 3, 000 lb. per acre.
31 Leaf 7,500 lb. + super 30 lb. + lime 1,500 lb. per acre.
32 Leaf 7,500 lb + super 45 lb. + lime 1,500 lb. per acre.
33 Leaf 7,500 lb. + super 60 lb. + lime 1'500 lb. per acre.
34 Leaf 7,500 lb. + super 30 lb. + lime 3,000 lb. per acre.
35 Leaf 7,500 lb. + super 45 lb. + lime 3,000 lb. per acre.
36 Leaf 7,500 lb. + super 60 lb. + lime 3,000 lb. per acre.

Field No.—III 1 c, 2c, 2d & 3c.
Plot size—19′ × 20½′.
Lay out—36 × 4 randomized blocks.

Sown—3rd June 1953.
Planted—13th July 1953.
Harvested—10th October 1953.

Variety—PTB. 9.

Summary of results.

Particulars.	1	2	3	4	5	6	7	8	9
Acre in yield in lb.	1,873	2,265	2,712	2,209	2,460	2,460	2,432	2,432	2,489
Percentage on control	100·0	121·5	145·5	118·8	131·9	132·7	130·1	130·9	133·9
Particulars	10	11	12	13	14	15	16	17	18
Acre yield in lb.	2,740	2,712	2,514	2,600	2,684	2,992	2,628	2,992	2,656
Percentage on control	146·6	145 9	135·4	140·2	145·1	160·2	140·6	160·5	143·2
Particulars.	19	20	21	22	23	24	25	26	27
Acre yield in lb.	2,908	2,908	2,935	2,935	2,992	3,019	3,271	3,131	3,048
Percentage on control	156·0	156·4	157·5	157·5	160·2	162·0	175·2	168·4	164·3
Particulars.	28	29	30	31	32	33	34	35	36
Acre yield in lb.	3,243	2,544	2,768	2,935	3,131	3,019	2,908	3,048	3,019
Percentage on control	174·8	136·1	148·1	157·5	168·4	162·0	156·8	163·2	162·8

Particulars.	General mean.	Standard error.	'Z' test.	Critical difference P = 0·05.
Acre yield in lb.	2,767	271·2	Satisfoctory.	539
Percentage on control	148·6	14·56	..	28·97

Field No.—III 1c, 2cd & 3c.
Plot size—19′ × 20½′.
Lay out—36 × 4 ronamidzed blocks.

Sown—14th September 1953.
Planted—10th November 1953.
Harvested—1st February 1954.

Summary of results.

Variety—PTB. 21.

Particulars.	1	2	3	4	5	6	7	8	9
Acre yield in lb.	804	951	1,083	882	971	874	902	1,070	1,021
Percentage on control	100·0	118·3	134·7	109·7	120·8	108·7	112·2	133·1	127·0

Particulars.	10	11	12	13	14	15	16	17	18
Acre yield in lb.	1,119	1,119	1,021	1,196	1,171	1,168	1,133	1,119	1,097
Percentage on control	139·2	139·2	127·0	148·8	145·6	145·8	140·9	139·2	136·4

Particulars.	19	20	21	22	23	24	25	26	27
Acre yield in lb.	1,237	1,196	1,230	1,209	1,286	1,286	1,230	1,196	1,17
Percentage on control	153·9	148·8	153·0	150·4	160·0	160·0	153·0	146·8	145·

Particulars.	28	29	30	31	33	33	34	35	36
Acre yield in lb.	1,171	1,049	1,182	1,272	1,362	1,251	1,286	1,146	1,251
Percentage on control	145·6	131·3	147·0	158·2	169·4	155·6	160·0	142·5	156·6

Particulars.	General mean.	Standard error.	'Z' test.	Critical difference. P—0·05.
Acre yield in lb.	1,131	113·1	Satisfied.	225
Percentage on control	140·7	14·07	..	27·99

(*d*) *Chilean nitrate experiment.*—The experiment was continued for the second year to find out the comparative effect of this manure as against ammonium Sulphate. Both Chilean nitrate and ammonium sulphate were applied as a top dressing at 40 lb. and 60 lb. N. per acre alone as well as over a basal dressing of lime at 450 lb. plus cattle manure at 3 tons and superphosphate to supply 30 lb. P205 per acre. The results satisfied the 'Z' test in the first-crop season. Nitrogen at both the levels over the basal dressing has given better yields than either basal dressing alone or nitrogen alone in the form of ammonium sulphate or chilean nitratat both the levels. The second-crop was severely affected by drought and hence no reliable results could be obtained. In the previous year, ammonium sulphate at 60 lb. N. over basal dressing recorded 19·4 per cent and 24·1 per cent increased yields over chilean nitrate at 60 lb. N. over basal dressing, in the first and second crops respectively.

TABLE.

Plot No.—A2a.
Plot size—18′ × 23′.
Lay out—9 × 5 randomised blocks.

Date os sowing—10th June 1953.
Date of transplanted—15th July 1953.
Date of harvest—27thOctober 1953.

Treatmonts—
1 Basal dressing of 450 lb. lime + farm yard manure at 3 tons + P205 30 lb. per sale.
2 As 1 + ammonium sulphate 40 lb. N. per acre.
3 As 1 + ammonium sulphate 60 lb. N. per acre.
4 Ammonium sulphate alone to supply 40 lb. N. per acre.
5 Ammonium sulphate alone to supply 60 lb. N. per acre.
6 As 1 + chilean nitrate 40 lb. N. per acre.
7 As 1 + chilean nitrate 60 lb. N. per acre.
8 Chilean nitrate alone 40 lb. N. per acre.
9 Chilean nitrate alone 60 lb. N. per acre.

Particulars	1	2	3	4	5	6	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Acrre yield in lb.	2,399	2,778	2,609	2,425	2,357	2'609	2,609
Percentage on general mean ..	96·6	113·0	106·0	98·5	95·5	106·1	106·0

Particulars.	8	9	General mean.	Standard error.	'Z' test.	Critical difference (=0·05).
	(9)	(10)	(11)	(12)	(13)	(14)
Acre yield in lb.	2,188	2,209	2,465	101·1	Satisfied.	205
Percentage on general mean ..	88·7	89·6	100·0	4·1	..	3·36

Conclusion—2, 6, 3, 7, 4, 1, 5, 9, 8.

Particulars.	1	2	3	4	5	6	7
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Acre yield in lb.	2,356	2,925	3,156	2,588	2,762	2,667	2,646
First crop 1952–55	..	..	..	..	..	..	..
Percentage on general mean	88·4	110·7	119·4	97·9	104·9	100·9	100·0

Particulars.	8	9	General mean.	Standard error.	'Z' test.	Critical difference (P =0·05.).
	(9)	(10)	(11)	(12)	(13)	(14)
Acre yield in lb.s	2,267	2,414	2,642	82·69	..	169
First crop 1952–53	..	..	..	..	Satisfied.	..
Percentage on general mean	85·8	91·4	100·0	3·13	..	6·39

Particulars.	1	2	3	4	5	6	7
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Acre yield in lb.	1,570	1,932	2,027	1,192	882	1,788	1,670
Second crop 1952–53	..	..	..	..	..	..	..
Percentage on general mean	105·7	130·1	136·5	80·3	59·4	120·2	112·4

Particulars.	8	9	General mean.	Standard error.	'Z' test	Critical difference (=0·05).
	(9)	(10)	(11)	(12)	(13)	(14)
Acre yield in lb.s	1,197	1,113	1,485	232·69	..	457
Second crop 1952–53	..	..	..	..	Satisfied.	..
Percentage on general mean	80·6	74·9	100·0	15·67	..	31·97

Conclusion, 1952–53—

First crop—3, 2, 5, 6, 7, 4, 9, 1, 8.

Second crop—3, 2, 6, 7, 1, 8, 4, 9, 5.

(e) *Calcium carbonate slurry.*—The experiment was continued during the first-crop season to find out how far the calcium carbonate slurry, bye-product of the Travancore Fertilizers and Chemicals, Limited, would compare with slaked lime when applied to paddy crop at different doses of one, two and three tons over a basal dressing of 5,000 lb. green leaves. Treatment differences were significant and lime at three tons over a basal dressing of 5,000 lb. green leaf gave 20·2 per cent increased yield over slurry at the same dose with the same basal dressing. In the previous second crop also the same treatment recorded a higher yield by 39·0 per cent over slurry, while in the first crop, the results did not satisfy the 'Z' test. The results so far would show that slaked lime is definitely superior to calcium carbonate slurry. It may also be noted that about two to three tons of slurry have to be applied to equal the effect of one ton of lime.

Field No.—B 5 bc.
Strip size—26′ × 50′.
Lay out—7 × 4 randomized blocks.

Sown—10th June 1953.
Transplanted—17th July 1953.
Harvested—28th October 1953.

Treatments—

1 Green leaf at 5,000 lb. pre acre.
2 As 1+lime at 1 ton per acre.
3 As 1+ lime at 2 tons per acre.
4 As 1+ lime at 3 tons per acre.
5 As 1+ calcium carbonate slurry at 1 ton per acre.
6 As 1+calcium carbonate slurry at 2 tons per acre.
7 As 1 + calcium carbonate slurry at 3 tons per acre.

Particulars.	1	2	3	4	5	6
(1)	(2)	(3)	(5)	(5)	(6)	(7)
Acre yield in lb.	2,078	2,470	2,753	2,782	2,232	2,428
Percentage on control	100·0	118·8	132·4	133·8	107·4	116·8

Particulars.	7	General mean.	Standard error.	'Z' test.	Critical difference (P=0·05).
	(8)	(9)	(10)	(11)	(12)
Acre yield in lb.	2,362	2,444	27·86	Satisfied.	82
Percentage on control	113·6	117·5	1·34	..	3·95

Conclusion—4, 3, 2, 6, 7, 5, 1.

Particulars.	1	2	3	4	5	6
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Acre yield in lb. —First crop 1952–53	2,542	2,800	3,025	3,233	2,642	2,725
Percentage on control	100·0	110·4	199·2	123·4	104·2	107·4

Particulars.	7	General	Standard	'Z' test.	Critical difference (P—0·50).
	(8)	(9)	(10)	(11)	(12)
Acre in yeld in lb.—First crop 1952–53 ..	2,701	2,795	193·6	Not satisfied.	..
Percentage on controls	106·4	110·1	7·63	..	

Particulars.	1	2	3	4	5	6
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Acre yield in lb.—Second crop 1952–53. ..	1,775	1,896	2,410	2,762	1,890	1,919
Percentage on control	100·0	106·0	137·7	155·6	106·58	108·1

Particulars.	7	General mean.	Standard error.	'Z' test.	Critical difference (P=0·05).
	(8)	(9)	(10)	(11)	(12)
Acre yield in lb.—Second crop 1952–53	2,070	2,104	176·3	Satisfied.	375
Percentage on control	116·6	104·5	8·8	..	18·6

Conclusion, 1952–53—

Second crop—4, 3, 7, 6, 2, 5, 1.

(*f*) *Co-ordinated manurial experiment No.* 1.—The experiment was laid out for the first time to determine the organic matter requirements of soil in the shape of cattle manure, green manure and compost on a basal dressing of 60 lb. P_2O_5 as super applied by placement and 45 lb. N. as ammonium sulphate as top dressing. The results did not satisfy the 'Z' test in the first-crop season, though plots manured with green leaf equivalent to organic matter content of 7,500 lb. cattle manure, recorded the best yield of 14·5 per cent over control. The second-crop was badly affected by stem-borer and drought and hence no reliable results could be obtained. The experiment was dropped.

TABLE

Field No.—A 4 ab.
Plot size—14′ × 44′.
Lay out—10 × 4 randomized blocks.

Sown—10th June 1953.
Transplanted—15th July 1953.
Harvested—30th October 1953.

Variety P I C-2.

Treatments—

1 No manure.
2 Cattle manure at the rate of 2,500 lb. per acre.
3 Do. 5,000 lb. ,,
4 Do. 7,500 lb. ,,
5 Green leaf equal to the organic matter content of 2,500 lb. of cattle manure.
6 Do. do. 5,000 lb. do.
7 Do. do. 7,500 lb. do.
8 Compost equal to the organic matter content of 2,500 lb. of cattle manure.
9 Do. do. 5,000 lb. do.
10 Do. do. 7,500 lb. do.

Particulars.	1	2	3	4	5	6	7
(1)	(12)]	(3)	(4)	(5)	(6)	(7)	(8)
Acre yield in lb.	2,316	2,510	2,386	2,439	2,490	2,615	2,651.
Percentage on control	100·0	108·0	102·7	104·9	107·6	112·6	114iF

Particulars.	8	9	10	General mean.	Standard error.	'Z' test.
	(9)	(10)	(11)	(12)	(13)	(14)
Acre yield in lb.	2,563	2,475	2,490	2,494	109·7	Not satisfied.
Percentage on control	110·3	106·9	107·2	107·4	4·7	..

(*g*) *Co-ordinated manurial experiment No. 2—(Permanent manurial trial).*—The experiment was laid out for the first time during the second-crop season to find out the direct manurial value of organic manures and inorganic fertilizers and to find out the necessity of liming to paddy soils for correcting acidity if any. Ammonium sulphate, compost, cattle manure and green leaf were applied at 60 lb. N. per acre as main plot treatments against no nitrogen with the sub-treatments consisting of 0 lb. P205 and 60 lb. P205 ; 0 lb. K20 and 60 lb. K20 ; 0 lb. lime and 1,500 lb. lime. The results satisfied the 'Z' test for main plot treatments, subplot treatments and for interaction. Plots manured with green leaf at 60 lb. N. recorded the maximum yield of 16·4 per cent increase over no nitrogen. Super at 60 lb. P205 gave 10·9 per cent higher yield over 0 lb. P205. Lime at 1,500 lb. per acre yielded 6·7 per cent increase over no time. Plots manured with 60 lb. N. as green leaf plus 1,500 lb. lime recorded an increased yield of 32·9 per cent over no manure. This was discontinued as per orders of the Director of Agriculture.

TABLE

Field No.—III/1 bc, 2 bc, 3 bc, 4 bc.
Plot size—16′ × 25′.
Lay out—5 × 8 × 4 split plot design.

Sown —14th June 1953.
Planted—23rd September 1953.
Harvested—13th January 1954.

Variety—PTB. 18.

Treatments—
Main treatments Nitrogen.
1 No nitrogen (No).
2 60 lb. N. as ammonium sulphate (N.as).
3 60 lb. N. as compost (N.c.).
4 60 lb. N. as cattle manure (N.om.).
5 60 lb. N. as green leaf (N.g.).

Sub-treatments—
P205, K20 and lime.
Po : No P205.
P1 : 60 lb. P205.
Ko : No K20.
K1 : 60 lb. K.
Lo : No lime.
L1 : 1,500 lb. of lime.

1 Po Ko Lo.
2 Po K1 Lo.
3 P1 Ko Lo.
4 P1 K1 L0.
5 Po Ko L1.
6 Po K1 L1.
7 P1 Ko L1.
8 P1 K1 L1.

Particulars.	No	N.as	N.c	N.com.	N.g	General mean.	Standard error.	'Z' test.	Critical difference (P=0·05)
Acre yield in lb. ..	2,198	2,437	2,336	2,477	2,562	2,402	52·6	Satisfied.	106
Percentage on control ..	100·0	110·8	106·3	112·6	116·4	109·2	2·4	..	4·8

Conclusion—5, 4, 2, 3, 1.

Particulars.	Po	P1	General	Standard mean.	'Z' test. error.	Critical difference (P=0·05)
Acre yield in lb. ..	2,279	2,528	2,404	31·7	Satisfied.	63
Percentage on control ..	100·0	110·9	105·5	1·4	..	2·74

Particulars.	Lo.	L1	General mean.	Standard error.	'Z' test.	Critical difference (P = 0·05)
Acre yield in lb. ..	2,325	2,480	2,403	31·7	Satisfied.	63
Percentage on control ..	100·0	106·7	103·4	13·6	..	2·60

Particulars.	Ko Lo	K1 Lo	Ko L1	K1 L1	General mean.	Standard error.	'Z' test.	Critical difference (P=0·05)
Acre yield in lbs. ..	2,347	2,303	2,458	2,508	2,403	43,·2	Satisfied.	87
Percentage on control ..	100·0	98·1	104·7	106·8	102·4	1·84	..	3·69

Particulars.	1 No PoKoLo	2 No PoK1Lo	3 No P1KoLo	4 No P1K1Lo	5 No PoKoL1	6 No PoK1L1	7 No P1KoL1	8 No P1K1L1
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Acre yield in lb. ..	2,205	1,960	2,269	2,232	2,014	2,178	2,314	2,450
Percentage on control ..	100·0	89·7	102·7	101·8	91·9	99·7	104·9	111·8

Particulars.	9 N. as PoKoLo	10 N. as PoK1Lo	11 N. as P1KoLo	12 N. as P1K1Lo	13 N. as PoKoL1	14 N. as PoK1L1	15 N. as P1KoL1	16 N. as P1K1L1
	PoKoLo	PoK1Lo	P1KoLo	P1K1Lo	PoKoL1	PoK1L1	P1K1L1	P1K1L1
	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
Acre yield in lb. ..	2,178	2,09	2,641	2,614	2,287	2,506	2,668	2,559
Percentage on control ..	99·7	96·0	120·1	119·2	103·7	114·9	121·4	116·8

Particulars.	17 N.c. PoKoLo	18 N.c. PoK1Lo	19 N.c. P1KoLo	20 N.c. P1K1Lo	21 N.c. PoKoLo	22 N.c. PoK1L1	23 N.c. P1KoL1	24 N.c. P1K1L1
	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
Acre yield in lb. ..	215	2,042	2,45 0	2,314	2,178	2,369	2,559	2,614
Percentage on control ..	98·4	93·1	112·2	106·6	99·7	108·4	116·8	119·6

Particulars.	25 N.cm. PoKoLo	26 N.cm. PoK1Lo	27 N.cm. P1KoLo	28 N.cm. P1K1Lo	29 N.cm. PoKoL1	30 N.cm. PoK1L1	31 N.cm. P1KoL1	32 N.cm. P1K1L1
	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)
Acre yield in lb.	2,287	2,205	2,559	2,477	2,450	2,668	2,586	2,614
Percentage on control ..	104·3	100·9	116·4	112·7	111·2	122·1	117·4	116·9

Particulars.	33 N.g. PoKoLo	34 N.g. PoK1Lo	35 N.g. P1KoLo	36 N.g. P1K1Lo	37 N.g. PoKoL1	38 N.g. PoK1L1	39 N.g. P1KoL1	40 N.g. P1K1L1
	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)
Acre yield in lb. ..	2,124	2,314	2,614	2,777	2,777	2,450	2,666	2,614
Percentage on control ..	906·6	105·9	119·6	127·0	132·9	111·8	121·4	119·6

Particulars.	General mean.	Standard error.	'Z' test.	Critical difference (P=0·05).
Acre yield in lb. ..	2,401	141·7	Satisfied.	279
Percentage on control ..	109·6	6'47		12·7

(*h*) *Co-ordinated manurial experiment No.* 3—(*Nutrient requirements of paddy*).—The experiment was laid out for the first time during the first-crop season to find out the economic dose of N. and P205 required for paddy. Nitrogen at 30 lb., 45 lb. and 60 lb. was applied in the form of ammonium sulphate and P205 at 30 lb., 45 lb. and 60 lb. in the form of superphosphate. Differences in treatments were not significant in the first-crop, though plots manured with 60 lb. N. gave 9·1 per cent increased yield over no manure. The second-crop was a failure due to severe drought and hence no reliable results could be obtained. This was discontinued as per orders of the Director of Agriculture.

TABLE

Field No.—B 3 bc, 4b 1, b2.
Plot size—10′×48′.
Layout—16×4 randomized blocks.

Sown—10th June 1953.
Transplanted—18th July 1953.
Harvested—30th October 1953.

Variety—PTB. 2.

Treatments—

1 No manure.
2 Ammonium sulphate to supply 30 lb. N. per acre.
3 Do. 45 lb. ,,
4 Do. 60 lb. ,,
5 Do. 30 lb. N+Superphosphate to supply 30 lb. P205.
6 Do. 30 lb. N+Superphosphate to supply 45 lb. P205.
7 Do. 30 lb. N+Superphosphate to supply 60 lb. P205.
8 Do. 45 lb. N+Superphosphate to supply 30 lb. P205.
9 Do. 45 lb. N+Superphosphate to supply 40 lb. P205.
10 Do. 45 lb. N+Superphosphate to supply 50 lb. P205.
11 Do. 60 lb. N+Superphosphate to supply 30 lb. P205.
12 Do. 60 lb. N+Superphosphate to supply 45 lb. P205.
13 Do. 60 lb. N+Superphosphate to supply 60 lb. P205.
14 Superphosphate to supply 30 lb. P205.
15 Superphosphate to supply 45 lb. P205.
16 Superphosphate to supply 60 lb. P205.

Particulars.	1	2	3	4	5	6	7	8	9	10
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Acre yield in lb. ..	2,609	2,490	2,496	2,859	2,541	2,291	2,382	2,541	2,700	2,336
Percentage on control ..	100·0	95·9	95·9	109·1	96·9	87·3	91·1	97·4	103·3	89·8

Particulars.	11	12	13	14	15	16	General mean.	Standard error.	'Z' test
	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
Acre yield in lb. ..	2,586	2,541	2,586	2,223	2,382	2,482	2,497	227·2	Not satisfied.
Percentage on control ..	98·9	97·2	96·7	86·4	90·9	90·9	95·5	8·2	

(*i*) *Co-ordinated manurial experiment No.* 4.—The experiment to determine the best method of application of phosphate manures either as direct application to paddy or as indirect application to the preceding green manure crop and also to determine the best green manure that would respond to the treatment at 45 lb. P205 per acre was laid out in the first-crop season both in the single-crop and double crop lands and sunnhemp during June in single-crop lands. As a result of heavy showers during July, the crop of sunnhemp in single crop land rotted and no green. Wild indigo, dainch and sesbania were shown during April in double crop lands matter could be estimated. Hence the trial in palliyal land had to be dropped. Wild indigo in double-crop lands shed their leaves during July due to heavy showers and no green matter could be estimated for this also. The results did not satisfy the 'Z' test, though daincha with 45 lb. P205 recorded the best yield. This was also discontinued as per orders of the Director of Agriculture.

TABLE

Field No.—B1 a b.
Plot size—26′ × 16′.
Pay not—9 × 4 randomized blocks.

Sown—10th June 1953.
Transplanted—17th July 1955.
Harvested—19th October 1953.

Variety—PTB. 2.

Treatments—

1 Wild indigo with 45 lb. of P205—Paddy.
2 Wild indigo without P205—Paddy with 45 lb. of P205.
3 Wild indigo alone—Paddy alone.
4 Daincha with 45 lb. P205—Paddy.
5 Daincha without P205—Paddy wtih 45 lb. P205.
6 Daincha alone—Paddy alone.
7 Seebania with 45 lb. P. 205—Paddy.
8 Sesbania without P205—Paddy with 40 lb. P205.
9 Seebania alone—Paddy alone.

Particulars.	1	2	3	4	5	6	7	8	9	General mean.	Standard error.	'Z' test.
Acre yield in lb. ..	2,382	2,261	2,261	2,649	2,528	2,407	2,431	2,309	2,261	2,368	200·5	Not satisfied.
Percetage on control ..	100·0	94·9	94·9	111·2	105·6	101·0	102·0	96·9	94·4	100·0	8·4	..

8. *Miscellaneous experiments—(a) Treatment of seedlings with insecticides—* (i) *Against stem-borer.*—The trial to find out how far spraying with insecticides would prevent the incidence of pests and diseases was continued. Spraying was done both in the nursery and transplanted field with BHC. and DDT. in two strengths.

ANNUAL REPORT OF THE AGRICULTURAL RESEARCH STATION, PATTUKKOTTAI FOR THE YEAR 1953–54 (FASLI 1363).

1. *Season and rainfall.*—The total rainfall for the year was 46·14 inches in 57 rainy days against a total precipitation of 35·73 inches in 43 rainy days during last fasli. The normal rainfall for the place is 34·97 inches in 53 rainy days. The rainfall during the year was greater than that or last year and it is slightly greater than the normal of last ten years.

(i) *South-west monsoon.*—Rains received during the period were 5·96 inches in 14 rainy days while the corresponding period of last year experienced 12·22 inches spread over 14 rainy days. The normal rainfall for the period is 10·15 inches in 16·4 days. The rainfall during the period was very useful for the commencement of dry land sowings and also for the inter cultivation of the crops, namely, groundnut. In garden lands with the help of rains received, beds were formed for raising vegetable crops and sowing of seeds in nurseries could be done. Raising of nurseries of fruit plants and planting cuttings of lemon and pomegranates for propagation were also done during the period. In wet lands trasplanting of seedlings and raising paddy nurseries for both kuruvai and samba could be progressed. The rains reeeived during the period were spread over uniformly throughout and hence the crops did not suffer for want of water.

(ii) *North-east monsoon.*—A total precipitation of 29·45 inches in 33 rainy days during the period was received as against 18·35 inches over 23 rainy days during the corresponding period of last year. The rainfall received during the period helped in pushing the growth of dry land crops namely, groundnut and redgram and also the fruit and vegetable plants in the orchard. In wet lands the samba crops of paddy raised in high level lands and which suffered a great deal due to insufficient supply of water in channels, improved very much after the rains.

(iii) *Hot weather period.*—The rainfall received during the period was 10·73 inches in 10 rainy days as against a total precipitation of 5·20 inches in 6 rainy days during the corresponding period of last year. Rains in the month of March helped the groundnut and other garden plants. The drought condition that prevailed during May combined with low water table in the well had this effect on the standing crops of cotton, green manure in rice fallows after groundnut. The cotton crop could not be given sufficient irrigations at the later stages for reasons mentioned above and this affected the yield of the crop very much. The green manure crop was also affected considerably. (Table I) Rainfall data is furnished in Table I.

The maximum temperature varied from 78·50°F to 98·50°F and minimum temperature from 66·00°F to 85·40°F.

TABLE I.—*Rainfall Statement for the year* 1953–54.

Month.	Week.	1953-54. Rainfall in inches.	1953-54. Number of days.	1952-53. Rainfall in inches.	1952-53. Number of days.	Normal rainfall 10 years. Rainfall in inches.	Normal rainfall 10 years. Number of days.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			South-west monsoon.				
June 1953	7—13	..	..	0·08	..	0·217	0·7
	14—20	0·70	2	0·03	..	0·095	0·4
	21—27	..	..	..	..	0·084	0·3
	21—30	..	..	0·63	2	0·287	0·7
July 1953	1— 4	..	..	0·08	..	5·151	0·2
	5—11	0·31	2	4·19	5	4·529	2·4
	12—10	0·50	1	1·20	1	0·510	0·6
	19—25	2·43	2	..	..	0·316	0·3
July-August, 1953	26—1	0·48	1	..	..	1·243	1·5
August, 1953 ..	2—8	..	..	..	..	0·604	1·2
	9—15	0·03	..	0·03	..	0·540	1·1
	16—22	..	..	..	..	0·582	1·0
	23 - 29	0·43	2	5·09	2	1 640	1·9
August-September, 1953.	30 - 5	0·10	1	0·64	3	0·523	0·9

TABLE I.—*Rainfall Statement for the year* 1953-54—cont.

Month.	Week.	1953-54.		1952-53.		Normal rainfall 10 years.	
		Rainfall in inches.	Number of days.	Rainfall in inches.	Number of days.	Rainfall in inches.	Number of days.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
September, 1953 ..	6—12	0·76	2	0·25	1	0·448	0·9
	13—19	0·14	1	..	..	0·941	1·4
	20—26	0·08	..	..	..	0·439	0·8
Total ..	..	5·96	14	12·22	14	10·149	16·4
		North-east monsoon.					
September-October, 1953.	27—3	0·05	..	0·61	2	1·281	2·0
October, 1953 ..	4—10	0·52	2	0·70	8	0·931	1·5
	11—17	2·91	2	1·73	1	1·560	2·3
	18—24	1·86	4	1·02	1	1·664	2·3
	25—31	3·45	3	0·38	1	1·157	1·6
November, 1953 ..	1—7	0·32	1	1·72	1	1·650	2·0
	8—14	0.08	..	0·46	1	2·064	2·4
	15—21	5·68	4	1·85	3	1·968	3·1
November, 1953 ..	22—28	1·72	2	1.23	3	1.152	1·6
December, 1953 ..	29—5	5·34	2	5·83	3	2·195	2·2
December, 1953 ..	6—12	0·15	1	1·22	3	0·869	1·7
	13—19	0.46	2	0·12	..	1·034	1·8
	20—26	1·14	2	0·05	..	0·212	0·5
December, 1953-January 1954.	27—3	1·59	1	0·06	..	0·427	1·4
January, 1954 ..	4—10	2·78	4	1·17	2	0·533	1·3
	11—17	1·40	3	0·20	..	0·303	0·4
	18—24	..	.	..	..	0·191	0·4
	25—31	..	..	..	..	0·396	0·8
Total ..	..	29·45	33	18·35	23	19·587	28·9
		Hot weather.					
February, 1954 ..	1—7	0·14	1	..	..	0·050	0·2
	8—14	..	..	..	..	..	..
	15—21	..	..	2·70	1	0·736	0·6
	22—28	..	..	0·41	1	0·201	0·5
March, 1954 ..	1—7	..	..	..	..	0·414	0·6
	8—14	1·62	2	..	..	0·025	0·1
	15—21	0·02	..	..	..	0 220	0·1
	22—28	0·22	1	..	..	0·625	0·6
March, April, 1954 ..	29—4	..	..	..	..	0·714	0·8
April, 1954	5—11	..	..	1·45	2	0·438	0·3
	12—18	..	..	0·27	1	0·644	1·1
	19—25	5·29	2	0·37	1	0·073	0·2
April, May, 1954 ..	26—2	0·31	1	..	..	0·077	0·3
May, 1954	3—9	0·90	2	..	..	0·188	0·2
	10—16	..	..	..	..	0·203	0·4
	17—23	..	..	..	..	0·227	0·4
	24—30	2,23	1	..	..	0·238	0·5
May-June, 1954 ..	31—6	..	..	..	..	0·163	0·5
Total ..	..	10·73	10	5·20	6	5·233	7·9
Grand Total ..	..	46·14	57	35·77	43	34·969	53·2

2. *Crops—Cereals—Paddy.*—A. *Kuruvai season.*—(i) The channel water (Rajamadam channel) was received on 15th July 1953 and the preparatory cultivations for *kuruvai* were taken up immediately after that. Due to the scanty rainfall in May, water table both in the temporary and permanent well went very low. Ploughing and carting compost for raising dry nurseries of paddy were done well, in advance of receipt of cannel water. A total of 67 cents of *kuruvai* nursery were raised with the available amount of water-supply from the wells. Transplanting operation commenced immediately after the receipt of channel water. The nursery area was given a basal dressing of 20 tons of farmyard manure per acre and were later top dressed at 100 lb. with Ammonium Sulphate per acre a week before pulling out of seedlings. Transplanted field reeeived a basal dressing of 4,000 lb. of green leaves, 6,800 lb. of groundnut haulms, 400 lb. of old indigo or kolingi seeds and 100 lb. of Super Phosphate per acre. The preparation of fields had to be taken up as and when sufficient water was available, as water supply in the channels were irregular. Due to the highly drained nature of the soil water could not be stagnated in the fields for long time to put down weeds. Hence considerable expenditure had to be incurred for weeding. The

paddy crop was top dressed with Ammonium Sulphate at 100 lb. per acre in the third week after transplantation. The crop was harvested during September. The strains grown during the year under report were only Adt. 3 and Adt. 20 in bulk area and the details are given below :—

Strains.	Total areas.	Acre yield.
Adt. 3.	3·93 acres.	2,813 lb.
Adt. 20.	11·89 acres.	1,941 lb.

Table No. II shows the average yield of paddy crops per acre from 1936–37 onwards

TABLE II.—*Average yields of Kuruvai in lb. per acre.*

Strain No.	1936–37.	1937–38.	1938–39.	1939–40.	1940–41.	1941–42.	1942–43.	1943–44.	1944–45.
ADT. 3 ..	1,329	1,608	1,737	2,020	2,080	2,120	1,610	2,350	1,736
ADT. 4 ..	1,988	1,496	2,011	2,366	2,416	2,292	2,587	2,705	1,906
ADT. 9 ..	2,088	1,144	2,360	1,736	2,784	2,213	2,660	2,863	1,984
ADT. 12 ..	1,098	978	1,889	2,533	2,604	..	..	3,020	2,032
ADT. 14 ..	..	..	..	..	2,592	2,400	3,000	3,256	1,863
ADT. 15 ..	..	..	2,040	2,056	2,052	2,144	2,360	2,920	2,056
ADT. 16 ..	..	..	1,536	2.366	2,264	2,360	2,320	3,108	1,684
ADT. 18 ..	..	..	..	..	3,712	2,640	3,000	3,176	2,252
ADT. 19 ..	..	..	..	..	2,420	2,234	2,520	3,388	2,176
ADT. 20 ..	..	..	..	2,176	2,116	1,920	2,960	2,608	1,928
Co. 10 ..	..	..	..	..	..	2,000	3,240	3,420	2,268

Strain No.	1945–46.	1946–47.	1947–48.	1948–49.	1949–50.	1950–51.	1951–52.	1952–53.	1953– 4 .
ADT. 3 ..	2,000	2,040	2,198	2,196	1,828	2,380	2,286	2,249	813·3
ADT. 4 ..	2,616	2,560	2,024	..	..	..	..	..	..
ADT. 9 ..	3,340	3,004	2,180	2,860	1,865	..	2,922	..	.
ADT. 12 ..	2,468	..	..	..	..	..	..	..	..
ADT. 14 ..	2,720	2,772	2,968	..	..	..	..	..	..
ADT. 15 ..	2,224	2,192	1,908	..	..	..	..	..	..
ADT. 16 ..	2,272	2,760	2,696	..	..	..	..	..	..
ADT. 18 ..	2,792	2,960	2,696	..	..	..	..	..	..
ADT. 19 ..	2,320	2,680	2,400	..	..	..	..	..	..
ADT. 20 ..	2,352	2,760	2,176	..	1,873	2,580	2,723	2,489	1941·1
Co. 10 ..	2,603	2,800	2,024	..	..	..	..	..	..

(ii) Sesbania seedlings were planted all around the fields of kuruvai 4 inches apart covering the entire area of kuruvai. The Sesbania plants planted all around the kuruvai field bunds was able to give an average of 3,000 lb green manure for thaladi crop. Daincha, Sesbania and Sunnhemp were grown in summer in rice fallows to produce sufficient green manure both for kuruvai and samba crops. Though the green manure crops suffered for want of water during earliar stages, they put on a good growth after June and gave sufficient green leaves for kuruvai and samba crops of paddy.

(iii) *Kuruvai varietal trials*.—This was conducted during the year in the modified form for the third year as per instructions from the Research Council. The object of the experiment is to fix the most suitable variety both among the long and short duration varieties of kuruvai. While conducting the trials varieties of almost of uniform duration in both short and long duration varieties were compared in half cent plots, replicated six times in each case. The following are the varieties compared during this year :—

Series I.	Series II.
ADT. 3.	ADT. 12.
ADT. 4.	ADT. 14.
ADT. 20.	ADT. 16.
PLR. 2.	ADT. 18.
and PTB. 10.	Co. 10 and
	Co. 13.

The results are significant in the case of short duration varieties and ADT. 20 gave the maximum yieid but among the long duration varieties ADT. 14 gave the maximum yield. In the previous year the results were significant among the long duration

varieties and ADT. 14 gave the maximum yield. The results of the experiments of this year are shown in Tables III and IV.

TABLE III.—*Kuruvai varietal trials—Series I.*

Field No.—G. 11.
Date of sowing—1st August 1953.
Date of planting—16th and 17th August 1953.
Date of harvest—12th November 1953.
Size of plot—½ cent.
Treatments—5.
Replication—Six and randomized.
Spacing—4″ × 4″ (doubles).

Treatments—(1), ADT. 3, (2), ADT. 4, (3) PLR. 2, (4), ADT. 20 & (5), PTB. 10.

Summary of conclusions.

Particulars.	1	2	3	4	5	General mean.	Standard error.	'Z' test. satisfied or not.	Critical differenee (P=0·5.)
Acre yield of grain in lb.	1,708	1,675	1,567	2,167	1,642	1,752	22·25	Yes.	46·43
Percentage on general mean	97·5	95·6	89·4	123·7	93·7	100	1·27	..	2·65
Flowering duration in days.	68	73	75	76	73	..	..	..	..

Conclusion—4, 1, 2, 5, 3.

TABLE IV.—*Kuruvai varietal trials—Series II.*

Field number—G. 12.
Date of sowing—25th July 1953.
Date of planting—10th August 1953.
Date of harvest—3, 9 and 11th November 1953.
Size of plot—½ cent.
Treatments—6.
Replication—6 and randomized.
Spacing—4″ × 4″ (doubles).

Treatments—1. ADT. 16, (2) Co. 10, (3) ADT. 18, (4) ADT. 14, (5) Co. 13 and (6) ADT. 12.

Summary of conclusions.

Particulars.	1	2	3	4	5	6	General mean.	Standard error.	(Z) test satisfied or not.	Criticale differenc (P=0·05)
Acre yield of grain in lb.	1,350	1,975	1,733	2,000	1,883	1,825	1,794	24·22	Yes.	4,987
Percentage on general mean.	75·3	110·1	96·6	111·5	105·0	101·6	100	1·35	..	2·78
Flowering duration in days.	85	89	89	86	85	86	..	..	..	..

Conclusions—4, 2, 5, 6, 3, 1.

(iv) *Japanese method* versus *Farm method experiments.*—The nursery for kuruvai experiment was sown on 16th July 1963 and the seedlings were planted on 6th to 8th August 1953. The crop was harvested on 16th October 1953.

ADT. 20 and ADT. 3 were tried both for Japanese and Farm method.

The results are significant for main plot treatments (varieties) only. The results are not significant for sub-plot treatments, i.e., method of cultivation and for interaction (i.e., variety × methods). Among varieties ADT. 20 has given higher yield than ADT. 3. Though the results are not significant generally Japanese method and ADT. 20 Japanese method have given higher yields.

The details of experiments conducted are given in Table V.

TABLE V.—*Japanese method* versus *Farm method experiment—Kuruvai.*

Field number—H 12 and 13.
Date of sowing—16th July 1953.
Date of planting—6th, 7th and 8th August 1953.
Date of harvest—16th October 1953.
Treatments—Main plots—ADT. 3 and ADT. 20.
Size of plot—2 cents.
Treatment—Main plots 2, Sub plots 2.
Replications—4.
Sub plots—Japanese method and farm method.

Summary of conclusions.

(*a*) For main plot treatments (varieties).

Particulars.	ADT. 3.	ADT. 20.	General mean.	Standard error.	'Z' test satisfied or not.	Critical difference (P—0·05)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Acre yield on grain lb.	3,156	3,475	3,316	15·25	Yes.	48·41
Percentage on general mean	95·2	104·8	100	0·40	..	1·40

Conclusion—ADT- 20, ADT. 3

(*b*) For sub-plot treatments (method of cultivation).

Particulars.	Japanese method.	Farm method.	General mean.	Standard error.	'Z' test satisfied or not.	Critical difference (P = 0·05).
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Acre yield of grain lb. ..	3,525	3,106	3,316	..	No.	..
Percentage of general mean.	106·3	93·7	100	..	..	..

(*c*) Interaction (Varieties × Methods).

Particulars.	ADT. 3.		ADT. 20.		General mean.	Standard error.	'Z' test satisfied or not.	Critical difference (P = 0·05).
	Japanese method.	Farm method.	Japanese method.	Farm method.				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Acre yeild of grain lb.	3,313	3,000	3,738	3,213	3,316	..	No.	..
Percentage of general mean.	99·9	90·5	112·7	96·9	100	..	..	..

(B) *Samba season.*—Sowings of samba varieties were started on 23rd July 1953 and completed on 9th September 1953. The Samba season transplantation began in the first week of September and completed by the end of October 1953. The samba nurseries were given a basal dose of 2,500 lb. of green manure and 100 lb.of ammonium sulphate per acre four weeks after the sowing of seeds. In the case of transplanted fields 5,000 lb. of green manure and 100 lb. of superphosphate were applied as a basal dressing per acre and top dressing of ammonium sulphate at 100 lb. per acre in the fifth week after transplanting.

Pest attack of paddy Mealy bug (*Ripersia oryzae*) was found in a number of places. Control measures, namely, spraying of Hexidole 950, application of lindane, pulling out affected plants, were adopted. The following strains have been grown during samba season as bulk crop and the area and the yields are noted against each :—

Strain number.	Area.	Average yield per acre.
ADT. 8.	5·56 acres.	1,867 lb.
BAM. 3.	0·75 ,,	1,928 ,,
Co. 25.	0·60 ,,	1,658 ,,
SR. 26. B.	0·62 ,,	1,542 ,,
CO. 2.	0·62 ,,	2,281 ,,

Table VI gives the yields of samba strains per acre from 1936–37 onwards.

TABLE VI.—*Average yields of Samba in lb. per acre.*

Strains.	1935–36.	1936–37.	1937–38.	1938–39.	1939–40.	1940–41.	1941–42.	1942–43.	1943–44.	1944–45.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
ADT. 1	..	..	1,338	2,496	2,538	1,854	2,300	1,714	2,692	1,925
ADT. 2	1,662	..	1,861	2,506	..	..	..	..	..	..
ADT. 5	..	2,372	1,422	1,680	1,694	2,388	1,711	1,333	2,314	1,386
ADT. 8	..	..	1,990	1,500	2,213	1,564	1,840	..	..	..
ADT. 10	1,584	2,643	2,367	2,108	2,429	2,301	1,175	2,336	2,776	1,758
ADT. 11	1,940	2,423	1,936	2,557	2,789	2,352	2,061	2,324	2,032	2,004
ADT. 17	..	..	..	..	..	..	..	1,729	2,174	1,775
GEB. 24	1,708	2,208	1,415	2,904	1,742	1,396	1,190	1,594	1,650	1,920
CO. 4	..	..	..	..	..	..	..	1,432	..	..
CO. 16	..	..	..	..	..	..	..	1,956	2,344	1,365
CO. 19	..	..	..	..	..	..	..	..	..	2,363
PTB. 15	..	..	..	..	..	..	..	..	..	..
CO. 26	..	..	..	..	..	..	..	..	..	..
CO. 25	..	..	..	..	..	..	..	..	..	..
SR. 26 B	..	..	..	..	..	..	..	..	..	..
CO. 2	..	..	..	..	..	..	..	..	..	..

TABLE VI.—*Average yield of Samba in lb. per acre*—cont.

Strains.	1945-46.	1946-47.	1947-48.	1948-49.	1949-50.	1950-51.	1951-52.	1952-53.	1953-54
	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
ADT. 1	2,692	1,440	980	..	..	..	..	..	..
ADT. 2	..	..	2,414	..	..	..	..	..	
ADT. 5	2,451	1,395	1,325	..	..	..	..	..	..
ADT. 8	..	..	..	..	..	2,175	1,113	..	1,867
ADT. 10	..	..	..	..	..	..	..	..	..
ADT. 11	..	..	..	..	..	..	..	..	..
ADT. 17	2,387	2,295	1,576	..	..	..	..	..	..
GEB. 24	2,378	2,060	1,820	..	..	..	..	..	..
Co. 4	..	..	..	..	..	..	..	..	..
Co. 16	2,692	1,760	1,172	..	..	..	..	..	..
Co. 19	2,812	2,360	2,277	2,349	2,663	2,537	1,968	..	..
PTB. 15	1,944	2,049	2,598	1,603	2,306	..	..	..	..
Co. 26	..	..	..	1,407	2,141	..	..	..	..
Co. 25	..	..	..	..	2,673	2,939	2,823	830	1,658
SR. 26 B	..	..	..	..	..	..	2,280	1,697	2,487
Co. 2	..	..	..	..	..	..	..	..	2,281
BAM 3	..	..	..	..	..	..	..	..	1,928

(ii) *Samba varietal trials.*—As in the case of kuruvai paddy long and short duration varieties of Samba of almost uniform duration were compared with the object of fixing the most suitable type of paddy for the season. The following varieties were compared in each of the long and short duration groups.

ADT. 8.	CO. 3.
ADT. 21.	CO. 16.
ADT. 22.	CO. 25.
CO. 2.	ADT. 1.
ASD. 5.	PTB. 15.

The experiment was conducted for the second year in the modified form. The results in the case of short duration varieties were not significant. Of the long-duration varieties Co. 25 gave the highest yield. During last year ADT. 8 and CO. 16 gave the maximum yield among the short and long duration varieties respectively.

The details of experiments of this year are shown in Tables VII and VIII.

TABLE VII.—*Samba varietal trials—Series I.*

Field No.—D. 4.
Date of sowing—28th August 1953.
Date of planting—2nd October 1953.
Date of harvest—19th January 1954.
Treatments—(1) ADT. 8, (2) ASD. 5, (3) Co. 2, (4) ADT. 22 and (5) ADT. 21.
Size of plot —½ cent.
Treatments—5.
Replications—Six (Randomised).
Spacing—6″ × 6″ (doubles).

Summary of conclusion.

Particulars.	1	2	3	4	5	General mean.	Standard error.	'Z' test satisfied or not.	Critical difference (P = 0·05).
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Acre yield of grain lb. ..	2,656	2,866	2,933	2,800	2,858	2,823	..	No.	..
Percentage on general mean.	94·1	101·5	103·9	99·2	101·3	100	..	..	..
Flowering duration in days.	112	104	104	105	106	..	..	..	..

TABLE VIII.—*Samba varietal trials—Series II.*

Field number—D. 4.
Date of sowing—28th August 1953.
Date of planting—3rd October 1953.
Date of harvest—19th January 1954 and 7th February 1954.
Treatment—(1) Co. 3, (2) ADT. 1, (3) PTB. 15, (4) Co. 16 and (5) Co. 25.
Size of plot—½ cent.
Replications—Six (Randomised).
Spacing—6″ × 6″ doubles.
Treatments—5.

Summary of conclusions.

Particulars.	1	2	3	4	5	General mean.	Standard error.	'Z' test satisfied or not.	Critical difference (P = 0·05).
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Acre yield of grain lb. ..	2,400	2,700	2,800	3,167	3,592	2,932	30·25	Yes.	
Percentage on general mean. ..	81·9	92·1	95·5	108·0	122·5	100	1·03	..	2·15
Flowering duration in days.	105	122	122	125	125	..	..	..	..

Conclusions—5, 4, 3, 2, 1.

(iii) *Japanese method* versus *Farm method experiments.*—The nursery for the experiment was sown on 12th August 1953 and transplanted on 17th and 18th September 1953. The crop was harvested on 3rd February 1954; CO. 19 and CO. 25 were tried both for Japanese and farm method.

The results were significant both for varieties and interaction of varieties × methods. The results were not significant for 'methods.'

Among the varieties Co. 25 has given higher yields and for interaction Japanese method X Co. 25 have given definitely higher yields. Though the results are not significant in the case of 'methods,' Japanese method has given higher yields.

The results of the experiments and details are given in Table IX.

TABLE IX.—*Japanese method* versus *farm method experiment—Samba.*

Field No.—E-6 and 7.
Date of sowing—12th August 1953.
Date of plaating—17th and 18th September 1953.
Date of harvest—3rd February 1954.
T reatments—Main Plots—Co. 19 and Co. 25.
Sub-plots—Japanese method and Farm method.
Size of plot—2 cents.
Treatments—Main plots 2; Sub-plots—2.
Replications.—4

Summary of conclusions.

(*a*) For main plot treatments (varieties).

Particulars.	Co. 19.	Co. 25.	General mean.	Standard error.	'Z' test satisfied or not.	Critical difference (P = 0·05).
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Acre yield of grain in lb.	2,981	3,625	3,303	15·85	Yes.	50·54
Percentage on general mean ..	90·3	109·7	100	0·48	..	1·53

Conclusion—Co. 25, Co. 19.

(*b*) For sub-plot treatments (method).

Particulars.	Japanese method.	Farm method.	General mean.	Standard error.	'Z' test satisfied or not.	Critical difference (P = 0·05).
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Acre yield of grain lb.	3,356	3,250	3,303	..	No.	..
Percentage on general mean ..	101·1	98·9	100	..	..	..

(*c*) For interaction (Varieties × methods).

Particulars.	Co. 19.		Co. 25.		General mean.	Standard error.	'Z' test satisfied or not.	Critical difference (P = 0·05).
	Japanese method.	Farm method.	Japanese method.	Farm method.				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Acre yield of grain lb.	2,875	3,088	3,838	3,413	3,303	50·87	Yes.	124·52
Percentage on general mean.	87·0	93·5	116·2	103·3	100	1·54	..	3·77

Conclusion—Co. 25 Japanese, Co. 25 Farm, Co. 19 Farm, Co. 19 Japanese.

(iv) *Thaladi season.*—The Sesbania plants grown along the filed bunds all aorund *Kuruvai* paddy was very useful by giving an yield of 3,000 lb of green leaves per acre and the same was supplemented by Gliricidia leaves, cut from road sides, channels and field bunds. The thaladi field could be manured in the uniform average of 5,000 lb of green manure per acre and superphosphate at 100 lb. per acre. Weeds appeared in large numbers and they were pulled out immediately. The yield of Thaladi crop was fairly low. The planting of Thaladi crops were taken up in the second week of October and harvest came to a close by about the middle of March.

The following are the strains planted with details of area and yield per acre :—

Strain number.	Extent. ACRES.	Average acre yield.
ADT. 8.	14·30	1,536 lb.
Co. 25.	2·10	1,512 ,,
BAM. 3.	0·22	2,145 ,,

The damage done by the rats and 'Stemborer' was very considerable. Light traps were set up as a control measure against 'Stemborer' and Bamboo bow traps and zinc phosphide baits were adopted as control measure for rates. The average yield of Thaladi strains of paddy is given in Table X.

TABLE X.—*Average yields of Thaladi paddy in lb. per acre.*

Strain number.	1936–37.	1937–38.	1938–39.	1939–40.	1940–41.	1941–42.	1942–43.	1943–44.	1944–45.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ADT. 1 ..	...	...	...	...	...	...	2,453	...	...
ADT. 2 ..	1,854	1,144	1,279	1,349	1,359	1,229	1,423	1,467	1,090
ADT. 8 ..	1,612	1,676	1,538	1,437	1,380	1,201	1,420	1,455	1,357
ADT. 11 ..	...	...	...	...	...	1,600	1,887	2,016	1,531
Co. 2	1,505	1,350	1,560	1,550	1,425	1,164	1,289	1,188	1,220
Co. 16 ..	..	..	..	..	..	..	2,240	...	...
Co. 19 ..	..	..	..	..	..	..	..	2,540	1,845
Co. 25 ..	..	..	..	..	..	..	..	..	..
BAM. 3 ..	..	..	..	..	..	..	..	..	..

Strain number.	1945–46.	1946–47.	1947–48.	1948–49.	1949–50.	1950–51.	1951–52.	1952–53.	1953–54.
	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
ADT. 1 ..	..	1,440	2,036	..	..	..	..	..	..
ADT. 2 ..	1 1,80	...	...	...	...	...	...	...	...
ADT. 8 ..	1,225	1,330	1,188	1,107	1,363	1,360	1,113	571	1,536
ADT. 11 ..	...	..	..	..	..	..	..	..	
Co. 2	1,520	..	..	..	..	..	..	..	..
Co. 16 ..	1,294	1,430	...	..	..	..	..	..	..
Co. 19 ..	1,586	1,586	1 ,498	..	..	1,871	..	...	...
Co. 25 ..	..	..	..	..	..	..	..	773	1,512
BAM. 3 ..	..	..	..	..	..	..	..	..	2,145

3. *Other cereals*—(i) *Ragi.*—Ragi was raised in garden lands in July-August season and in summer season. In summer in rice fallows Co. 3 was sown and Co. 2 was sown in B-7 (garden land condition). Farm yard manure at the rate of 40 cart-loads per acre was applied. Seedlings were raised on 18th July 1953 and the same was transplanted on 10th August 1953. A weeding was given in the third week after planting. Irrigation was given as and when found necessary. The acreage under ragi this year was 0·75 acres. The yield in summer rice fallows was very poor. The following are details of yields obtained :—

Variety.	Acreage.	Average yield per acre.
Co. 2.	0·25	1,136 lb.
Co. 3.	0·50	370 ,,

4. *Oilseeds*—(i) *Groundnut—TMV. 2 in rice fallows.*—Groundnut TMV. 2 was grown in an area of 7·62 acres during the year as compared to last year's acreage of 3·76 acres. TMV. 2 was preferred for its short duration. The crop has to be sown in the month of January in order to get best results. The crop comes to harvest in April and after that it is possible to raise a green manure crop, like Sesbania or Daincha and groundnut haulms are also there to be used as cattle food or as green manure. Thus it is possible to obtain self-sufficesency in green manure for Kuruvai and Samba seasons. Three ploughings were given just after the harvest of paddy crop and groundnut kernels were dibbled in plough furrows behind the country plough at 100 lb. of kernels per acre. The average acre yield works out to 745 lb. of dried pods and 2,972 lb. of haulms.

(ii) *Coconut.*—Five coconut seedlings have been planted in the premises of the farm during the year. The Cyclone effect is still being felt and two trees only yielded 14 nuts.

5. *Fibre crops*—(*a*) *Cotton in rice fallows.*—P. 216 F cotton was raised in rice fallows over an area of 2·49 acres during the year. The land was ploughed after the harvest of paddy crop and cotton seed was dibbled 2½ feet apart between lines and 9 inches in lines. A basal dressing of 100 lb. of superphosphate was given before the seeds were dibbled. The sowing commenced on 2nd February 1954 and came to a close by 17th March 1954. The crop was intercultivated once by country plough and the weeds were removed by hand. The crop was top dressed with

Ammonium sulphate at 50 lb. per acre soon after weeding. The crop was given splash irrigation as many times as necessary. Flood irrigation was also given. The yield ranged between 239 lb. to 600 lb. per acre. Bolls began to burst in early sown crops, and pickings commenced by the middle of May 1954. Harvesting was over by the last week of July. The crop recorded an average yield of 460 lb. per acre.

(*b*) *Cotton—P.* 216 *F. and M.C.U.* 1. *on rice field bunds.*—P. 216 F. and M.C.U. 1 was raised during last year in paddy filed bunds both in Kuruvai and Samba in July and August of the previous year. The result is 17 lb. 10 oz. o f kapas of M.C.U. 1 and 10 oz. of kapas in the case of P. 216 F were obtained from an acre field bunds. Sowing of P. 216 F and M.C.U. 1 in field bunds is very promising.

6. *Green manure.*—The quantity of green manure produced during this year was quite sufficient for the paddy crop raised in this station. Sesbania and Sunnhemp among the annuals, gliricidia and *Indigofera teysmanii* among the perennials are the green manure crops grown in this farm. Sesbania and Sunnhemp were sown in rice fallows, after the harvest of groundnut in summer. The growth of the crops in the earlier stages wes rather slow, but later on, after the receipt of channel water they made good progress and gave an average yield of 20,000 lb. per acre in the case of Sunnhemp and 25,000 lb. per acre in the case of Sesbania. Sunnhemp was mainly grown for the supply of green manure for samba season. The seeds were sown six weeks before the preparation of fields for samba after the receipt of channel water. The total area under green manure during the year was 14·35 acres. Sesbania was planted all around the kuruvai crops at 4 inches apart and the yield obtained for manuring thaladi fields was 3,000 lb. per acre. One foot spacing was given for the Sesbania seedlings planted along the field margins of samba crop. A total quantity of 635 lb. of Sesbania seeds was collected. Gliricidia seedlings and cuttings were planted afresh along the road and field bunds and gap fillings were also done. The trees on an average gave 10 lb. per plant and this was utilized for samba and thaladi crops. *Indigofera teysmanii* seedlings were raised and transplanted in well manured pits. The germination was not satisfactory and the few seedlings that were obtained were transplanted in orchard and along road sides. The plants produced large quantity of seeds and total quantity of 11 lb. and 13 oz. of seeds was obtained.

A quantity of 1 oz. of Calapogonium seeds were received from the Arakku Valley Scheme and the existing stock of $1\frac{3}{4}$ lb. were also sown in the orchard. This creaper is fast growing and covers the ground very quickly. The foliage is very profuse and the green manure obtained seems to be encouraging.

7. *Vegetables.*—An area of 86 cents were sown with vegetable crops during the year under report. The main purpose of growing vegetables is for producing seeds for sale. Seedlings of brinjal and tomato were alse raised and sold to ryots. The details regarding the area, seeds collected, etc., during the year are given below :—

Crop.	Area.	Quantity of seeds collected	
		LB.	OZ.
Bendai	0·47	41	$4\frac{1}{2}$
Brinjal	0·06	2	6
Bittergourd	0·05	5	$6\frac{3}{4}$
Amaranthus	0·10	9	$12\frac{1}{2}$
Snakegourd	0.15	9	$13\frac{1}{2}$
Tomato	0.03	0	$9\frac{1}{2}$

The yields are low due to attack of insect pests.

8. *Sattur chillies.*—Sattur chillies being a commercial variety were tried successfully last year and a small area of 5 cents were planted with the same. The seedlings were raised and sold to the people in the locality. The yield obtained is given below.,—

I. Sattur chilly pods obtained .. .. .. 40 lb.

9. *Fruit plants.*—The orchard area which was only 1·15 acres during 1951-52 was increased to 1·65 acres in 1952–53. Large numbers of seedlings of lime, Nepali lemon, Jack, cuttings of Nepali lemon, pomegranate and citron were raised in nurseries from the seed materials available in this station. They were all sold to public. The details of seedlings raised and sold are given below :—

	Transferred.	Sold.
(i) *Seedlings*—		
Acid lime seedlings	191	72
Nepali lemon seedlings	35	112
Nepali lemon rooted cuttings	39	397
Cirton rooted cuttings	..	2
Singapore Jack seedlings	..	2
Indian gooseberry seedlings	..	1
Pomegranate rooted cuttings	..	5
Mango seedlings	..	165
Kapok seedlings	533	946

(ii) *Fruits.*—Additions were made by planting the following during the year :-

1 Seville lemon	5
2 Sapota (Cricket ball)	5
3 Sapota (Dwarapudi)	5
4 Sapota (Bangalora)	5
5 Sannakuli grafts	2
6 Peter grafts	2
7 Bangalora grafts	2
8 Mulgova grafts	2
9 Lemon Villa franka	1
10 Pummels budded	2
11 Lemon lisban	1
12 Marmalade orange	5

10. *Pests and diseases.*—The samba crop was affected by the paddy mealy bug (Ripersia oryzae) and they were sprayed with Hexidole 950 and application of Lindane were made. Affected plants were pulled out and the gaps were filled up. Rat damage in paddy fields were on an increased scale. Rat traps and zinc phosphide baits were set up as a control against this and light traps were set up as a control against stemborer in bulk samba and thaladi crops of paddy. Sulphur dusting was done to control mite in Sathugudi plants. Citrus plants were sprayed with Bordeaux mixture to control ' die-back ' in citrus plants.

V. RAJAGOPAL REDDY,
Assistant-in-charge.

AGRICULTURAL RESEARCH STATION, PATTUKKOTTAI,
9th November 1954.

APPENDIX I

STEPS TAKEN TO INCREASE THE REVENUE OF THE STATION DURING 1953-54.

The area under paddy has been increased by bringing more area under Kuruvai. The area under double crop of paddy has been increased from 14·07 to 16·85 acres.

Groundut in 7·49 acres, ragi in 0·50 acres and cotton in 2·50 acres were raised in rice fallows to increase the revenue of the station.

Seedlings, cuttings and layers of fruit plants were raised and supplied to the public.

Tables I (*a*), I (*b*), II and III prescribed are given below :—

TABLE I (*a*).

Particulars.	Details of crops.				
	Paddy.	Groundunt.	Ragi.	Cotton.	Tapioca.
(1)	(2)	(3)	(4)	(5)	(6)
Area in acres	43·32	7·49	0.50	2·50	0·25
Seed—					
Yield in lb.	92,526	8,246¾	346	..	5,900 Cuttings.
Value (Rupees)	14,214 1 7	1,546 4 3	36 0 0	..	29 8
Grain—					
Yield in lb.	26,084¾	1,369	66	1,154 (kapas).	103 (Tubers)[1]
Value (Rupees)	326 0 6	9 1 6	6 14 0	577 0 0	6 7 0
Straw—					
Yield in lb.	50,443	24,505 (haulms).	3,080	..	..
Value (Rupees)	630 8 0	81 10 8	38 8 0	..	..
Total receipt for the year	15,170 10 1	1,637 0 5	81 6 0	577 0 0	35 15

Particulars.	Details of crops—*cont.*			
	Vegetable seeds.	Other miscellaneous produce.	Seedlings and plants.	Total.
	(7)	(8)	(9)	(10)
Area in acres	1·10	..	..	..
Seed—				
Yield in lb.	135	..	98,384	..
Value (Rupees)	634 0 0	..	489 2 9	16,949 0 7
Grain—				
Yield in lb.	..	7,641½ (includes fuel twigs, etc.).	..	..
Value (Rupees)	..	818 14 3	..	1,744 5
Straw—				
Yield in lb.	..	..	..	..
Value (Rupees)	..	..	..	750 10 8
Total receipt for the year	634 0 0	818 14 3	489 2 9	19,444 0 6

Total receipts for three years—	RS.	A.	P.
1950–51	11,400	0	0
1951–52	18,547	3	10
1952–53	16,295	1	7

1. Cotton kapas has been calcuated at Re. 0–8–0 per lb.
2. Ragi straw has been calculated at Re. 1 per 80 lb.
3. Groundnut haulms has been calculated at Re. 1 per 300 lb.

TABLE I (*b*).

Crops.	Seed.			
	Retained on the Station.		Transfered or Sold.	
	Quantity.	Value.	Quantity.	Value.
(1)	(2)	(3)	(4)	(5)
	LB.	RS. A. P.	LB.	RS. A. P.
Paddy	45,298	7,628 14 0	47,228	6,585 3 7
Groundnut	5,586-12	1,047 8 3	2,660	498 12 0
Ragi	35	3 11 0	311	32 5 0
Cotton	..	..	..	..
Tapioca	5,900 cuttings.	29 8 0	..	..
Vegetable seeds	..	..	135	634 0 0
Other miscellaneous produce	..	..	..	..
Seedlings and plants	..	..	98,384	489 2 9
Total	..	8,709 9 3	..	8,239 7 4

Crops,	Grain.			
	Retained on the Station.		Transfered or sold.	
	Quantity.	Value.	Quantity.	Value.
	(6)	(7)	(8)	(9)
	LB.	RS. A. P.	LB.	RS. A. P.
Paddy	1,631-8	211 0 7	976-12	114 15 11
Groundnut	..	..	1,369	9 1 6
Ragi	66-0	6 14 0	..	..
Cotton	..	..	1,154	577 0 0
Tapioca	..	..	103 lb, (Tubers)	6 7 0
Vegetable seeds	..	..	..	..
Other miscellaneous produce	..	..	7,641½	818 14 3
Seedlings and plants	..	..	..	..
Total	..	217 14 7	..	1,526 6 8

Crop.	Straw.			
	Retained on the station.		Transfered or sold.	
	Quantity.	Value.	Quantity.	Value.
	(10)	(11)	(12)	(13)
	LB.	RS. A. P.	LB.	RS. A. P.
Paddy	25,098	312 7 0	23,345	318 1 0
Groundnut	24,505	81 10 8	..	..
Ragi	3,080	38 8 0	..	..
Cotton	..	..	..	..
Tapioca	..	..	..	..
Vegetable seeds	..	..	..	..
Other miscellaneous produce	..	..	..	..
Seedlings and plants	..	..	..	..
Total	..	432 9 8	..	318 1 0

Crops.	Total value.	1950–51.	1951–52.	1952–53.
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
	(14)	(15)	(16)	(17)
Paddy	15,170 10 1	..	..	..
Groundnut	1,637 0 5	..	..	..
Ragi	81 6 0	..	..	..
Cotton	577 0 0	..	..	..
Tapioca	85 15 0	..	..	..
Vegetable seeds	634 0 0	..	..	..
Other miscellaneous produce	818 14 3	..	..	..
Seedlings and plants	489 2 9	..	..	..
Total	19,444 0 6	11,400 0 0	185,47 3 10	16,295 1 7

TABLE II.—*Cost of cultivation for bulk crops.*

Details of expenditure.	1953–54.	Actual expenditure for three years. 1950–51.	1951–52.	1952–53.
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
1 Pay and allowances of staff ($\frac{1}{3}$ of actuals).	710 10 0	927 5 4	954 0 0	972 0 0
2 Miscellaneous cultivation expenses.	195 10 4	428 7 8	372 7 4	193 9 7
3 Working Expenses (actuals).	13,016 8 6	8,939 7 6	11,097 5 3	12,064 2 4
4 One-tenth of Expenditure—Livestock and Deadstock.	133 15 10	153 6 0	60 5 0	176 2 5
5 Proportionate rent.	3,338 7 0	2,313 12 0	2,962 0 0	3,338 7 0
Total ..	17,395 3 8	12,762 6 6	15,446 1 7	16,744 5 4

TABLE III.—*Statement of abstract of Expenditure and Receipts.*

Particulars.	1950–51.	1951–52.	1952–53.	1953–54.
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
Expenditure ..	12,762 6 6	15,446 1 7	16,744 5 4	17,395 3 8
Revenue	11,400 0 0	18,547 3 10	16,295 1 7	19,444 0 6

APPENDIX II.

Statement of Expenditure and Receipts for the fasli year 1363 (1953–54).

Expenditure.	Amount. RS. A. P.
1 Pay of Establishment	4,340 11 0
2 Dearness allowance of establishment	1,445 10 0
3 Travelling and other allowance	268 11 0
4 Petty constructions and repairs	65 9 9
5 Purchase of live and dead stocks	1,464 14 0
6 Working expenses	12,129 11 0
7 Rents and taxes	15 4 6
8 Service postage	285 0 0
9 Other contingencies	61 10 9
10 Dearness allowance to menials	2,056 3 0
Total..	22,133 5 0

Receipts.	Amount. RS. A. P.
1 Agricultural stations	2,643 1 10
2 Miscellaneous	379 12 6
3 Transfers	6,774 8 0
Total ..	9,797 6 4

ANNUAL REPORT OF THE AGRICULTURAL RESEARCH STATION, SATYAMANGALAM (COIMBATORE DISTRICT) FOR THE YEAR 1953–54 (FASLI 1363).

This is the third annual report of the Agricultural Research Station, Satyamangalam, since its opening in August 1951 and the first report after the advent of irrigation, following the completion of the Lower Bhavani Project Reservoir. A short account of the origin and the object of this station is given in Appendix I.

Season and rainfall.—A total rainfall of 42·49 inches was received during the fasli year 1953–54 spread over 62 days as against 23·26 inches over 23 days in the previous year. The quantity received exceeded the annual average for the past ten years by 10·99 inches. The excess over normal was about two inches during the south-west monsoon, seven inches in the north-east monsoon and about two inches in the hot weather. The distribution of rainfall was not however quite favourable. With the rains received in July after a long spell of dry weather only a limited area could be sown on the dry lands before the surface soil lost moisture. The rains received towards the end of August and early in September were useful to complete dry land sowings though belated by a month.

On the project lands bulk of the sowings was done after the receipt of water in the channel on the 15th September. Subsequent weather conditions till the middle of November proved very unfavourable to normal crop growth, due to the unprecedented rains and prolonged murky weather. Heavy rains to the extent of 17·88 inches in October affected seed setting in cumbu completely. In cholam, grain setting was next to nothing due to severe attack of earhead bug. In ragi, planting in September which is late for the tract by about a month, and continued wet conditions in October affected growth and tillering. As a result flowering was premature. Grain setting though poor was very much better than cholam and cumbu.

Groundnut was also affected in growth and spread but with the onset of dry weather in November, it improved and gave fair yields unlike the millets. Cotton was affected by wilt and blackarm especially the earlier sown crop and further by shoot-borer and leaf-roller. But with the commencement of dry weather and application of insecticides, the crop pulled up. Pulses had sporadic attack of green bug. Thus the early crop season under the project from September to December was on the whole bad for millets, unfavourable for cotton and fair for groundnut and pulses. The late or the second season crops from December to March were nevertheless much better. As against only 3 to 4 irrigations which the early sown crop received, due to the heavy rains during the north east monsoon, the second crop was given about 10 irrigations up to March once in 10 days. Cholam and ragi gave fair yields, being the first year of cropping on these marginal lands. The second crop of ragi was affected by rhizactonia in fields with shallow depth of soil. Groundnut gave the best yield. Cumbu was poor in vegetative growth and the earheads were thin and the yields subnormal. The poor performance is attributed to the dewy and cold weather, which is said to be not conducive for normal growth of cumbu in the tract. Cotton yields for the year must be considered good especially on the lands newly brought under irrigation.

The hot weather rains in April and May were beneficial to the crops on the garden-land, and for the growth of green-manures. The latter had been intersown in the standing crops during the last but one irrigation from the project in March. There was good second flush in cotton which gave a fair amount of kar pickings. There was plentiful supply of water in the farm wells during the year due to the heavy rains and seapage from the irrigation channels. All the crops on the garden land are well.

The rainfall data for the year are given in Table I.

TABLE I.—*Statement of rainfall for* 1953–54.

Months.	Week.	1953–54. Rainfall in inches.	1953–54. Number of rainy days.	1952–53. Rain fall. in inches.	1952–53. Number of rainy days.	Average for ten years. Rain in inches.	Average for ten years. Rainy days.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		South-west monsoon.					
June	7–13	0·61	1	0·40	1	0·18	0·6
	14–20	..	..	..	..	0·59	1·3
	21–27	0·17	1	..	..	0·08	0·3
June-July	28–04	0·04	..	..	..	0·10	0·2
	5–11	0·50	2	0·95	2	0·59	1·2
	12–18	0·90	3	1·35	2	0·29	0·6
	19–25	0·87	3	..	..	0·26	0·7
July-August	26–01	0·70	3	..	..	0·30	0·5
	2–08	..	..	..	..	0·67	1·1
	9–15	..	..	..	..	0·48	1·2
	16–22	..	..	..	..	0·51	1·0
	23–29	0·54	2	1·25	1	0·66	1·2
August-September ..	30– 5	0·61	1	0·05	..	0·38	0·8
	6–12	2·12	2	..	..	0·36	0·9
	13·12	1·44	2	..	..	1·32	1·7
	20–26	0·69	1	..	..	0·46	1·1
Total ..		9·29	21	4·00	6	7·23	14·4
		North-east monsoon.					
September-October.	27–03	0·45	2	4·43	4	1·44	2·2
	4–10	1·55	4	..	..	1·46	2·4
	11–17	5·95	2	0·22	1	2·05	2·9
	18–24	4·98	4	..	..	2·46	1·9
	25–31	5·06	3	..	..	0·89	1·7
November	1–7	0·38	1	..	..	1·62	1·8
	8–14	0·61	2	..	..	2·54	2·6
	15–21	0·19	1	..	..	0·89	1·7
	22–28	0·21	1	0·20	1	0·72	1·1
November-December.	29–5	..	..	1·97	2	0·62	0·9
	6–12	..	..	1·60	4	0·30	0·7
	13–19	..	..	..	..	0·06	0·1
	20–26	..	..	..	..	0·20	0·3
December-January	27–03	0·13	1	..	..	..	..
	4–10	1·60	2	0·30	1	0·10	0·3
	11–17	1·31	2	..	..	0·03	0·1
	18–24	..	..	..	..	0·17	0·3
	25–31	..	..	..	..	0·01	0·1
	Total ..	22·42	25	8·72	13	15·46	22·1
		Hot weather period.					
February	1–7	..	..	..	..	0·03	0·1
	8–14	..	..	..	..	0·05	0·1
	15–21	..	..	..	..	0·16	0·3
	22–28	..	..	1·92	1	0·33	0·5
March	1–07	..	..	..	..	0·29	0·2
	8–14	0·08	..	..	..	..	..
	15–21	0·07	..	..	..	0·50	0·4
	22–28	2·00	2	..	..	0·17	0·4
March-April ..	29–04	0·43	2	..	..	1·34	0·9
	5–11	..	..	2·59	3	0·80	1·5
	12–18	..	..	2·44	1	0·97	1·4
	19–25	1·15	2	0·83	2	0·35	0·8
April-May	26–02	0·92	3	0·40	1	0·35	0·6
	3–09	2·02	2	1·09	1	0·71	1·0
	10–16	2·50	2	..	..	0·68	1·3
	17–23	0·47	2	0·53	3	0·72	1·6
	24–30	1·14	1	0·39	1	0·95	1·5
May-June	31– 6	..	..	0·28	2	0·41	1·1
	Total ..	10·78	16	10·47	15	8·81	13·7

Irrigation under the project conditions.—This is the first year of irrigation of the lands hitherto under dry cultivation. Nearly 47 acres were irrigated. The supply from the canal was made from 15th September 1954 regularly, conforming to the schedule of 2 inches in 10 days. In practice one turn of irrigation was given from the sluice for a period of 120 hours day and night. The water was cut off for 5 days and again let in on the sixth day. Irrigations during the nights were also done on the station using two pertromax lights. Casual mazdoors who were regularly employed, along with one or two permanent mazdoors attended to the

night work without any discomfort. It was possible to irrigate nearly 50 acres during a period of 120 hours with four men working in shifts.

Plot sizes of about 2 cents for areas of half per cent slope and 1 cent for one per cent slopes were adopted. In tall crops like cholam and cumbu the plots were further divided into two, to facilitate easy and uniform irrigation in the nights. Irrigation of cotton raised on ridges was found to be very convenient for uniform wetting.

Chemical investigation.—The chemical investigations during the year consisted in the continuation of the pot-culture studies started last year and analysis of soils and plant samples from the field experiments. Besides, estimations of nitrogen and organic matter were made in the manures applied to the fields.

The pot-culture experiment comprised—

(1) Dose of organic matter as soil amendment.

(2) Comparative value of green manure, cattle manure and compost as suppliers of organic matter.

(3) Variety of legume suitable for the tract.

The yield data from the pot-culture experiments under item I for cotton during 1952-53 and from ragi raised next season in the same set of pots are given in Table II (*a*).

In Table II (*b*) the results of the experiment noted under item 2 on ragi and cotton following are given, and in Table II (*c*) the yields of kapas due to the different legume treatments grown and incorporated in the pots.

TABLE II (*a*).—*Yield data of pot culture experiment on cereals and cotton.*

		1952-53.		
Name of experiment.	Treatment.	Crop.	Average weight for replication. (gms.)	Percentage increase in weight over control.
(1)	(2)	(3)	(4)	(5)
Dose of organic matter as Soil amendment with external application of green leaf (Sunhemp).	Control	M.U. 1 cotton.	5·62	..
	Sunnhemp at 2,500 lb. per acre. ..		6·36	13·1
	Do. at 5,000 „ ..		5·78	2·8
	Do. at 7,500 „ ..		7·36	30·9

		1953-54.			
		Grain.		Straw.	
Name of experiment.	Crop.	Average weight of replication. (gms.)	Percent increase over control.	Average weight of replication. (gms.)	Per cent increase in weight over control.
	(6)	(7)	(8)	(9)	(10)
Dose of organic matter as Soil amendment with external application of green leaf (Sunnhemp).	Co. 2 ragi.	2·1	..	6·6	..
		3·02	44·0	10·5	59·0
		3·16	50·0	10·3	56·0
		4·16	95·0	13·0	97·0

TABLE II (*b*).

Name of the experiment.	Crop.	Treatment	Average weight of replication.	Per cent increase in weight.	Average weight for replication.
(1)	(2)	(3)	(4)	(5)	(6)
comparative value of green manure, cattle manure, compost and ammonin sulphate at 45 lb. N. per acre and 30 lb. P2 O5 per acre.	Ragi Co.2.	Control ..	4·30	..	16·3
		Sunnhemp ..	4·81	11·8	16·6
		Cattle manure.	5·58	29·09	18·8
		Compost	4·41	2·5	12·8
		Ammonium sulphate.	6·43	49·0	17·3

Name of the experiment.	Per cent increase in weight.	Average weight of lint of replication.	Per cent increase over control.	Remarks.
	(7)	(8)	(9)	(10)
Comparative value of green manure, cattle manure, compost and ammoniam sulphate at 45 lb. N per acre 30 lb. P2 O5 per acre.	..	0·4	..	The crop was very badly attacked by pests and diseases resulting in shedding of flowers and buds.
	2·6	1·3	225	
	15·0	0·5	25	
	..	0·66	65	
	6·4	1·5	275	

TABLE II (*c*).

Name of the experiment.	Crop.	Treatment.	Total weight of kapas.	Increase in weight over control.	Percentage increase in weight over control.
(1)	(2)	(3)	(4)	(5)	(6)
Variety of legumes and their effect on succeedd ng cotton and cereals 30 lb. P2 O5 and 45 lb. N applied as basal dose.	M.U. 1. cotton.	Sunnhemp	13·49 gm.	2·06 gm.	18·01
		Daincha	12·68	1·25	10·94
		Cowpea	17·52	6·19	54·17
		Dewgram	16·54	5·14	44·98
		Control	11·43	..	..

From the figures in the Table II (*a*) it is seen that heavy dose of 7,500 lb. of Sunnhemp has produced 30·9 per cent extra yield over the control. The bolls in this treatment had been noticed to be bigger and earlier to burst than the control. In the ragi crop (Co. 2) that followed cotton the yields of both straw and grain are higher than those of the control in all the treatments, 7,500 lb. recording the maximum.

In Table II (*b*) the response of ragi to the application of ammonium sulphate is marked which is apparently due to the easy availability of nitrogen in the fertilizer. With compost no response is seen either in the straw or grain yields.

In the experiment where legumes were grown and incorporated separately in pots, dewgram is found to induce better yields than Daincha or Sunnhemp. The results given in Table II (*c*) are in consonance with the higher nitrogen content in the soil cropped to dewgram noted in Table III (*c*).

In the experiment with dose of organic matter, the soils from the pots were analysed at the close of the cotton crop of 1952–53. Despite the varying quantities of Sunnhemp applied and the differential yields obtained, the residual plant food elements in all the treatments are more or less equal.

In the second experiment with cattle-manure, compost and Sunnhemp, similar trends are noted. With higher doses of organic matter applied in the form of Sunhemp no appreciable increase is noticed in nitrogen content over the control.

In the case of legume varieties grown in pots, and incorporated, the analysis of the soils indicate an increase in nitrogen content with dewgram. The results are presented in table.

TABLE III (*a*).

Description.	Dose.	Moisture.	Loss on ignition.	Nitrogen. gen	Total P2O5.	Lime (Cal.)	Total potash. (K20)	Organic carbon (C).
(1)	(2)	(3) PER CENT.	(4) PER CENT.	(5) PER CENT.	(6) PER CENT.	(7) PER CENT.	(8) PER CENT.	(9) PER CENT.
Soil from pot-culture experiment on M.U. 1. cotton.—Dose or oraganic matter as soil amendment at 3 different levels with a basal dressing of 45 lb. N. as ammoinum sulphate and 30 lb. P2O5 as super for all treatments including Control	Sunnhemp, 2,500 lb.	1·40	1·23	0·028	0·043	0·23	0·34	0·23
	Sunnhemp, 5,000 lb.	1·48	1·35	0·028	0·036	0·37	0·37	0·25
	Sunnhemp, 7,500 lb.	1·20	0·75	0·03	0·043	0·38	0·35	0·28
	Control (no organic matter.)	1·20	1·00	0·03	0·035	0·34	0·29	0·20

Description.	Dose.	Moisture.	Loss on ignition.	Nitrogen.	Total P_2O_5.	Lime (Cal.)	Total potash. (K_2O)	Organic carbon (C).
(1)	(2)	(3) PER CENT.	(4) PER CENT.	(5) PER CENT.	(6) PER CENT.	(7) PER CENT.	(8) PER CENT.	(9) PER CENT.

TABLE III (*b*).

Soil from pot culture experiment on Ragi.—Comparative value of green manure, cattle manure compost and Ammonium Sulphate at 45 lb. of N per acre with a dressing of 30 lb. of P_2O_5 as Super Phosphate.	Green manure Sunnhemp.	1·25	1·55	0·034	0·037	0·39	0·39	0·22
	Cattle manure c. 45 lb. of N.	1·40	1·40	0·033	0·04	0·32	0·40	0·24
	Compost c. 45 lb. of N.	1·40	1·53	0·034	0·042	0·30	0·40	0·20
	Ammonium Sulphate at 45 lb. N.	1·43	1·53	0·033	0·038	0·24	0·37	0·19
	Control (no organic matter).	1·35	1·60	0·028	0·043	0·23	0·34	0·19

TABLE III (*c*).

Soil from pot-culture experiment.—Variety of legumes and their effect on succeeding crops of cotton and cereals when applied insitu, with a basal dressing of 45 lb. N and 30 lb. of P_2O_5 (taken after the harvest of the green manure.s	Sunnhemp ..	2·10	1·85	0·031	0·042	0·31	0·34	0·2
	Daincha ..	2·15	1·70	0.03	0·047	0·28	0·34	0·19
	Cowpea ..	2·00	1·60	0·032	0·054	0·26	0·35	0·29
	Dewgram ..	1·88	1·80	0·051	0·056	0·37	0·40	0·20
	Control (no green manure).	2·05	1·60	0·035	0·042	0·33	0·38	0·02

Samples from field experiments—Dose of organic matter experiment.—In the dose of organic matter experiment where Sunnhemp and Cassia leaves were applied at three levels, 2,500 lb. 5,000 lb. and 7,500 lb. soil samples were taken after the application of the treatments prior to sowing cotton in the field. The analytical data obtained show no difference in the fertility status of the soil. The results are given in Table IV (*a*).

Legume varietial trial.—Before raising legumes in the blocks intended for their trial, the soils from the area were sampled and analysed to determine their chemical status to start with. The results of the analysis are furnished in Table IV (b.)

It is noted from the above table that soil depth 0-9″ contains more of P_2O_5 both available and total than the depth 9″ to 18″. In the first two series the soil is calcareous and in the third and fourth series the soil is non-calcareous. The total exchangeable capacity also is found to increase with the depth in the first two series.

Cotton plant samples collected from all the treatments of the organic matter experiment were also analysed to assess their major plant food contents. The data given in Table IV (*c*) do not show any difference between the cotton samples in chemical composition.

TABLE IV (*a*).

Serial number.	Lab. number.	Particulars of samples.	Treatment.	Locality and depth.	Moisture.	Loss on igintion.	Nitrogen (N).
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
58	94	Soil from Agricultural Research Station, Satyamangalam, plot of the experiment of dose of organic matter as soil amendment F. No. 27 before sowing of cotton.	Sunhemp 2,500 lb.	Agricultural Research Station, Satyamangalam, 0-9″	PER CENT. 2·4	PER CENT. 2·4	PER CENT. 0·041
59	95		Sunhemp 5,000 lb.	Do.	2·3	2·4	0·039
60	96		Sunhemp 7,500 lb.	Do.	2·3	2·3	0·039
61	97		Cassia 2,500 lb.	Do.	2·5	2·5	0 031
62	98		Cassia 5,000 lb.	Do.	2·4	2·4	0 039
63	99		Cassia 7,500 lb.	Do.	2·3	2·1	0 033
57	93		Control ..	Do.	3·2	1·5	0·036

TABLE IV (*a*)—*cont.*

Serial number.	Lab. number.	Particulars of samples.	Total P2O5.	Lime (Cal.).	Total Potash. (K-20).	Organic carbon.	P.H.	Available. P2O5.
			(9)	(10)	(11)	(12)	(13)	(14)
			PER CENT.	PER CNET.	PER CENT.			PER CENT.
58	94	Soil from Agricultural Research Station, Satyamangalam, plot of the experiment of dose of organic matter as soil amendment F. No. 27 before sowing of cotton.	0·032	0·29	0·20	0·16	8·27	0·0048
59	95		0·038	0·37	0·19	0·16	8·24	0·0067
60	96		0·039	0·32	0·19	0·16	8·27	0·0059
61	97		0·031	0·39	0·19	0·13	8·25	0·0057
62	98		0·032	0·36	0·21	0·18	8·25	0·0068
63	99		0·033	0·37	0·20	0·18	8·25	0·0060
57	93		0·032	0·45	0·23	0·16	8·25	0·0056

Serial number.	Lab. number.	Particulars of samples.	Available (K2O).	Total Exchange capacity.	Exchange calcium.	Exchange mg.	Exchange Number.	Exchange K.
					m.e.	m.e.	m.e.	m.e.
			(15)	(16)	(17)	(18)	(19)	(20)
			PER CENT.					
58	94	Soil from Agricultural Reesarch Station Satyamangalam, plot of the experiment of doss of organic matter as soil amendment F. No. 27 before sowing of cotton.	0·0048	11·0	6·1	..	..	..
59	95		0·0067	10·3	7·0	..	..	..
60	96		0·0059	10·2	6·6	..	..	..
61	97		0·0057	1·21	8·7	..	..	..
62	98		0·0068	10·2	7·7	..	..	..
63	99		0·0060	10·2	7·2	..	..	..
57	93		0·0056	10·2	7·2	..	..	..

TABLE IV (*b*).

Serial number.	Lab number.	Particulars of samples.	Treatment.	Locality and depth.	Moisture per cent.	Loss on ignition per cent.	Nitrogen (N) per per cent.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
64	61	Soil from legume experimental plots of Agricultural Research Station, Satyamangalam, taken before growing legume from field No. 1-B and 30.	Depth series I.	1-B 0-9" ..	3·7	4·5	0·072
65	62		Do. ..	9"-18" ..	4·7	3·9	0·026
66	63		Depth II, 1-B Series II.	1-B, 0-9" ..	3·9	4·0	0·03
67	64		Do. ..	9"-18" ..	5·5	4·5	0·03
68	65		Depth— .. Series III ..	30-B 0-9" .. 30—9"-18" ..	2·8 2·4	3·5 2·7	0·046 0·023

Serial number.	Lab number.	Particulars of sample.	Total P2O5	Lime (Cal).	Total potash.	Organic carbon.	P.H.	Available per cent.
			(9)	(10)	(11)	(12)	(13)	(14)
64	61	Soil from legume experimental plots of Agricultural Research Station Satyamangalam, taken before growing legume from field No. 1-B and 30.	0·082	2·72	0·28	0·49	..	0·016
65	62		0·073	4·24	0·27	0·21	..	0·006
66	63		0·085	1·84	0·26	0·45	..	0·011
67	64		0 066	2·37	0·37	0·18	..	0·0045
68	65		0·042	0·38	0·33	0·19	..	0 0045
			0·058	0·57	0·32	0·12	..	0·006

Serial number.	Lab number.	Particulars of samples.	Available (K2O) per cent.	Total Exchange capacity.	Exchange calcium. m.e.	Exchange mg. m.e.	Exchange. number. m.e.	Exchange K m.e
			(15)	(16)	(17)	(18)	(19)	(20)
64	61	Soil from legume experimental plots of Agricultural Research Station, Satyagalam. taken before growing legume from field No. 1-B and 30.	..	18·98	11·39	4·1	2·48	1·0
65	62		..	20·66	14·69	2·8	2·39	07·8
66	63		..	19·37	13·02	3·0	2·50	45·0
67	64		..	28·57	17·99	4·8	4·4	1·38
68	65		..	12·41	8·2	2·6	1·2	0·41
			..	11·7	7·7	2·2	1·1	0·70

TABLE IV (*c*).

S. No.	Particulars of sample.	Lab number.	Treatment.	Moisture per cent.	Nitrogen (N). per cent.	Phosporic acid P2O5 per cent.	Potash (K2O) per cent.	Loss on ignition per cent.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Cotton plants from plot of organic matter assoil ament to periment in Field No. 27 at Agricultural Research Station, Satyamangalam.	100	Control (no manure).	11·8	0·188	0·301	0·32	78·2
2		101	Sunnhemp 2,500 lb. per acre.	12·3	0·187	0·347	0·34	78·1
3		102	5,000 lb. per acre ..	12·9	0·163	0·269	0·28	79·3
4		103	Sunhemp 7,500 lb. per acre.	12·7	0·19	0·304	0·29	77·4
5		104	Cassia 2,500 lb. per acre.	12·7	0·173	0·269	0·28	75·7
6		105	Cassia 5,000 lb. per acre.	11·5	0·178	0·329	0·33	78·5
7		106	Cassia 7,500 lb. per acre.	11·1	0·18	0·28	0·29	80·1

Agronomy—Bulk crops—Dry lands.—Of the total cultivable area of 47·5 acres 0·81 acre was set apart permanently for dryland cropping. The rest of the area having been brought under irrigation, this dry block will serve as the control, to study the changes in the soil properties under irrigation from the project in the adjoining areas. This area aligned to represent the pre-project conditions will have cotton-millet rotation. Half the area will be sown to dry cotton and half to mixture of cholam and cumbu with a little of cowpea, commonly followed in the tract. During the year, Nadam cotton and the annual types intended to replace Nadam were sown on 47 cents, cholam-cumbu mixture on 34 cents in August and September following the rains. As stated earlier seed setting in both cumbu and cholam were affected due to the heavy rains in October. The crops were harvested as straw, which gave 950 lb. per acre. The yields from Nadam cotton and other dry selections averaged to 103 lb. per acre.

Garden lands.—The station had only 3·05 acres under garden land to start with in 1951, commanded by 3 wells one in each of the survey Nos. 27, 1.B and 30. It was increased to about 8 acres in 1952–53 and during 1953–54 to nearly 12 acres (excluding $1\frac{1}{4}$ acres under grasses, fruits, flowers and banana varieties), with the improved water supply in the wells. Three crops were raised on the gardenlands. Millets in summer were followed by fodder cholam and then tobacco. In the area where cotton was grown from September to March, it was preceded by summer cholam and followed by green manure. Tobacco crop grown on 3·11 acres on the gardenland gave per acre 510 lb. of cured leaf of good quality and 205 lb. of second sort. On a small scale observation trial conducted, in plots of 12 cents each with local tobacco, using water from the well and from the project separately, with and without Potash, the following yield variations were noted:

Treatments.	Cured leaf in lb. 16 acre.	
1 Tobacco irrigated with project water plus with potash.	700	Potash applied as muriate of Potash to supply 60 lb. of K_2O—half at sowing and half, 4 weeks later.
2 Tobacco irrigated without potash	450	
3 Tobacco irrigated with well water plus with potash.	1,042	All plots received 45 lb. N as Ammonium Sulphate, half at sowing and half, 4 weeks later.
4 Tobacco irrigated without potash..	750	

The crop raised with water from the well was greener and better in growth and heavier too.

Project lands.—Excluding 3·05 acres under old garden land and 0·81 acre under dry cultivation and 1·29 under parennial crops the balance of about 42 acres were grown to crops under project irrigation. Nearly 19 acres were grown to cotton as the long duration crop from September to June. About 15 to cholam, ragi and cumbu and seven acres to groundnut, pulses and other miscellaneous crops in both the seasons adopting rotation between millets, also between groudnut and millets. Excluding the area under gardenland grown to summer millets and a small area to masipattam cotton, the rest of the area, of about 30 acres was sown to green manures in summer, the bulk of which consisted of sunnhemp. They were incorporated in the soil in July with the rains received.

Green manures grown insitu was helpful to reduce the application of cattle manure by about forty per cent or nearly 4 cartloads per acre.

The yields of grain from cumbu and cholam were very poor as stated earlier due to the heavy rains in October and unfavourable weather conditions. Ragi on the bulk areas gave about 140 lb. per acre and groundnut 520 lb. In the second season from December to March, there was considerable improvement in the yields of crops.

On the bulk area consisting of shallower and rather slopy lands cumbu gave about 200 lb. per acre, cholam about 260 lb. ragi nearly 400 lb. and groundnut 850 lb. on an average. Cotton yields from both season and Kar pickings came up to 420 lb. per acre. Yields from cotton and groundnut were more profitable, and the next best was ragi.

The yields of crops from the gardenlands and project lands are given in Appendix II.

Agronomical investigations.—The experiments started during the year consisted of—

(1) Finding out suitable methods of building up soil fertility and improving the texture of these shallow and porus soils by application of green manures and bulky organic manures like cattle manure and compost.

(2) Trial of legumes suitable to the tract and ploughing them insitu, to study the effects on the succeeding cotton and millets.

(3) Study of a number of systems of crop rotation with cotton as the money crop in the first year followed by millets and pulses in the next year, to find out the most profitable system of rotation for the project lands.

(4) Study of the yields of crops raised under definite crop rotation, with irrigation 1 inch in 5 days as against the standard of 2 inches in 10 days to see the response to irrigation at shorter intervals in these open textured soils.

(5) Testing of varieties of crops in observation plots as a prelude to the replicated trials to test their suitability for the tract and the season.

All the experiments were conducted on the lines approved by the Special Committee for the station.

TABLE V.—*Dose of organic matter experiment.*

Field No. 27.
Previous crop—Cotton M..U. 1.
Crop in 1953–54 under project irrigation ragi Co. 2 (September to November) followed by cumbu Co. 3. (December to March).
Object—To study the effect of application of organic matter in different doses and forms to ragi crop and the residual effect on cumbu following.
Lay out—Randomized blocks replicated 4 times.
Variants—Seven as given in the table.
Gross area of each plot—1·1 cent.
Net area of each plot—0·74 cent.
Date of application of green manures—2nd September 1953.

	Ragi Co. 2.	Cumbu Co. 3.
Date of sowing or planting	26th September 1953.	7th January 1954.
Date of harvest	29th November 1953.	18th April 1954.

Basal dose—45 lb. of N as Ammonium Sulphate and 30 of P_2O_5 applied in the form of Superior to planting ragi.

Treatments.	Yield in lb per care.			
	Ragi Co. 2.		Cumbu Co. 3.	
	Grain.	Straw.	Grain.	Straw.
1 Control (no manure but only basal dose)	490	1,149	652	2,196
2 Cassia leaf at 2,500 lb. per acre	433	1,284	571	2,365
3 Cassia leaf at 5,000 lb. per acre	487	1,149	549	2,804
4 Cassia leaf at 7,500 lb. per acre	462	1,047	606	2,432
5 Sunnhemp at 2,500 lb. per acre	430	1,081	655	2,804
6 Sunnhemp at 5,000 lb. per acre	482	1,520	701	2,331
7 Sunnhemp at 7,500 lb. per acre	482	1,182	648	2,534
Significance by z test	Not significant.		Not significant.	
Standard Error Mean per cent	17·21	15·44	10·23	11·52

Conclusion—No difference between the treatments.

During the course of the growth of ragi 7,500 lb. dose was found to be greener and earlier by about a week in flowering and more vigorous in growth. But the yields were not better as a result. In the case of cumbu, such differences between the treatments was not marked.

The results indicate no difference between treatments during the first year of trial in the two short duration crops of ragi and cumbu. This experiment is a continuation of experiments started on cotton last year, and will be concluded this year as elaborate experiments with different legumes have been included in the programme for trial in the coming years.

TABLE VI.—*Experiment II.—Doss of organic matter experument with different legumes.*

Field No. 34 C. South.
Previous crop—Cholam—Sunnhemp mixture, (dry crop).
(Crop in. 1953–54 under project irrigation—Cumbu Co. 3. (September to December) followed by Ragi Co. December to March).

SATYAMANGALAM

Object—To study the differential effects of the application of green leaf manures in varying doses on cumbu Co. 3 and the residual effect on ragi following.
Layout—Randomized blocks replicated 4 times.
Variants—20 is noted in the table.
Gross area of each plot—1·3 cents.
Net area of each plot—1·0 cent.
Date of application of manures—26th September 1953.

	Cumbu Co. 3.	Ragi Co. 2.
Date of planting or sowing	29th September 1953.	24th December 1953.
Date of harvest	9th December 1953.	15th March 1954.

Basal dose—P_2O_5 at 30 lb. per acre applied prior to planting cumbu. Nitrogen applied as ammonium sulphate at 20 lb. of N to cumbu, 3 weeks after planting and 25 lb. of N to ragi, 3 weeks after planting.

Treatments.		Yield in lb. per acre.				Remarks.
		Cumbu Co. 3.		Ragi Co. 2.		
		Grain.	Straw.	Grain.	Straw.	
1 Daincha	0 lb. per acre	5·0	2,500	916	575	Heavy rains in October when cumbu was in flower resulted in practically no setting of grain. Hence the data was not analysed though the figures are given.
2 Do.	2,500 Do.	5·0	2,325	985	600	
3 Do.	5,000 Do.	4·5	2,250	984	550	
4 Do.	7,500 Do.	4·5	2,925	839	700	
5 Cowpea	0 Do.	4·8	2,175	935	725	
6 Do.	2,500 Do.	4·8	2,150	878	550	
7 Do.	5,000 Do.	5·0	3,675	885	600	
8 Do.	7,500 Do.	5·3	4,800	1,082	775	
9 Sesbania	0 Do.	6·0	1,625	916	600	
10 Do.	2,500 Do.	4·0	1,650	870	450	
11 Do.	5,000 Do.	2·8	2.000	822	575	
12 Do.	7,500 Do.	5·5	2,075	885	650	
13 Glyricidia	0 Do.	4·3	1,550	751	575	
14 Do.	2,500 Do.	5·0	2,225	823	550	
15 Do.	5,000 Do.	4·8	2,600	997	675	
16 Do.	7,500 Do.	5·3	2,625	993	550	
17 Sunnhemp	0 Do.	4·5	2,350	855	675	
18 Do.	2,500 Do.	3·5	2,225	884	550	
19 Do.	5,000 Do.	3·3	2,375	949	625	
20 Do.	7,500 Do.	5·8	2,475	957	625	
Significance by z test		Not	Not	Not	Not	
Standard error mean per cent		Analysed.	23·10	10·26	13·20	
Dose, variety of legume and Interactions		Not significant.				
Conclusions		All equal.				

In this experiment cumbu transplanted within a week of the application of the green manures started withering in the treatments that had received 7,500 lb. of cowpea and gliricidia. But the crop recovered in 3 or 4 days. The effect was noticed during the period of decomposition of the leaves of gliridicia and cowpea This indicated that the applications should be done a week or two in advance of planting.

With high dose of 7,500 lb. cumbu showed better vigour in growth but the heavy rains in October caused much heterogenity in growth and poor seed setting. In ragi too no marked difference was noticed between the treatments, while in the pot-culture experiment (noted earlier) possibly under controlled conditions, the beneficial effects appear to be more marked in the yields.

TABLE VII.—*Dose of organic matter experiments. Experiment III.*

Field No. 34-A.
Previous crop—Cholam and sunnhemp (dry crop).
Crop in 1953–54 under project irrigation—Cotton M.U.1. (September to March).
Object—To study the effect of application of organic matter in different forms and doses, to cotton M.U. 1.
Layout—Randomized blocks replicated four times.
Variants—20 as given in the table.
Gross area of each plot—1·6 cents.
Net area of each plot—1·3 cents.
Date of application of manures—22nd September 1953.
Date of planting or sowing—26th September 1953.
Date of harvest—9th February 1954 to 25th May 1954 (Season pickings).
Basal dose—20½ lb. of N as ammonium sulphate at the time of sowing cotton and 30 lb. of P_2O_5 as super.
Top dressing—22½ lb. of N as ammonium sulphate at the time of flowering of cotton.

Treatments.		Yield of kapas in lb. per acre.
1 Daincha	0 lb. per acre	372
2 Do.	2,500 do.	356
3 Do.	5,000 do.	436
4 Do.	7,500 do.	433
5 Cowpea	0 do.	318
6 Do.	2,500 do.	427
7 Do.	5,000 do.	429
8 Do.	7,500 do.	530

	Treatments.		Yield of kapas in lb. per acre.
9	Sesbania	0 lb. per acre.	346
10	Do.	2,500 do.	350
11	Do.	5,000 do.	444
12	Do.	7,500 do.	356
13	Glyricidia	0 do.	359
14	Do.	2,500 do.	352
15	Do.	5,000 do.	458
16	Do.	7,500 do.	414
17	Sunnhemp	0 do.	349
18	Do.	2,500 do.	429
19	Do.	5,000 do.	439
20	Do.	7,500 do.	481
	Significance by z test		Significant.
	Critical difference		93·0
	Standard Error Mean per cent		7·96

Conclusion—8 20 15 11 19 3 4 7 18 6 16 1 13 2 12 14 10 17 9 5

	Doses.	Yield in lb. per care.	Remarks.
1	0	349	Doses significant. Variety of legume and interaction not significant.
2	2,500	383	
3	5,000	441	
4	7,500	443	
	Significant or not	Significant.	
	Critical difference	42 lb.	
	Conclusion	4 3 2 1	

In this experiment, the beneficial effect of 7,500 lb. doses was more marked than in the case of millets, particularly from the middle of November, both in growth of the plants and earliness of boll production. This observation is in conformity with the increased yields of kapas obtained in the pot culture studies. In Dajncha and Cowpea treatments pickings started earlier, nearly a fortnight in advance. Seven thousand and five hundred lb. dose with cowpea was the best. There was no significant difference due to the variety of legume applied and in the interaction between variety and dose of legume. Seven thousand five hundred lb. and 5,000 lb. doses are on a par and significantly better than 2,500 lb. which in turn is only as good as control or no manure. The experiment indicates that any of the green manures which is cheap enough of, e.g., glyricidia leaves can be applied. It may be possible to get better effects if the doses are increased beyond 7,500 lb. both for the millets and cotton, as in the case of the former doses up to 7,500 had not shown marked effects in the final yields.

TABLE VIII.—*Experiment IV—Green manure, cattle manure and compost as soil amendments.*

Field No. 34-C. South.
Previous crop—Mixture crop of cholam Co. 5 and sunnhemp.
Crop in 1953-54 under project irrigation—Cumbu Co. 3 (September to December) followed by ragi Co. 2 (December to March).
Object—To study the comparative value of green manure (sunnhemp), cattle manure and compost supplied in equal amounts based on the organic matter content of the bulky manures (Sunnhemp in three doses).
Layout—Randomized blocks replicated four times.
Variants—Twelve as given in the table.
Gross area of each plot—1·3 cents.
Net area of each plot—1·0 cent.
Date of application of manures—26th September 1953.

	Cumbu Co. 3.	Ragi Co. 2.
Date of planting or sowing	29th September 1953.	24th December 1953
Date of harvest	9th December 1953.	15th March 1954.

Basal Dose—P2O5 at 30 lb. per acre applied prior to planting cumbu. Nitrogen applied as Ammonium Sulphate at 20 lb. N to cumbu three weeks after sowing and 25 lb. N to Ragi following three weeks after planting.

	Treatments.		Yield in lb. per acre.			
			Cumbu Co. 3.		Ragi Co. 2.	
			Grain.	Straw.	Grain.	Straw.
1	Sunnhemp at 0	lb. per acre	4·5	2,350	855	675
2	Do. 2,500	do.	3·5	2,225	884	550
3	Do. 5,000	do.	3·3	2,375	949	625
4	Do. 7,500	do.	5·8	2,475	957	625

	Treatments.		Yield in lb. per acre.			
			Cumbu Co. 3.		Ragi Co. 2.	
			Grain.	Straw.	Grain.	Straw.
5	Compost at 0 lb. per acre.	.. .. ..	4·0	1,225	838	675
6	Do. 2,500 do.	.. .. ..	4·0	2,150	935	650
7	Do. 5,000 do.	.. .. ..	4·3	2,200	827	525
8	Do. 7,500 do.	.. .. ..	4·8	2,750	887	575
9	Cattle manure at 0 do.	.. .. ..	4·0	1,925	852	575
10	Do. 2,500 do.	.. .. ..	8·8	1,500	840	550
11	Do. 5,000 do.	.. .. ..	3 8	2,675	878	575
12	Do. 7,500 do.	.. .. ..	4·3	2,000	845	550
	Significance by Z test		Poor yield not analysed.	Not significant.		
	Standard Error Mean per cent		..	23·8	10·26	7·85

NOTE.—Ragi in this block had attack of rhizoctonia. 40 to 50 per cent of the plants were affected and drying up just before seed setting.

As in Experiment III, the effects of higher dose of 7,500 lb. though noted in general growth and vigour of the crop has not been reflected in the yields. The differences due to the treatments were less marked on ragi following. This should mean that higher doses of manure are worth trying, on millets for possible significant increases in the yields.

Varieties of legume suitable for the tract.—In this experiment it was proposed to grow a number of leguminous green manure crop like Sunnhemp, Cowpea, Daincha and Dewgram to select the best that is capable of quick growth, higher tonnage production and good yields in the crop succeeding when ploughed *in situ*.

During the first year the crops were raised under irrigation from April to July and incorporated after eleven weeks growth, when the green manures were mostly in flower. Half the number of plots were given a basal does of 30 lb. of P_2O_5 as super and on the other half-legumes were grown without P_2O_5. The results of cotton raised in these plots from September to April are given in the tabular Statement IX.

As it is not practicable to raise legumes specially under irrigation from wells, during the regular crop season, the experiment was modified during 1954 on the following lines to fit in with the system of cropping under project irrigation.

The experiment was conducted in two sets one for cotton and the other for the millets. Green manures like Daincha, Cowpea, Sunnhemp, Dewgram and Indigo were intersown in the standing crops of cotton and millets or after the harvest of millets if earlier, about the middle of March, a fortnight in advance of the closure of the canal for irrigation. The legumes raised, were cut at flower and incorporated in the soil, in the two sets of experiments, Legume raised in the standing crop of cotton will be applied to the succeeding crop of millets and that grown in the standing crop of millets to the succeeding crop of cotton during the project season. In case the soil is not in condition for the green manure to be ploughed in at flower, the plants will be cut and heaped and then incorporated with the next rains. The results of the first trials on cotton following the legumes incorporated are given in Table IX, and the quantities of the green manure raised during summer fallow (i.e., March to June) in the standing crops of cotton and ragi as given in Table XI. The effects of incorporation of these summer catch crops will be studied on cotton and millets from September 1954 to March 1955.

TABLE IX.—*Experiment V—Experiments with varieties of legumes for the improvement of soil.*

Field No. 1. B and 30.
Previous crop—Legume varieties.
Crop 1953–54—M.U. 1. cotton under Project irrigation from September 1953 to April 1954.
Object To study the effects of growing different varieties of legume with and without P2O5 as basal dose and ploughing them *in situ*, on cotton succeeding.
Layout—Split plot, replicated four times.
Date of ploughing in Green Manure—20th July 1953 to 22nd July 1953.
Date of sowing of cotton—3rd October 1953.
Date of harvest of cotton—6th February 1954 to 27th April 1954.
Main plot—P2O5 at 30 lb. and No. P2O5.
Sub-plot—The four legume varities and control as noted in the table.
Gross area of sub plot—2·02 cents.
Net area—1·60 cents.
Basal dose—P2O5 at 30 lb. per acre applied as Super to half the number of replications, in the previous legume crop.

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	Crop.	Yield in lb. per acre (dry).	Weight of kapas in lb. per acre.	Remarks.
1	Daincha with P2O5	5,000	691	Difference between main treatments P2O5 and no P2O5 also not significant Interactions also not significant
2	Daincha no P2O5	5,266	791	
3	Sunnhemp with P2O5	4,813	878	
4	Sunnhemp no P2O5	4,578	747	
5	Cowpea with P2O5	2,719	725	
6	Cowpea no P2O5	2,391	685	
7	Dewgram with P2O5	3,422	660	
8	Dewgram no P2O5	2,719	698	
9	Control with P2O5	..	749	
10	Control no P2O5	..	761	
	Significance by Z test	..	Not significant.	
	Standard Error Mean per cent	7 5		

TABLE X (*a*)—*Experiment VI—Green manure, cattle manure and compost as soil amendment*

Field No. 34-A.
Crop in 1953-54 under project irrigation—M.U. 1. cotton
Object—To study the comparative value of green manure (Sunnhemp, Cattle manure, Compost) supplied in equal amounts based on the organic matter content of the bulky manures (Sunnhemp as standard).
Layout—Randomized blocks replicated 4 times.
Variants—Twelve as in the table.
Gross area of each plot—1·6 cents.
Net area of each plot—1·3 cents.
Date of application of manures—22nd September 1953.
Date of planting or sowing—26th September 1953.
Date of harvest—9th February 1954 to 25th May 1954 season pickings.
Basal dose—22½ lb. of N as ammonium sulphate at the time of sowing cotton and 30 lb. of P2O5 as Super.
22½ lb of N as ammonium sulphate at the time of flowering of cotton.

	Treatments.		Yield of kapas in lb per acre.
1	Sunnhemp	0 lb. per acre	349
2	Do.	2,500 do.	429
3	Do.	5,000 do.	439
4	Do.	7,500 do.	481
5	Compost	0 do.	342
6	Do.	2,500 do.	264
7	Do.	5,000 do.	411
8	Do.	7,500 do.	334
9	Cattle manure	0 do.	341
10	Do.	2,500 do.	355
11	Do.	5,000 do.	336
12	Do.	7,500 do.	525
	Significance by z test		Yes.
	Standard Error Mean per cent.		10·96
	Critical difference		119

Conclusion—12 4 3 2 7 10 1 5 9 11 8 6

In this set of trial too, better growth and earliness in boll production were noted particularly with 7,500 lb. dose of sunnhemp and cattle manure. The yield data analysed show the superiority of the maximum dose of cattle manure and sunnhemp.

The difference between the doses as well as the kind of manure are significant but the interaction is not significant. The results are given in Table X (*b*).

	Dose of manure				Significant or not.	Critical difference lb. per acre.	Conclusion.
	0 lb. 1	2,500 lb. II	5,000 lb. III	7,500 lb. IV			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Yield of kapas in lb. per acre.	344	352	396	456	Significant.	69	IV, III, II, I

Standard error mean per cent. 7·35

	Kind of Manure			Significant or not.	Critical difference in lb. per acre.	Conclusion.
	Sunnhemp. 1	compost 2	cattle manure. 3			
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Yield of kapas in lb. per acre ..	425	339	389	Significant.	60	1 3 2

Standard error mean per cent = 5·75.

TABLE XI.—*Expreriment VII.—Experiment with catch crop of legumes raised in the standing crops of cotton and millets.*

Object—To raise catch crops of legumes in summer from March to June and study the effects of incorporation on millet and cotton.

Lay-out—Randomized blocks replicated four times.

Treatments—Legumes as noted in the table with and without $P_2 O_5$.

Gross area of each plot—2·2 cents.

Net area of each plot—1·6 cents.

Date of sowing—Set I, 23rd March 1954.
Set II, 23rd March 1954.

Date of harvest—Set I, Sunnhemp—18th June 1954.
Set I Cowpea, Daincha, Indigo and Dewgram—29th June 1954.
Sunnhemp—13th June 1954.
Cowpea, Daincha, Indigo and Dewgram—8th June 1954.

Set I.

Field No. 27—North Raised in cotton.

Crop.	Yield of dry weight in lb. per acre.	
	P2O5.	no P2O5.
(1)	(2)	(3)
1 Sunnhemp	2,063	1,297
2 Cowpea	891	547
3 Daincha	406	391
4 Dewgram	813	876
5 Indigo	297	250

Set II.

Field No. 34—C. raised in millets (regi).

Crop.	Yield of dry weight in lb. per acre.	
	P2O5.	No P2O5
(4)	(5)	(6)
Sunnhemp	3,797	*4,453
Cowpea	1,344	1,422
Daincha	2,125	1,859
Dewgram	2,344	2,406
Indigo	1,030	1,141

* REMARKS.—Due to the early removal of ragi, the legumes grew better on these plots while the plots under cotton the green manures in association with cotton came up less vigorously.

Rotation Experiment.—As per scheme of cropping proposed for the project lands (based on the preliminary trials at Kugalur and Mewani) half the area should be grown to cotton as the money crop and the other half to millets to be raised in regular two-year rotation. The agricultural practice in this tract on the dry lands in the pre-project period is to sow cholam if rains are received early in June-July. If the sowing rains occur in August-September cumbu will be grown or a mixture of cholam and cumbu with a little of pulses like cowpea or lab-lab. In the next year groundnut or a mixture of groundnut and redgram will follow. On the garden land the present crop rotation commonly followed is ragi planting in July-August followed by tobacco. Then tenai or cholam will be grown after the harvest of tobacco in March. The next crop will be again ragi prior to planting tobacco. The present experiment consists of the trials with six systems of crop rotation as given in the Table XII to find out a profitable sequence of the millets for the project seasons from September to December and December to March. The treatments also include groundnut and other pulses to study the profitability of other rotations. The experiment is designed to have all the stages or phases of rotation every year side by side for comparative study.

This is the first year of trial and hence no crop effects could be studied. The yields recorded from the different treatments are given in table.

TABLE XII (*a*).—*Experiment VIII—Rotation experiment.*

Field No.—27.
Previous crop—Cumbu.
Object—To determine the most suitable rotation of crops with cotton in the first year and two millets in the second year or a combination of a millet and another pulse or groundnut or tobacco.

Crop in 1953-54, rotation crops under project irrigation
Lay-out—Six systems as six main treatments in which the crops will be raised under rotation.
Gross area of each rotation plot—2·4 cents.
Net area for millets, etc.—1·9 cents.
Net area for cotton crop—2·0 cents.

First crop.			Second crop.		
Crop.	Date of planting or sowing.	Date of harvest.	Crop.	Date of planting or sowing.	Date of harvest.
(1)	(2)	(3)	(4)	(5)	(6)
1 Tenai Co. 3 and redgram. ..	11th September 1953.	3rd December 1953 and 3rd March 1954.	Gingelly	12th January 1954.	24th May 1954.
			Co. 13 cholam after groundnut.	11th January 1954.	4th May 1954.
2 Groundnut T.M.V. 3.	Do.	15th January 1954.	Ragi Co. 2 ..	27th December 1953.	25th March 1954.
3 Cumbu Co. 1 ..	Do.	30th November 1953.	Groundnut T.M.V. 2.	25th January 1954.	18th May 1954.
4 Cholam Co. 1 ..	Do.	17th January 1954.	Co. 3 cholam after ragi.	18th December 1953.	5th April 1955.
5 Ragi Co. 1 ..	21st September 1953.	2nd December 1953.	Tobacco after ragi.	27th December 1953.	3rd May 1954
6 Cotton M.U. 1 ..	10th September 1953.	..			3rd February 25th April 1954.

Basal dose—All the plots received a basal dose of local cattle manure at 5 tons per acre and P_2O_5 at 30 lb. per acre as super phosphate.

Groundnut plots received no nitrogen as manure but only super. Cotton plots at sowing were given a dose of Ammonium Sulphate at 1 cwt. per acre and the second similar dose at flower.

To the first millet crop Ammonium Sulphate was applied to supply 20 lb. of N three weeks after planting and the millet succeeding Ammonium Sulphate to supply 25 lb. of N three weeks after planting.

TABLE XII (*b*).

System of rotation.	First year or season.				Second year or season.	
	September to March.		March to August.		September to November.	
	Crop. Green manure.	Yield of kapas in lb. per acre.	Crop.	Yield in lb. per acre (dry).	Crop.	Yield in lb. per acre Grain/ Straw.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Cotton	598	Dewgram ..	912	Ragi	553/1,640
2	Cotton	696	Sunnhemp ..	1,798	Groundnut (spreading).	325/1,807
3	Cotton	750	Cowpea	483	Cumbu	31/4,509
4	Cotton	665	Sunnhemp ..	1,535	Redgram and Tenai mixture.	27 (redgram) 235/632 (tenai).
5	Cotton	710	Dewgram ..	991	Cholam	34/8,526
6	Cotton	697	Dewgram ..	711	Ragi	675/1,570

System or rotation —*cont.*	Second year or season—*cont.*				
	December to March.		March to August.		
	Crop.	Yield in lb. per acre Grain/Straw.	Crop.	Yield in lb. per acre Grain/Straw.	Remarks.
	(8)	(9)	(10)	(11)	(12)
1	Cholam ..	519/4,632	Dewgram ..	1,193	
2	Cholam	712/4,053	Dewgram ..	746	
3	Ragi	508/912	Dewgram ..	1,474	After ragi growth was goodr
5	Gingelly	59	Dewgram ..	254	Gingelly sown as mixture with redgram following removal of tenai.
5	Groundnut (bunch).	1,452/2,483	Dewgram ..	202	Poos growth due to sowing later after removal of groundnut.
6	Tobacco ..	382 good. 180 inferior.	Dewgram ..	1,757	After tobacco growth was good.

Scheme of rotations and crop yields during 1953–54.—During the first crop season cumbu was badly affected by heavy rains and practically set no grain. Cholam had severe attack of earhead bug; Application of Hexidole 810 was not of much avail against the pest. Ragi Co. 1 came up fairly well and was better in growth and yield than Co. 2 ragi in the adjoining plots. Cotton suffered from attack of blackarrw, jassids and leaf roller, but pulled up following the dry weather in November. Groundnut on the whole fared better than others without any disease. Redgram had borer attack and gave poor yields.

In Co. 13 cholam grown as the second crop from December to March seed setting was good. Cumbu, though free from diseases was not coming up so well as cholam or ragi and the earheads were thin. Groundnut T.M.V. 2 was conspicuous by its good growth and the yield was nearly four times that of T.M.V. 3 grown in the first season. Gingelly intersown in redgram after the harvest of tenai was poor in growth, and the yield was also sub-normal. The second crop of ragi suffered from Rhizactonia due to which nearly 40 per cent of the plants were affected. Cotton crop was normal

and gave good yields. Tobacco raised on project lands for the first time after ragi was not lacking in vigour of growth and was normal with the application of muriate of potash and Ammonium Sulphate. The leaves after curing were found to be distinctly paler in colour, and thinner than the crop raised under well irrigation similarly manured. These observations have been proposed to be tested in a special scheme proposed for improvement of the local Meenampalayam tobacco.

Duty of water experiments.—From the irrigation trials conducted at Kugalur and Mewani previously supply of 2 inches of water once in 10 days for the crop to be raised under the Bhavani Project was fixed. To economize the use of water, closure of the canal for about a month during the periods of heavy rains in the North-East monsoon period is also being done as adumberated in the scheme. In the present experiment it is proposed to find out if the same quantity of water 2 inches in ten days, if applied at shorter intervals at 1 inch in five days could improve the crop yields. In this experiment besides the irrigation treatments, rotation of cotton with millets and groundnut is included to find out the performance of the crops under the different rotation systems and irrigations.

The experiment is laid out in the split plot design with the irrigation treatments as to the two main treatments and the rotation systems as the sub-treatments. As this is the first year of the experiment, results of crop effects will not be available. The yield data obtained from the crops are analysed for the two irrigation treatments. Due to continued rains from late September to early November during the year, the first season crops from September to December, had only 3 to 4 irrigations. All the second season crops from December to March were regularly irrigated once in 10 days skipping over one turn due to the rains during the first week of January. The details of the experiment and the yield data are given in Table XIII.

TABLE XIII.—*Experiment IX—Duty of water experiment.*

Field No.—In contiguous block of S. Nos. 29, 32 A B and C, 31 A.
Previous crop—Sunnhemp.
Object—To find out the best method of irrigation for increased crop yields.
Lay-out—Split plot design.
Main treatments—Irrigation—
(*a*) 2 inches in ten days.
(*b*) 1 inch in five days.
Sub-treatments—Six phases of the crop rotation.
Crop in 1953-54, rotation crops as in the table.
Replication—Six.

System of rotation.	First year. September to March.	Second year. September to March.	Third year. September to March.
I	(1) Cotton on ridges ..	(2) Cumbu followed by ragi.	(3) Cholam followed by bunch groundnut.
II	(1) Cotton on beds	(2) Regi followed by cumbu.	(3) Spreading groundnut followed by cholam.

Treatment or crop.	First crop (September to December). Date of planting or sowing.	First crop (September to December). Date of harvest.	Treatment of crop.	Second crop (December to March). Date of planting or sowing.	Second crop (December to March). Date of harvest.
(1)	(2)	(3)	(4)	(5)	(6)
Cumbu Co. 1 ..	13th September 1953.	25th November 1953.	Cumbu Co. 3 ..	17th December 1953.	11th April 1954.
Cholam Co. 1 ..	Do.	20th January 1954.	Cholam Co. 13 ..	24th January 1954.	4th May 1954.
Ragi Co. 2	25th September 1953.	24th November 1953.	Ragi Co. 2	27th December 1953.	26th March 1954.
Groundnut T.M.V. 3	12th September 1953.	18th January 1954.	Groundnut T.M.V 2 bunch.	24th January 1954.	5th May 1954.
Cotton M.C.U. 1 ..	13th September 1953.	..			8th February to 25th April 1954.

Basal dose—Ten cart-loads of cattle manure and P_2O_5 at 30 lb. per acre as super.

To cotton at 22½ lb. of N at sowing and 22½ lb. at flower as Ammonium Sulphate. To millets first, millet three weeks after sowing at 20 lb. of N and for second millet at 25 lb. of N three weeks after sowing.

No nitrogenous manure will be applied to groundnut, but only super phosphate.
Gross area of each sub-plot—3·6 cents.
Net for millets and groundnut—2·7 cents.
Net for cotton crop—2·8 cents.

Number and crop.		Yield in lb. per acre. Irrigation treatments 1″ in 5 days 2″, in 10 days.		Significance by 'Z' test.	Standard error mean percentage.	Critical difference.	Conclusions.
(1)		(2)		(3)	(4)	(5)	(6)
(a) First season crops—September to December 1953.							
1 Cumbu Co. 1	Grain.	4	3	Not analysed due to negligible yields.	..	..	..
	Straw.	4,130	3,815	Not	..	..	All equal.
2 Cholam Co. 1	Grain.	37	40	Not analysed due to poor yields.	..	..	..
	Straw.	6,327	5,623	Not significant.	19·80	..	All equal.
3 Ragi Co. 2	Grain.	235	232	Do.	6·7	..	Do.
	Starw.	549	506	Do.	7·6	..	Do.
4 Groundnut T.M.V. 3 ..	Pods.	735	780	Do.	3·2	..	Do.
	Haulm.	1,623	167	Do.	3·7	..	Do.
(b) Second season crops December to March 1954.							
1 Cumbu Co. 3	Grain.	308	259	Not significant.	6·01	..	All equal,
	Straw.	1,080	1,123	Do.	8·4	..	Do.
2 Ragi Co. 2	Grain.	532	529	Do.	4·5	..	Do.
	Straw.	840	827	Do.	12·4	..	Do.
3 Cholam Co. 13	Grain.	306	331	Do.	4·5	..	Do.
	Straw.	4,617	3,716	Do.	8·2	..	Do.
(c) Cotton M.U. 1—September 1953 to March 1954.							
1 Cotton on beds		618	411	Not significant.	9·87	..	All equal.
2 Cotton on ridges		473	578				

The records of irrigation were made in right angular " V " notches fixed one for each of the sub-treatments and another at higher reach of the channel. The flow into this was first regulated through a masonary cistern having an adjustable outlet. The flow was regulated in the " V " notch at the higher level and then in the " V " notch at the entrance of the plot. During the course of the crops no marked difference was noticed between the treatments. Following the heavy rains in October cotton plants on beds had comparatively more attack of blackarrw jassids but the plants recovered when bright weather set in.

In the irrigation treatments increased yields of straw are noted with 1″ in five days but in all cases they fall short of the level of significance. With cotton trends are towards higher yields with bed-sowing and 1″ in five days. But sowing on ridges and 2″ in ten days is also nearly as good and the differences between the treatments are not significant.

Cumbu Transplanted vs. *Broadcast.*—In this tract cumbu is both sown and transplanted. Cumbu transplanted is said to give better yields than the crop sown broadcast on the garden lands. The experiment was proposed to be conducted on the project lands under irrigation from September to December. In conformity with the local practice cumbu nursery for transplanting was raised one week in advance of sowing the broadcast treatment. Transplanting was done when the seedlings were three weeks old.

TABLE XIV.—*Experiment X—Cumbu Transplanted vs. Broadcast.*

Previous crop—Sunnhemp.
Object—To study if transplantnig cumbu gives better yield than the broadcast plot.

Date of broadcastihg—15th September 1953.
Date of harvest—12th December 1953.

Crop in 1953-54—Co. 3.
Lay out—Randomized blocks replicated 12 times.
Treatments—Two, broadcast vs. transplanted.
Gross area of each plot—1·54 cents.
Net area of each plot—1·06 cents.
Date of transplanting—28th September 1953.
Date of sowing nursery—8th September 1953.

Treatments.	Yield in lb. per acre. Grain.	Straw.	Remarks.
(1)	(2)	(3)	(4)
1 Broadcast plots	4	2,726	Due to heavy rain in October seed setting in both the treatments were affected.
2 Transplanted	9	1,396	
Significance by 'Z' test not analysed—		Yes.	
Standard error mean per cent—		5·72	
Critical difference—		60 lb.	
Conclusion—		2, 1, 2	

Quite contrary to expectations, broadcast plots have given higher yields of straw. This is traceable to the fact that the crop on the broadcast plots made some good growth, before the commencement of heavy rains in October. Following transplanting, heavy showers were received for nearly a month, and hence the growth of the crop in this variant was stunted resulting in poor yields of straw.

The experiment has been proposed to be taken up again on the garden lands during summer.

Crop varietal studies.—One of the main items of work of the station is the study of the crop varieties available from the specialists and select the most suitable ones for the irrigation under the project conditions from September to March. The requirements of the tract, is one long duration crop of cotton, for the period of irrigation September to March, to be followed by two millets during the same period next year. The millets having nearly half the duration of cotton, it is necessary to fit in any two suitable millets strains, available from cholam, cumbu and ragi. To this end trials were started in two sets, one for the first season, from September to December and the second set from December to March. Though M.U. 1 is now taken as the standard cotton for the area, small scale trials with M.U. 2 and Lakshmi cotton were also made. Besides, a number of groundnut varieties, gingelly and castor spared by the Oil Seeds Specialist and a few pulses from the pulses section were also tried. Pending appointment of research staff, to take up in addition spacing trials and time of sowing experiments, the crop varieties obtained from the Specialists were tested in observation plots. The results of the trials are given in Table XV.

TABLE XV.

1. (*a*) *Cumbu varietal trials—First crop* (*September to December*).

Field No. 27.
Date of sowing—6th September 1953.
Date of harvest—25th November 1953.
Area of each plot—7·6 cents.

Number and varieties.	Yield in lb. per acre. Grain.	Straw.	Remarks.
(1)	(2)	(3)	(4)
1 Co. 1 cumbu	26	2,671	Of the varieties Co. 4 was earlier to flower than others by a week to ten days. X.2 also equally early. But all were affected by the rain, at flower and gave poor grain yields. Hence the trials will be repeated.
2 Co. 2 cumbu	51	2,618	
3 Co. 3 cumbu	39	1,908	
4 Co. 4 cumbu	72	2,804	
5 X. 2. cumbu	52	3,500	

1. (*b*) *Second crop* (*December to March*).

Field No.—27.
Date of sowing—9th January 1954.
Area of each plot—7·6 cents.
Date of harvest—22nd April 1953 for Co. 3 and 1st May 1954 for other varieties.

Number and varieties.	Yield in lb. per acre. Grain.	Straw.	Remarks.
(1)	(2)	(3)	(4)
1 Co. 1 cumbu	171	1,118	The season was normal. But dewy whether is not considered favourable for growth and setting of cumbu. Hence the plants were in general not very vigorous and earheads also thin. Co. 3 and Co. 4 were better in growth and earlier than others Co. 2 was nearly as good. The yields on the whole were sub-normal.
2 Co. 2 cumbu	252	881	
3 Co. 3 cumbu	238	908	
4 Co. 4 cumbu	211	803	
5 X. 2 cumbu	178	961	

2 (*a*). *Cholam varietal trials :—First crop.*

Field No. 27.
Date of sowing—31st August 1953 (sown with rains and continued later with project irrigation).
Date of harvest 21st December 1953 to 3rd January 1954.
Area of each plot—5·7 cents.

Serial number and varieties.	Yield in lb. per acre. Straw.	Grain.	Remarks.
1 Cholam Co. 1	6,368	13	Co. 6 and Co. 9 were earlier in flowering than others by about 2 weeks, the last being Co. 1. These two were poorer in vigour of growth and suffered the worst due to ear-head bug being close panicle types. A.S. 681, A.S. 8001, A.S. 8002 and A.S. 8112 were taller. The trials were vitiated by poor seed setting. They were mostly harvested for straw. Planting in August, September for the Project conditions is considered late for cholam in this tract.
2 Cholam Co. 6	3,684	Nil.	
3 Cholam Co. 9	2,737	Nil.	
4 Cholam A.S. 681	7,333	12	
5 Cholam A.S. 8001 ..	8,421	20	
6 Cholam A.S. 8002 ..	7,807	13	
7 Cholam A.S. 8112 ..	7,053	13	
8 Cholam A.S. 5414 ..	5,579	8	

2. (*b*) *Second crop.*

Date of sowing—8th January 1954.
Date of harvest—22nd April 1954.
Area of each plot—5·5 cents.

Number and varieties.	Yield in lb. per acre. Grain.	Straw.	Remarks.
1 Co. 4 cholam	76	2,072	A.S. 8388 and Co. 13 were found to be more vigorous in growth and earlie than the rest, followed by Co. 9 and Co. 14 and A.S. 7583. Co. 13 and A.S. 8388 and Co. 9 fared the best of the lot. The season was more favourable to cholam than the first season. Yet in production, ragi is better.
2 Co. 9 cholam	297	3,000	
3 Co. 12 cholam	323	2,691	
4 Co. 13 cholam	471	3,218	
5 Co. 14 cholam	274	2,527	
6 Co. 15 cholam	248	2,759	
7 Co. 16 cholam	44	2,253	
8 A.S. 7583 cholam ..	56	2,273	
9 A.S. 8155 cholam ..	238	2,800	
10 A.S. 8159 cholam ..	219	3,182	
11 A.S. 8388 cholam ..	464	3,853	
12 Local white cholam ..	201	2,182	

3. (*a*) *Ragi varietal Trials—First crop.*

Field No. 32-C.
Date of transplanting—5th October 1953.
Date of harvest—24th December 1953 to E.C. 4310, 4573 and Co. 1. 18th December 1953 to E.C. 4610 and Co. 2.
Area of each plot—
Co. 1. 4310 each 3 cents.
E.C. 4601 each 7 cents.
E.C. 4573 each 6 cents.
Co. 2 each 9 cents.

Serial number and variety.	Yield in lb. per acre. Grain.	Straw.	Remarks.
1 E.C. 4601	91	543	Due to the abnormal rains in October and planting nearly a month later than the usual period of planting in the tract, all the varieties made poor progress in growth and with little tillering and limited vegetative growth. The poorest and earliest of the lot was Co. 2. 4601 was equally early and poor in earhead production. 4310 was later than Co. 2 but earlier than 4573. Co. 1 was the last but more vigorous in growth and gave better yields than others.
2 E.C. 4301	131	1,200	
3 E.C. 4573	147	800	
4 Co. 1 Ragi	242	800	
5 Co. 2	21	333	

3. (*b*) *Second crop.*

Serial number and variety.	Yield in lb. per acre. Grain.	Straw.	Remarks.
1 Co. 1 Ragi	1,699	1,870	All varieties including local ragi were earlier than Co. 1 as noted in the first season. Co. 2 and 4601 were the earliest to flower. 4573, 4310 were later than the above by about 2 weeks. Co. 1 Ragi which is a late type has fared the best followed by Co. 2. The second season is in general favourable for good yield of ragi.
2 Co. 2 Ragi	1,514	1,324	
3 E.C. 4310	1,282	2,083	
4 E.C. 4573	1,421	1,565	
5 E.C. 4601	815	1,019	
6 Local white	1,258	1,623	

4. (a) *Groundnut varietal trials—First crop.*

August-September to December 1953.
Field No. 27.
Date of sowing—3rd August 1953 (with rains) and 10th August 1953.
Date of harvest—14th November 1953 T.M.V. 2; 25th November 1953 T.M.V. 3; T.M.V. 4, AH. 477 and 4354; 2nd December 1953 T.M.V. 1.
Area of each plot— 5·0 cents.

Serial number and variety.	Yield in lb. per acre.		Remarks.
	Haulms.	Pods.	
1 T.M.V. 2	1,060	800	T.M.V. 2 is the earliest of the lot to flower and set pods by over a fortnight T.M.V. 4 slightly earlier than 477. AH. 477 and 4354 almost similar the former being a semi-spreading type. T.M.V. 1 is later than the rest by a week and more. T.M.V. 4 appear to be not inferior in yield to T.M.V. 3 during the first crop season.
2 T.M.V. 3	1,568	695	
3 T.M.V. 4	2,100	780	
4 A.H. 477	1,320	880	
5 A.H. 4354	1,700	820	
6 T.M.V. 1	920	640	

4 (b) *Second crop.*

Date of sowing—7th January 1954.
Date of harvest—28th April 1954 all, except 6481 harvested a week later.
Area of each plot—5·5 cents.

Serial number and variety.	Yield in lb. per acre.		Remarks.
	Haulms.	Pods.	
1 T.M.V. 2	2,309	2,200	T.M.V. 2 is the earliest of the lot to flower and set pods by nearly a week in advance. Last to flower was 6481 and the rest intermediate between the two. The best and outstanding is T.M.V. 2 for the second season. All the varieties had light attack of wilt.
2 A.H. 4390	1,800	1,882	
3 A.H. 4111	1,491	2,036	
4 A.H. 4515	1,382	1,809	
5 A.H. 4218	1,291	2,018	
6 A.H. 6279	1,218	1,718	
7 A.G. 6481	1,527	945	

5. (a) *Gingelly—First crop.*

Field No. 27.
Date of sowing—7th August 1953.
Date of harvest—3rd January 1953 to T.M.V. 1 and T.M.V. 3; 7th November 1953 to T.M.V. 2.
Area of the plot—4·4 cents.

Serial number and variety.	Yield in lb. per acre.	Remarks.
1 T.M.V. 1	102	T.M.V. 2 was slightly late.
2 T.M.V. 2	67	
3 T.M.V. 3	101	

5. (b) *Second crop.*

Field No. 27.
Date of sowing—15th December 1953.
Date of harvest—23rd March 1954.
Area for selections—10 cents each.
Area for local kar—15 cents.

Serial number and variety.	Yield in lb. per acre.	Remarks.
1 T.M.V. 1	39	Growth and yield in general were poor.
2 T.M.V. 2	63	
3 T.M.V. 3	75	
4 Local Kar	48	

6. (a) *Tenai—First crop.*

Field No. 27.
Tenai Co. 3 sown on 13th September 1953.
Harvested on 12th December 1953.
Tenai local sown on 10th September 1953.
Harvested on 5th December 1953.

Serial number and variety.	Yield in lb. per acre.	Remarks.
1 Tenai Co. 3	163	The crop was affected by rains in October.
2 Tenai local	19	

6. (*b*) *Second crop.*

Field No. 27.
Date of sowing—16th December 1953.
Date of harvest—Co. 2 and Co. 3—28th March 1954. Local 12th March 1954.

Serial number and variety.	Yield in lb. per acre.	Remarks.
1 Co. 2 Tenai	277	Co. 2 vigorous in growth but later than the local
2 Co. 3 Tenai	85	Co. 3 also later than local.
3 Local Tenai	154	

7. (*a*) *Cotton (irrigated).*

Field No. 31-A.
Date of sowing—25th September 1953.
Date of harvest—31st January to 10th April 1954.
Area of each plot—6 cents.

Serial number and variety.	Yield in lb. per acre.	Remarks.
1 Cotton M.U. 1	811	P. 216. F was comparatively of poor vigour than
2 Cotton M.U. 2	944	the other three, and finished picking 3 weeks
3 Cotton Lakshmi	800	in advance, early in March, while the others
4 Cotton P. 216 F	353	prolonged up to end of March. M.U. 2 was slightly earlier than M.U. 1 with more perfect boll opening. Second flush was not much in P. 216. F. compared to those in the other three.

7. (*b*) *Cotton (dry).*

Nadam Cotton sown on—14th August 1953.
Nadam harvested on 9th January 1954 to 10th May 1954.
Annual types sown on 1st August 1953.
Annual harvested on 29th January to 10th May 1954.
Area of each plot—7·5 cents.

Serial number and variety.	Yield in lb. per acre.	Remarks.
1 Nadam Cotton	19	Earliest to flower was 32/48, during first week of
2 K. 5. Cotton	178	January followed by B. 32/47 and then K. 5
3 B. 32/47 Cotton	180	within a fortnight. Nadam was slow growing
4 B. 32/48 Cotton	193	and started flowering 1½ months late.

8. *Castor.*

Field No. 27.
Date of sowing—11th August 1953.
Date of harvest—21st March to 31st May 1954.
Area of each plot—4·4 cents (3′ × 3′ spacing.)

Serial number and variety.	Yield in lb. per acre.	Remarks.
1 T.M.V. 1	401	T.M.V. 1 is slightly earlier than the other two. T.M.V.
2 T.M.V. 2	666	1 had attack of jassids while the other two were
3 T.M.V. 3	698	free. Capsule borer was noted in all the three. T.M.V. 3 was the best of the three.

9. *Horsegram.*

Date of sowing—10th September 1953.
Date of harvest—13th January 1954.
Area of local—14 cents and No. 35—13 cents.

Serial number and variety.	Yield in lb. per acre.	Remarks.
1 Horsegram No. 35	185	No. 35 is darker green in appearance and later than
2 Horsegram local	500	local by about 2 weeks. The yield was comparatively poorer.

10. *Greengram.*

Date of sowing—9th September 1953.
Date of harvest—8th January to 11th February 1954.
Area of each plot—Co. 1—22 cents and local—23 cents.

Serial number and variety.	Yield in lb. per acre.	Remarks.
1 Greengram Co. 1	136	Greengram local is earlier than Co. 1 by a week
2 Greengram local	62	in flowering and pod setting.

11. *Dewgram.*

Date of sowing—9th September 1953.
Date of harvest—21st January 1953.
Area of plots—20 cents.

Yield in per acre	142·5	The progress of crop was good. The leaves had mottled colour in patches indicating cholorosis. Such a feature is said to be common for dewgram in this tract.

12. *Redgram.*

Date of sowing—19th September 1953.
Date of harvest—3rd March 1954.
Area of each plot—28 cents.

Serial number and variety.	Yield in lb. per acre.	Remarks.
1 Redgram SA. 1.	61	The crop came up well but due to attack of pod borer the yield was reduced. Dusting of Hexidole 810 twice had not much effect against the pest.

12. *Cowpea.*

Date of sowing—29th September 1953.
Date of harvest—21st January 1954 for selections and local on 30th January 1954.
Area of each plot—1·25 cents.

Serial number and variety.	Yield in lb. per acre.	Remarks.
1 New Era	140	E.C. 419 and E.C. 455 are earlier than the local by about 3 weeks in flower. New Era by about 2 weeks. Local is more spreading in habit and more vegetative in growth.
2 E.C. 419	20	
3 E.C. 455	120	
4 Local	40	

From the results of the varietal trials and cropping in general during the first year under the project irrigation the following useful information is elicited :—

1. Cotton M.U. 1 as the money crop suited to the project conditions from September to March and cotton M.U. 2 which is better in quality also appears to be equally promising in yield.

2. Pulses and gingelly as pure crops are not paying under the present fertility status of the soils.

3. In this tract cholam is usually sown on the dry lands in July if the showers are received early in July and if in August, cumbu is sown. These two crops when sown late in August or September to suit the project irrigation they are liable to be affected in seed setting by any unseasonal rains in October-November as in the present year. Hence these two millets are not dependable for late sowings in August-September for good yields.

4. Performance of ragi is comparatively better than cholam and cumbu under similar unfavourable conditions. For getting economic yields by inducing better growth and vigour in the crop it is necessary to plant the crop at least early during the second half of August till a strain suited to September planting is evolved. This would mean that it would be desirable to let in water in the canal, early during the second half of August, for earlier planting of ragi to ensure normal yields.

5. Despite the unfavourable wet season, groundnut sown in August-September has given profitable yields. It may be possible to evolve a cumbu-groundnut mixture consisting of a shorter duration cumbu (which can flower earlier before heavy rains set in) and a longer duration groundnut like T.M.V. 3, which can be harvested in December.

6. For the second season (December to March) yields from Cumbu are subnormal while cholam is better and ragi the best. It may be possible to grow, ragi as the first crop followed by cholam like Co. 13 to have a proper rotation between the millets. Alternately, a green manure crop can be raised from September to

November and ragi planted after the incorporation of the green manure in November to ensure high yields. Improved fertility and favourable season for ragi may interact to give high yields. Of the strains tried, ragi Co. 1 appears to fare well in the both seasons.

7. Groundnut T.M.V. 2 is found best suited to the second season and has given yield three times that of the spreading type in the first season. The actual yield recorded by this variety (T.M.V. 2) in the second season is 2,200 lb.

8. The castor crop in general has recorded good yields varying from 400 to 600 lb. per acre, though there were slight attacks of pests. The variety T.M.V. 3 was the best in yield, having recorded 698 lb.

9. Yields from tenai are in general lower than ragi and cholam under normal conditions. But it has not got a very definite season and can be grown as is the usual practice when the season is late for other millets.

Other crops—Potato.—Varieties President and Great Scot obtained from the District Agricultural Officer, Ooty and Superintendent, Nanjanad were tried in 10 cents and 4 cents respectively on the garden land in October 1953. Their growth was good but most of the plants were found to lodge. Border plants which had the shade of gliricidia falling upon them, from adjoining rows were more vigorous in growth. Based on the above observation a few of plants were shaded by raising sunnhemp on either side. The shaded plants came up with vigour. But both varieties of potato had attack of virus in January and were drying up. Hence they were harvested early in February, collecting about 30 lb. of tubers medium and small size. Virus free seeds possibly may prove better under the conditions here.

Bellary onions.—A small area of 2 cents was planted to Bellary onion seedlings in November. The crop harvested in March gave good yields recording 8,500 lb. bulbs per acre.

Banana varieties.—Forty choice varieties of banana supplied by the Fruit Specialist, were planted in July and August, over an area of 40 cents. They are all progressing well despite the poor fertility of the soil. Eleven of these have produced bunches so far. The fruits are slightly below normal in size. The plants have been given further additions of manure to reduce the defect. Krishnavazhai, Sirumalai, Virupakshi, Kapur are earlier than others to produce bunches.

Redgram (Tenkasi).—Sown as a mixture with groundnut in February in line 6 feet apart, it set seed well giving 96 lb. per acre. Last year when the small pulse was raised in April it suffered from much insect attack and was also spoiled by rain in August and September.

Vegetables.—Tomato, Brinjal, Bendai and Snake gourd were grown on 37 cents. Nearly 1,400 lb. of vegetables were gathered from the area.

Tapioca.—Cuttings from eighteen varieties of Tapioca were obtained from the Agricultural Research Station, Pattambi in June. The cuttings are coming up well.

Orchard.—Grape vines planted last August are trailing up the pandal. Malta lemon plants planted in September 53 are a bit slow growing. Nearly fifty papaya seedlings planted are coming up.

Ornamental plants.—Three varieties of Bougainvillea planted are spreading and also four plants of Tilosma Minor. Besides canna with variegated colours lily plants and a few crotons obtained have been grown.

Flower plants.—Eight Jasmin plants and one rose plant have been raised on a small plot.

Grasses.—Kolukattai grass seeds were sown on 12 cents and blue buffel on 4 cents early in November. Both have established well, the former flowered and set seed in January and the second has not flowered so far.

Pillipesara.—Grown over 37 cents has given 6,000 lb. of green stuff per acre.

Lucerne.—The plot was foul with hariali. Hence the lucerne plants were uprooted and planted over 5 cents in March. The plants established well and started flowering and seed setting after 3 months.

Leguminous green manures.—A number of leguminous green manure plants usually grown on the hills were tried on small plot, on this station in October 1953. *Crotalaria anagyroides* was the most robust of all and it flowered five nonths after planting and is found to survive without irrigation during summer. *Crotalaria usaromoensis* was quicker in growth and produced profuse flowers and seeds but dried up with the onset of dry weather in May-June. *Crotalaria Brownii* was also stunted in growth. It set seed well and dried up in June-July. *Crotalaria Grahamiana* and *C. fulva* were slow and less vigorous in growth, and flowering was very sparse. The former produced a few pods and the latter has not flowered. *Tephrosia candida* and *T. Vogeli* came up vigorously under light irrigation. But both did not flower so far. With the onset of dry weather in May-June, vogeli dried up while Tephrosia candida plants are continuing with light shedding of leaves. Indigofera arrecta was quick in growth. It had limited vegetative growth but was better than Indigo or Kolinji and dried up after seed setting, 6 months after planting.

Masipattam cotton.—M.U. 1 and M.U. 2 were raised in small observation plots in Masipattam. They are progressing well and are expected to give over 800 lb. per acre.

Green manure.—During the year nearly 12,000 seedlings and cuttings of Gliricidia were planted all along the bunds. Sesbania seedlings nearly 2 lakhs were planted along the irrigation channels adjoining the bunds over nearly 40 acres. Two hundred Indigofera Teysmani seedlings were also planted on the road-side and along channels. The plantings were done from October to January. Sesbania plants harvested from April to June gave on an average $\frac{1}{2}$ ton of green stuff, and 15 lb. of seed per acre. Indigofera Teysmani planted in December started flowering in July. Prunings from Gliricidia gave about 10 tons of green leaves and twigs which were composted.

Pests and diseases.—The following are the chief pests noted on the crops during the year :—

(1) Tobacco had mild attack of Aphis and was protected by dusting partly with Hexidole 810 and by spraying with H.E..T.P.

(2) Calocoris on cholam was bad on cholam varieties in October-November. Dusting with Hexidole 810 had not much effect.

(3) Ragi nursery had flea beetle attack. The plants were sprayed with 0·3 per cent of D.D.T. 550.

(4) Cotton had attack of wilt, jassids, shoot borer. The affected plants were dusted with Taxophene and also cotton spray powder supplied by the Plant Protection Officer.

(5) Pod borer in Redgram was partially controlled by dusting with Hexidole 810.

Fungus diseases.—(1) Tomato which had light wilt attack was protected by spraying Bordeaux mixture.

(2) The second crop of ragi grown from December to March had attack of *Rhizoctania* after flowering which was traced to the shallow nature of the soil and temporary stagnation of water and high temperature prevailing.

Livestock.—One animal had attack of Hæmorrhagic Septicoemæ and was saved by timely inoculation. The four pairs on the whole maintained good condition throughout the year.

Compost.—Seven more pits were opened during the year which has increased the scope to prepare nearly 150 tons of compost at a time. During the year 50 tons of compost produced have been used and there are still 100 tons unripe in the pits

to be removed in a month. Thirty cart-loads of cotton stalks have also been composted.

Fence.—Gaps in the fence were filled up by planting 2,000 prosopis seedlings and cuttings of Tirukukalli.

Vanamahotsavam.—460 pungam seedlings were planted along the fence during the period.

Special Committee Meeting.—Two meetings were held, the first on 28th July 1953 and the second on 10th December 1953 at Satyamangalam and at Coimbatore respectively.

Farmers' day.—Farmers' day was held on 31st December 1953 when nearly 200 farmers even from far off places like Bhavani, Dharapuram and Erode attended the function. Exhibition with departmental strains and pictorial charts was arranged. Besides going round and seeing the work in progress, the crop specialists and the Entomologist and the Mycologist and Chemist addressed them, regarding cropping in relation to the Bhavani project, pest and disease control of crops. The Special Deputy Collector for the development of ayacut also spoke regarding the development work.

Statement of cost of cultivation of bulk crops is given in Appendix IV table I and expenditure and receipts relating to working charges of Bulk crops in Appendix IV, Tables II and III.

AGRICULTURAL RESEARCH STATION,
SATYAMANGALAM (COIMBATORE DISTRICT),
9th September 1954.

S. SUNDARAM,
Agronomist.

LAWLEY ROAD POST, COIMBATORE,
9th September 1954.

T. RAJAGOPALA IYENGAR,
Government Agricultural Chemist-in-charge.

APPENDIX I.

EFFORTS MADE TO AUGMENT THE REVENUE OF THIS STATION DURING 1953–54.

The following are the measures taken to increase the income of the station during the year :—

1. *Live fence.*—The live fence raised with Tirukalli, Mullukiluvai and Prosopis Juliflora were strengthened by filling up gaps with further planting of prosupis and kiluvai. Thereby losses due to trespass and stray cattle were minimized. Two-thousand seedlings of prosopis were planted along the fence in gaps and also 460 seedlings of pungam.

2. *Increasing the irrigable area commanded by well 1-B in* 1953–54.—Advantage was taken of the increased warer-supply in the well during the year due to the heavy rains and to a good extent through seepage from the adjoining project channel to increase the gardenland area from 8 to 12 acres. Area under banana was increased from 38 cents to 42 cents and vegetables from 37 cents to 57 cents. Besides tobacco, cholam, cumbu and ragi, usually grown, chillies have been raised on 75 cents. Green manures raised and incorporated have improved the yields of ragi and cholam compared to last year.

3. *Reducing the fallow area by adjusting cropping scheme.*—On about 12 acres of gardenland 3 crops were raised including fodder and green manure. During summer from March to July catch crops of leguminous green manures were raised over nearly 30 acres of the project land excluding gardenlands grown to other crops and some experimental plots. On an average over 4,000 lb. of Sunnhemp per acre was obtained and ploughed thereby reducing the procurement of cattle manure from outside by nearly forty per cent. With nearly 45 acres under regular cultivation excluding perennial grasses, fruits and banana two to three crops were raised during the year totalling 120 acres including 30 acres under green manure. A small area of 5 cents which was foul with weeds and grasses was reclaimed and grown to Jasmin and roses.

4. *Control of pests and diseases and protection of crops.*—Tobacco was partly dusted with Hexidole 810 and also sprayed with H.E.T.P. against aphids. A protective spray of bordeaux mixture was given against the incidence of " frog eye ". On cotton, leaf roller, shoot borer and jassids were controlled by dusting with Taxophene and cotton spray powder supplied by the Plant Protection Officer.

5. *Miscellaneous.*—Nearly 12,000 plants of Glyricidia and over 200,000 of seedlings of Sesbania were planted along field bunds and channels to augment the supply of green manure. Loppings from Glyricidia and Sesbania harvested accounted for nearly 15 tons of green manure. Besides 30 cart-loads of cotton stalks were composted. Fifty tons of compost from farm wastes were obtained and 100 tons more are in the pits partially ripe. Seven more compost pits opened have increased the scope to prepare nearly 150 tons of compost at a time. All the above items have contributed to reducing the procurement of bulky organic manure from outside.

Grass growth was encouraged and over 45,000 lb. of grass obtained were fed to cattle. Despite the increase in the cost of cattle feeds last year and veterinary charges the cost of maintenance of a pair of bullocks was only Rs. 1–9–8 per pair per day.

Castor was sown along the bunds 3 feet apart to a length of one furlong to augment the income.

APPENDIX II.

TABLE I-A.

Annual report for the Agricultural Research Station, Satyamangalam for the year 1953–54.

Serial number and details of crops, etc.	Area in acres.	Seed. Yield in lb.	Seed. Value.	Grain. Yield. in lb.	Grain. Value.	Straw. Yield in lb.	Straw. Value.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			RS. A. P.		RS. A. P.		RS. A. P.
1 Cholam	7·93	1,819	363 11 7	234	57 7 6	37,043	611 1 8
				2,032	541 15 3	25,884	248 14 9
2 Cumbu	10·22	..	..	378	47 4 0	..	..
3 Ragi	5·51	1,345	175 1 9	781	138 4 6	2,314	38 0 2
4 Groundnut	5·71	1,153	288 4 0	2,782	695 8 0	7,392	86 14 4
5 Tenai	2·24	67	8 0 6	209	78 14 3	774	18 4 5
6 Maize	2·16	35	8 12 0	..	..	9,759	122 1 2
7 Other crops—Horsegram, Greengram, Dewgram and Redgram.	3·21	234	82 7 8	..	..	..	..
8 Cowpea	0·05	14	28 0 0	..	..	..	..
9 Tobacco	3·94	..	..	2,738	962 5 9	473*	12 4 0
10 Green manures	34·90	84	82 4 0	..	..	106,211	951 0 0
11 Cotton	11·69	..	..	4,738	2,030 9 0	..	..
12 Vegetables	0·37	7	31 5 0	1,399	91 5 11	..	..
13 Pillipesara	0·37	57	7 2 0	..	..	2,224	35 15 6
14 Gingelly	0·40	..	..	17	5 9 0	..	..
15 Green grass cut and fed to cattle.	..	..	..	..	..	45,091	225 7 0
Total	88·70	4,815	1,074 15 6	15,308	4,649 3 2	237,165	2,349 15 0

Serial number and details of crops, etc.	Total receipts for three years. Yield in lb.	Total receipts for three years. Value.	Total receipts during the three years. 1951–52.	1952–53.	1953–54.
	(9)	(10)	(11)	(12)	(13)
		RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
1 Cholam	39,096	1,032 4 9	873 15 3	1,186 0 0	1,032 4 9
2 Cumbu	28,294	838 2 0	364 4 0	971 6 9	871 4 0
3 Ragi	4,440	351 6 5	741 3 4	890 1 6	351 6 5
4 Groundnut	11,327	1,070 10 4	..	1 2 0	1,070 10 4
5 Tenai	1,050	105 3 2	125 12 9	57 14 9	105 3 2
6 Maize	9,794	130 13 2	9 1 0	244 9 0	130 13 2
7 Other crops—Horsegram, Greengram, Dewgram and Redgram.	234	82 7 8	121 2 5†	81 0 0†	82 7 8
8 Cowpea	14	28 0 0	12 14 5	66 12 0	28 0 0
9 Tobacco	3,211	974 9 9	402 6 0	1,074 0 0	974 9 9
10 Green manures	106,295	1,033 4 0	22 8 0	596 7 0	1,033 4 0
11 Cotton	4,738	2,030 9 0	25 2 0	60 0 0	2,030 9 0
12 Vegetables	1,406	122 10 11	24 3 0	234 2 0	122 10 11
13 Pillipesara	2,281	43 1 6	..	..	43 1 6
14 Gingelly	17	5 9 0	..	..	5 9 0
			35 0 0	400 0 0	225 7 0
15 Green grass cut and fed to cattle.	45,091	225 7 0	62 10 3	44 8 0	..
Total	257,288	8,074 2 8	2,820 2 5	5,907 15 0	8,107 2

* Stalks.

† Hosegram only.

APPENDIX II.

TABLE I-B.

Annual report of the Agricultural Research Station, Satyamangalam, for the year 1953–54.

	Seeds.				Grains.	
	Retained on the station.		Transferred or sold.		Retained on the station.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
		RS. A. P.		RS. A. P.		RS. A. P.
1 Cholam	1,350½	280 11 1	..	..	..	..
2 Cumbu	..	..	1,200	337 12 0	..	..
3 Ragi	..	..	1,840	517 8 0	231	28 14 0
4 Groundnut	..	..	1,750	437 8 0	2,125	531 4 0
5 Tenai	67	8 0 6	..	..	89	14 13 4
6 Maize	35	8 12 0	..	..	..	..
7 Other crops—Horsegram, Dewgram, Greengram and Redgram.	234	82 7 8	..	..	..	..
8 Cowpea	14	28 0 0	..	..	..	..
9 Tobacco"	..	..	..	..	2,738	962 5 9
10 Green manure	84½	82 4 0	..	..	..	..
11 Cotton	..	..	6	2 5 0	4,738	2,030 9 0
12 Vegetables	5-11/16	35 11 0	2⅞ 1⅝	46 0 0 1 10 0	..	..
13 Pillipesara	56	6 2 0	1	1 0 0	..	..
14 Gingelly	..	..	..	..	16½	5 9 0
15 Greengram	..	..	..	..	..	..
16 Samai	..	..	..	..	34	4 13 7
Total	1,846-11/16	532 0 3	4,800½	1,343 11 0	9,571½	3,578 4 8

	Grains—*cont.*		Straw.				Total.
	Transferred or sold.		Retained on the station.		Transferred or sold.		
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Value.
	(8)	(9)	(10)	(11)	(12)	(13)	(14)
		RS. A. P.		RS. A. P.			RS. A. P.
1 Cholam	702½	140 8 0	37,042	611 1 8	..	..	1032 4 9
2 Cumbu	2,066	258 4 0	25,884	248 14 9	..	..	844 14 9
3 Ragi	2,703	321 9 6	2,314	38 0 2	..	..	905 15 8
4 Groundnut	60	15 0 0	7,392	86 14 4	..	..	1,070 10 4
5 Tenai	120	20 0 0	774	18 4 5	..	..	61 2 3
6 Maize	..	..	9,759	122 1 2	..	..	130 13 2
7 Other crops—Horsegram, Dewgram, Greengram and Redgram.	..	..	..	..	..	..	82 7 8
8 Cowpea	..	..	..	..	..	..	28 0 0
9 Tobacco	2,361	878 2 0	745	28 8 0	..	..	1,868 15 9
10 Green manure	..	..	106,211	951 0 0	..	..	1,033 4 0
11 Cotton	395¾	155 7 6	..	..	..	..	2,188 5 6
12 Vegetables	1,399	91 5 11	..	..	..	..	174 10 11
13 Pillipesara	..	..	2,224	35 15 6	..	..	43 1 6
14 Gingelly	..	..	..	..	..	..	5 9 0
15 Greengram	..	..	45,091	225 7 0	..	..	225 7 0
16 Samai	154	22 0 0	..	..	..	..	26 13 7
Total	9,961¼	1,902 4 11	237,437	2,366 3 0	..	..	†9,722 7 10

	Total for the three years. 1951–52. (15)	1952–53. (16)	1953–54. (17)	Differences to table I-A. (18)	Remarks (The differences between the tables in Appendix IV, Tables I-A and I-B i are explained in the items given below). (19)
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	
1 Cholam "..	873 15 3	1,186 0 0	1032 4 9	..	
2 Cumbu	364 4 0	971 6 9	844 14 9	— 6 12 9	
3 Ragi	741 3 4	890 1 6	905 15 8	— 554 9 1	2,648 lb. of Ragi seeds were brought forward from the previous year.
4 Groundnut	..	1 2 0	1,070 10 4	..	
5 Tenai	125 12 9	57 14 9	61 2 3	+ 44 0 11	The difference is due to fall of price.
6 Maize	9 1 0	244 9 0	130 13 2	..	
7 Other crops—Horsegram, Dewgram, Greengram and Redgram.	121 2 5	81 0 0	82 7 8	..	
8 Cowpea	12 14 5	66 12 0	28 0 0	..	
9 Tobacco	402 6 0	1,074 0 0	1,858 15 9	— 894 6 0	2,361 lb. of tobacco and 272 lb. of tobacco stalks were brought forward from the previous year.
10 Green manure	22 8 0	596 7 0	1,033 4 0	..	
11 Cotton	25 2 0	60 0 0	2,188 5 6	— 157 12 6	395¾ lb. of kapas were brought forward from the previous year.
12 Vegetables	24 3 0	234 2 0	174 10 11	— 52 0 0	3 lb. 4 oz. of tomato seeds were brought from the previous year.
13 Pillipesara	..	..	43 1 6	..	
14 Gingelly	..	..	5 9 0	..	
15 Greengram	35 0 0	400 0 0	225 7 0	..	
16 Samai	62 10 3	44 8 0	26 13 7	— 26 13 7	188 lb. of samai seeds were brought from the previous year.
Total ..	2,820 2 5	5,907 15 0	9,772 7 10	— 1,648 5 7 = 8,074 2 10	

TABLE II.

Copy of pro forma of cost of cultivation for bulk crops of the Agricultural Research Station, Satyamangalam for 1953–54.

Serial number and details of expenditure. (1)	Actual expenditure for three year. 1951–52, (2)	1952–53. (3)	1953–54. (4)
	RS. A. P.	RS. A. P.	RS. A. P.
1 Pay and allowances of the staff (one-third of actual) (Farm Manager and Maistry or fieldman).	1,061 10 4	1,147 13 8	1,735 12 8
2 Miscellaneous cultivation expenses (one-third of actual).	348 0 1	856 3 7	1,449 3 8
3 Working expenses (actual)	2,255 3 9	8,442 2 6	10,850 0 6
4 One-tenth of expenditure of live and dead stock.	201 9 6	388 12 6	486 5 11
5 Proportionate rent for the lands if the station is on lease, if it is Government farm the normal rental of the tract subject to 15 times the land assessment per acre to be debited as expenditure.	1,744 3 11	1,744 3 11	1,721 9 7
6 Unforseen contingencies if any	..	..	..
Total ..	5,610 11 7	12,579 4 2	16,243 0 4

TABLE III.

Statement of abstract of expenditure and receipts.

Serial number and particulars. (1)	1951–52. (2)	1952–53. (3)	1953–54. (4)
	RS. A. P.	RS. A. P.	RS. A. P.
1 **Expenditure**	5,610 11 7	12,579 4 2	16,243 0 4
2 **Revenue**	2,818 2 5	5,908 8 0	8,074 2 10

ANNUAL REPORT OF THE AGRICULTURAL RESEARCH STATION, TALIPARAMBA FOR THE YEAR 1953-54 (FASLI 1363).

I.—Season and Rainfall.

There was a total rainfall of 130·85 inches in 108 days during the year, as against the ten-year average of 148·04 inches in 120 days. Thus, the rainfall during the year was in deficit by 17·19 inches.

The south-west monsoon which generally commences from the first week of June with full vigour was late in commencing in 1953, and the real monsoonish rains started only from 30th June 1953. The south-west monsoon of 1953 recorded a rainfall of 90·63 inches in 70 days as against the ten-year average of 115·85 inches in 86 days. The late start of the south-west monsoon in 1953 resulted in the late commencement of paddy transplanting. There was very heavy and concentrated precipitation, amounting to 29·99 inches in the first week of July 1953, and this resulted in the paddy crop getting submerged for two days soon after transplanting and also caused many breaches of the revetments of the main drainage channel and the boundary wall. Thereafter, the rainfall was well-distributed and was beneficial to all the crops.

The north-east monsoon commenced in the last week of September 1953, and recorded a total rainfall of 12·65 inches in 17 days, as against the ten-year average of 16·74 inches in 19 days during this season. The bulk of the rains was received during the month of October, and the months of November and December 1953 and January and February 1954 were almost dry. The drought during these four months necessitated the maintenance of the fruit plants and vegetables by pot-watering.

During the hot-weather season of 1954, a total rainfall of 27·57 inches of rain was recorded in 21 days, as against a total fall of 1·89 inches in four days during the corresponding period of the previous year and the ten-year average of 15·45 inches for this period. The well-distributed and fairly heavy rainfall during the hot-weather greatly reduced the necessity for pot-watering the nursery plants and greatly benefited all the crops, except pepper.

The season during the year was generally favourable for all crops, except for the pepper crop of 1954.

The statement of rainfall is given in Table I:—

Table I—*Statement of rainfall.*

Month.	Week.	1953-54. Quantity in inches.	1953-54. Number of rainy days.	1952-53. Quantity in inches.	1952-53. Number of rainy days.	Average for past 10 years. Quantity in inches.	Average for past 10 years. Number of rainy days.	Average for past 43 years. Quantity in inches.	Average for past 43 years. Number of rainy days.
		South-west monsoon.							
1953.									
June	7—13	0·98	2	2·81	6	7·47	6·3	8·60	6·40
	14—20	6·09	6	11·48	7	11·40	6·9	9·28	6·20
	21—27	5·50	5	11·98	7	9·31	6·4	8·11	6·40
June-July ..	28—4	18·41	7	12·31	7	11·03	6·1	10·56	5·60
	5—11	20·25	7	6·62	6	10·26	6·2	14·15	6·20
	12—18	4·28	6	4·33	7	11·26	6·6	12·10	6·40
	19—25	8·58	6	7·33	6	11·01	7·1	10·96	6·30
July-August ..	26—1	12·15	6	4·81	7	8·48	6·3	8·31	6·60
	2— 8	3·97	6	6·73	7	8·22	5·5	6·79	6·30
	9—15	1·92	2	8·04	7	6·03	5·1	5·44	5·60
	16—22	4·95	6	4·88	7	6·93	6·1	3·96	5·75
	23—29	1·53	2	2·36	6	5·01	4·6	2·45	5·21
August-September.	30—5	0·92	3	1·32	3	2·39	3·7	2·38	4·89
	6—12	0·94	5	0·02	..	3·41	4·0	2·42	3·69
	13—19	..	..	..	..	1·46	2·4	2·13	3·76
	20—26	0·16	1	0·56	1	2·18	3·1	2·26	3·27
Total ..		90·63	70	85·88	84	115·85	86·4	109·90	88·57

Month.	Week.	1953–54. Quantity in inches.	1953–54. Number of rainy days.	1952–53. Quantity in inches.	1952–53. Number of rainy days.	Average for past 10 years. Quantity in nches.	Average for past 10 years. Number of rainy days.	Average for past 43 years. Quantity in inches.	Average for past 43 years. Number of rainy days.
				North-east monsoon.					
September-October.	27—3	0·37	1	0·13	1	1·68	3·0	2·82	3·10
	4—10	1·41	2	8·24	5	1·45	2·1	4·38	3·50
	11—17	4·54	4	3·85	3	2·55	2·8	2·53	3·19
	18—24	2·43	4	0·39	1	3·54	2·7	2·03	2·19
	25—31	3·38	5	0·03	..	0·90	1·9	1·84	2·81
November ..	1—7	..	..	..	..	1·49	1·5	2·57	2·23
	8—14	..	..	..	..	0·82	2·1	1·04	1·67
	15—21	0·01	..	..	..	1·60	1·3	1·14	1·84
	22—28	..	..	..	..	0·90	0·8	0·57	1·71
November-December.	29—5	..	..	0·39	1	0·06	0·1	0·62	0·63
	6—12	..	..	1·01	2	0·60	0·6	0·23	0·72
	13—19	..	..	0·13	1	0·51	0·5	0·12	0·19
	20—26	..	..	..	..	0·17	0·1	0·11	0·21
December-January 1954.	27—3	..	..	..	..	0·22	0·1	0·04	0·09
	4—10	0·51	1	..	..	0·25	..	0·39	0·27
	11—17	..	..	..	..	..	..	0·03	0·04
	18—24	..	..	..	..	..	..	0·03	0·03
	25—31	..	..	..	..	..	..	0·02	0·14
Total ..	..	12·65	17	14·17	14	16·74	19·6	20·51	24·56
				Hot weather.					
ebruary ..	1—7	..	..	..	..	..	..	0·13	0·14
	8—14	..	..	..	..	0·28	1·0	0·22	0·14
	15—21	..	..	..	..	..	..	0·01	0·06
	22—28	..	..	0·02	..	0·21	0·3	0·05	0·07
February-March.	29—7	..	..	..	..	0·15	0·2	0·01	0·06
	8—14	0·28	1	..	..	..	..	0·01	0·02
	15—21	0·65	2	..	..	2·10	0·2	0·69	0·14
	22—28	0·03	..	..	..	0·12	..	0·05	0·34
March-April ..	29—4	..	..	..	..	0·47	0·7	0·29	0·55
	5—11	..	..	..	..	0·52	0·7	0·20	0·41
	12—18	..	..	..	..	0·85	0·8	3·36	4·14
	19—25	2·60	2	0·15	1	0·47	1·2	0·18	0·89
April-May ..	26—2	0·50	1	0·51	1	0·22	0·5	0·29	1·13
	3—9	..	..	..	..	0·28	0·6	0·48	1·12
	10—16	4·30	3	..	..	0·72	1·0	1·44	1·58
	17—23	2·31	4	..	..	1·70	1·1	2·13	2·04
	24—30	1·06	2	1·06	2	1·63	2·4	4·32	3·66
	31—6	15·84	6	0·15	..	5·73	3·5	3·14	6·10
Total ..		27·57	21	1·89	4	15·45	14·2	17·00	22·59
Grand total.		130·85	108	101·64	102	148·04	120·2	147·41	135·72

II.—Crops.

1. *Paddy*—(*a*) *Bulk crop.*—Paddy strains and varieties, PTB. 8, PTB. 9, PTB. 13, Rajakayama and Kurumkayama were grown in a total area of 6·56 acres in the first-crop season. The nursery was raised according to the modified Japanese method and the crop transplanted from 30th June 1953 to 14th July 1953. The plots received application of green leaves and super-phosphate at the rate of 4,000 lb. and 112 lb. per acre, respectively, as basal dressing and 100 lb. of ammonium sulphate per acre as top dressing, one month after transplanting. The growth and yield of PTB. 9 was very satisfactory, but due to the submersion of the plots soon after transplanting and severe lodging of the crop, the performance of PTB. 8, PTB. 13, Rajakayama and Kurumkayama was poor.

The comparative yields of the strains and varieties for the past three years are given in Table II.

Table II.—*Bulk yields of strains and varieties of paddy.*

	Acre yield in pounds. 1951–52.	1952–53.	1953–54.
PTB 8	2,889	2,178	1,970
PTB 9	2,433	2,828	3,020
PTB 13	2,272	2,680	2,193
Rajakayama	1,633	1,210	1,768
Kurumkayama	2,875	912	1,938

(*b*) *Irrigated crop.*—For the first time, in this station, an irrigated crop of paddy was raised from February 1954 to May 1954 by lifting water from the stream running along the boundary of the wet land by means of an oil engine and pumpset. Strain PTB. 10 was grown in an area of 2·42 acres. The plots were given application of compost at the rate of 10 tons per acre and super-phosphate at the rate of 112 lb. per acre as basal dressing and sprouted seeds were sown in puddle adopting a seed rate of 80 lb. per acre. A top-dressing of ammonium sulphate at the rate of 100 lb. per acre was given to this crop one month after sowing. The crop sown in the second week of February 1954 was harvested in the third week of May 1954, about 85 days after sowing. The crop came up very well and an acre yield of 2,366 lb. of grain was obtained, which is a very satisfactory yield considering that the average yield of paddy in the first crop for this locality is seldom over 2,500 lb. per acre. From this trial, it is found that irrigated crops of paddy can be profitably raised in this tract, from February to May, where there are suitable irrigation sources by pumping water by means of oil engine and pumpset.

(*c*) *Comparative yield trial of paddy strains.*—Paddy strains PTB. 8, PTB. 9, Mtu. 3 and Mtu. 4 were put under comparative yield trial in the first crop in 1953. The details and the result of the trial are presented in Table III :—

TABLE III.—*Comparative yield trials of paddy strains*, 1953–54.

Field No.—Block IV.
School wet land.
Layout—4 × 6 randomized blocks.
Size of plot—4′ × 28′.
Sown—22nd May 1953.
Transplanted—12th July 1953.
Harvested—
PTB. 8—7th October 1953.
PTB. 9—19th October 1953.
Mtu. 3—19th October 1953.
Mtu. 4—26th October 1953.

Treatments—
A. PTB. 8.
B. PTB. 9.
C. Mtu. 3.
D. Mtu. 4.

Summary of results.

Particulars.	A.	B.	C.	D.	G.M.	Standard error per cent P = 0·05.	'Z' test.	I.
Per cent on G.M.	107·9	115·0	78·6	98·4	100	5·68	Satisfied.	12·10
Acre yield in pounds	2,948	3,143	2,147	2,689	2,732	155·18	..	330·69

Conclusions—B, A, D, C.

From the data, it is seen that PTB. 9 has recorded 16·6 per cent increased yield over Mtu. 436·4 per cent increased yield over Mtu. 3 and 7·1 per cent increased yield over PTB. 8, and therefore, the strain PTB. 9 is found to be superior to the other three strains for cultivation in the first-crop season in this locality.

(*d*) *Comparative trial of different kinds of compost.*—Compost was made separately with dried leaves of jack, cashew, and mango and an experiment to assess the comparative merits of the compost made out of these three different kinds of leaves and to find out if the large quantities of these leaves available in this tract can be usefully utilized for manuring paddy crop. The details of the trial and the results are presented in Table IV.

TABLE IV.—*Compost manurial experiment.*

Field No.—Block III—School wet land.
Layout—4 × 8 randomixed blocks.
Size of plot—12′ × 30′.
Sown—22nd May 1953.
Transplanted—14th July 1953.
Harvested—17th October 1953.
Strain—PTB. 9.

Treatments—
A. Jack leaf compost at 5 tons per acre.
B. Mango leaf compost at 5 tons per acre.
C. Cashew leaf compost at 5 tons per acre.
D. Control no compost.

Summary of results.

Particulars.	Treatments. A.	B.	C.	D.	G.M.	Standard error per cent P = 0·05.	'Z' Test.	
Percentage (per cent) on G.M. ..	116·3	102·7	95·6	85·3	100	4·54	Satisfied.	9·44
Per cent on control	136·3	120·5	112·1	100·0	1,172	5·32	..	11·07
Acre yield in pounds	2,718	2,401	2,235	1,993	2,337	106·10	..	220·69
N contents of composts ..	1·36 per cent.	1·14 per cent.	0·64 per cent.	..	..	..	..	..

Conclusion—A, B, C, D.

From the data it is found the compost made of jack leaves is significantly superior to the compost made of mango leaves or cashew leaves. Application of jack leaf compost has resulted in 36·3 per cent increased yield over the control (no manure) and 15·8 per cent increased yield over application of mango leaf compost which is on a par with application of cashew leaf compost. At the time of opening of the compost pits for application of the compost, it was found that the jack leaves had decomposed very much better than the mango and cashew leaves. From the trial, it is evident that the large quantities of dried leaves of jack, cashew and mango available in this tract, and which is seldom used for any manuring, can be profitably utilized for composting for application to the paddy crops.

2. *Chilli*—(*a*) *Comparative yield trial.*—The three varieties South Malabar, Guntur 1 and Guntur 1,402 were put under comparative yield trial. The plots received cattle manure at the rate of 5,000 lb. per acre as basal dressing at the time of planting and a further dose of 1,500 lb. of cattle manure per acre and 100 lb. of ammonium sulphate per acre at the time of earthing up, one month after planting. The plants were earthed up three times. The details of the trial and the results obtained are presented in Table V :—

TABLE V.—*Chillies comparative yield trials.*

Filed No.—Block III—Farm dry land.
Layout—3 × 9 randomized blocks.
Size of plot—4′ × 34′.
Sowing—5th May 1953.
Transplanting—23rd June 1953.
Treatments—A. South Malabar type.
B. Guntur type, G. 1.
C, Guntur type, C. 1402.
Harvested—21st September to 26th December 1953.

Summary of results.

Particulars.	A.	B.	C.	G.M.	'Z' test.
Acre yield in pounds fresh pods	4,148	4,144	4,070	4,121	Not satisfied.
Per cent on G.M.	100·6	100·5	98·8	100	..

The results did not satisfy the 'Z' test. It was found that the Guntur types commence flowering and fruiting about a fortnight in advance of the variety South Malabar. Along with this trial, the average number of ripe pods of each variety per unit weight and the dryage ratio of the three varieties were worked out. The data recorded are furnished below:—

	South Malabar.	Guntur 1.	Guntur 1402.
Average number of pods per lb. ..	80·5	163·2	165·7
Dryage ratio	21·2%	27·5%	24·2%

(*b*) *Bulk crop.*—An area of 0·38 acre was grown to chillies. The seedlings were transplanted in the second week of June 1953. A basal dressing of cattle manure at the rate of 5,000 lb. per acre was given at the time of transplanting, and at the time of first earthing up one month after planting a further dose of 1,500 lb. of cattle manure per acre with 100 lb. of ammonium sulphate per acre was applied. The harvest of ripe pods commenced in September and continued till February. The crop recorded an acre-yield of 2,237 lb. ripe pods.

3. *Pepper.*—The season was highly beneficial to this crop. The incidences of pollu and spike-shedding were only very slight during the year. From an area of 30·20 acres, inclusive of the abandoned area of 13 acres, a total quantity of 10,944 lb. of green pepper was harvested from which 3,919 lb. of dry pepper was obtained. This yield is the highest one recorded since 1934.

The plotwise yield of pepper is given in Table VI. As in the previous year, plot 21 recorded the best acre-yield :—

TABLE VI.—*Details of yield of pepper.*

Plot number.	Area in acre.	Number of bearing standards.	Green yield per plot.	Green yield per acre.
(1)	(2)	(3)	(4)	(5)
1	1·15	40	180	156½
2	1·50	45	588	392
3	2·20	45	329½	149¾
4	1·00	123	385	285

Plot number.	Area in acre.	Number of bearing standards.	Green yield per plot.	Green yield per acre.
(1)	(2)	(3)	(4)	(5)
5	1·70	150	443	260½
6	0·40	13	117½	293¾
8	2·65	120	1,240	468
12	1·9	115	577	303½
13	4·3	200	943	219½
15	2·3	36	581	254
16	1·4	341	346½	247½
19	2·15	80	123	57
21	1·9	882	3,335	1,755
22	1·35	300	714½	529
23	0·35	12	226	645½
24	2·15	408	811½	377½

The yield performance records of 619 pepper vines in this station were continued to be maintained. The range in yield of these vines is presented below :—

Yield range for 619 *standards.*

Pounds yield range.	Number of standards.	Per cent to total.
1 to 5 lb.	395	63·8
6—10 lb.	143	23·2
11—15 lb.	46	7·4
16—20 lb.	18	2·8
Over 20 lb.	17	2·8

It is found that there is very wide variation in yield between the vines and that out of a total of 619 vines, only 35 vines give heavy yields.

(*b*) *Improvement of the abondoned pepper area.*—With a view to increase the production of pepper by utilizing the vacant standards in the station, pepper cuttings were planted to a total of 1,914 vacant standards in plots 2, 3, 18, 19 and 20 during the year.

(*c*) *Planting new area to pepper.*—An area of 3·50 acre of uncultivated scrub-jungle in plot 5, 16 and 20 was cleared and pepper cuttings planted to temporary and permanent standards in June 1954, as detailed below :—

Plot number.	Area.	Number of standards.	
		Temporary.	Permanent.
	ACS.		
5	2·30	923	35
16	0·70	281	13
20	0·50	..	150

(*d*) *Growing pepper to coconut and arecanut trees.*—Only 12 per cent, the pepper vines planted to the coconut trees in blocks I and III, in June 1953 survived the summer of 1954. The vines which have survived have made very satisfactory growth. The failures in the planting in June 1953 were replaced during June 1954 with rooted pepper cuttings.

Pepper cuttings were planted to 380 arecanut trees in plots 3, 6 and 8 in June 1954.

(*e*) *Studies on pollu.*—There was only very slight incidence of pollu during the year. However, the data recorded on the incidence of pollu in dense shade and in open situation confirmed the previous finding that dense shade is conducive to a greater incidence of pollu. It was also found that the variety Balankotta is more susceptible to pollu incidence than Kalluvally and Uthirankotta.

(*f*) *Effect of spraying Bordeaux mixture for control of pollu.*—As there was only very slight incidence of pollu during the year, no difference in the incidence of pollu on the vines sprayed with Bordeaux mixture and the unsprayed vines could be noticed. It was, however, found that the spraying of the vines with Bordeaux mixture resulted in severe mealy bug infestation of the vines.

4. *Fruits*—(i) *Mango*—(*a*) *Varietal collection.*—The crop was poor during the year since out of a total number of 331 trees of bearing age in 43 varieties represented

in the station, only 112 trees in 28 varieties flowered and produced a crop. The particulars of the trees and varieties which recorded statisfactory yield performance during the year are given in Table VII :—

TABLE VII.—*Particulars of varieties of mango which recorded good performance during* 1953–54.

Block and plot number.	Tree number.	Name of variety.	Yield.
Block VIII	15	Bennet Alphonso	222
Do.	16	Do.	260
Do.	17	Do.	467
Orchard	26	Neelum	320
Do.	5	Do.	255
Do.	24	Do.	280
School area	291	Do.	1,570
Do.	4	Suvarnarekha	170
II	99	Do.	170
II	71	Olour	890
II	53	Do.	310
II	35	Do.	675
17	159	Collector	359
17	151	Saloopa	151
17	172	Kadri	138
Orchard	100	Panchadarakalasa	270
Block IV	170	Himayuddin	145
Do.	171	Do.	135

From a review of the performance of the different varieties of mango in the station collection, it has been possible to classify the following varieties found suitable for the tract into early, mid season and late varieties :—

Early.	Mid season.	Late.
1 Bennet Alphonso ..	1 Himayuddin	1 Neelum.
2 Olour	2 Alampur Baneshan ..	2 Mundappa.
3 Panchadarakalasa ..	3 Baneshan	3 Suvarnarekha.
4 Kalapady	4 Bangalora.	
	5 Kadri.	
	6 Gaddemar.	

One hundred and fifty-seven mango grafts of 21 varieties were planted in sites from which poor performers were grubbed out during 1952–53. The new plantings included new six varieties from Kodur and the total number of varieties represented in the station collection by the end of the year is 62. The details of the varieties planted, the block or plot in which they weve planted and the number of each are presented in Table VIII :—

TABLE VIII.

Serial number and block number. (1)	Name of variety. (2)	Number of grafts planted. (3)	Source from where grafts were obtained. (4)
1 Block II ..	Olour	29	Taliparamba.
2 Block IV ..	Alampur Baneshan ..	6	Do.
Orchard	Do. ..	2	Do.
17	Do. ..	6	Coimbatore.
3 IV	Baneshan	5	Taliparamba.
Orchard	Do.	12	Do.
Do.	Do.	2	College Orchard, Coimbatore.
4 Block IV ..	Nangilery	2	Badagara.
14	Do.	1	Do.
5 Block VIII ..	Bennet Alphonso	1	Taliparamba.
Orchard	Do.	18	Do.
6 Orchard	Do.	5	Do.
7 Do.	Kalapady	11	Do.
8 Do.	Chinnarasam	4	Kodur.
9 Do.	Jahangir	1	Do.
10 Do.	Himayuddin	2	Do.
17	Do.	4	Do.
Block IV ..	Do.	6	Taliparamba.
11 Orchard	Pairi	4	Kodur.
12 Do.	Mulgoa	4	College Orchard, Coimbatore.

Serial number and broke number. (1)	Name of variety. (2)	Number of grafts planted. (3)	Source from where grafts are obtained: (4)
13 Orchard	Sannakalan	8	Kodur.
14 Do.	Mundappa	8	Do.
15 Do.	Phirangiludwa	2	Do.
16 Do.	Karuthakolamban.. ..	1	Do.
17 Do.	Yerramulgoa	1	Do.
18 Do.	Manorangithan	1	Do.
19 17	Vellaikulamban	3	Do.
20 17	Chottajehangir	4	Do.
21 17	Panchadam Kalasa ..	3	Do.
	Total ..	157	

(*b*) *Introduction and trial of new varieties.*—Nineteen grafts of six varieties were newly introduced during the year, bringing the total number of such introduction since 1949–50 to 56 grafts of 12 varieties, inclusive of 10 hybrids in seven combinations. The progress of the grafts of the new varieties introduced till the beginning of the year under report is satisfactory. The particulars of the varieties introduced during the year 1953–54 are furnished below :—

Variety.	Source.	Number planted.	Number surviving.
1 Sannakalu ..	Fruit Research Station, Kodur	9	9
2 Karuthakolamban	Do. ..	1	1
3 Vellakolamban	Do. ..	3	3
4 Yerramulgoa	Do. ..	1	1
5 Chota Jehangir	Do. ..	4	4
6 Manorangithan	Do. ..	1	1

(*c*) *Controlled pollination.*—Hybridization work in mango was initiated for the first time in this station during this year. A total number of 613 controlled pollinations involving seven parental combinations were carried out during the year, out of which 232 set fruits ; but only 15 fruits of the following five parental combinations reached the maturity stage and became available for harvest :—

Female plant.	Male plant.	Number of fruits.
1 Mundappa	Suvarnarekha	5
2 Neelam	Kurukkan	1
3 Neelum	Olour	2
4 Bennet Alphonso	Bennet Alphonso	6
5 Alampur Baneshan	Bennet Alphonso	1

The stones of the above mentioned fifteen fruits of five parental combination have been collected and sown for raising the seedlings.

(*d*) *Production of grafts.*—A total number of 5,400 inarches were prepared during the year, and from these 3,870 grafts were obtained.

(ii) *Sapota*—(*a*) *Varietal collection.*—The varietal collection was enriched by the introduction of 33 grafts of the undermentioned seven varieties from the Fruit Research Station, Kodur, and these were planted in the rest-house compound :—

Dwarapundi	5
Thagarapundi	6
Bangalora	6
Kuttibharathi (big)	4
Kuttibharathi (small)	4
Pala	4
Geda	4
	33

A total number of 8,012 fruits weighing 762 lb. was obtained from 64 bearing trees in the station. The bulk of the harvest was during June-July. It was found, that the fruits harvested during the monsoon season were of very poor quality.

(*b*) *Sapota rootstock trial.*—Growth increments in respect of tree height and stock and scion girth and the number of casualties of the grafts of sapota on the three rootstocks, sapota seedlings and seedlings of *Madhuca longifolia* and *Mimusops hexandra* in the sapota rootstock trial were recorded during the year. The summary of the data recorded is presented in Table IX.

TABLE IX.

Name of rootstock.	Sapota seedling.	*M. Longifolia.*	*M. Hexandra.*
1 Average stock girth increment	1·35	1·87	2·9
2 Scion girth increment	0·94	0·98	1·6
3 Height increment	34·2	25·0	55·2
4 Number of casualties recorded during the year.	2	12	1

From the data presented above, it is found that the grafts on *Mimusops hexandra* have recorded the maximum growth increase and recorded the minimum casualty. The grafts on *Madhuca longifolia* have exhibited pronounced distortion at the graft joint, and also recorded 50 per cent casualties. From the observations and data recorded so far, it is found that *Mimusops hexandra* rootstock imparts the greatest vigour to the sapota scion in the early stages of the orchard life of the plant. The comparative unsuitability of *Madhuca longifolia* as a rootstock for sapota is indicated by the heavy casualties recorded by the grafts on the rootstock and the distorted graft joints of these grafts.

(iii) *Pineapple*—(*a*) *Bulk planting.*—Pineapple suckers of 'Kew' and 'Mauritius' were planted in 0·50 acre and 0·27 acre, respectively, in block III of the farm dry land.

From the analysis of flowering and fruiting of pineapple recorded, it is found that pineapple variety 'Kew' has two distinct seasons of fruiting, namely, May to July and November to December, the bulk of the fruits being harvested in the former season. The fruits harvested in June-July is of inferior quality being acidic and inclined to be mushy. The fruits harvested during the summer months is found to be sweeter than those harvested at other periods of the year.

(*b*) *Trial of hormones for extending the bearing season of pineapple.*—Observation on the influence of application of alpha-naphthalene acetic acid in extending the bearing season of pineapple was continued during the year. The details of the trial and the results are furnished in Table X.

TABLE X.—*Lower consentration.*

Date of planting—17th September 1951.

Date of first application—16th May 1952 (applied eight months after planting).

Applied for six weeks commencing from four months prior to normal differentiation of flowerbuds.

Treatments.	Total number of suckers planted.	Number flowered within four months. of application.	Number flowered within six months.	Number flowered within eight months.	After eight months.	Number of suckers proliferated.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
A. Control	60	9	..	..	50	
B. ·001 per cent of alpha naphthalene acetic acid.	60	12	..	..	31	
C. .003 per cent of alpha napthhthalene acecicd.ati	60	3	..	..	51	6
D. ·006 per cent of alpha naphthalene acetic acid	60	5	..	..	50	5

High concentration.

Date of planting—17th September 1951.

Date of first application—18th August 1952 (applied 11 months after planting).

Applied at weekly intervals for six weeks commencing from one month prior to normal differentiation of flower buds.

Treatments.	Total number of suckers planted.	Number flowered within four months of application.	Number flowered within six months.	Number flowered within eight months.	After eight months.	Number of suckers proliferated.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
A. Control	60	7	4	2	45	2
B. 0·01 per cent of alpha naphthalene acetic acid.	60	31	5	..	18	6
C. 0·05 per cent of alpha naphthalene acetic acid.	60	14	6	..	36	4
D. 0·1 per cent of alpha naphthalene acetic acid.	60	16	4	4	28	8

From the data presented above, it is found that application of alpha naphthalene acetic acid in concentration of 0·01 per cent has hastened flowering of pineapple, as 50 per cent of the suckers so treated flowered within four months of application as against 11 per cent in the control.

As the abovementioned observational trial on the effect of alpha naphthalene acetic acid for extending the bearing season of pineapple has indicated that application of this chemical at concentration of 0·01 per cent induces earlier fruiting, it is proposed to initiate a comprehensive trial on application of alpha naphthalene acetic acid for extending the bearing season of pineapple next year, and for this purpose about 4,100 plants of unifrom age of pineapple of variety 'Kew' have been raised from stem slices.

(*c*) *Forcing pineapple suckers to flower by application of ice and calcium carbide.*—The process of forcing pineapple plants to fruit out of season by application of three table spoons of ice-water into the central core of the pineapple plant followed immediately with a pinch of granulated calcium carbide was tested. The details of the trial are furnished below : —

Approximate age of suckers treated ..	8 months after planting.
Number of suckers treated	90
Number of suckers in control	90
Date of application	24th May 1954.

Out of 90 suckers treated with ice-water and calcium carbide, 40 flowered within 50 days of application while none of the suckers in the control flowered within this period. From the result obtained from this observation trial, it is inferred that pineapple plants can be forced to flower out of season by application of ice-water and calcium carbide to the central core of the plant. It is proposed to carry out more comprehensive trial on this aspect during next year with plants of known and uniform age.

(*d*) *Pineapple varietal collection.*—Plants of pineapple varieties, Kew, Mauritius, Charlotte Rothschild and West Indian were multiplied from stem slices for initiating a varietal trial.

(iv) *Jack*—(*a*) *Blossom biological studies and jack hybridization.*—Blossom biological studies undertaken during the year confirmed the following findings of the previous year :—

(i) Opening of flowers starts from the base of the spikes two to three days after the emergence of the spikes from the sheath.

(ii) The emergence of all the flowers on a male spike is complete within three to four days.

(iii) The anthers start dehiscing from 7 p.m. and reaches the peak between 8-30 p.m. and 9 p.m.

(iv) The pollen remains viable till 9 a.m.

(*b*) Two crosses between soft flaked and hard flaked varieties were made, as detailed below :—

Serial number.	*Female parent.*	*Male parent.*	*Number of seeds obtained.*
1	Tree No. 194 (soft flaked)	Tree No. 68 (hard flaked).	200
2	Do.	Tree No. 102 (Hard flaked).	180

The seeds obtained from the above crosses were sown for raising seedlings.

(*c*) *Singapore jack.*—Out of 79 seedlings planted in 1948, eight trees are surviving and one of these produced one fruit during the year, within six years of planting. The fruit was small, weighing only 8 lb. The flavour of the fruit was good, and carpels, crisp and yellow in colour. Fifty seeds obtained from the fruit were sown for raising seedlings.

(v) *Banana.*—Sixty-four banana suckers of the variety Pedda Pachai Aratti planted on 26th February 1953 in an area of 10 cents in the wet land matured bunches within 9½ months of planting. The total quantity of fruits obtained from 54 plants was 876¼ lb. valued at Rs. 58–14–9. In addition, 214 suckers valued at Rs. 53–8–0 were also obtained. A ratoon crop was allowed to develop from the original planting, and in addition 115 suckers were planted in an area of 0·17 acre during the year to meet the increasing demand for the suckers of this variety.

Ten suckers of each of Mauritius and Gros-Michel were obtained from Wynad and planted for multiplication of suckers for distribution.

(vi) *Citrus*—(*a*) *Lemon.*—The under mentioned six varieties of lemons were newly introduced and planted as detailed below :—

	Name of variety.	*Number planted.*	*Plot number.*	*Station introduced from.*
1	Nepali, round (layers)	3	Plot No. 26 ..	Anakapalle.
2	Nepali, oblong (budded)	3	„ 4a ..	Kodur.
3	Villafranca (budded)	6	„ 4a-26 ..	Do.
4	Rajahmundry (layer)	3	„ 4a ..	Kallar and Burliar.
5	Halian (layer)	3	„ 26 ..	Anakapalle.
6	Lisbon (budded)	3	„ 25 ..	Kodur.

(*b*) *Citron.*—The progress of Hawaiian citron introduced in 1949 is promising. Two varieties of citron, one from Anakapalle (layered) and Bengal citron (budded) from Kodur were obtained and planted in plots 23 and 25.

(*c*) *Sathgudi orange.*—Nine budded plants of sathgudi were obtained from Kodur and planted in plot 23.

(*d*) *Pummalo.*—Two budded plants of pummalo obtained from Kodur were planted in plot 25.

(vii) *Cashew.*—From a total population of 1,130 trees of bearing age in the station, 3,424 lb. of nuts were obtained during the year. Thirteen trees among these recorded an average yield of 33·5 lb. per tree as against the average yield of 3 lb. per tree for all the trees in the station. The maximum yield recorded from a single tree was 55 lb.

The failures in the 1952–53 planting of cashew in the *punam* area were replaced during the year.

(viii) *Mangosteen.*—From 13 bearing trees in the station, a total of 3,053 fruits weighing 325 lb. was harvested during the year. The fruits were small sized. But the fruits which ripened before the advent of the monsoon were of good quality. The fruits became 'gambooged' after the receipt of monsoon rains. Tree No. 2 recorded the maximum yield of 1,116 fruits.

(ix) *Pappaya.*—A total number of 250 seedlings of pappaya 'Philippines' frised from seeds obtained from Coimbatore were planted along the borders of aarm wet land and school wet land.

(x) *Yellow passion fruit.*—Five yellow passion fruit seedlings obtained from the Pomological Station, Coonoor, were planted on 2nd July 1953. The vines made very good growth and started flowering within three months of planting. The fruit sett was very poor during the dry months. But with the advent of the monsoon, the vines started producing fruits in large numbers. This variety of passion fruit is found suitable for cultivation in the plains.

(xi) *Guava.*—Three plants of each of the two varieties Bangalora and Banares were obtained from the College Orchard, Coimbatore, and planted in plot 9.

5. *Vegetables*—(*a*) *Monsoon vegetables.*—A total area of 1·84 acres was grown to brinjals, bhendai and cowpea during the monsoon season of 1953.

Bhendai was grown in an area of 0·86 acre in the dry land and a total quantity of 64 lb. seed and 135 lb. of vegetables were obtained.

Brinjal was grown in an area of 0·16 acre and a total quantity of 6 lb. seed and 168 lb. vegetable were obtained.

Cowpea 'New Era' was grown in an area of 0·82 acre and a total quantity of 89 lb. seed was obtained.

(*b*) *Summer vegetable.*—An area of 1·36 acres in the wet land was grown to amaranthus, bitter gourd, snake gourd, ash gourd, New Era cowpea, and bhendai for seed production.

The details of the areas grown to each vegetable and quantities of seeds obtained are furnished below :—

Variety.	*Area.*	*Seed-quantity obtained.*	*Acre yield.*
	ACS.	LB. OZ.	LB.
Cowpea	0·58	62 0	106
Bitter gourd	0·19	71 0	374
Ash gourd	0·02	3,734 lb. of fruits harvested and kept for extraction of seeds.	
Snake gourd	0·02	5 0	250
Bhendai	0·35	68 14	194
Amaranthus	0·12	13 12	117

6. *Root crops*—(*a*) *Colocasia.*—Four varieties of colocasia, *Malaraman, Palchembu, Pilathatti* and *Karimchembu* were planted in a total of 57 pits in March 1953 and the corms were harvested in February 1954. The details of the number of pits planted to each variety and the yield obtained are furnished below :—

Name.	*Number of corms planted.*	*Number of corms harvested.*	*Weight of corm obtained.*	*Estimated acre yield.*
			LB.	LB.
1 *Malaraman*	25	130	52	7,634
2 *Palchembu*	12	93	19½	6,116
3 *Pilathatti*	18	160	23	4,690
4 *Karimchembu*	2	19	2	3,670

Of the abovementioned four varieties, *Malaraman* and *Palchembu*, were found superior to the other two varieties in respect of yield and cooking quality and *Palchembu* was found to be superior to *Malaraman* in cooking quality. With a view to multiply the planting material of *Malaraman* and *Palchembu* planting material of these were planted in 100 and 75 pits respectively.

(*b*) *Yam.*—For multiplying the planting material of yam, a total of 108 pits were planted with pieces of corms in April 1954 in plot 25.

(*c*) *Tapioca.*—The cultivation of tapioca was limited to a total area of 20 cents during the year. Two varieties Travancore Red and Travancore White, were planted in July 1953. The crop has made satisfactory growth and is getting ready for

harvest. To prevent the damage of the crop by wild animals, the crop was fenced round with wire-netting.

(*d*) *Potato.*—To assess the possibility of potato cultivation in this tract during the cold season, a total of 488 tubers (25 lb.) of the variety 'President,' obtained from Nanjanad was planted in an area of 2 cents on ridges, in the wet land, on 14th November 1953 and grown under irrigation. Only 163 tubers sprouted and developed a crop. Though the plants appeared healthy in the initial stages, it was badly affected by wilt later. The plants attained a height of 15 inches to 20 inches. The crop was harvested on 19th February 1954 and a total of 753 tubers weighing 17 lb. 10 oz. was obtained. From the trial, it was found that potato cannot be grown successfully in this tract.

7. *Coconut.*—The trees in the station were manured at the rate of 100 lb. green leaf, 2 lb. ammonium sulphate, 1 lb. superphosphate and 1 lb. muriate of potash per tree in September 1953.

The yield of nuts during the year was very low, being only 3,921, as against 8,932 in the previous year. The very low yield of nuts during the year under report is due to the severe drought during the previous year.

8. *Arecanut.*—The yield of arecanuts during the year was 116,289 as against 129,020 in the previous year. The severe drought during the previous year affected the crop very adversely and not only reduced the yield but affected the size of nuts also.

Twelve seedlings of four varieties of arecanuts Sinhala Puwak, Humban Puwak, Rata Puwak, Areca Parena Becca raised in the station from seeds supplied by the Secretary, Indian Central Arecanut Committee, were planted in plot 26 in August 1953. Eight seedlings of four varieties are surviving at the end of the year. Fourteen seedlings of three varieties were raised from seeds supplied by the Secretary, Indian Central Arecanut Committee, and these are awaiting transplanting.

9. *Cover crops*—(*a*) *Calopogonium mucunoides.*—The crop was sown in an area of 0·50 acre in plot 5 in June 1953 and made excellent growth. Within a period of two months of sowing the seed, the crop made very vigorous growth and effectively covered the ground and smothered grass and other weed growth. From the very vigorous growth made by the crop, it was considered to be an excellent cover crop for this tract, and in April 1954 an area of 27·60 acres planted to perennial crops like pepper, coconut, mango, etc., was sown with Calapogonium seed and the crop has established very well by the end of the year.

(*b*) *Centrosema pubescense.*—The crop raised originally in 1948 continues to make vigorous growth and has effectively covered an area of 0·75 acre. It is found that this plant takes three to four years for developing a proper and effective cover on the ground unlike Calapogonium which develops effective cover even within two months of sowing.

10. *Green manure crops*—(*a*) *Gliricidia.*—In addition to the 6,000 seedlings and cuttings planted in 1952–53, seedlings totalling 37,000 were planted in June 1954 along roads, foot-paths, boundary and field bunds for augmenting the green leaf supply in the station.

(*b*) *Indigofera teysmanii.*—Seedlings numbering 1,800 raised in the station from seeds collected from the fourteen old trees in the station were planted in June 1954 along footpaths and sides of channels.

(*c*) *Flamingia congesta.*—The small quantity of seed of this plant was sown on 19th September 1953. The few seedlings that were raised have made only poor growth so far. This does not appear to be a suitable green manure plant for this tract.

(*d*) *Sesbania speciosa.*—The crop was grown in an area of 1·45 acres of wet land from October-November 1953 to May 1954 and recorded an yield of about 6,000 lb. of green leaf per acre. The progress of the seedlings planted along the

margin of the fields in the wet land during the monsoon along with the transplanting of paddy seedlings was poor.

In June 1954, a total of 10,900 seedlings were transplanted along the margins of field bunds in the wet land.

(e) *Crotalaria striata.*—The crop was grown in an area of 1·00 acre in the wet land, as a self-sown crop, and recorded an yield of about 6,000 lb. of green leaf per acre. In addition, the crop was grown as a self-sown crop in an area of 3·42 acres of mango orchard and coconut tope.

11. *Miscellaneous crops*—(a) *Cacao.*—Out of 1,655 cacao seedlings planted in 1952 and 1953, a total of 829 seedlings have survived. The casualties are found to be more in more exposed sites than in less exposed sites.

(b) *Nutmeg.*—Out of 12 seedlings planted in 1952–1953, seven seedlings are surviving and have made satisfactory growth. In addition 20 seedlings were transplanted during the year and these have established and made good growth.

(c) *Clove.*—Out of 12 seedlings planted in 1952, three are surviving and these have made only slight growth. In addition 25 seedlings were planted during the year and of these 22 have survived till the end of the year.

(d) *Kolanut.*—Out of 12 seedlings planted in 1952–53, 11 seedlings are surviving and these have made good growth.

(e) *Oyster nut.*—Out of nine vines surviving at the beginning of the year, two vines died during the year. The surviving seven vines have grown to a height ranging from 28 feet to 42 feet. None of the plants has flowered till the end of the year.

(f) *Vanilla planifolia.*—Six rooted cuttings obtained from Burliar Fruit Station were planted on 30th September 1953 in plot 9. All the six plants have established and made satisfactory growth. The vines have been trained on Garcinia trees.

(g) *Malayan oil palm.*—Six seedlings of Malayan oil palm received from the Agricultural Research Station, Nileshwar, were planted in plot 14 on 13th July 1953. Of these, three have survived and made slow progress in growth.

(h) *Kapok.*—During the year a total quantity of 25½ lb. of floss was obtained from 80 bearing trees.

12. *Ensilage.*—A total quantity of 44,000 lb. of green grass was ensilaged and a total quantity of 34,713 lb. of silage was obtained.

13. *Compost.*—During the year a total quantity of 96 tons of compost was made with the large quantity of green leaves available in the station.

14. *Livestock.*—Four pairs of work animals were maintained during the year. The maintenance of buffaloes in the station was stopped during the year. Two buffalo breeding bulls and three cow-buffaloes were auctioned and five buffalo cows and calves were transferred to the Central Farm, Coimbatore.

15. *Vanamahotsava.*—A total of 906 seedlings and grafts of various trees were planted in the station during the Vanamahotsava week. In addition, 2,161 grafts and seedlings were distributed from the station during the period.

16. *Teaching.*—The Refresher Course for young farmers was started in the station on 1st July 1953 with five trainees. But, subsequently the course was closed at this centre and the trainees were transferred to the Central Farm, Coimbatore, on 15th August 1954.

The students of the second year class of the Agricultural College, Coimbatore, and the trainees of the Diploma Course in Horticulture, Coimbatore, visited the station to get themselves acquainted with the agricultural and horticultural crops and practices in the tract.

17. *Publicity and Propaganda*—(1) *Farmer's Day.*—The Farmer's Day of the station was celebrated on 31st December 1954.

(2) *Exhibition.*—An exhibition in connexion with the Farmer's Day was conducted in the station. In addition, exhibits from the station were sent to four exhibitions in various parts of the State.

(3) *Posters.*—Six coloured posters depicting the achievement of the station were prepared.

(4) *Publication.*—The undermentioned articles were sent for publication during the year :—

(i) A note on the seed production of *Sesbania speciosa* on the West Coast.

(ii) Practical hints on storage of paddy.

(iii) Note on the cultivation of *Calapogonium mucunoides.*

(iv) Note on the performance of sapota on three root-stocks.

Seeds and plants distributed.—The undermentioned seeds and plants, etc., were distributed from the station during the year :—

Paddy seeds	12,750 lb.
Vegetable seeds	215 ,, 11 oz.
Cashew seeds	1,223 ,,
Jack grafts	22 Nos.
Mango grafts	3,127 ,,
Sapota grafts	554 ,,
Sapota seedlings	55 ,,
Jack seedlings	1,313 ,,
Arecanut seedlings	3,287 ,,
Malta lemon cuttings	2,353 ,,
Pepper cuttings	5,127 ,,
Pineapple suckers	452 ,,
Pedda Pacha Aratti suckers	199 ,,
Bastard sago palm seedlings	60 ,,
Gliricidia cuttings	1,800 ,,
Brinjal seedlings	894 ,,
Chilli seedlings	11,250 ,,

Financial statement.—The financial statements are appended.

AGRICULTURAL RESEARCH STATION, TALIPARAMBA, 16*th September* 1954.

M. KELUKUTTY MENON,
Senior Assistant.

Countersigned.

M. OBAIDULLAH SHAW,
Deputy Director of Agriculture, Coimbatore.

20th September 1954.

APPENDIX I.

FINANCIAL STATEMENT FOR 1953–54.

(Fasli 1363.)

Agricultural Research Station, Taliparamba.

XXIX. Agriculture—Agricultural Receipts—

	RS.	A.	P
1 Agricultural Research Stations	10,715	7	7
2 Miscellaneous	1,078	3	0
3 Rent on buildings	143	8	0
4 Recoveries of overpayments	..		
Total ..	11,937	2	7
Deduct refunds	15	4	0
	11,921	14	7
Add value of stock transferred and book adjustment	11,168	0	2
Grand total ..	23,089	14	9

Charges.

1 Pay of Establishment—Permanent	4,153	14	0
2 Allowances—			
Dearness allowances	1,257	4	0
Travelling allowances	165	14	0
Total (1 and 2) ..	5,577	0	0
3 Contingencies—			
Petty construction and repairs	100	0	0
Purchases of live and deadstock	477	2	0
Other contingencies	507	14	9
Freight charges	350	11	9
Service stamps	425	0	0
Working expenses	23,302	9	9
Dearness allowance to menials	4,112	7	0
Total ..	29,275	13	3
Grand total (1 to 3) ..	34,852	13	3
50 d. Civil Works—Repairs—Ordinary repairs to residential buildings ..	80	0	0
Total ..	80	0	0

APPENDIX I-A.

Details of crops.	Area in acres.	Seed. Quantity.	Seed. Value. Rs. A. P.	Grain. Quantity.	Grain. Value. Rs. A. P.
1 Paddy	9·38	18,736	3,805 12 0	1,390	271 14 0
2 Vegetables	3·02	381	804 11 3	6,872½	115 9 3
3 Chillies	0·38	154½	154 4 0	..	..
4 Coconuts	10·25	3,021	726 11 9	..	..
5 Arecanuts	1·35	116,289	1,271 4 0	..	..
6 Pepper	30·20	15	300 0 0	3,918	9,765 0 0
7 Fruits	..	..	..	21,776½	841 11 3
8 Root crops	..	..	..	515	24 2 3
9 Cashewnuts	..	2,610½	985 15 0	562½	219 3 0
10 Firewood (cart-loads),	..	..	..	..	..
11 Seedlings and suckers.	..	23,240	2,859 7 0	..	..
12 Crafts	..	3,767	3,879 4 0	..	..
13 Calapagonium	..	820 lb.	1,640 9 0	..	..

Details of the crops.	Straw. Quantity.	Straw. Value. Rs. A. P.	Total receipts for the year. 1951–52. Rs. A. P.	1952–53. Rs. A. P.	1953–54. Rs. A. P.
1 Paddy	21,850	18 8 0	4,296 2 0	2,990 8 0	3,898 9 0	4,296 2 0
2 Vegetables	..	..	920 4 0	135 8 0	1,926 12 0	920 4 6
3 Chillies	..	..	154 4 0	468 12 0	206 4 0	154 4 0
4 Coconuts	..		726 11 9	709 0 0	1,262 12 0	726 11 9
5 Arecanuts	..		1,271 4 0	766 0 0	1,585 8 0	1,271 4 0
6 Pepper	..		10095 0 0	4,925 0 0	3,001 6 0	10,095 0 0
7 Fruits	..	..	841 11 3	268 12 0	375 13 0	841 11 3
8 Root crops	..	..	24 2 3	5½ 0	22 15 0	24 2 3
9 Cashewnuts	..	..	1205 2 0	154 10 0	330 10 0	1,205 2 0
10 Firewood (cart-loads).	38	342 0 0	342 0 0	195 0 0	219 0 0	342 0 0
11 Seedlings and suckers.	..	..	2,859 7 0	10,159 4 0	2 935 8 0	2,859 7 0
12 Crafts	..	..	3,879 4 0	2,454 0 0	2,068 8 0	3,879 4 0
13 Calapagonium	..	..	1,640 0 0	..		1,640 0 0
	..		28,255 4 9	23,371 10 0	17,803 8 0	28,255 4 9

APPENDIX I-B—1953-54.

Particulars.	Seed. Retained. Quantity.	Seed. Retained. Value. Rs. A. P.	Seed. Sold or transferred. Quantity.	Seed. Sold or transferred. Value. Rs. A. P.	Grain. Retained. Quantity.	Grain. Retained. Value. Rs. A. P.	Grain. Sold or transferred. Quantity.	Grain. Sold or transferred. Value. Rs. A. P.
1 Paddy	5,986	215 14 6	12,750	2,589 13 6	1,390	271 14 0	..	..
2 Vegetables	242½	456 15 3	138½	347 12 0	3,734	58 5 6	3,138½	57 3 0
3 Chillies	..	..	154½	154 4 0	..	..	..	..
4 Coconuts	351	49 5 9	3,570	677 6 0	..	..	..	..
5 Arecanuts	..	..	116,289	1,271 4 0	..	..	..	..
6 Pepper	15	300 0 0	..	..	3,908½	9,770 0 0	9½	29 2 0
7 Fruits	..	..	..	..	..	..	21,776½	841 11 3
8 Root crops	..	..	..	..	370	17 5 6	145	6 2 9
9 Cashewnuts	1,704	639 12 0	906½	346 3 0	574	219 0 0	8½	0 3 0
10 Firewood (cart-loads).	..	..	..	..	..	..	..	..
11 Seedlings and suckers.	..	..	28,240	2,852 7 0	..	..	..	..
12 Grafts	..	..	3,757	3,879 4 0		..	..	..
13 Calapagonium	177 lb.	354 0 0	643 lb.	1,286 0 0		..	..	..

Particulars.	Straw. Retained. Quantity.	Straw. Retained. Value. Rs. A. P.	Straw. Sold. Quantity	Straw. Sold. Value. Rs. A. P.	Total receipts for year. 1951–52. Rs. A. P.	1952–53. Rs. A. P.	1953–54. Rs. A. P.
1 Paddy	21,850	218 8 0	..	..	2,990 8 0	3,868 9 0	4,296 2 0
2 Vegetables	..	..	..	..	135 8 0	1,926 12 0	920 4 0
3 Chillis	..	..	..	..	468 12 0	206 4 0	154 4 0
4 Coconutes	..	..	..	..	709 0 0	1,262 12 0	726 11 9
5 Arecanuts		..	..	..	796 0 0	1,585 8 0	1,271 4 0
6 Pepper	..	..	..	..	4,925 0 0	3,001 6 0	10,095 0 0
7 Fruits	..	..	..	..	268 12 0	375 13 0	841 11 0
8 Root crops	..	..	..	..	145 4 0	22 14 0	24 2 3
9 Cashewnuts	..	..	..	..	154 10 0	330 10 0	1,205 2 0
10 Firewood (cart-loads).	..	..	38	842 0 0	195 0 0	219 0 0	342 0 0
11 Seedlings and suckers.	..	..	..	..	10,159 4 0	2,935 8 0	2,859 7 0
12 Grafts	..	..	..	..	2454 0 0	2,068 8 0	3,879 4 0
13 Calapagonium	..	..	..	..	..	..	1,640 0 0
					28,371 10 0	17,808 8 0	28,255 4 9

APPENDIX II.

COST OF CULTIVATION OF BULK CROPS FOR THE YEAR 1953–54 (FASLI).

Agricultural Research Station, Taliparamba.

Details.	1951–52.	1952–53.	1953–54.
	RS. A. P.	RS. A. P.	RS. A. P.
1 Pay and allowance of staff ($\frac{1}{3}$ actuals) ..	3,765 2 0	3,705 1 0	1,859 0 0
2 Miscellaneous cultivation expenses ($\frac{1}{3}$ actuals).	4,952 4 3	3,414 8 9	2,714 2 1
3 Working expenses (actuals)	30,635 14 11	24,310 13 0	15,160 3 6
4 Proportionate rent of the tract subject to 15 times land assessment per acre.	3,436 14 0	3,436 14 C	3,436 14 0
5 Unforeseen contingencies	..	..	..
Total ..	42,840 3 7	34,906 0 9	23,170 3 7

Statement of abstract expenses and receipts.

	1951–52.	1952–53.	1953–54.
	RS. A. P.	RS. A. P.	RS. A. P.
Expenses	59,369 14 8	47,860 2 0	34,852 13 3
Receipts	21,417 15 1	16,321 0 1	23,089 14 9

APPENDIX III.

COST OF PRODUCTION AND VALUE REALISED FROM THE MAIN CROPS, 1953–54.

Agricultural Research Station, Taliparamba.

Crop.	Area grown.	Total cost of production.	Total value realized.	Cost of production per acre.	Value realized per acre.	Profit or loss per acre.
	ACS.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
1 Wet land paddy ..	6·96	1,510 10 10	2,885 9 0	206 12 10	356 10 4	149 13 6
2 Irrigated paddy ..	2·42	786 14 0	1,119 10 6	385 2 6	466 12 0	(+)81 9 6
3 Pepper	30·20	1,911 3 6	10,085 0 0	50 15 4	333 15 0	(+) 283 0 0
4 Coconut	10·25	966 15 2	732 9 9	94 5 5	71 7 7	(—)22 13 10
5 Chillies	0·38	83 3 6	157 1 6	222 0 0	418 13 4	(+) 196 13 4

Steps taken to increase the receipts of the station.

1. *Increasing the supply of irrigation water wherever possible for stepping up crop production.*—An oil engine and pumpset were fitted up for pumping water from the stream adjoining the wet land of the station for raising irrigated crop of paddy during the summer months and an irrigated crop of paddy was raised in an area of 2·42 acres from which a total quantity of 5,700 lb. of grain and 3,300 lb. of straw were obtained. In addition, summer vegetables were grown in an area of 1·36 acres with the surplus water available, and a total quantity of 220 lb. of vegetable seeds were obtained.

To impound more water in the irrigation source in the nursery for irrigating the nursery plants, the dam across the channel was repaired to prevent leaks and the reservoir deepened. This has increased the capacity of the reservoir by about 90 cubic feet.

2. *Adjusting the cropping programme suitably to reduce the fallow period and increasing crop outturn.*—The fallow period in the wet land during the year was very little, as, soon after the harvest of the first crop of paddy, green manure crops, irrigated crop of paddy and vegetables were grown in the entire area of the wet land.

3. *Raising live fence.*—The station is provided with boundary wall and wire fence along the major portion of the boundary. To reinforce the protection against cattle tresspass, cuttings of *Adathoda* were planted on the boundary walls and along the fence. In addition, in portions where a live fence can be developed in addition to the wire fence, attempts to raise live hedges of Adathoda, Gliricidia and Erythrina were in progress.

4. *General.*—The main receipts of this station are from paddy, pepper, arecanut, jack, cashew, coconut, vegetable seed, fruit and other plants and firewood. To increase the production of paddy and incidentally the receipts from the crop an irrigated crop of paddy was raised in an area of 2·42 acres during the year and it is proposed to further increase the area under irrigated paddy crop in the next year. To increase the production of pepper by increasing the population of heavy bearing vines in the station, pepper cuttings were planted to 2,294 existing standards including coconut and arecanut trees and an additional area of 3·5 acres was brought under pepper and vines planted to 1,402 standards in this area. As a result of new planting of pepper vines during 1952–53 and 1953–54 and the new planting proposed during the next two years, the receipts of the station is expected to be increased considerably in the next five years when these new vines start yielding. As a very large population of the mango trees in the station are poor performers, the unthrifty trees were grubbed out and 157 grafts of good performers planted. When these mango grafts start yielding after some years, the production of mango will increase considerably in this station. The area under cashew was increased by about five acres by planting cashew in very steep slopes. To increase the return from the area planted to coconut, pepper vines were planted to coconut trees, as the return from the coconut trees is very poor.

The production of grafts of mango and sapota and jack and plants of other fuel and economic trees for which there is an increasing demand was stepped up during the year, and it is proposed to further increase the production in the coming years also. In addition to taking steps to increase the receipts, by drastic reduction in expenditure by excluding unremunerative items of work, the expenditure of the station has been considerably reduced during the year compared to that in the previous years, so that the station may become self-supporting.

ANNUAL PROGRESS REPORT OF THE AGRICULTURAL RESEARCH STATION, TINDIVANAM, FOR THE YEAR 1953–54 (FASLI 1363).

This is the report of work done on the station during the fasli 1363 (i.e., 1st July 1953 to 30th June 1954).

2. *Season*—(*a*) *Rainfall.*—The statement of rainfall for the year in weekly periods along with those of the previous year and the averages for the previous decennium are given in Table I.

TABLE I.—*Rainfall statement.*

Month.	Week.	1953–54. Quantity in inches.	1953–54. Number of rainy days.	1952–53. Quantity in inches.	1952–53. Number of rainy days.	Average for the past ten years 1943–44 to 1952–53. Quantity in inches.	Average for the past ten years 1943–44 to 1952–53. Number of rainy days.
South-west monsoon.							
June	7—13	..	..	..	..	0·25	0·8
	14—20	0·20	1	..	..	0·11	0·4
	21—27	0·26	1	0·40	1	0·33	0·5
June-July	28—4	..	..	..	..	0·39	0·8
	5—11	0·87	2	0·23	2	0·93	1·3
	12—18	1·05	3	0·38	1	0·56	1·2
	19—25	1·99	3	..	..	0·37	1·0
July-August	26— 1	0·28	1	..	..	1·40	1·9
	2—8	0·48	1	..	..	0·70	1·5
	9—15	0·03	..	0.28	1	0·57	1·5
	16—22	0·08	..	0.97	3	0·65	1·3
	23—29	3·45	2	1.31	2	2·10	2·3
August-September	30— 5	1·12	1	0.02	..	0·88	1·6
	6—12	1·07	2	0.02	..	1·72	1·8
	13—19	2·95	5	..	..	0·92	1·3
	20—26	0·44	2	0·09	..	0·62	1·1
	Total ..	14·27	24	3·70	10	12·51	20·3
North-east monsoon.							
September-October	27— 3	..	..	0·42	1	1·35	1·8
	4—10	0·40	1	0·35	1	1·65	1·9
	11—17	2·98	4	2·83	4	1·43	2·1
	18—24	3·40	4	4·38	2	1·43	2·0
	25—31	1·70	4	..	..	1·17	1·4
November	1— 7	..	..	..	..	0·81	1·1
	8—14	0·04	..	..	..	1·83	1·9
	15 -21	0·80	1	..	..	2·63	2·4
	22—28	2·41	4	1·61	2	1·50	2·1
November-December	29— 5	..	..	4·59	4	2·68	2·4
	6—12	..	..	4·01	5	0·90	1·2
	13—19	0·58	1	0·54	2	0·63	1·2
	20—26	0·07	..	0·05	..	0·39	0·8
December-January	27— 3	0·44	1	..	..	0·18	0·4
	4—10	2·71	3	0·44	1	0·59	0·8
	11—17	0·26	2	0·33	..	0·19	0·3
	18—24	..	..	..	..	0·28	0·3
	25—31	..	..	..	..	0·16	0·4
	Total ..	15·79	25	19·25	22	19·80	24·5
Hot weather.							
February	1— 7	..	..	..	..	..	..
	8—14	..	..	..	..	0·01	..
	15—21	..	..	..	..	0·04	0·2
	22—28	..	..	0·04	..	0·24	0·5
March	1— 7	..	..	..	..	0·31	0·6
	8—14	4 52	2	0·04	..	0·05	0·2
	15—21	..	..	..	..	0·06	0·2
	22—28	0 04	..	..	..	..	..
March-April	29— 4	..	..	0·08	..	0·41	0·8
	5—11	..	..	2·27	1	0·38	0·3
	12—18	0 59	2	0·84	1	0·33	0·6
	19—25	..	..	..	..	0·06	0·1
April-May	26— 2	..	..	0·06	..	0·20	0·2
	3— 9	..	..	..	..	..	..
	10—16	..	..	..	..	0·05	0·2
	17—23	..	..	..	..	0·54	0·7
	24—30	..	..	0·04	1	0·41	0·8
May-June	31— 6	..	..	0·21	1	0·54	0·9
	Total ..	5·15	4	3·90	4	3·63	6·3
	Grand total ..	35·21	53	26·85	36	35·94	51·1

The total rainfall received during the year was 35·21 inches distributed over 53 days as against 26·85 inches and 36 days of last year and the ten-year average rainfall of 35·94 inches received on 51 days. This was slightly in deficit of the normal fall but the normal fall for the tract has been considerably reduced by the successive failure of rains during the last six years.

This year during the south-west monsoon period 14·27 inches of rain was received and it is higher than the normal by 1·76 inches. The monsoon broke out early and fairly good amount of rain was received during the month of July. Taking advantage of 2·74 inches of rain received on 4 days during the third week of July, dry land sowings were taken up and completed in a short period. Germination of groundnut, castor and cereals was good. But large number of seedlings of cereals began to dry up due to drought that prevailed soon after sowings. The south-west monsoon rains were evenly distributed and the groundnut crop had luxuriant growth. The north-east monsoon rains started from the second week of October. The total quantity received was only 15·79 inches against the normal fall of 19·80 inches. The monsoon was active in the earlier half but was feeble later. During the hot weather period 5·15 inches of rain was recorded on 4 days. The period from the middle of March to the end of the year was dry and this delayed preparatory cultivation for the next rainfed crop.

(*b*) *Temperature.*—The maximum temperature ranged from 88°F. (December 1953) to 112°F. (May and June 1954) while the minimum temperature ranged from 59°F. (March 1954) to 77°F. (May 1954). The average relative himidity was the highest (90·8) in January 1954 and the lowest (73·6) in June 1954.

3. *Oilseed crops*—A. *Groundnut.*—(i) *General.*—With the receipt of 0·55 inch of rain, sowing of groundnut both experimental and bulk was commenced on 21st July 1953 and completed within a week. Germination in all the units was satisfactory. Due to the absence of adequate rains immediately after sowings, the growth of the plants was not vigorous. The young seedlings of cereals dried up in large numbers in the rotation experiment. After the receipt of rains towards the end of August the groundnut crop put forth luxuriant growth and flowering was profuse. A mild attack of *Surulpoochi* (*Stomopteryx nerteria*) was noticed in the beginning of September and it intensified later. The bunch types were affected by a short spell of drought during the first half of September. The pest disappeared completely after rains and both the bunch and spreading types again put on further growth. *Tikka* leafspot disease was noticed early in October and it intensified with the increase in rainfall. Bunch groundnut was harvested early in November and the yields obtained were fair. The harvest of spreading groundnut was taken up in the middle of December and failure of rains at this time made the operation difficult and costly. The yields obtained were also far below normal as the spreading types on account of their long duration were affected by the low rainfall during the north-east monsoon period. The average acre yields recorded for the strains during this year were as follows :—

Strain.	*Acre yield in pounds*	
	Station.	*Seed multiplication area.*
TMV. 1	563	394
TMV. 2	657	570
TMV. 3	501	326
TMV. 4	...	265

With the object of increasing the revenue of the station *cholam* was raised mixed in both the bunch and spreading groundnut in 8 acres. The season was favourable for *cholam* crop and good yields were obtained. Economics

of this cropping was worked out for both the bunch and spreading groundnut and the results are as follows :—

Particulars.	*Profit per acre in Rupees.*	
	Bunch.	*Spreading.*
	RS. A. P.	RS. A. P.
Pure	98 0 0	60 0 0
Mixed cropping	129 0 0	77 0 0

Even though the yield of groundnut is reduced by this system of cropping, the net return per acre is high.

(ii) *Comparative yield trials.*—(*a*) *Bunch.*—Three bunch strains from the States of Bombay, Madhya Pradesh and Mysore were compared with bunch strain TMV 2 for the third time. The strain from Mysore (HG 5) was longer in duration by a month and recorded very low yields and the data were not taken for statistical analysis. The yield data of the other two strains along that of TMV 2 were statistically analysed and the results are given in Table II.

TABLE II.—*Comparative yield trial of bunch strains*—1953–54 *rainfed season.*

Object—To compare the yields of two strains from Madhya Pradesh and Bombay with TMV 2 strain.
Field—A 7.
Area—0·86 acre.
Previous crop—Castor.
Manuring—10 cart-loads of manure mixture (equal parts of compost tank silk and red earth) per acre.
Layout—Randomised blocks replicated six times.
Plot size—
Gross 67′ × 3½′.
Net 66′ × 2¼′ or 1/264 acre.
Spacing—6″ × 6″.
Sown on—24th July 1953.
Harvested on—17th November 1953.

Strain.	Acre yield in lb.	Percentage on control.	Whether significant or not (P=0·05).
TMV 2	774	100·0	
AH 6708 (Improved Spanish MP)	692	89·4	Yes.
AH 6709 (Spanish Improved Bombay)	845	109·1	
Standard error	17·6	2·3	
Critical difference (P=0·05)	55·8	7·2	

Conclusion : 6709, TMV 2, 6708.

Results of previous year's trials.

Strain.	1951–52.			1952–53.		
	Acre yield in lb.	Percentage on control.	Whether significant or not (P=0·05).	Acre yield in lb.	Percentage on control.	Whether significant or not (P=0·05).
TMV 2 (control)	907	100·0		474	100·0	
AH 6707	451	49·7		171	36·1	
AH 6708	823	90·7	Yes.	389	82·1	Yes.
AH 6709	832	91·7		456	96·2	
Standard error	29·3	3·2		23·5	5·0	
Critical difference (P=0·05) ..	88·2	9·7		70·8	14·9	

Conclusion : 1951–52 TMV 2, 6709, 6708, 6707.
1952–53 TMV 2, 6709, 6708, 6707.

During this year the strain from Bombay, ' Spanish improved ' has recorded significantly increased yields over the control TMV 2. But a review of the results of three years' yield trials and quality studies, shows that the extra state strains are not superior to the strain TMV 2.

Qualitative studies on the produce of the strains were carried out and the results are given in Table III.

TABLE III.—*Qualitative determinations*—1953–54—*Rainfed season—Comparative yield trials—Bunch.*

Selection.	*Shelling percentage.*	*Natural test weight of one Madras measure in grms. of*		*Number of kernels per pound.*
		Pods.	*Kernels.*	
TMV. 2	77·5	619	1,287	1,419
AH. 6707	76·3	632	..	1,396
AH. 6708	77·6	622	1,294	1,448
AH. 6709	75·9	570	1,278	1,154

The quality of the extra-State strains was not superior to that of the local strain.

The trial will be discontinued.

(*b*) *Spreading.*—Seventeen selections and two strains from the States of Uttar Pradesh and Punjab were compared with the local spreading variety and the strains TMV 1 and TMV 3 in four series. The yield data were statistically analysed and the results are presented in Table IV along with the results of previous years' trials.

TABLE IV.—*Comparative yield trials of spreading selections*—1953-54—*Rainfed season.*

Object—To compare the yields of seventeen selections and two strains from other States with Local, TMV1 and TMV3 strains.
Field—A 3 and 4.
Area—1·00 acre and 0·86 acre respectively.
Layout—Randomised blocks replicated six times.

Plot size—
Gross 67½′ × 5½′.
Net 66′ × 3¾′ or 1/176 acre.
Spacing—9″ × 9″.
Sown on—24th July 1953 and 25th July 1953.
Harvested on—15th December 1953 and 16th December 1953.

Series I.

Selections.	Acre yield in lb.	Percentage on control.	Whether significant or not (P=0·05).
Local	634	100·0	
TMV 1	908	143·2	
TMV 3	967	152·5	
AH 6693 (Selection from Local)	684	107·9	Yes.
AH 6694 (Selection from Local)	731	115·3	
AH 6700 (Selection from Local)	732	115·4	
Standard error	48·0	7·6	
Critical difference (P=0 05)	140·1	22·1	

Conclusion: TMV 3, TMV 1, 6700, 6694, 6693, Local.

Series II.

Local	697	100·0	
TMV 1	740	106·2	
TMV 8	856	122·8	
AH 6710 (T 25-Uttar Pradesh)	542	77·8	Yes.
AH 6711 (Local Samrala Punjab)	596	85·5	
Standard error	38·2	5·5	
Critical difference (P=0·05)	112·7	16·2	

Conclusion: TMV 3, TMV 1, Local, 6711, 6710.

Series III.

Local	668	100·0	
TMV 1	863	129·2	
TMV 3	900	134·7	
AH 6712 (Selection from Rangoon)	790	118·2	
AH 6715 (Selection from Maus, Virginii)	722	108·1	
AH 6716 (Selection from Maus. Virginii)	788	118·0	
AH 6717 (Selection from Maus. Virginii)	733	109·7	
AH 6718 (Selection from Maus. Virginii)	839	125·6	
AH 6719 (Selection from virginia bunch)	1045	156·4	
AH 6720 Selection from Virginia bunch)	779	116·6	
Standard error	48·5	7·3	
Critical difference (P=0·05)	139·9	20·9	

Conclusion: 6719, TMV 3, TMV 1, 6718, 6712, 6716, 6720, 6717 6715, Local.

Series IV.

Local	625	100·0	
TMV 1	688	110·1	
TMV 3	795	127·2	
AH 6775 (Selection from Rangoon)	754	120·6	
AH 6777 (Selection from Rangoon)	648	103·7	
AH 6778 (Selection from Rangoon)	753	120·5	
AH 6783 (Selection from Texas)	793	126·9	
AH 6785 (Selection from Maus. Virgini)	689	110·3	Ye
AH 6786 (Selection from Masumbika)	824	131·8	
AH 6787 (Selections from Mans. Virgini)	751	120·1	
Standard error	36·7	5·9	
Critical difference (P=0·05)	106·0	17·0	

Conclusion. 6786, TMV. 3, 6783, 6775, 6778, 6787, 6785, TMV. 1, 6777, Local.

Results obtained in previous years.

Series I.

Selections.	1951–52. Acre yield in lb.	1951–52. Percentage on control.	1952–53. Acre yield in lb.	1952–53. Percentage on control.
Local	511	100·0	677	100·0
TMV 1	569	111·4	788	116·0
TMV 3	654	128·0	840	124·1
AH 6693 (Selection from local)	514	100·6	707	104·4
AH 6694 (Selection from local)	544	106·4	816	120·5
AH 6700 (Selection from local)	524	102·5	800	118·1
Standard error	39 0	7·6	28·8	4·3
Significant or not (P = 0·05)	No.		Yes.	
Critical difference (P = 0·05)	..	..	84·1	12·4

1952–53—Conclusion : TMV 3, 6694, 6700, TMV 1, 6693, Local.

Series II.

Local	546	100·0	581	100·0
TMV 1	602	110·3	643	110·7
TMV 3	680	124·6	868	149·4
AH 6710	416	76·2	488	84·0
AH 6711	467	85·5	528	90·5
Standard error	61·8	11·3	27·4	4·7
Critical difference (P = 0·05)	..	..	80·7	13·9

1952–53 Conclusion : TMV 3, TMV 1, Local, 6711, 6710.

Series III.

1 Local	551	100·0		
2 TMV. 1	828	150·3		
3 TMV. 3	872	158·2		
4 AH. 6712 (Selection from Rangoon)	773	140·3		
5 AH. 6715 (Selection from Maus Viriginii)	773	140·3		
6 AH. 6716 (Selection from Maus Virginii)	861	156·3		
7 AH. 6717 (Selection from Maus Virginii)	835	151·6		
8 AH. 6718 (Selection from Maus Virginii)	855	155·2		
9 AH. 6719 (Selection from Virginia Bunch)	985	178·7		
10 AH. 6720 (Selection from Virginia Bunch)	881	159·9		
Standard error	81·3	14·8		
Significant or not	Yes.			
Critical difference (P × 0·05)	177·8	32·3		

Conclusion—9, 10, 3, 6, 8, 7, 2, 5, 4, 1.

Series I.—Three selections from Local Mauritius were compared with the local, TMV 1 and TMV 3 strains for the third year. All the three selections were on par with the local groundnut and yielded significantly lower than the strains. In the first year the yield differences were not statistically significant and in the second year two were on par with TMV 3 and all of them on par with TMV 1. Based on their performance during the three years and their qualitative characters, two selections AH 6694 and 6700 have been selected for trials in South Arcot district during the ensuing rainfed season.

Series II.—Two strains, 'T 25' from Uttar Pradesh and 'Local Samrala' from Punjab were tested under comparative yield trials along with the local, TMV 1 and TMV 3 for the third time. Both the strains yielded significantly less than our strains, while one strain was on par with the local. Similar results were obtained in the second year also but in the first year the yield differences were not significant. The trial will be discontinued.

Series III.—Seven selections from big seeded variety suitable for edible purposes, were compared with the local TMV 1 and TMV 3 for the second time. Two selections gave significantly higher yields than the local and one selection, viz., AH 6719 yielded significantly higher than both the strains. Last year also the selection AH 6719 recorded the highest yield the percentage of increase over local being 78·7 per cent. The trial will be repeated for one more season. In view of the very encouraging performance of the selections, observation plots with the selections AH 6716, 6718, 6719 and 6720 have been arranged to be laid out in Tiruchirappalli, Thanjavur and Ramanathapuram districts.

Series IV.—Seven selections from big seeded varieties were compared with the local TMV 1 and TMV 3 strains for the first time. Five selections yielded significantly higher than the local groundnut and one selection

higher than the strain TMV. 1. Five selections were on par with the strain TMV. 3. The trial will be continued for two more seasons.

Qualitative determinations were made on the produce of the selections and strains under trials and the results are given in Table V.

TABLE V.—*Qualitative determinations*—1953–54—*Rainfed season*—*Comparative yield trials*—*Spreading.*

Selections.	Shelling percentage.	Natural test weight in gms. of 1 M.M. of		Number of kernels per lb.	Oil content.	Free fatty acid content.	Sucrose content.
		Pods.	Kernels.				
Series I.							
Local	78·3	665	1,181	1,246	51·22	0·34	..
TMV. 1	73·1	576	1,169	944	51·64	0·61	..
TMV. 3	76·2	649	1,194	1,153	51·82	0·32	..
AH. 6693	78·2	655	1,172	1,320	52·11	0·55	..
AH. 6694	77·7	658	1,177	1,229	51·98	0·48	..
AH. 6700	78·4	648	1,190	1,305	51·10	0·31	
Series II.							
Local	77·9	641	1,175	1,283	52·69	1·09	..
TMV. 1	72·8	578	1,152	1,010	51·19	0·33	..
TMV. 3	74·4	642	1,180	1,206	51·05	0·29	..
AH. 6710	74·7	550	1,120	929	52·09	0·27	..
AH. 6711	74·3	551	1,120	941	51·39	0·43	..
Series III.							
Local	78·3	657	1,182	1,246	52·65	0·23	2·51
TMV. 1	72·8	571	1,167	923	51·19	0·18	2·65
TMV. 3	75·3	645	1,183	1,128	50·64	0·14	4·06
AH. 6712	71·4	478	1,116	712	51·50	0·15	3·94
AH. 6715	70·5	449	1,125	639	51·28	0·14	3·56
AH. 6716	70·5	445	1,126	664	50·13	0·19	3·37
AH. 6717	69·7	451	1,107	688	50·69	0·74	3·72
AH. 6718	70·0	448	1,135	662	51·32	0·70	3·74
AH. 6719	73·9	566	1,133	745	51·32	0·70	3·12
AH. 6720	70·1	453	1,155	680	51·33	0·14	3·93
Series IV.							
Local	77·8	666	1,192	1,258	50·74	0·09	2·59
TMV. 1	72·2	587	1,172	997	52·42	0·14	2·79
TMV. 3	74·4	655	1,200	1,157	52·31	0·08	2·65
AH. 6775	71·5	489	1,127	737	51·53	0·48	3·67
AH. 6777	71·5	487	1,121	746	52·86	0·14	4·03
AH. 6778	72·0	488	1,121	748	52·01	0·29	3·74
AH. 6783	74·2	587	1,131	806	50·22	0·15	2·85
AH. 6785	67·8	471	1,150	717	50·14	0·13	3·67
AH. 6786	72·4	589	1,139	762	51·27	0·21	3·91
AH. 6787	68·1	475	1,130	695	51·07	0·20	3·12

The quality of the selections from Local Mauritius was as good as the unselected bulk. The strains from other States had poor quality compared with strain TMV 3. The big seeded selections were poor in quality. But the two high yielding selections AH 6783 and 6719 showed better quality than the rest. The results when compared with those of last year show that there is slight reduction in the shelling percentage as well as the number of kernels per pound. This is due to slightly increased size of the pods resulting from better distribution of rainfall this year. The oil, free fatty acids and sucrose contents of the big seeded selections under comparative yield trials were also determined. It is seen that out of the 14 selections, 9 had lower oil content than the local spreading groundnut. All the big seeded selections had higher sucrose content when compared with the local.

(iii) *Preliminary yield trials.*—(*a*) *Bunch.*—Seven selections from the dormant bunch strain, AH 6481 were compared with TMV 2. The differences in yield between the different treatments were not significant. The results of analysis of yield data and qualitative studies are given in Tables VI and VII.

TABLE VI.—*Preliminary yield trial of bunch selections*—1953–54—*Rainfed season.*

Object—To compare the yields of seven selections from AH. 6481 with strain TMV. 2.
Field—A-6.
Area—0·77 acre.
Previous crop—Castor. **Lay out**: Randomized blocks replicated four times.
Plot size—34′ × 2½′ gross.
33′ × 1½′ net or 1/880 acre.
Spacing—6″ × 6″.
Sown on 24th July 1953.
Harvested on 16th November 1953.

Selection.	Duration in days.	Acre yield in lb.	Percentage on control.	'Z' test satisfied or not (P = 0·05).
TMV. 2	105	857	100·0	
AH. 6630	118	861	100·5	
AH. 6631	115	809	94·4	
AH. 6767	115	770	89·8	
AH. 6768	112	836	97·5	No.
AH. 6769	115	741	86·5	
AH. 6770	115	834	97·3	
AH. 6788	115	751	87·6	
Standard error	..	63·8	7·4	

TABLE VII.—*Qualitative determinations—1953–54—Rainfed season—Preliminary yield trials (Bunch).*

Selections.	Shelling percentage.	Natural test weight in gms. of one Madras measure of		Number of kernels per lb.
		Pods.	Kernels.	
TMV. 2	77·6	618	1,264	1,429
AH. 6630	74·7	567	1,198	1,154
AH. 6631	74·5	522	1,202	1,115
AH. 6767	74·2	524	1,180	1,215
AH. 6768	74·3	550	1,184	1,178
AH. 6769	73·7	531	1,174	1,116
AH. 6770	74·3	535	1,188	1,190
AH. 6788	75·6	589	1,194	1,108

The quality of the selections was not as good as the strain TMV 2. As in last year the selection AH 6788 has slightly better quality than the other selections. As none of the selections are promising they will be discarded.

(*b*) *Spreading.*—Three selections from varieties, two from progenies of crosses and three big seeded selections were compared with the local groundnut and TMV 3 strain. The yield differences were statistically significant. Six selections were found superior to the local and one superior to the strain TMV 3. The two selections from crosses, AH 6795 and AH 6796 have recorded high yields besides being semi-spreading in habit of growth. The results of statistical analysis of the yield data are given in Table VIII.

TABLE VIII.—*Preliminary yield trial of spreading selections—1953–54—Rainfed season.*

Object—To compare the yields of eight selections from varieties and progenies of crosses with the local spreading groundnut and the strain TMV. 3.
Field—A-13.
Area—0·94 acre.
Previous crop—Groundnut.
Spacing—9″ × 9″.
Sown on—27th July 1953.
Harvested on—19th December 1953.
Layout—Randomised blocks replicated six times.
Plot size—34½′ × 3¾′ gross.
33′ × 2¼′ net or 1/586·7 acre.

Selections.	Acre yield in lb.	Percentage on control.	'Z' test satisfied or not (P = 0·05).
Local	305	100·0	
TMV. 3	719	235·7	
AH. 6795 (Selection from a cross)	870	285·2	
AH. 6796 (Selection from a cross)	781	256·1	
AH. 6797 (Selection from AH. 259)	602	197·3	
AH. 6798 (Selection from AH. 477)	590	193·5	Yes.
AH. 6799 (Selection from AH. 3849)	463	151·8	
AH. 6800 (Selection from AH. 20)	597	195·7	
AH. 6801 (Selection from AH. 20)	252	82·6	
AH. 6802 (Selection from AH. 20)	383	125·6	
Standard error	44·4	14·6	
Critical difference	128·0	42·0	

Conclusion—6795, 6796, TMV. 3, 6797, 6800, 6798, 6799, 6802, Local 6801.

Qualitative studies were carried out on the produce of the selections. The results are presented in Table IX.

TABLE IX.—*Qualitative determinations—1953–54—Rainfed season—Preliminary yield trials—Spreading.*

Selections.	Shelling percentage.	Natural test weight in gms. of one Madras measure of		Number of kernels per lb.
		Pods.	Kernels.	
Local	79·5	657	1,134	1,213
TMV. 3	77·1	667	1,180	1,076
A.H. 6795	72·3	568	1,146	845
A.H. 6796	74·6	567	1,131	1,008
AH. 6797	75·3	641	1,211	1,033
AH. 6798	62·5	599	1,111	909
AH. 6799	77·1	578	1,146	1,012
AH. 6800	73·8	514	1,103	658
AH. 6801	66·2	497	1,098	605
AH. 6802	72·1	466	1,066	598

The quality of the selections was poor compared to the local spreading groundnut. Six selections have been selected for further trials next season.

(iv) *Observations on single plant selections.*—(*a*) *Row tests.*—One hundred and fifty-one bunch and one hundred and eighty-four spreading selections were put under row tests with a check row after every two selections. TMV 2 served as control for the bunch selections and AH 1 for the spreading selections. Out of them 67 bunch and 71 spreading selections gave increased yields over their adjoining controls. These will be advanced to replicated row tests or seed multiplication depending upon the availability of seed material.

(*b*) *Replicated row tests.*—Seventeen bunch selections and twenty-seven spreading selections were put under replicated row tests in separate series with TMV 2 and AH 1 as controls for the bunch and spreading selections respectively. Eight bunch and one spreading selections yielded significantly less than their respective controls. All the rest were on par with the controls. The promising selections will be multiplied next season.

(*c*) *Seed multiplication.*—Eleven bunch selections were multiplied in small plots and studied. Two among them AH 6632 and AH 6633 both selections from AH 6481 were found promising and they have been marked out for further trials next year. Fifty-nine spreading selections were multiplied in small plots and studied in detail. Based on the performance and the qualitative characters 13 selections will be advanced to preliminary yield trials.

(v) *Hybridization.*—Twenty new crosses were effected between selected bunch and spreading purelines with the following objects in view :—

(*a*) To evolve a bunch strain with dormant seeds.
(*b*) To improve the shelling out-turn of TMV 1.
(*c*) To evolve high yielding white seeded type.
(*d*) To evolve edible types.

The setting of hybrid seeds was poor and all the seeds have been collected carefully along with those of their parents.

F1 progenies of eight crosses made last year were grown along with their parents and studied in detail. Produce of sixteen F1 plants has been harvested separately for raising the F2 progenies.

Fifty-four F2 families and thrity-one F3 families were raised and after studying individual plants at harvest time, 31 single plants with desirable characters were selected.

The details of the selections are—

(*a*) To evolve a dormant strain	12
(*b*) To evolve a white seeded strain	19
	31

(vi) *New varieties.*—Eighty-seven new bunch and spreading varieties were raised and studied. Five new varieties from Egypt received in July 1953 were also included in the study. Detailed description of all the varieties was made and the observations of the previous years were confirmed. The plants in each variety were individually studied at harvest and 225 bunch and 84 spreading selections were made. Qualitative studies on the produce of the new varieties were also carried out. A few bunch and spreading varieties possess good quality and they have been marked for further studies next season. The variety from Brazil had large sized kernels and its yielding potentiality will be tested.

(vii) *Rotation experiment.*—The rotation experiment was conducted for the ninth year in succession in the same fields without any change in layout and randomisation of plots. The experiment was started in the year 1945-46

with the object of finding out the effect of groundnut on the succeeding crop of cereals and *vice versa*. The details of the experiment are given in Table X :—

TABLE X.—*Schedule of cropping in the Rotation experiment.*

Treatments.	I	II	III	IV	V	VI	VII	VII	IX
Groundnut followed by groundnut.	G	G	G	G	G	G	G	G	G
Groundnut followed by *Cholam* ..	G	Ch	G	Ch	G	Ch	G	Ch	G
Groundnut followed by *Cumbu* ..	G	Cu	G	Cu	G	Cu	G	Cu	G
Groundnut followed by *Varagu* ..	G	V	G	V	G	V	G	V	G
Cholam followed by groundnut ..	Ch	G	Ch	G	Ch	G	Ch	G	Ch
Cumbu followed by groundnut ..	Cu	G	Cu	G	Cu	G	Cu	G	Cu
Varagu followed by groundnut ..	V	G	V	G	V	G	V	G	V
Cholam followed by *Cholam* ..	Ch	Ch	Ch	Ch	Ch	Ch	Ch	Ch	Ch
Cumbu followed by *Cumbu* ..	Cu	Cu	Cu	Cu	Cu	Cu	Cu	Cu	Cu
Varagu followed by *Varagu* ..	V	V	V	V	V	V	V	V	V
Groundnut followed by gingelly in the same year.	G Gi	G Gi	G Gi	G Gi	G Gi	G Gi	G Gi	G Gi	G Gi

During this year preparatory cultivation, manuring, spacing and other cultivation practices were the same as adopted during the previous years. The average acre yield recorded for the different crops for the nine years are given in Table XI :—

TABLE XI.—*Groundnut Rotation Experiment.*

Bunch Series.

Years.	Groundnut followed by Groundnut.	Groundnut followed by *Cholam*.	Groundnut followed by *Cumbu*.	Groundnut followed by *Varagu*.	*Cholam* followed by groundnut.
(1)	(2)	(3)	(4)	(5)	(6)
1945–46	1192	1157	1145	1125	770
1946–47	947	386	493	1,093	975
1947–48	1037	1168	1035	1100	576
1948–49	440	797	157	628	570
1949–50	1299	1341	1324	1357	257
1950–51	699	1644	771	352	863
1951–52	750	600	681	802	859
1952–53	456	853	...	...	456
1953–54	752	790	919	733	713

Years.	*Cumbu* followed by Groundnut.	*Varagu* followed by Groundnut.	*Cholam* followed by *Cholam*.	*Cumbu* followed by *Cumbu*.	*Varagu* followed by *Varagu*.	Groundnut in the main season and gingelly in the second.
	(7)	(8)	(9)	(10)	(11)	(12)
1945–46	588	1284	778	726	1283	1185/105
1946–47	928	940	105	380	449	929/98
1947–48	295	338	269	251	181	1113/30
1948–49	636	479	386	98	209	524/87
1949–50	293	56	105	148	148	1307 Not raised.
1950–51	869	797	770	509	287	713 Not raised.
1951–52	470	99	586	437	74	705 Failed
1952–53	566	442	678	..	..	475
1953–54	327	616	510	265	203	762/65

Spreading series.

Years.	Groundnut followed by Groundnut.	Groundnut followed by *Cholam*.	Groundnut followed by *Cumbu*.	Groundnut followed by *Varagu*.	*Cholam* followed by Groundnut.	*Cumbu* followed by Groundnut.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1945–46	962	982	962	962	352	451
1946–47	729	446	456	637	606	793
1947–48	808	749	730	745	372	337
1948–49	962	1276	192	687	807	1403
1949–50	988	840	1037	1036	34	494
1950–51	729	1444	685	502	850	885
1951–52	650	783	705	736	898	724
1952–53	416	810			553	553
1953–54	835	803	66	801	650	474

Spreading series—*cont.*

Years.	*Varagu* followed by Groundnut.	*Cholam* followed by *Cholam.*	*Cumbu* followed by *Cumbu.*	*Varagu* followed by *Varagu.*	Groundnut in the main season and gingelly in the second.
	(8)	(9)	(10)	(11)	(12)
1945-46	643	398	421	738	1052/61
1946-47	756	233	298	665	731/38
1947-48	445	260	183	424	755/39
1948-49	920	610	126	445	811/-
1949-50	116	164	280	498	1007/-
1950-51	781	864	455	523	757/-
1951-52	170	790	553	107	760/-
1952-53	546	677	..	..	534/-
1953-54	242	590	325	129	751/-

Yield data of groundnut in both the bunch and spreading series were statistically analysed. The results are given below in Table XII. As in all the previous years the yield differences between groundnut followed by groundnut and groundnut followed by cereals were not statistically significant.

TABLE XII.—*Groundnut Rotations Experiment*—1953-54—*Rainfed season.*

Spreading series.

Object—To study the effect of growing groundnut on other crops like *Cholam, Cumbu* and *Varagu* and *vice versa.*
Field No.—A 12.
Area—0·95 acre.
Previous crop—Same experiment.
Manuring—10,000 lb. of manure mixture (equal parts of compost, tank silt and red earth) per acre.
Layout—Randomized blocks replicated four times.

Size of plots—
Gross 68′ × 13′.
Net 60′ × 6′ or 1/121 acre.
Spacing—
9″ × 9″ for groundnut.
1″ × 6″ for cereals.
Strains—
Groundnut—TMV 3.
Cereals—Local.
Sown on 21st July 1953.
Harvested on 12th December 1953.

Treatments.	Acre yield in lb.	Percentage of control.	Whether significant or not (P=0·05).
1 Groundnut followed by groundnut	835	100·0	
2 Do. *Cholam*	803	96·2	
3 Do. *Varagu*	801	95·9	No.
4 Do. *Cumbu*	766	91·7	
5 Do. Gingelly	751	89·9	
Standard error	55·4	6·6	

Bunch Series.

Object—To find out the effect of growing cereals in rotation with groundnut.
Field No.—A 11.
Area—0·84 acre.
Manuring—10,000 lb. of manure mixture (equal parts of compost, tank silt and red earth) per acre.
Layout—Randomized blocks replicated four times.

Plot size—
Gross 60′ × 13′.
Net 56′ × 6′ or 1/129·6 acre.
Spacing—6″ × 6″.
Strain—TMV2.
Sown on 21st July 1953.
Harvested on 14th November 1953.

Treatments.	Acre yield in lb.	Percentage on control.
Groundnut followed by groundnut	752	100·0
Do. *Cholam*	790	105·1
Do. *Cumbu*	919	122·2
Do. *Varagu*	733	97·5
Do. Gingelly	762	101·4
Stanadard error	67·4	9·0
Whether significant or not (P_s= 0·05) ..	No.	

The germination of the cereal crops was fair but on account of the prolonged drought that prevailed soon after sowings, the young seedlings dried up necessitating re-sowing and gap filling. *Varagu* crop dried up completely inspite of pot-watering. Though the stand was not uniform, the *Cumbu* crop fared better. The performance of *Cholam* was good. The effect of preceding crop of groundnut was fully reflected in the increased yield of cereals succeeding groundnut. Acre yield of *Cholam and Cumbu* under the two treatments are given below :—

	Bunch series.		Spreading series.	
	Acre yield in lb.	Percentage over control.	Acre yield in lb.	Percentage over control.
Cholam after *Cholam*	510	..	590	..
Cholam after groundnut	713	40·0	650	10·2
Cumbu after *Cumbu*	265	..	325	..
Cumbu after groundnut	327	23·4	474	45·9

A second crop of gingelly was taken in the scheduled plots in the bunch series only. As the harvest of the spreading groundnut was delayed and as no rains were received, gingelly could not be successfully raised in the spreading series.

Qualitative studies were carried out on the groundnut produce from the different treatments. There was no difference in the quality of the produce due to the different rotational treatments. The experiment will be continued for three more years as originally programmed.

(viii) *Cultural experiment.*—The object of the experiment is to detrmine the best cultivation practice to be adopted for the groundnut crop and also to find out the feasibility of substituting ploughing with light cultivation. The experiment has been in progress from 1948–49 and was continued this year for the sixth time in the same field with the same treatments and without any change in the randomization of the plots. Results of analysis of yield data are given in Table XIII :—

TABLE XIII.—*Groundnut—Cultural experiment—1953–54—Rainfed season.*

Object—To determine the best and most economic practice to be adopted for the groundnut crop.
Field No.—B 3.
Area—1·30 acres.
Previous crop—Same experiment.
Manuring—10,000 lb. of manure mixture (equal parts of compost, tank silt and red earth) per acre.
Layout—Randomized blocks replicated four times.

Plot size—
Gross 82½′ × 12′.
Net 66′ × 6′ or 1/110 acre.
Sown on 24th July 1953.
Harvested on 29th December 1953.
Strain—TMV 3.

Treatments.	Acre yield in lb.	Percentage on control.	Whether significant or not (P = 0·05).
1 Ploughing twice with country plougd ..	483	83·0	
2 do. four times do. (control) ..	582	100·0	
3 do. six times	486	83·5	
4 do. twice with iron plough ..	431	74·1	
5 do. four times do. ..	501	86·1	
6 do. with iron plough once and Junior Hoe twice.	389	66·8	No.
7 do. four times	565	97·1	
8 do. twice and Junior Hoe twice ..	437	75·1	
9 do. and Junior Hoe four times ..	480	82·5	
Standard error	152·4	26·2	

The yield differences between the nine tillage treatments were not statistically significant. There is an indication that the yield increases as the number of ploughings increase. The results from the past five years are given in Table XIV. Only in 1952–53, the yield differences were statistically significant when ploughing four times with iron plough or six times with country plough gave the maximum yield. Qualitative studies were conducted on the produce from the different treatments and there was no difference in the quality of the produce.

TABLE XIV.—*Results of previous years.*

Treatments.	1948–49.		1949–50.		1950–51.		1951–52.		1952–53.	
	Acre yield in lb.	Percentage on control.	Acre yield in lb.	Percentage on control.	Acre yield in lb.	Percentage on control.	Acre yield in lb.	Percentage on control.	Yield in lb.	Per centage on control.
Ploughing with *country* plough twice.	633	89·4	346	87·4	404	93·5	505	91·5	398	82·6
Do. four times (control).	708	100·0	396	100·0	410	100·0	552	100·0	482	100·0
Do. six times ..	529	74·7	309	78·0	385	93·9	546	98·9	512	106·2
Ploughing with mould board plough twice.	710	100·3	368	92·9	397	96·8	594	1 07·6	312	64·7
Do. four times ..	568	80·2	432	109·1	425	103·6	498	90·2	512	106·2
Do. one and Junior Hoe twice.	559	79·0	409	103·3	410	100·0	504	91·3	346	718
Do. do. four times. ..	546	77·1	371	93·7	402	98·0	497	90·0	455	94·4
Do. twice and Junior Hoe twice.	562	79·4	403	101·7	414	100·9	471	85·3	489	101·4
Do. do. four times.	555	78·4	404	102·	395	96·3	435	78·8	476	98·8
Standard error whether significat or not (P = 0·05)	60·9	8·6	41·8	10·6	31	7·4	40·1	7·3	42·0	8·7
	No.		No.		No.		No.		Yes.	
Critical difference (P = 0·05)									122·4	23·4

Conclusion—1952–53 : 3, 5, 8, 2, 9, 7, 1, 6, 4.

The economics of cultivation as per the different treatments were worked out and the results are given in Table XV :—

TABLE XV.—*Cultural experiment—Economics of the cultural treatments.*

Treatments.	Cost of cultivation.	Gross return per acre.	Net profit per acre.
	RS.	RS.	RS.
Country plough twice	89	126	37
Country plough four times	94	152	58
Country plough six times	98	127	29
Mould board plough twice	95	113	18
Mould board plough four times	102	131	29
Mould board plough once and Junior Hoe twice.	94	97	3
Mould board plough once and Junior Hoe four times.	94	147	53
Mould board plough twice and Junior Hoe twice.	98	114	16
Mould board plough twice and Junior Hoe four times.	99	126	27

As the results were erratic much reliance should not be placed on the economics worked out from such data. The experiment is proposed to be conducted for three more years. Instead of growing a pure crop of groundnut, a mixed crop of *Cholam* and groundnut will be raised in this experiment.

(ix) *Manurial experiment.*—The experiment was conducted for the sixth and final time during this year. The experiment was started in 1948–49 with the object of determining the optimum and economic dose of potash and phosphoric acid to be applied to the groundnut crop. The results of the statistical analysis of the yield data are given in Table XVI.

TABLE XVI—*Groundnut manurial experiment*—1953–54 *Rainfed season.*

Object—To determine the economic doses of potash and phosphoric acid required for the groundnut crop.
Field No.—F11 C.
Area—0.71 acre.
Previous crop—Groundnut.
Layout—Randomized blocks replicated four times.

Plot size—
Gross 27′ × 6′.
Net 24′ × 4′ ½ or 1/403·3 acre.
Spacing—9″ × 9″.
Strain—TMV3.

Treatments—

CM *Versus* NO CM	×	0 Levels of K2O 1 Do. 2 Do. 3 Do.	×	0 Levels of P2O5. 1 Do. 2 Do. 3 Do.				
2	×	4	×	4	= 32			

Doses—
Potassium sulphate to supply 25 lb. of K2O or ½ cwt. per acre.
Do. 50 lb. of K2O or 1 cwt. „
Do. 75 lb. of K2O or 1½ cwt. „
Superphosphate to supply 20 lb. of P2O5 or 1 cwt. per acre.
Do. 40 lb. of P2O5 or 2 cwt. „
Do. 60 lb. of P2O5 or 3 cwt. „
Cattle manure at 5 tons per acre to supply 100 lb. of N. per acre.
Sown on—23rd July 1953.
Harvested on—29th and 31st December 1953.

Treatment.	Acre yield in lb.	Percentage on control.	Treatment.	Acre yield in lb.	Percentage on control.	Whether significant or not.
Control	486	100·0	CM+K1	574	118·1	
K1	564	116·1	CM+K2	561	115·4	
K2	566	116·5	CM+K3	708	145·6*	
K3	615	126·6*	CM+P1	571	117·5	
P1	515	105·9	CM+P2	521	107·2	
P2	537	110·5	CM+P3	585	120·4	
P3	493	101·4	CM+K1+P1	508	104·6	
K1+P1	493	101·4	CM+K1+P2	510	105·0	
K1+P2	487	100·2	CM+K1+P3	552	113·6	Yes.
K1+P3	530	109·1	CM+K2+P1	509	104·7	
K2+P1	554	114·0	CM+K2+P2	539	110·9	
K2+P2	525	108·0	CM+K2+P3	585	120·4*	
K2+P3	531	109·2	CM+K3+P1	568	116·9	
K3+P1	539	110·9	CM+K3+P2	605	124·6*	
K3+P2	556	114·4	CM+K3+P3	610	125·5*	
K3+P3	601	123·7*	Standard error.	33·8	7·0	
CM	620	127·6	Critical difference.	93·6	19·3	

* Significant at 5 per cent level.

Yield differences between the different manurial treatments were statistically significant. Six treatments namely, K3, K3 +P3, CM+K3, CM+K2+P3, CM+K3+P2 and CM+K3+P3 have recorded significantly higher yields

than the control. The effects due to the treatments were partitioned and it was found that cattle- manure and potash increase the yields while phosphoric acid had depressing effect. In all the previous years also, cattle-manure exerted a significant difference on the groundnut crop.

To find out the effect of the manurial treatments on growth, flowering and fruiting of groundnut plants, detailed studies on these aspects were carried out on 25 plants in case of former and 60 plants in case of the latter, in each treatment. The data from the studies did not yield any specific information regarding the effect of the fertilisers. The plants in cattle-manure applied plots had better growth, flowering and fruiting than those that did not receive the manure.

Qualitative studies were conducted on the produce from the different manurial treatments. There was no difference in the quality of the produce from the different treatments.

Though the experiment was conducted for six years, significant results were obtained during the last three years only. From the results obtained, it is evident that cattle-manure in combination with higher levels of K2O has given the maximum yield. Lower doses of P have also exerted some beneficial effect on yield. The experiment will be discontinued and a new manurial experiment started.

(x) *Fertilizer placement experiment.*—An observational trial was laid out during this season with two manure mixtures (2–4–10 and 4–6–10) prepared on the Station and with three methods of placements, viz., broadcast, side placement and placement below seed. The contents of the mixture were based on the earlier manurial experiments conducted on the Station and also on the results of similar trials conducted in foreign countries particularly in the U.S.A. This trial is intended to compare the side placement and placement below the seeds with the normal method of broadcast application. A basal dressing of cattle-manure was given to all the plots at 5 tons per acre. The yield data were statistically analysed and the differences were significant. The results are presented in Table XVII.

TABLE XVII.—*Groundnut—fertilizer placement experiment* 1953–54—*Rainfed season.*

Object—To find out the effect of two manure mixtures prepared on the station and three methods of placement on yield of groundnut crop.
Field No.—B 10.
Area—0·75 acres.
Previous crop—Groundnut.
Layout—Randomized blocks replicated six times.

Plot size—
Gross 67½ × 9′.
Net 60′ × 6′.
Spacing—9″ × 9″.
Methods of placement—
Broadcast.
Below seed.
Side placement.
Strain—TMV 3.
Sown on—26th July 1953.
Harvested on 28th December 1953.

	Treatments.	Acre yield on lb.	Percentage on control.	Whether significant or not (P=p0·05).
1	No manure	414	100·0	
2	Manure mixture I (2–4–10)—Broadcast	486	117·4	
3	Do. Side placement	531	128·2	
4	Do. Below seed	413	99·8	Yes.
5	Manure mixture II (4–6–10)—Broadcast	558	134·8	
6	Do. Side placement	472	114·0	
7	Do. Below seed	430	103·9	
	Standard error	35·2	8·5	
	Critical difference (P—0·05)	101·5	24·5	

Conclusion—5, 3, 2, 6, 7, I. 4.

Two treatments, namely, " mixture II applied broadcast " and " mixture I side placement " have recorded significantly increased yields over the control. Application of the manure mixture by broadcasting and side placement were on par with each other and superior to placement below seed.

Qualitative studies were also conducted on the produce from the different manurial treatments. There was no appreciable differnece in the quality. This experiment will bel aid out as rigid trials for the next three years.

(xi) *Groundnut cotton mixed cropping experiments.*—A mixed cropping experiment was conducted this season with the object of spotting out a cotton strain suited to this tract for being grown as mixed with groundnut. Four strains of cotton, MU 1, Co. 2, P216F and H420 were sown along with groundnut in randomized plots in rows six feet a part. Groundnut (TMV 3) was sown behind country plough. The sowing of H420 cotton was delayed by three weeks due to late receipt of the seeds. This strain in spite of best efforts completely failed to establish. Among the other three cotton strains, though the performance in general was very poor, MU1 was promising. The results of the trial are given below in Table XVIII.

TABLE XVIII.—*Groundnut mixed cropping experiment* 1953–54—*Rainfed season.*

Object—To find out a cotton strain suited to this tract for being grown as mixed crop with groundnut.
Field No.—G 6 and 13.
Area—1·20 acres.
Manuring—10,000 lb. of manure mixture (Equal parts of compost, tank silt and red earth) per acre.
Layout—Randomized blocks replicated four times.

Size of plot—
Gross 69′ × 18′.
Net 66′ × 6′ or 1/110 acre.
Spacing—
Groundnut behind country plough.
Cotton in rows 6′ apart.
Sown on 26th July 1953.
Harvested on 27th December 1953.

Treatments.	Acre yield of groundnut in lb.	Acre yield of cotton in lb.
Groundnut pure	736	..
Groundnut plus MU 1	690	49
Groundnut plus CO 2	590	24
Groundnut plus P216F	780	20
Groundnut plus H420	691	Crop failed completely.

Thus in the trials conducted this year, no conclusive information regarding a suitable cotton strain for the tract could be obtained. In the previous trials also MU 1 was found promising. The experiment will be continued.

(xii) *Irrigated summer season* (1954) *trials.*—The following experiments have been laid out this summer (1954) season :—

(*a*) *Yield trials.*—Five bunch selections and a mass selection from the new Australian white-seeded variety AH 6742 have been put under comparative yield trials with TMV 2 as control. Germination was satisfactory. Growth was good in the initial stages though it received a setback in the latter stages due to severe summer conditions. The crop is still in the field.

(*b*) *Spacing trials.*—To find out the optimum spacing to be adopted for the bunch and spreading groundnut under irrigated condition an experiment with the following treatments has been laid out in two series, one for bunch and other for spreading groundnut for the second year.

Serial number.	*Bunch.*	*Spreading.*
1	6″×6″	9″×9″
2	9″×6″	12″×9″
3	9″×9″	12″×12″
4	12″×9″	15″×12″
5	12″×12″	15″×15″

The germination and growth were good in the bunch series. In the spreading series, sowings were taken up late and the germination was rather poor. Further, the growth of the spreading plants was not satisfactory as the field was badly infested with weeds. The crop is still in the field.

(*c*) *Seed multiplication of varieties.*—Thirty-eight bunch and forty-five spreading varieties have been sown in small plots. They are being studied in detail.

(*d*) *Trials at the Agricultural Research Station, Palur.*—The following trials have been laid out at the Station :—

(1) *Yield trials.*—Five bunch pure lines have been put under comparative yield trial along with TMV 2 strain. Germination was satisfactory but the growth was only average. There was heavy incidence of wilt and affected plants were removed. The crop is nearing harvest.

(2) *Groundnut mixed cropping experiment.*—An experiment has been laid out with the following six treatments to find out the economics of raising mixed crop of groundnut, cotton and *Ragi* for the third year :—

(i) Groundnut pure.
(ii) Cotton pure.
(iii) *Ragi* pure.
(iv) *Ragi* plus cotton.
(v) *Ragi* plus groundnut.
(vi) *Ragi* plus groundnut plus cotton.

(3) The *Ragi* crop has been harvested and good yield was obtained. The cotton and groundnut crops are still in the field.

(xiii) *Results of the trials conducted during* 1953 *summer*—(*a*) *At the Agricultural Research Station, Tindivanam—Spacing trials—Bunch series.*—To determine the optimum spacing to be adopted for the bunch groundnut grown under irrigation an experiment was laid out with five spacings, namely, 6"×6", 9"×6", 9"×9", 12"×9" and 12" × 12". The yield data were statistically, analysed and the differences between the treatments were statistically significant. The spacing 9" × 6" has resulted in the highest yield and was on par with the spacing 9" × 9". Lowest yield was obtained when the plants were spaced 12" × 9". The results of analysis along with the economics of adopting the different spacings are given in Table XIX and Table XX:—

TABLE XIX.—*Groundnut spacing trials—Bunch—*1953 *summer.*

Object—To find out the optimum spacing to be adopted for the bunch groundnut raised under irrigated conditions.
Field—H 11.
Previous crop—Gingelly.
Manuring—10,000 lb. of compost per acre.
Layout—Randomised blocks replicated six times.
Plot size—Net 24'×6'or 1/302·5 acre.
Strain—TMV 2.

Spacing— 6"×6".
9"×6".
9"×9".
12"×9".
12"×12".
Sown on—30th March 1953.
Harvested on—7th August 1953.

Spacing.	Acre yield in lb.	Percentage on control.	Whether significant or not. (P = 0·05).
(1)	(2)	(3)	(4)
6" × 6"	639	94·8	
9" × 6"	745	110·5	
9" × 9"	674	100·0	
12" × 9"	515	76·4	Yes
12" × 12"	602	89·3	
Standard error	35·3	5·2	
Critical difference (P = 0·05)	102·5	15·3	

Conclusion—9" × 6", 9" × 9", 6" × 6", 12" × 12", 12" × 9".

TABLE XX.—*Economics of different spacings.*

Spacing.	Seed rate in lb. per acre.	Acre yield in lb.	Cost of cultivation per acre.	Gorss receipt per acre.	Net profit per acre.
(1)	(2)	(3)	(4)	(5)	(6)
6" × 6"	134	639	217	223	6
9" × 6"	90	745	195	256	61
9" × 9"	67	674	181	232	51¼
12" × 9"	45	515	169	177	8
12" × 12"	33	602	162	206	44

Maximum net return is obtained by adopting the spacing 9"×6".

(*b*) *At the Agricultural Research Station, Palur*—(i) *Comparative yield trials.*—Four bunch pure lines were compared with TMV. 2 strain under comparative yield trials. The yield data were statistically analysed and the results are presented in Table XXI:—

TABLE XXI.—*Comparative yield trials of bunch selections*—1953—*Summer.*

Object—To compare the yields of four bunch pure lines with TMV 2 under irrigated condition.
Field—1–3.
Area—1·75 acres.
Manuring—20 cart-loads of compost per acre.
Layout—Randomised blocks replicated six times.

Plot size—Gross 36'×9'.
Net 33'×7½'.
Spacing—9"×9".
Sown on—23rd February 1953.
Harvested on—29th June 1953.

Selections.	Acre yield in lb.	Percentage on control	Whether significant or not (P = 0·05).
(1)	(2)	(3)	(4)
TMV. 2	875	100·0	Yes.
AH. 4111	968	110·6	
AH. 4218	1,056	120·7	
AH. 4515	990	113·2	
AH. 6481	473	54·1	
Standard error	85·3	9·8	
Critical difference	253·0	28·9	

(P = 0·05).

Conclusion—4218, 4515, 4111, TMV. 2, 6481.

Yields obtained were below normal. Dormant bunch strain AH. 6481 has recorded significantly less than all the others. The other purelines were on par with TMV. 2.

(2) *Groundnut irrigation experiment.*—An experiment was conducted for the second time to find out the optimum number of irrigations required for the groundnut crop grown during summer (February-July). Four irrigation treatments were adopted from the first flowering stage before which two irrigations were given uniformly to all the treatments. The yield data were statistically analysed and the results are given in Table XXII :—

TABLE XXII.—*Groundnut irrigation experiment*—1953—*Summer.*

Object—To find out the optimum number of irrigations required for the groundnut crop grown under irrigation.
Field—1-3.
Manuring—20 cart-loads of compost per acre.
Layout—Randomized blocks replicated six times.
Plot size—Gross 36′ × 10′.
Net 32′ × 8′ or 1/170·1 acre.
Spacing—1′ × 1′.
Sown on—23rd February 1953.
Harvested on—11th August 1953.

Treatments.	1953-54.		1952-53.	
	Acre yield in lb.	Percentage on control.	Acre yield in lb.	Percentage on control.
(1)	(2)	(3)	(4)	(5)
1 Irrigating every 10th day	1,669	100·0	1,843	100·0
2 Do. 15th day	946	56·7	1,725	93·6
3 Do. 20th day	456	27·3	1,302	70·6
4 Do. 25th day	307	18·4	1,314	71·3
Standard eror	163·7	9·8	94·5	5·1
Whether significant or not (P = 0·05)	Yes.		Yes.	
Critical difference	493·0	29·5	284·0	15·4
Conclusion—1, 2, 3, 4			1, 2, 4, 3.	

As in last year, the treatment " irrigating every 10th day " has recorded significantly higher yield than the other treatments. The yields declined as the interval between irrigations became greater and the fall was more marked than in the previous year. Economics of the different treatments were worked out and the data are given in Table XXIII :—

TABLE XXIII.—*Economics of the groundnut irrigation experiment.*

Treatments.	Total number of irrigation.	Total cost of cultivation.	Gross receipt.	Profit or loss.	Profit or loss in 1952-53.
(1)	(2)	(3)	(4)	(5)	(6)
		RS.	RS.	RS.	RS.
Irrigating every 10th day	14	185	424	227	208
Do. 15th day	10	166	241	67	196
Do. 20th day	9	157	118	—46	122
Do. 25th day	7	149	81	—73	131

Irrigating the crop at 10 days intervals has given the highest monetary return. The two treatments " irrigated every 20th and 26th days " have resulted in loss. Last year also irrigating every 10th day gave the highest monetary return and no treatment resulted in any loss. The severity of the summer this season appears to have been responsible for this variation.

(xiv) *Groundnut spacing trials.*—With the object of finding out the effect on yield by giving wider spacings between the rows and closer spacings in the row to facilitate intercultivation of the crop with bullock drawn implements, observa-

tional trials were laid out one for the bunch and another for the spreading groundnut adopting the following spacings.

Bunch.	*Spreading.*
6″× 6″	9″ × 9″
9″× 4″	12″ × 6″
12″× 3″	18″ × 4″

The yield data obtained showed that the yield of the two groundnut type does not suffer any reduction by their being grown with under spacings between rows and narrow spacing in the rows. The results are given below.

	Spacing.	*Acre yield in lb.*
Bunch TMV 2	6′×6″	1,160
Do.	9″×4″	1,090
Do.	12″×3″	1,190
Spreading–TMV 3	9″×9″	757
Do.	12″×6″	789
Do.	18″×4″	850

Study of growth and productive phase on 25 plants in each treatment also confirmed the above results. The wider spacing between rows facilitated intercultivation with "*Danthis*" and this resulted in considerable saving in labour and expense. The trial has been programmed to be carried out under replicated conditions next season.

(xv) *Pests and diseases.*—*Surulpoochi* (*Stomopteryx nerteria*) made its appearance in a mild form in the beginning of September when the crop was about five weeks old. The pest attack intensified later during a short spell of drought and the bunch types were more affected. The pest disappeared completely after heavy showers were received and thereafter the pest was not noticed in a severe form.

Tikka leaf spot disease (*Cercospora personata*) was noticed early in October and it intensified later with the increase in rainfall.

B. *Gingelly*—(i) *General.*—Gingelly was grown in the cold weather and summer seasons, the former during November and December 1953 to March 1954 and the later from March 1954.

Due to better seasonal conditions, the cold weather sowings of gingelly were done on a large area of 17·84 acres inclusive of experimental sowings as against 4·70 acres last year. Almost all the sowings were completed by the close of November 1953. The crop in general gave fair yields and the strain TMV. 3 gave the highest acre yield. The following are the acre yields obtained in each of the three strains :—

	1953–54 *Cold weather.*
TMV 1	69 lb. per acre.
TMV 2	120 lb. per acre.
TMV 3	133 lb. per acre.

Summer sowings of the crop were taken up by the end of March 1954 and completed by the middle of April 1954. An area of 8·74 acres inclusive of area under experimental units was sown to the crop as against an area of 8·57 acres last year. The crop had good stand and put on satisfactory growth. The attack of shoot-webber pest (*Antigastra catalaunalis*) at the time of flower production reduced considerably the setting of capsules. The severe summer conditions that prevailed hastened maturity in general by about ten days in both the bulk and the experimental units.

(ii) *Cold weather crop*—(*a*) *General.*—The bulk crop was sown in an area of 16·78 acres. The sowings were done in two stages, 14·77 acres were sown by the end of November 1953 and 2·01 acres by the end of December 1953. The experimental units were sown in an area of 1·06 acres by the end of November 1953, and were maintained under partially irrigated conditions.

(*b*) *Replicated row tests.*—Twenty-two selections out of twenty-six selections that out-yielded their adjoining controls in the last year's row tests were put under replicated row tests with TMV. 2 and local as standards for comparison. Seed materials in the rest of selections were chaffy. The yield differences did not attain the level of significance.

(*c*) *Row tests.*—Twenty-one selections made for desirable economic characters were sown in single rows with TMV. 2 strain as control. Only six selections out-yielded their adjoining controls and will be advanced for further trials.

(*d*) *Maintenance of varieties.*—The existing collection of cold weather and *Pyru* varieties was raised in small plots and maintained. One hundred and eighty-four single plant selections with desirable economic characters were made from these varieties. Besides these two hundred and ninety-one selections were made from local gingelly in ryots holdings.

(*e*) *Seed multiplication of selections.*—The three selections, viz., S.I. 966/2, X 6/7 and X 6/2 that were under preliminary yield trials during the last season were put under seed multiplication to obtain enough seed material for further trials.

(*f*) *New varieties.*—Eleven varieties received from the College Station, Texas, United States of America, were again tried during this season. Their performance at this station was not good but six of them possessed economic characters like 1-3 capsules per leaf axil and very close setting. Two single plant selections with close setting of capsules and 1-3 capsules in an axil were made from them. Four cultures received from the Ministry of Agriculture, Egypt, through the Indian Council of Agricultural Research were raised in single rows and found to be of no economic importance. Two local varieties obtained from Tindivanam and Gingee also did not show any promise.

(*g*) *Hybridization.*—Four new crosses with the selected parents were attempted this season, with the object of evolving economic types with 6-8 loculed nature and 1-3 capsules per leaf axil.

(iii) *Summer (irrigated crop), 1953.*—The results of experiments conducted during 1953 summer season, which could not be included in the last year's annual report consequent on the late harvests, are now presented.

(*a*) *Comparative yield trial of selections.*—Two selections, viz., S.I. 1/5 (a high yielding selection from local) and S.I. 957/2 (a selection from Karur variety) were compared with TMV. 1, TMV. 3 and local. Four selections isolated from TMV. 1 and possessing different seed colours were compared with TMV. 1 and local in another series. The results are summarized in Table XXIV.

TABLE XXIV.—*Gingelly—Comparative yield trials—1953 summer.*

Object—To compare the yields of two selections, viz., S.I. 1/5 and S.I. 957/2 with the standard strain TMV 1, TMV 3 and local gingelly and to compare the yields of four selections from TMV 1 with local and TMV 1 strain.
Field—H 16 and 17.
Area—0·30 acre and 0·33 acre.
Previous crop—Paddy.
Manuring—10 cart-loads of cattle-manure per acre.
Layout—Randomised blocks replicated six times.
Plot size—36′ × 7′ gross.
32′ × 5′ net or 1/220 acre.
Spacing—1′ × 1′.
Sown on—Series I and II—12th April and 9th April 1953.
Harvested on—Series I and II—14th July 1953.

Series I.

Treatments.	1948 Summer.		1949 Summer.		1951 Summer.		1952 Summer.		1953 Summer.	
	Acre yield in lb.	Percentage on control.	Acre yield in lb.	Percentage on control.	Acre yield in lb.	Percentage on control.	Acre yield in lb.	Percentage on control.	Acre yield in lb.	Percentage on control.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1 S.I. 1/5	124	81·0	216	110·3	226	142·8	48	78·8	85	110·4
2 S.I. 957/2	192	125·5	256	130·6	182	114·5	62	102·2	92	119·5
3 TMV. 1	146	95·4	208	106·1	192	120·8	46	75·1	70	90·9
4 TMV. 3	126	82·1	210	107·1	229	144·0	81	133·8	107	139·0
5 Local	153	100·0	196	100·0	159	100·0	61	100·0	77	100·0
Standard error.. ..	26·7	17·5	20·5	10·5	31·8	20·0	9·3	15·2	18·2	23·6
Whether significant or not (P = 0·05).	No.		No.		No.		No.			

Conclusion—The results in the years did not ataain the level of significance.

Series II.

Treatments.	1948 summer.		1949 summer.		1950 summer.		1951 summer.	
	Acre yield in lb.	Percentage on control.	Acre yield in lb.	Percentage on control.	Acre yield in lb.	Percentage on control.	Acre yield in lb.	Percentage on control.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1 Local	121	100·0	219	100·0	94	100·0	177	100·0
2 TMV. 1	Not included in trial		271	123·8	72	77·0	139	78·5
3 TMV. 1-A black ..	147	121·5	299	136·6	87	92·4	221	124·8
4 TMV. 1-B dark brown.	171	141·3	246	113·6	109	116·0	242	136·7
5 TMV. 1-C red brown.	178	147·8	303	136·4	86	91·6	223	126·0
6 TMV. 1-D brown ..	128	105·8	194	88·6	73	77·9	130	73·4
Standard error.. ..	12·5	10·3	18·8	8·6	23·4	24·9	12·7	7·2
Whether significant or not (P = 0·05).	Yes.		Yes.		No.		Yes.	
Critical difference ..	38·7	32·0	52·0	23·7	..	..	6·9	20·8

Treatments.	1952 summer.		1953 summer.		Average percentage on control.
	Acre yield in lb.	Percentage on control.	Acre yield in lb.	Percentage on control.	
	(10)	(11)	(12)	(13)	(14)
1 Local	34	100·0	66	100·0	100·0
2 TMV. 1	42	170·0	94	142·4	118·3
3 TMV. 1-A black ..	70	192·8	12	18·9	114·5
4 TMV. 1-B dark brown.	42	115·8	69	104·8	121·3
5 TMV. 1-C red brown.	44	177·9	97	147·0	138·1
6 TMV. 1-D brown ..	22	81·3	55	83·4	85·1
Standard error ..	9·2	25·5	15·3	23·2	..
Whether significant or not (P = 0·05).	Yes.		Yes.		
Critical difference ..	26·7	73·9	..	..	..

Conclusion—1948 summer : 5, 4, 3, 6, 1

1949 summer : 5, 3, 2, 4, 1, 6

1950 summer : Not significant.

1951 summer : 4, 5, 3, 1, 2, 6

1952 summer : 3, 5, 2, 4, 1, 6

1953 summer : Not significant.

TABLE XXV.—*Gingelly—Spacing experiment—1953 summer season—cont.*

Treatments.	1948 summer.		1949 summer.		1950 summer.		1951 summer.	
	Acre yield in lb.	Percentage on control.	Acre yield in lb.	Percentage on control.	Acre yield in lb.	Percentage on control.	Acre yield in lb.	Percentage on control.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Spacing—								
(1) 2′ × 2′ ..	238	63·4	279	94·9	37	49·5	180	81·8
(2) 1½′ × 1½′ ..	266	71·1	247	84·1	57	76·1	237	103·4
(3) 1′ × 1′	525	140·4	311	105·8	67	90·4	236	107·8
(4) 9″ × 9″	457	122·2	362	123·1	79	106·1	186	84·6
(5) 6″ × 6″	385	102·9	244	89·8	135	181·2	270	122·7
(6) General mean ..	374	100·0	294	100·0	75	100·0	220	100·0
Standard error ..	39·8	7·9	28·9	10·0	15·8	21·2	24·0	10·9
Whether significant or not (P = 0·05).	Yes.		No.		Yes.		No.	
Critical difference ..	84·1	22·5	..	..	47·6	64·0	..	..

Treatments.	1952 summer.		1953 summer.		Average percentage on general mean.
	Acre yield in lb.	Percentage on control.	Acre yield in lb.	Percentage on control.	
	(10)	(11)	(12)	(13)	(14)
Spacing—					
(1) 2′ × 2′	12	90·6	48	50·1	86·1
(2) 1½′ × 1½′ ..	162	118·5	78	82·1	104·6
(3) 1′ × 1′	174	125·2	134	141·1	142·0
(4) 9″ × 9″	149	107·2	101	106·3	129·9
(5) 6″ × 6″	85	61·2	113	118·9	135·3
(6) General mean ..	139	100·0	95	100·0	100·0
Standard error ..	16·1	11·8	12·9	13·6	..
Whether significant or not (P = 0·05).	Yes.		Yes.		..
Critical difference ..	47·5	34·1	35·0	40·0	..

Conclusion—1948 summer : 1′ × 1′, 9″ × 9″, 6″ × 6″ | 1½′ × 1½′, 2′ × 2′.

1949 summer : Not significant.

1950 summer : 6″ × 6″, 9″ × 9″, 1′ × 1′ | 1½′ × 1½′, 2′ × 2′.

1951 summer : Not significant.

1952 Summer : 1′ × 1′, 1½′ × 1½′, 9″ × 9″ | 2″ × 2″, 4″ × 4″.

1953 summer : 1′ × 1′, 6″ × 6″, 9″ × 9″ | 1½′ × 1½″, 2′ × 2′.

In series I the yield data did not attain the level of statistical significance. In all the years of trial S.I. 957/2 a selection from Karur has given consistantly increased yield over local. The trial has been repeated during 1954 summer season. In series II also the yield differences have not attained significance. The selection TMV. 1—C red brown has given significant increase in yield in two years besides it has given maximum average increased yield over local (control) by about 38·1 per cent. Mass selection from the selection ' C ' (red brown) will be made in future.

(*b*) *Preliminary yield trials.*—Two strains one from Bombay and the other from Uttar Pradesh were put under preliminary yield trials along with TMV. 1, TMV. 3 and local in one series and four selections from varieties along with TMV. 3 and local gingelly, in another series. The crop in both the series dried up in patches in the field. The trial will be repeated with the seed material gathered.

(*c*) *Replicated row tests.*—Out of twenty selections that were under replicated row tests nine selections gave increased yields than TMV 3 control, and they will be put under preliminary yield trials during the next season.

(*d*) *Row tests.*—Out of forty-four selections that were put under row tests fifteen selections out-yielded their adjoining controls, and will be advanced to replicated row tests during the coming season.

(*e*) *Spacing trails.*—In order to determine the optimum and economic spacing required for the summer (irrigated) crop of gingelly an experiment with the same set of treatments and layout as in previous years was laid out for the last time. As in previous years TMV. 3 strain of gingelly was used in the trial. The yield data did not attain statistical significance. The results are given in Table XXV.

TABLE XXV.—*Gingelly—Spacing trials*—1953 *summer.*

Object—To determine the optimum spacing to be adopted for the gingelly crop grown under irrigated condition.
Field—F 3 b.

Area—0·32 acre.
Previous crop—Paddy.
Manuring—Compost manure at 13 cart-loads per acre.

Treatments—Spacing ..		*Plot size gross.*	*Net.*
	2′ × 2′	36′ × 10′	30′ × 6′ Or 1/242 acre.
	1½′ × 1½′	36′ × 9′	
	1′ × 1′	36′ × 9′	
	9″ × 9″	36′ × 9′	
	6″ × 6″	36 × 9′	

Layout—Randomized blocks replicated six times.
Sown on—20th April 1953.
Harvested on—31st July and 1st August 1953.

From the results of the six years' trials it has been established that the optimum spacing required for the summer gingelly crop is one foot either way. In four years the trial gave significant results out of which one foot spacing recorded the maximum yield in three years. The trial has been concluded.

(iv) *Summer (irrigated crop)* 1954—(*a*) *General.*—Sowing of the summer crop of gingelly was commenced by the third week of March 1954 and completed by the first fortnight of April 1954. An area of 8·74 acres inclusive of the experimental area of 2·93 acres was sown to the crop. All the experimental units were sown to the crop by the end of March 1954 and the bulk sowings were done in stages during April 1954. The various experimental units generally showed good stand and growth. The shoot-webber pest (*Antigastra catalaunalis*) appeared in very early stage of crop growth in both the bulk and experimental plots and was kept under control by timely dusting of BHC. 5 per cent. The pest reappeared in a severe form at the time of flowering of the crop and resulted in poor setting in spite of timely dusting and hand-picking of the caterpillars. The severe summer conditions that prevailed hastened maturity by about ten days.

(*b*) *Comparative yield trials.*—Two selections, viz., S.I. 1/5 (a high yielding local selection) and S.I. 957/2 (a high yielding selection from Karur variety) were compared with TMV. 1, TMV. 3 and local gingelly for the final time. The initial stand and growth of the crop were very satisfactory. But some of the plots became gappy towards the end and the crop attained early maturity. The crop has just been harvested.

(*c*) *Preliminary yield trials.*—Nine selections from varieties and crosses were compared in two separate series with TMV. 3 as control. Though the stand and growth of the crop were very good the setting of capsules was rather poor and the crop attained early maturity. The crop has just been harvested.

(*d*) *Observations on single plant selections*—(1) *Row tests.*—Nineteen single plant selections made for their desirable economic characters were put under row tests with TMV. 3 as control. The crop has just been harvested.

(2) *Replicated row tests.*—Fifteen selections that out-yielded their adjoining controls during the last year's row test were put under replicated row tests with TMV. 3 strain as control. Some of the selections attained maturity very early, while in others the maturity was not uniform necessitating partial harvests. Harvest of the crop has just been completed.

(3) *Seed multiplication of selections.*—Fourteen selections were multiplied in small plots to obtain enough seed material for further trials. The selections have just been harvested.

(*e*) *Hybridization.*—Three fresh crosses have been effected between selected parents with the object of evolving a white seeded type and cosmopolitan type.

F1 progenies of earlier crosses and those made during 1953–54 cold weather were raised along with their parents. The F1's have been studied in detail for all their economic characters.

(*f*) *Seed multiplication of varieties and types.*—The existing collection of varieties and types were raised in small plots and studied in detail. One row in each of them was selfed to maintain purity of the types.

(*g*) *New varieties.*—A white seeded variety from Pakistan was raised in observational plot and studied in detail. The plants are of open type with big sized capsules. Ten cultures received from the Head of the Division of Botany, Indian Agricultural Research Institute were raised in the pot culture house. They are under study.

(*h*) *Manurial trial.*—To determine the effect of manuring gingelly with Chilean Nitrate in comparison with other fertilizers like ammonium sulphate, cattle-manure, etc., a trial was laid out this season with the following treatments. The layout adopted was randomized blocks replicated five times.

(i) No manuring control.
(ii) Ammonium sulphate to give 30 lb. N per acre.
(iii) Ammonium sulphate to give 45 lb. N per acre.
(iv) Chilean nitrate to give 30 lb. N per acre.
(v) Chilean nitrate to give 45 lb. N per acre.
(vi) Basal dressing of 3 tons cattle manure per acre plus superphosphate to give 35 lb. P. 205 per acre.
(vii) As in (vi) plus ammonium sulphate to give 30 lb. N per acre.
(viii) As in (vi) plus ammonium sulphate to give 45 lb. N per acre.
(ix) As in (vi) plus Chilean nitrate to give 30 lb. N per acre.
(x) As in (vi) Chilean nitrate to give 45 lb. N per acre.

The crop was sown in lines one foot apart and plants thinned to about 12 inches in the line. The stand of the crop was very uniform and growth satisfactory. The crop attained early maturity, and has just been harvested.

(*i*) *Cultural trial.*—To determine the preparatory cultivation needs for gingelly crop raised under irrigated condition an experiment was laid out with the following treatments. The layout is simple randomized blocks replicated four times.

(i) Mould board plough twice.
(ii) Mould board plough four times.
(iii) Country plough twice.
(iv) Country plough four times.
(v) Country plough six times.
(vi) Mould board plough twice plus Junior Hoe twice.
(vii) Mould board plough twice plus Junior Hoe 4 times.

The stand and growth of the crop were good. Setting of capsules was very satisfactory. The crop has just been harvested.

(*j*) *Pests and diseases.*—The shoot-webber pest (*Antigastra catalaunalis*) appeared in a very severe form at the time of flower production both during the cold weather and summer seasons. Though the pest was brought under control in the initial stages by hand-picking and dusting BHC. the pest did considerable damage in the later stages.

Cases of wilt attack were also noticed during summer. Mildew (*Oidium sp.*) appeared during cold weather in a mild form.

C. *Castor*—(i) *General.*—With the receipt of 0·55 inch of rain sowing of castor was commenced on 21st July 1953 and completed in five days. A total area of 9·67 acres was sown to the crop during the year as against 10·01 acres in the previous year. The conditions were ideal for sowing and further showers helped in obtaining good germination and stand. The subsequent growth of the crop was also satisfactory. Intercultivation was given as often as necessary and the crop was in full bloom by October-November. Setting of capsules was somewhat affected due to continuous rains in October. The rainfall during the south-west monsoon period this year was in excess of the requirements of the crop and resulted in heavy vegetative growth of the crop at the expense of yield and delayed maturity. Three broods of semi-looper caterpillars appeared within two months of sowing and did severe damage to the young plants. But for the timely adoption of control measures, like hand picking, dusting with BHC. 10 per cent dust and spraying 0·2 per cent DDT the crop would have been destroyed completely. These factors affected the yield considerably. The yields recorded for the strains grown on a bulk scale this season are as follows :—

Register number of strains.	*Area in acres.*	*Acre yield of beans in lb.*
TMV 1 castor	1·01	278
TMV 2 castor	1·02	383
TMV 3 castor	0·71	163

(ii) *Comparative yield trials.*—Three series of yield trials were laid out during the year. In the first series, three selections from other States were

compared for the second time with two of the established strains, viz., T.M.V. 1 and T.M.V. 2. In the second series five selections from progenies of a cross between 'Namakkal' and 'Kumbakonam' varieties were tried along with T.M.V. 1 and T.M.V. 2 for the third time, while in the third series another set of three selections from the same cross were compared with T.M.V. 1 and T.M.V. 2 for the first time. The crop in the third series was very badly affected by semi-looper pest and the trial had to be abandoned. The details of layout and the analyses of the yield data together with the qualitative determinations are presented in Tables XXVI and XXVII.

TABLE XXVI.—*Castor—Comparative yield trials* 1953–54—*Rainfed season.*

Object—Series I.—To compare the three new strains from Uttar Pradesh, Bombay and Madhya Pradesh with TMV 1 and TMV 2.
Series II.—To compare five selections from progenies of crosses with two of the standard stains TMV 1 and TMV 2.
Fields—B2 and B1 (area 0·94 and 1·14 acres respectively).
Previous crop—Groundnut.
Manuring—5,000 lb. of manure mixture (equal parts of compost, red earth and tank silt) per acre.
Layout—Randomized blocks replicated six times (5 × 6 in series I and 7 × 6 in series II).
Size of plot—69″ × 15′ gross.
63′ × 9′ or 1/76·8 acre net.
Spacing—3′ × 3′.
Sown—21st July 1953.
Harvested—From 30th November 1953 to 2nd April 1954—Sries I.
From 2nd December 1953 to 22nd March 1954—Series II.

Series I.

Selections.	1952–53. Acre yield in lb.	1952–53. Percentage on control.	1953–54. Acre yield in lb.	1953–54. Percentage on control.
TMV 1 castor	789	155·3	1,295	103·1
TMV 2 castor	508	100·0	1,256	100·0
RC 1083 (Kanpur)	584	114·9	819	65·2
RC 1090 (Bombay)	489	96·3	735	58·5
RC 1091 (Madhya Pradesh)	317	62·4	651	51·8
Standard error	40·0	7·8	136	10·9
Whether significant or not		Yes.		Yes.
Critical difference (P = 0·05)	118·1	23·3	389·8	31·0

Conclusion—1953–54 : TMV 1, TMV 2, 1083, 1090, 1091

1952–53 : TMV 1, 1083, TMV 2, 1090, 1091

Series II.

Selections.	1951–52. Acre yield in lb.	1951–52. Percentage on control.	1952–53. Acre yield in lb.	1952–53. Percentage on control.	1953–54. Acre yield in lb.	1953–54. Percentage on control
TMV 1 castor	312	82·1	667	116·4	1,254	139·5
TMV 2 castor (control)	380	100·0	573	100·0	899	100·0
RC 1078 (X 99/22)	404	106·9	494	86·1	651	72·4
RC 1079 (X 99/43)	440	115·8	493	86·0	630	70·1
RC 1080 (X 99/44)	402	105·8	468	81·7	682	75·9
RC 1081 (X 99/97)	347	91·3	548	97·6	808	89·9
RC 1082 (X 99/172)	433	114·3	550	95·9	752	83·6
Standard error	47·8	12·6	51·9	9·0	116·1	12·9
Whether significant or not	No		No		Yes	
Critical difference (P = 0·05)	..	..	..	..	335·2	37·3

Conclusions—1953–54 : TMV 1, TMV 2, 1081, 1082, 1080, 1078, 1079
1952–53 : Not significant.
1951–52 : Not significant.

TABLE XXVII.—*Qualitative determinations on selections.*

Series I.

Selections.	1952–53. Duration in month.	1952–53. Number of beans per lb.	1952–53. Natural test weight of 1 M.M. of beans in grams.	1953–54. Duration in month.	1953–54. Number of beans per lb.	1953–54. Natural test weight of 1 M.M. of beans in grams.
TMV 1 castor	6½	1,935	1,129	6¾	1,930	1,176
TMV 2—castor (control)	7	1,354	1,074	7½	1,30C	1,134
RC 1083 (Kanpur—T3)	6¼	1,200	1,033	6¾	1,093	1,062
RC 1090 (Bombay—S. 20)	7½	1,930	1,109	7¾	1,802	1,158
RC 1091 (Madhya Pradesh E.B. 16)	7	976	982	7¼	970	989

Series II.

Selections.	1951–52.			1952–53.			1953–54.		
	Duration in month.	Number of beans per lb.	Natural test weight 1 M.M. of beans in grams.	Duration in month.	Number of beans per lb.	Natural test weight of 1 M.M. of beans in grams.	Duration in month.	Number of beans per lb.	Natural test weight of 1M.M. of beans in grams.
TMV 1 castor	6½	1,787	1,166	6½	1,935	1,129	6¾	1,935	1,175
TMV 2 castor (control)	7	1,333	1,116	7	1,354	1,074	7¼	1,340	1,139
RC 1078 (X 99/22)	5½	1,635	1,227	5½	1,675	1,089	5¾	1,433	1,134
RC 1079 (X 99/43)	5½	1,723	1,141	5½	1,695	1,122	5¾	1,666	1,117
RC 1080 (X 99/44)	5¼	1,523	1,121	5¼	1,545	1,096	5½	1,485	1,110
RC 1081 (X 99/97)	5½	1,543	1,131	5¾	1,518	1,095	6	1,413	1,119
RC 1082 (X 99/172)	5½	1,409	1,046	5½	1,366	1,044	5¾	1,243	1,106

In the first series, this year, the yield differences were statistically significant. The standard strains T.M.V. 1 and T.M.V. 2 recording significantly higher yields than the three extra State strains, while in the previous year, the extra State strains excepting one were on par with T.M.V. 2 in respect of yield. In both the years the strain from Madhya Pradesh gave the lowest yield. As regards, the qualitative characters, the natural test weight of T.M.V. 1 castor was highest followed by the strain from Bombay. The trial will be repeated for one more season to get confirmatory results.

In the second series, the yield differences were statistically significant and all the selections gave significantly lower yields than T.M.V. 1. In the first two years the yield differences did not attain the level of significance. However, in the first year, four of the selections gave higher yields than the standard strains T.M.V.1 and T.M.V. 2, while in the second year of the trials, all the selections are shorter in duration than T.M.V. 2 by one to one and a half months. They will be multiplied during the next year for conducting district trials.

In respect of qualitative characters no marked differences between the selections were noted.

(iii) *Preliminary yield trials.*—Five selections isolated from the progenies of crosses and varieties were compared with T.M.V. 1 and T.M.V. 2 strains. The semilooper attack in the field was severe resulting in highly uneven stand and the trial had to be abandoned. Few plants under each selections were however, selfed and the seeds carefully gathered for repeating the trial next season.

(iv) *Replicated row tests.*—Thirty-two selections made from progenies of crosses and varieties were compared with the standard strains T.M.V. 1 and T.M.V.2. In respect of yield eleven selections were on par with T.M.V. 1. All the eleven selections will, therefore, be put under preliminary yield trials during the next season. Five of the above selections were noted to be fairly resistant to semi-looper pest. The summary of the results of the statistical analysis and qualitative determination are given in Table XXVIII.

TABLE XXVIII.—*Castor—Replicated new test*—1953–54.
(*Rainfed season*).

Object—Thirty-two selections from progencies of crosses and varieties are compared with TMV 1 and TMV 2 to as assess their duration and yielding ability.
Field—B 8. Area in acres : 0-75.
Previous crop—Groundnut.
Manuring—5,000 lb. of manure mixture (equal parts of compost red earth and tank silt) per acre.
Lay out—Randomised blocks replicated four times (4 × 34).
Treatments—Thirty-two selections and two strains.
Plot size—66′ × 3′ or 1/220 acre.
Spacing—3′ × 3′.
Sown—22nd July 1953.
Harvested—From 15th December 1953 to 9th February 1954.

Selections.	Acre yield in lb.	Percentage on general mean.	Duration in months.	Number of beans per lb.	Natural test in weight of 1 M.M. of beans in grams.
1 TMV 1	447	174·7	6¼	1,934	1,140
2 TMV 2	414	163·6	7¼	1,295	1,122
3 99/104	391	150·6	6¼	1,525	1,084
4 X-126-6	361	142·7	6¼	1,535	1,104
5 118/2	322	127·3	6¾	1,419	1,112
6 X 124—1—4—4	12	3123·3	5¼	1,401	1,133

Selections.	Acre yield in lb.	Percentage on general mean.	Duration in months.	Number of beans per lb.	Natural test in weight of 1 M.M. of beam in gram.
7 X—126—5	311	123·0	6½	1,641	1,045
8 RC 862	292	115·4	7¼	2,184	1,133
9 99/414	288	113·9	7	1,933	1,115
10 99/34	281	111·0	7	1,625	1,159
11 99/452	278	109·8	6¼	1,617	1,110
12 99/264	274	108·3	7	1,580	1,032
13 99/249	272	107·5	5½	1,652	1,152
14 RC 816/9	260	102·8	5⅓	2,138	1,154
15 99/44	258	102·0	7¼	2,003	1,094
16 99/38	253	100·0	7	1,750	1,039
17 99/408	250	98·8	7	1,888	1,070
18 99/434	247	97·7	6¼	1,725	1,166
19 99/432	243	96·0	6½	1,727	1,104
20 99/358	240	94·9	6¼	1,660	1,120
21 99/449	235	92·9	6	1,600	1,100
22 99/413	228	90·1	6	1,590	1,165
23 X—131—1	208	82·2	7¼	1,436	1,074
24 99/412	208	82·2	6¼	1,755	1,022
25 99/276	204	80·6	6	1,675	1,054
26 RC 816/5	199	78·7	8¼	1,964	1,120
27 X—131—12	184	72·7	7¼	1,553	1,143
28 99/266	179	70·8	7	1,565	1,141
29 99/260	173	68·4	6¼	1,640	1,088
30 99/296	172	68·0	6¼	1,497	1,078
31 X—126—3	170	67·2	6½	1,842	1,109
32 99/229	158	62·5	7¼	1,800	1,126
33 99/240	150	59·3	6	1,602	998
34 99/329	141	55·7	7	1,822	1,106
General mean	253	100·0	..	..	..
Standard error	62	24·5	..	..	..
Whether 'Z' test satisfied or not	Yes.				
Critical differences (P = 0·05)	176·3	69·7	..	..	..

The cultures with serial number 3 to 13 have recorded higher yields than the general mean. These will be advanced for next season's preliminary yield trials.

(v) *Purity studies.*—Seventy selections made from progenies of crosses and varieties were sown in single rows for testing their purity and yielding capacity. From a detailed study twenty selections were observed to be pure for their morphological characters and to possess good branching habit with a good number of fruit clusters. These will be sown under replicated row tests along with TMV. 1 and TMV. 2 in the next season to assess their yielding ability.

(vi) *Hybridisation.*—Seven fresh crosses were effected with the following objects in view :—

(*a*) To reduce the duration of existing strains—

(i) RC. 913 (Namakkal) × RC. 1077 (South African).
(ii) TMV. 1 × RC. 1098 (Baker—195 U.S.A.).
(iii) TMV. 1 × TMV. 2.
(iv) TMV. 1 × TMV. 3.
(v) TMV. 1 × RC. 1094 (Cimmarron—U.S.A.).

(*b*) To impart distinct colour to the strains for easy identification in the ryots' fields.

(1) RC. 1073 (Green double bloom stem, yellow capsules) × TMV. 1.
(2) RC. 1073 × TMV. 2.

Seeds of the hybrids along with their respective parents have been gathered for raising the first generation in the next season. The F2 progenies of crosses made earlier (i) to evolve short duration and high yielding strains and (ii) to impart distinct colour to the strains were also raised and studied in detail along with their parents. Eleven single plant selections from the progenies of crosses with the desired combination were made and will be studied for purity and yielding ability next season.

(vii) *Inbred types.*—One hundred and thirty-four inbred types isolated from varieties were grown this season and studied in detail for their morphological characters. Two type plants in each were selfed and the selfed material gathered for further propagation and maintenance. Eight single plants with promising economic characters were selected for study of yield and purity.

(viii) *Ornamental types of castor.*—The eight ornamental types of castor evolved at this station were grown and their purity maintained. A total of 30 lb. of bulk seeds and 14 lb. of selfed seeds were gathered and supplied to various district centres.

(ix) *Maintenance of vigour and purity of strains.*—With the object of maintaining the vigour and purity of the three established strains, viz., TMV. 1, TMV. 2 and TMV. 3 outstanding type plants selected from each of them were sown in progeny row trials in isolated blocks. Five selections in each of TMV. 1, TMV. 2 and TMV. 3 were tried. Out of these, two in each of TMV. 1 and TMV. 2 and one in TMV. 3 recorded increased yields over their respective general means even though the yield differences did not satisfy the statistical scrutiny. The produce of these high-yielding selections has been pooled for further multiplication.

Outstanding type plants numbering sixteen in TMV. 1, nine in each of TMV. 2 and TMV. 3 strains have again been selected for continuing the trial.

(x) *Pests and diseases.*—During the second fortnight of August 1953 a rainfall of 4·65 inches was received. During this period stray incidence of semi-looper caterpillars (*Achoea janata*) was observed. The pest was controlled by immediate hand-picking and dusting with D.D.T. Again during the first fortnight of September the semi-looper attack assumed a very serious form and did heavy damage and the young crop of castor was almost completely defoliated in fields. B4, B5 and B6. Control measures were immediately taken by spraying 0·2 per cent D.D.T. and 0·08 per cent B.H.C. Both the chemicals were found to be very effective in combating the pest successfully. The control measures adopted have saved the crop in the adjoining fields. A severe attack was again noted for the third time during the second fortnight of September 1953 but was controlled by timely spraying with D.D.T. and hand-picking the caterpillars. During the period of heavy rainfall, the infestation of this pest appears to be severe.

During November 1953 tobacco caterpillars (*Prodenia litura*) appeared in a mild form and taking advantage of the gregarious nature of the caterpillars they were hand-picked and destroyed, before they could do any damage to the crop. Stray cases of red spider mite (*Tetranychus telarius*) were noticed during the cold weather period, viz., November-December and dusting fine sulphur prevented the pest assuming a severe form.

4. *Other crops*—(i) *Fodders*—(*a*) *Permanent fodder grasses.*—Of the four permanent fodder grasses, viz., Guinea grass, water grass, thin Napier grass and Napier grass, three grasses excepting Napier grass were continued in the fields they occupied in the previous year. Napier grass was removed from field F14-b since it had been occupying the field for the past several years. The grass will be planted in field E8 (0·28) during the ensuing rainfed season.

Intensive cultivation was given to the grasses during the year and the yields were higher than those obtained in the previous year. Two inter-cultivations were given during the months of August and December. Compost at 20 cart-loads per acre was applied in December and was worked in with mammatties. Two irrigations were given during the summer months to all the grasses. The details of yield and the number of cuttings taken are given below as compared with the previous year :—

Field Number.	*Area.*	*Name of the grass.*	*Number of cuttings taken.*	*Acre yield of green fodder obtained during 1953–54 in lb.*	*Acre yield of green fodder obtained in 1952–53 in lb.*
E3, 4 ..	0·52	Thin Napier grass ..	5	9,620	4,300
F12-b ..	0·23	Guinea grass ..	6	27,740	18,730
F14-*a* ..	0·27	Water grass	5	18,390	17,470
F14-*b* ..	0·29	Napier grass	1	1,310	2,100

(*b*) *Fodder cholam.*—Co. 11 fodder *cholam* was sown in fields E1, 2, F2 15, 16 and G14 (2·60 acres). Two other fodder *cholam* strains, viz., K1 and AS. 7081 received from the Agricultural Research Station, Koilpatti, were also raised in fields A10, E7, G3, 4, 7, 8, 9, 10, 11 (2·91 acres) during the rainfed season. The fields were ploughed thrice with mould-board plough followed once by H.M. Guntaka. A manure mixture consisting of red-earth, tank-silt and compost was applied to the fields at 20 cart-loads per acre. Sowings were started soon after the receipt of rains early in July and were done in stages. The germination and growth of the crop was satisfactory. The fodder was cut, dried in the field and stacked. The yield of fodder was higher during the year in Co. 11 *cholam* than in the previous one. Of the two strains of fodder *cholam* received from Koilpatti, it was found that strain AS. 7081 was better than strain K1 in respect of yield of fodder as well as grain. Seed setting was poor in all the three strains because the ear-heads were damaged by the heavy rains received in the month of October. The following are the acre yields of dry fodder obtained from the three strains :—

Strain number.	*Acre yield of dry fodder obtained in lb. during 1953–54.*	*Acre yield of dry fodder obtained in lb. during 1952–53.*
Co. 11 *Cholam*	5,500	1,660
AS. 7081	4,710	..
K1	3,540	..

(*c*) *Pillipesara.*—Field H5 (0·33 acre) was sown to Pillipesara. The field was well cultivated and manured with compost at 10 cart-loads per acre. Seeds were sown late in July. The germination and growth of the crop were not very satisfactory. Irrigations were given whenever necessary. The green fodder was cut and fed to cattle daily at 3 lb. per animal. Only 5,870 lb. of green fodder was obtained from an acre. Thirty pounds of seeds were also collected.

Besides these, 80,040 lb. of green grass cut from field bunds, 13,170 lb. of dry, 12,240 lb. of green groundnut healms were also fed to cattle during the year.

The production and utilization of fodders was higher during the year than in the previous years. The area under fodder cholam was increased from 3·42 acres in 1952–53 to 5·91 acres in 1953–54. The best use was made of green grass growing on field bunds and a quantity of 80,040 lb., nearly three times the quantity obtained in 1952–53, was fed to cattle. Self-sufficiency in the matter of fodder requirement of the station has been achieved since 1952–53.

(ii) *Paddy.*—The area under paddy was increased from 2·39 acres in 1952–53 to 4·77 acres in 1953–54 with a view to increasing the revenue as well as the fodder production of the station. Two strains, viz., MTU. 19 and BAM. 3 were grown in fields in F and H blocks respectively. Sunnhemp was first sown as green manure during the second fortnight of July. When fully grown, a portion of the green manure crop was ploughed in at the rate of 5,000 lb. per acre. The main fields to be transplanted were ploughed repeatedly to give a good puddle. Farm yard manure and superphosphate were applied along with the green manure at 20 cart-loads and 150 lb. per acre respectively. Superphosphate when applied together with the green manure was found to hasten the rotting of the green stuff. Nurseries for MTU. 19 and BAM. 3 paddy were raised in F and H blocks respectively. The transplanting was taken up during the middle of October. Ammonium sulphate was applied to as basal dressing at 150 lb. per acre at the time of transplantation. Two fields in F block and one in H block were planted according to the modified Japanese method and the others by the ordinary method. The transplanted crop came up well but towards the middle of December was subjected to an attack by stem-borer and jassid pests. Though both were successfully controlled by timely spraying and dusting of insecticides, there was some damage. Both the strains came to harvest towards the close of January. The yields obtained were fairly satisfactory and can be considered above normal when compared with the yields

obtained in the neighbourhood where the crop was completely damaged by the stem borer pest. The yields of straw and grain obtained from the modified Japanese method and the ordinary method are given below :—

Straw	1953–54.				1952–53.	
	Ordinary method.		Modified Japanese method.		Acre yield of grain (dry) in lb.	Acre yield of straw.
	Acre yield of grain (dry) in lb.	Acre yield of straw.	Acre yield of grain (dry) in lb.	Acre yield of straw.		
MTU. 19	3,088	3,816	3,423	4,933	..	..
BAM. 3	2,910	3,392	2,735	3,458	3,393	4,340

(iii) *Vegetables.*—Vegetables like *bendai*, snake-gourd, bitter-gourd, pumpkin, ash-gourd, tomato, nileshwar cucumber, *nellarimathan* and amaranthus were raised both during the monsoon and summer seasons while Lab-lab, Cow-pea and Raddish were raised only during the monsoon season. Fields F6, 7, E4, Quarters Site I to IV (1·44 acres) were put under vegetables during the rainfed and fields F4, 7 (0·45 acre) during the summer seasons. The fields were repeatedly ploughed to give a fine tilth and farm yard manure was applied at 20 cart-loads per acre. Ammonium sulphate was applied at 50 lb. per acre as a top dressing, a month after sowing. The yield of green vegetables and seeds produced during the year as compared with the previous year are given below :—

Name of the vegetables.	1953–54.		1952–53.	
	Quantity of green vegetables produced in lb.	Quantity of seeds produced in lb.	Quantity of green vegetables produced in lb.	Quantity of seeds produced in lb.
Amaranthus	598½	32½	50	15
Ash-gourd	698½	..	504	..
Bendai	39¼	63	19	27½
Bitter-gourd	11	1	..	4
Cow-pea	10	49	28¾	14
Cucumber (Nilesghwar)	933½	½	185	..
Chillies	2 1½	¼	49½	..
Lab-lab	15½	2	¾	12
Pumpkin	837	..	240	..
Raddish	305	..	..	..
Snake-gourd	78¼	1	8½	¾
Tomato	19	..	14	..
Vellagrumathan	60½	..	17½	..
Cluster beans	..	11	..	5
Roselle	..	..	..	5
Gogu	..	..	..	8
Total ..	3,827½	160	1,110½	88
Value in Rs. ..	21:-9-0	369-850	58-6-9	179-12-0

(iv) *Root crops*—(*a*) *Sweet potato.*—Two varieties, viz., V8 and V10 were grown during the year. Field F8 (0·22 acre) was thoroughly cultivated and manured with compost at 20 cart-loads per acre. Setts were planted early in August and the crop came to harvest during the first week of January. The yields obtained were not encouraging when compared with those obtained during 1952–53 season.

Variety.	1953–54. (*Acre yield in lb.*).	1952–53. (*Acre yield in lb.*).	1951–52. (*Acre yield in lb.*).
V 8	6,180	14,000	6,240
V 10	3,820	11,000	4,820
V 12	..	9,240	5,400
IB 55	..	5,096	3,000

(*b*) *Potato.*—" President " variety of potato was tried on the Station during the cold weather season in an area of 5 cents. Part of field F4 was well prepared for the purpose and manured with farm yard manure at 20 cart-loads per acre. Seed tubers were sown on the lines suggested by the Superintendent, Agricultural Research Station, Nanjanad, during the month of November. A manure mixture consisting of groundnut cake, ammonium sulphate, superphosphate and sulphate of potash was applied at the time of sowing at the rate of 300 lb., 150 lb., 150 lb. and 100 lb. per acre respectively. The germination was satisfactory. The crop came up well but was subjected to an attack of " Early blight ". The disease was

brought under control by spraying Bordeaux mixture. Irrigations were given whenever necessary. The crop came to harvest late in February nearly three months after sowing. An acre yield of 3,860 lb. of tubers was obtained.

(v) *Horse-gram.*—The local variety of horse-gram was raised during the winter months in fields A1 to 5 and D8 (4·12 acres). But due to want of rains the crop dried up in fields A1—5 and was therefore ploughed in. Seventy pounds of seeds, however, were collected from the crop in field D8.

(vi) *Coconuts.*—Of 136 seedlings in the *Uthukuttai* area 13 died during the year. The seedlings were manured during the middle of December at 100 lb. of green manure, 10 lb. of ash and 1 lb. of ammonium sulphate per tree. Rhinoceros beetles attacking the young seedlings were periodically removed with the help of beetle-hook and were destroyed. The holes were plugged with Gammexane paste to prevent further attack.

Forty nuts were harvested from the trees in the Quarters Site. These trees were also manured during the month of December at 100 lb. of green matter, 10 lb. of ash, 3 lb. of ammonium sulphate and 2 lb. of superphosphate per tree.

(vii) *Fruit plants*—(*a*) *Sathugudi.*—Of the three cheeni budded and one *Gidarangai* trees, only the later bore fruits during the year. Eleven *Gidarangai* and one *Sathugudi* budded plants were planted in Quarters Site I and II in the course of the year. Late in December the young plants as well as the trees were manured at the rate of 2 lb. of superphosphate and 100 lb. of compost per plant. Irrigations were given whenever necessary but due to the failure of water in the wells, irrigation to the fruit plants was made difficult during the summer months. The following are the yields of fruits obtained during the year.

	1953–54.		1952–53.	
	Yield in lb.	*Value.*	*Yield in lb.*	*Value.*
		RS. A. P.		RS. A. P.
Gidarangai	150¾	28 4 3	182½	34 3 6
Sathugudi	..	..	54	10 2 0
Pummello	86½	10 13 0	63½	7 15 0

(*b*) *Sapota.*—The trees (three) remained unproductive during this year also.

(*c*) *Malta lemon.*—Twenty rooted cuttings were planted during the year in Quarters Site I and IV. Due to the severe summer, half of them perished. None of the 37 seedlings planted in 1951 have come to bearing so far.

(*d*) *Lemon varieties.*—Only eighteen of the thirty-six plants in six varieties originally planted are surviving. The growth of these seedlings is far from satisfactory.

(*e*) *Jack.*—Singapore jack which came to bearing in 1952–53 did not bear any fruits this year. One tree of the local variety came to bearing and has so far yielded three fruits weighing 33 lb. Two more are in the tree. Seeds obtained from these fruits have been sown in nurseries.

(*f*) *Papaya.*—Seventy seedlings of "Honey Dew" variety were planted behind the rest house and in field F4. Of these, thirty dried and the rest have come up well. A few plants have also just started bearing.

(*g*) *Melons.*—Water and musk melons were cultivated during the summer seasons. A popularly cultivated variety of local melon was also grown and this yielded profusely. The following are the quantities of fruits harvested and sold during the year as compared with those obtained in the previous year.

	1953–54.		1952–53.	
	Weight.	*Value.*	*Weight.*	*Value.*
		RS. A. P.		RS. A. P.
Local melon	24½	19 8 3	6208	6 5 6
Water melon	144	4 8 0	462	14 7 0
Musk melon	9	0 9 6	8	1 0 0

(*h*) *Lime.*—Forty seedlings of lime were planted during the year in Quarters Site. Despite good watering and care twenty-four of them dried, and the rest are coming up well.

One of the lime plants in Quarters Site II which was planted in 1947 came to bearing during the year and yielded 100 fruits valued at Rs. 1-8-0.

(viii) *Green manure plants*—(*a*) *Gliricidia.*—Nearly 5,000 Gliricidia seedlings were planted during the year but 60 per cent of them dried subsequently. The surviving seedlings have come up well thus bringing the total number of plants alive at the end of the year to well over 7,300. The seedlings were pot-watered regularly. Two cuttings of green leaves were taken from the older plants and 18,000 lb. of green stuff so obtained was composted. Thirteen pounds of seeds were also collected. The number of seedlings distributed was over 10,000.

(*b*) *Sesbania.*—Sesbania was planted along paddy field bunds and in roguing lines during the last monsoon season. Most of the plants were left to seed and 25 lb. of seeds were collected.

A pure crop of this green manure was also raised both during the rainfed as well as during the summer seasons on a field scale in F8 (0·28). The crop raised during the rainfed season gave a poor acre yield of only 5,000 lb. of green matter due to the failure of rains. The crop sown during the summer season is still in the field. A total quantity of 3,840 lb. of green matter obtained from plants raised in odd places was composted. Nearly two lakhs of seedlings were distributed through departmental channels for large-scale planting in the taluk.

(*c*) *Indigofera teysmani.*—The two plants near H13 well, came to flower and two pounds of seeds were collected and distributed. Nearly 200 seedlings were also planted in field bunds during the summer season. Most of the seedlings have established and are progressing satisfactorily.

(*d*) *Sun-flower.*—Sunflower was sown during the rainfed season as a green manure crop in field H 16 (0·30 acre). The crop growth was not very satisfactory and gave an acre yield of 5,300 lb. of green manure which was ploughed *in situ.*

(*e*) *Others.*—The following seedlings of economic trees were planted during the year. Nearly seventy-five per cent of them are surviving.

Kapok	120 Nos.
Cassia siamea	35 ,,
Neem	20 ,,
Malaipoovarasu	10 ,,
Albizzia lebeck	20 ,,
Pungam	10 ,,
Thespesia	10 ,,

(ix) *Other economic plants*—(*a*) *Prosopis juliflora.*—Nearly 500 seedlings of Prosopis were planted during the year all along the fence line. One hundred and thirty-five pounds of pods were collected from the trees near Quarters Site and in G and H blocks.

(*b*) *Oyster nut* (*Telfairia pedata*).—Only three of the five plants are surviving now. The vines have been trained on to trees. The plants have made rapid growth but are yet to come to bearing.

(*c*) *Balsa* (*Ochroma lagopus*).—Of the four seedlings transplanted early in the year only two have established. One of these has grown up to a height of over six feet while the other has attained a height of only three feet. The plants were watered during the summer months and are being looked after with care.

(*d*) *Pepper.*—Twenty rooted cuttings of pepper received from the Pepper Specialist, Taliparamba, were planted in Quarters Site and near the cattle-shed. The vines in Quarters Site were trained on coconut trees and those near cattle-shed were trained on to *Erithrina indica*—only five vines are surviving now.

(*e*) *Bastard sago.*—Six seedlings of Bastard sago were received from the Fruit Research Station, Burliar and were planted in field G-1. The seedlings did not make any growth. They also dried up inspite of copious pot-watering., during the summer months.

(*f*) *African oil palm* (*Elaeis guineenis*).—Six seedlings of this oil palm were received from the Superintendent, Agricultural Research Station, Nileshwar, and were planted in field G-1. These also dried up during the summer months.

(*g*) *Doum palm.*—Three plants in field G-1 are coming up well.

(*h*) *Ramie fibre.*—Seeds of Ramie fibre obtained from the Director of Agriculture, Madras, were sown in nurseries. The germination of seeds was satisfactory. Most of the seedlings dried up in the nursery itself. Only 10 seedlings are surviving now and these will be planted during the monsoon season.

(*i*) *Eucalyptus.*—Nurseries of Eucalyptus were raised with the seeds received from the Oilseeds Specialist, Coimbatore. The germination was far from satisfactory and even the few seedlings that came dried up subsequently.

5. *Bulky organic manures.*—Fifty-one compost pits of size 12′ × 6′ × 3′ were dug in the course of the year thus bringing the total number of compost pits on the station to 67. All available wastes on the farm and dry leaves collected from road margins were periodically composted. Three hundred and thirty-four cart-loads of compost have so far been produced and utilized during the year and still 100 cart-loads are available in pits for immediate use. That the production of compost was more than double that of the previous year will be evident from the following figures :—

	1953-54.	1952-53.	1951-52.
Production of compost in tons	220	95	60

During the year one hundred and sixteen tons of cattle manure was produced on the station. The following table gives the comparative production figures for the current year and the past two years:—

	1953-54.	1952-53.	1951-52.
Production in tons	116	108	63

The station has achieved self-sufficiency in the production of organic manures. Since last year the purchase of bulky organic manures has been altogether stopped.

6. *Pisciculture.*—Of the varieties Trichogaster, Etroplus and Chanos maintained on the station, the last mentioned variety perished completely. The other two varieties have multiplied. Fingerlings of these are available for supply.

7. *Works.*—The sanctioned items of work relating to the annual repairs to residential buildings were taken up and completed. Besides these, re-thatching the roofing of rest-house, cattle-shed and manure pits, re-netting the crossing enclosure, replacing the broken panes of M.B. shed, and replacement of the wooden frame of the gate in the western side of the farm fence line were the other items of work taken up and completed. The expenditure under Petty Construction and Repairs was Rs. 1,981.

8. *Seed distribution.*—The following are the quantities of seed materials distributed during the year :—

	QUANTITY IN LB.
Groundnut pods—	
TMV 1	368
TMV 2	9,374
TMV 3	11,108
TMV 4	45
Other selections	472
	21,367
Groundnut kernels	925
Gingelly—	
TMV 1	129
TMV 2	103
TMV 3	1,570
	1,802
Castor—	
TMV 1	202
TMV 2	243
TMV 3	90
	535

	Quantity in lb.
BAM 3 paddy seeds	6,440
MTV 19 paddy seeds	5,080
AKP 1 *Ragi* seeds	187
Cumbu seeds	70
Cholam (local) seeds	176
Vegetable seeds	89
Prosopis Juliflora pods	98
Thin Napier grass seeds	10
Vegetable seedlings	516 Nos.
Lime seedlings	4 ,,
Moringa cuttings (Jaffna variety)	8 ,,
Guinea grass slips	2,300 ,,
Paddy seedlings	625 bundles.
Sesbania seedlings	91,000 Nos.
Gliricidia seedlings	10,230 ,,
Gliricidia cuttings	250 ,,
Neem seedlings	175 ,,
Seedling of economic importance	15,305 ,,

9. *Cost of cultivation of bulk crops.*—The cost of cultivation of bulk crops and other statistical information are given separately in Appendices III to V.

10. *Vanamahotsava.*—Seedlings of green leaf yielding trees like *Pungam*, Bassia, Gliricidia, Thespesia, etc., were planted in large numbers on the station during Vanamahotsava. A large number of seedlings were also distributed to the public directly and through the departmental agency.

11. *Farmers' Day and Exhibition.*—The Farmers' Day was celebrated on 21st December 1953 on the station. The celebration was widely publiczied in all the neighbouring villages and in the urban area. Improved strains of oilseeds, seeds and seedlings of vegetables, green manure and economic plants were exhibited supported by illustrated charts. Labour saving and tractor-drawn implements were also prominently displayed. The function was presided over by Sri. K. Muthulinga Reddiar of Kayapakkam and was attended by nearly 100 ryots besides the Crop Specialists from Coimbatore.

12. *Visitors.*—Dr. Naganna Gowda, Sri M. Bakthavathsalam, successive Ministers for Agriculture and Sri M. A. Manickavelu Naicker, Minister for Land Revenue were the distinguished visitors. Sri J. Chandnani and Sri S. S. Rajan from the Indian Agricultural Research Institute were the other prominent visitors.

M. BHAVANI SHANKER RAO,
Superintendent.

AGRICULTURAL RESEARCH STATION, TINDIVANAM,
10*th July* 1954.

C .R. SESHADRI,
Oilseeds Specialist and Vice Principal.

AGRICULTURAL COLLEGE AND RESEARCH INSTITUTE, COIMBATORE,
27*th July* 1954.

APPENDIX I.

STATEMENT OF CHARGES AND RECEIPTS FOR THE FASLI YEAR 1363 (1ST JULY 1953 TO 30TH APRIL 1954).

Charges.

	Rs.
1. '40. Agriculture—Experimental Farms—Agricultural Research Stations'.—	
1 Pay of officer and establishment	14,050
2 Dearness allowance	4,371
3 House rent allowance	435
4 Travelling allowance	573
Total ..	19,439
2. Other charges—	
1 Dearness allowance to menials	2,990
2 Service postage	450
3 Other contingencies	738
4 Petty construction and repairs	1,981
5 Purchase of live and deadstock	223
6 Working expenses	24,117
7 Apparatus and materials	185
Total ..	30,684
Grand total ..	50,123
3. Zonal Nucleus Seed farm Scheme—	
1 Pay of establishment	2,183
2 Dearness allowance	827
3 House rent allowance	107
4 Travelling allowance	252
Total ..	3,369
4. Other charges—	
1 Lease amount	3,000
2 Working expenses	3,275
Total ..	6,275
Grand total ..	9,644
Receipts 'XXIX-A. Agricultural Receipts'.	
1 Stations	8,574
2 Miscellaneous	4,373
3 Rent on buildings	18
4 Tractor hire charges	959
Total ..	13,924
Value of seeds transferred	9,659
Grand total ..	23,583

APPENDIX II.

STEPS TAKEN TO INCREASE THE REVENUE OF THE STATION.

Consequent on the deepening of the irrigation wells in the previous years, the water supply in them increased facilitating an assured cropping during the summer season.

The fodder requirements of the station was amply met with by the increased area under fodder *Cholam* and paddy. The area under these two were increased by 2·00 and 2·38 acres respectively when compared with the previous year. The green grass growing on field bunds was also advantageously used and nearly 80,000 lb. representing three times the quantity utilized in 1952–53 was cut and fed to cattle. As in the previous years, groundnut haulms were preserved and used as cattle food.

The coconut seedlings in the *Uthukuttai* are coming up well and will give good revenue in due course.

The production of both vegetable seeds as well as green vegetables was more than doubled during the year. The value realized in terms of rupees from sale and transfer of both was Rs. 582, an increase of nearly Rs. 340 as compared with the previous year.

Seedlings of *Pungam*, Cassia, Gliricida, Sesbania, Neem, etc., were planted in large numbers. The yield of green leaves from these as well as from those planted in previous years will provide enough organic matter to meet the manurial requirements of the station.

The production of compost as well as farm-yard manure reached the peak during the year. Two hundred and twenty tons of compost and 116 tons of farm-yard manure representing nearly thrice the quantity produced in the year 1951–52 was obtained and utilized during the year.

The existing live fence of Prosophis in G, H and F block was reinforced by filling up gaps wherever necessary. The fence line was also extended to other blocks.

A local variety of *Cholam* was sown mixed with the rainfed groundnut in bulk fields. The produce obtained from this crop was valued at over Rs. 600.

The tractor stationed on the farm in the scheme for the mechanical cultivation of groundnut was most profitably utilized during off time and an area of nearly 80 acres were ploughed in the neighbourhood bringing in a revenue of Rs. 960.

The farm animals and implements were hired out when not in demand on the Station realising thus a revenue of nearly Rs. 35.

APPENDIX III.

COST OF CULTIVATION OF BULK CROPS DURING 1953–54 RAINFED SEASON.

	Groundnut.		Gingelly.		Castor.	Paddy.
	Stations.	Seed multiplication.	Irrigated.	Cold weather.		
Preparatory cultivation	7	5	27	5	0	56
Manures and manuring	24	14	18	..	25	84
Seeds and sowing	47	48	9	6	7	63
After-cultivation	17	13	8	7	15	6
Irrigation	..	..	17	..	..	94
Harvesting	24	13	6	6	26	31
Total working expenses	119	93	85	24	81	334
Cost of produce	180	122	30	70	87	452
Profit or loss	61	29	—55*	46	6	118

*Due to severe summer condition and partial failure of water supply from the wells, the yield of summer gingelly was poor and this resulted in loss.

APPENDIX IV-A

PRODUCTION AND VALUE OF THE IMPORTANT CROPS OF THE STATION.

erial number	and details of crops.	Area in acres.	Seed.		Grain.	
			Yield in lb.	Value.	Yield in lb.	Value.
	(1)	(2)	(3)	(4)	(5)	(6)
				RS.		RS.
1	Groundnut	28·18	13,810	3,453	2,208	276
2	Gingelly	24·69	1,365	853	398	15
3	Castor	9·08	2,459	768	1,148	240
4	Paddy	4·76	12,050	1,700	2,188	274
	Total value ..	..	..	6,774	..	805

		Straw.		Total receipts for the year, value.	Total receipts for the past three years.		
		Yield in lb.	Value.		1950–51.	1951–52.	1952–53
			RS.	RS.	RS.	RS.	RS.
		(7)	(8)	(9)	(10)	(11)	(12)
1	Groundnut	46,540	155	3,884	2,489	2,168	1,465
2	Gingelly	..	..	868	1,082	659	207
3	Castor	5,400	22	1,030	1,072	860	451
4	Paddy	7,049	171	2,145	365	636	1,457
	Total value ..	..	348	7,927	5,008	4,323	3,580

APPENDIX IV-B.

UTILIZATION OF PRODUCE OF THE IMPORTANT CROP OF THE STATION.

	Seed.				Grain.			
	Retained on the station.		Transferred or sold.		Retained on the station.		Transferred or sold.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	LB.	RS.	LB.	RS.	LB.	RS.	LB	RS.
Groundnut	7,776	1,944	29,712	7,428	..	..	5,418	1,683
Gingelly	176	110	2,430	1,519	..	..	398	15
Castor	59	18	969	303	..	..	3,515	717
Paddy	1,666	213	10,284	1,317	824	103	1,364	171
Chola (local) ..	..	..	..	..	..	..	3,740	427
Total ..	..	2,285	..	10,567	..	103	..	3,013

	Straw.					Total receipts for three years		
	Retained on the Station.		Transferred or sold.		To al value.	1950–51.	1951–52.	1952–53
	Quantity.	Value.	Quantity.	Value.				
	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
	LB.	RS.	LB.	RS.	Rs.	RS.	Rs.	RS.
Groundnut	..	..	..	..	11,055	5,998	7,593	11,200
Gingelly	..	..	..	..	1,644	1,339	875	991
Castor	..	..	..	..	1,038	579	1,591	470
Paddy	17,069	171	..	..	1,975	244	636	1,457
Cholam (local) ..	14,000	90	..	..	517	..	..	..
Total ..	..	261	..	..	16,229	8,160	10,695	14,118

APPENDIX V.

Serial number and details of expenditure.	Actual expenditure for three years. 1950–51.	1951–52.	1952–53.	1953–54.
1 Pay and allowances of the staff (one-third of actuals). —Farm Manager, Maistri or fieldman (*a*).	456	564	580	348
2 Miscellaneous cultivation expenses (one-third of actuals) ..	1,080	1,731	1,242	1,419
3 Working expenses (actuals)—Mazdoor labour	4,501	4,347	4,712	4,245
4 one-third of expenditure of live and deadstock	510	479	426	11
5 Proportionate rent for the land if the station is on leased land. If it is Government farm the normal rental of the tract subject to 15 times the land assessment per acre to be debited as expenditure (*b*).	1,560	1,140	814	893
6 Unforeseen contingencies if any	..	..	..	..
Grand total ..	8,107	8,258	7,774	6,916

APPENDIX VI.

STATEMENT OF ABSTRACT EXPENDITURE AND RECEIPTS.

Serial number and particulars.	1950–51.	1951–52.	1952–53.	1953–54.
1 Expenditure—	Rs.	Rs.	Rs.	Rs.
1 Stations	50,629	57,363	51,905	50,123
2 Gingelly scheme	2,980	2,223	1,833	..
3 Groundnut seed multiplication and Zonal Nucleus Seed Farm Scheme.	9,019	5,778	9,257	9,644
4 Scheme to carry out large-scale trials with insecticides and fungicides on groundnut.	..	18,421	13,254	..
Total ..	62,628	83,785	76,249	59,767
1 Revenue—				
1 Stations	4,808	6,545	8,806	8,574
2 Miscellaneous	2,418	1,847	6,734	4,373
3 Rent	5	24	1	18
4 Seeds transferred	9,276	13,113	10,508	9,659
5 Tractor hire charges	..	..	..	95
Total ..	16,507	21,529	26,058	23,583

ANNUAL REPORT OF THE RICE RESEARCH STATION, TIRURKUPPAM FOR THE YEAR 1953–54 (FASLI 1363).

1. *Season.*—The rainfall during the year was 38·92 inches on 46 rainy days as against 32·86 inches on 42 rainy days received during the previous year and the preceding ten-year average of 49·54 inches on 53 rainy days. The south-west monsoon that set in during the last week of June recorded 12·08 inches on 20 rainy days as against 9·74 inches on 20 rainy days in the previous year and the ten-year average of 17·71 inches on 26 rainy days. Though the south-west monsoon set in in the last week of June the rainfall was not enough for taking up the sowings in dry and semi-dry areas from the middle of August when the sowings are usually done. Owing to the rains in late August and in September the plots would not get into condition for sowing with the result that sowings could be taken up late by the end of September only and the entire area programmed could not be sown due to continuous wet weather.

The north-east monsoon that started early in October recorded 26·84 inches in 26 rainy days as against 21·74 inches in 20 rainy days in the previous year and the ten-year average of 26·04 inches in 22 rainy days. The monsoon was very active in October. The rainfall being widespread, freshes were received in the Coovum river and this helped in filling up the tank and raising the level of water in wells. Though there was enough water in almost all the tanks in the district to irrigate the Samba crop, in the farm cultivation had to depend on lift irrigation. The farm being supplied by the top-most sluice, flow of water in the supply channel from the tank stopped on 20th of November with the result that both the engines had to be worked and the entire area programmed could not be planted for want of water. The rainfall of 3·41 inches in December-January was beneficial to standing crops of Samba paddy, sesbania speciosa, tapioca, etc. With the commencement of Navari paddy in December-January the irrigation for Samba crop became more and more difficult though both the engines worked 16 hours a day.

The hot weather period recorded no rainfall at all as against 1·38 inches of rain on two rainy days during the previous year and the preceding ten-year average of 5·79 inches on six rainy days. Owing to the continued dry weather the Navarai crop had to depend entirely on lift irrigation and enough green manure crops could not be raised as per programme. On the whole the season was not favourable for paddy cultivation. The rainfall statement is given in Table I.

TABLE I.—*Statement of rainfall.*

Month.	Week.	1953–54. Quantity in inches.	1953–54. Number of rainy days.	1952–53. Quantity in inches.	1952–53. Number of rainy days.	Average for the previous ten years. Quantity in inches.	Average for the previous ten years. Number of rainy days.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		South-west monsoon.					
1953—							
June	7–13	..	..	..	..	0·49	1·0
	14–20	..	..	..	..	0·43	1·0
	21–27	0·67	2	0·58	2	0·75	0·8
June–July	28– 4	0·13	1	0·58	1	0·46	1·1
	5–11	0·88	2	0·31	1	1·67	2·0
	12–18	0·02	..	1·95	2	0·73	1·8
	19–25	1·58	2	..	..	1·03	1·8
July–August	26– 1	0·27	1	0·53	1	0.96	1·6
	2– 8	0·21	1	0·53	2	1·26	1·9
	9–15	0·11	1	0·69	3	1·08	2·1
	16–22	0·44	1	0·90	3	1·27	2·1
	23–29	2·44	2	2·78	3	1·93	2·2
August–September ..	30– 5	0·38	1	..	..	1·50	2·0
	6–12	1·41	2	0·24	1	1·82	2·5
	13–19	3·07	4	..	..	1·33	1·0
	20–26	..	..	0·60	1	1·00	1·3
Total ..		12·08	20	9·74	20	17·71	25·7

TABLE I.—*Statement of rainfall*—cont.

Month.	Week.	1953–54. Quantity in inches.	1953–54. Number of rainy days.	1952–53. Quantity in inches.	1952–53. Number of rainy days.	Average for the previous ten years. Quantity in inches.	Average for the previous ten years. Number of rainy days.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
North-east monsoon.							
1953—							
September–October ..	27– 3	0·78	1	0·37	1	0·63	1·0
	4–10	2·75	2	2·53	4	4·87	2·5
	11–17	3·79	6	2·09	3	1·56	1·6
	18–24	10·04	5	0·70	1	1·38	1·9
	25–31	2·59	4	..	..	1·07	1·6
November	1– 7	..	..	..	..	1·86	1·3
	8–14	0·52	1	..	..	2·19	2·0
	15–21	..	..	..	..	4·25	2·7
	22–28	2·96	3	0·37	1	1·07	1·6
November–December ..	29– 5	..	..	8·07	3	3·53	1·7
	6–12	..	..	6·46	4	1·65	0·9
	13–19	..	..	0·81	1	0·69	0·8
December–January 1954 ..	20–26	0·25	1	..	..	0·35	0·7
	27– 3	0·11	1	..	..	0·18	0·4
	4–10	2·98	2	0·13	1	0·15	0·4
	11–17	0·07	..	0·21	1	0·06	0·2
	18–24	..	..	..	..	0·20	0·2
	25–31	..	..	..	..	0·35	0·2
Total ..		26·84	26	21·74	20	26·04	21.7
Hot weather.							
February	1– 7	..	..	..	..	..	..
	8–14	..	..	..	..	..	..
	15–21	..	..	..	..	0·40	0·2
	22–28	..	..	..	..	0·15	0·3
March	1– 7	..	..	..	..	0·65	0·5
	8–14		..	..	..	0·08	0·2
	15–21	..	..	..	..	0·14	0·3
	22–28	..	..	..	..	0·02	0·1
March–April	29–4	..	..	..	..	0·62	0·6
	5–11	..	..	0·04	..	..	..
	12–18	..	..	1·00	1	0·59	0·7
	19–25		..	..	..	0·12	0·2
April–May	26– 2	..	..	..	..	0·01	0·1
	3– 9	..	..	..	..	0·02	0·1
	10–16	..	..	..	..	0·11	0·2
	17–23	..	..	..	..	1·58	0·5
	24–30	..	..	..	..	0·62	0·7
	31– 6	..	..	0·34	1	0·68	1·0
Total ..		..	..	1·38	2	5·79	5·7
Grand total ..		38·92	46	32·86	42	49·54	53·1

2. *Cultivation routine.*—Preparatory cultivation of rain-fed and semi-dry areas consisted of two courses of ploughings with the iron plough followed by a number of ploughings with country plough till a good tilth was obtained. 'Karmaram' was worked to collect the weeds and 'Kattimaram' was passed to break the clods and level the fields. The rain-fed and semi-dry areas were manured with farm-yard manure at 10 to 15 cart-loads per acre. Bulk sowings were done with 'Gorru' and seeds were covered with 'Guntaka'. To facilitate germination by breaking the crust 'Guntaka' was again worked on the third day after sowing. The seed rate used in dry and semi-dry areas was 60 lb. per acre. Preparatory cultivation given to each of the three transplanted crops of the year consisted of ploughing twice with the iron plough and then with the country plough. After spreading green leaf at 5,000 lb. per acre, green manure trampler was worked. Superphosphate at 150 lb. and ammonium sulphate 75 to 100 lb. per acre were applied just before the last ploughing and the levelling board was passed finally. Ammonium sulphate 75 to 100 lb. per acre was applied 4 to 6 weeks after planting. All the seed-beds of the three seasons were manured with green leaf at 5,000 lb. per acre. The seed rate for

nursery or Samba season was 3 lb. and for Sornavari and Navarai seasons 3½ lb per cent. The details of sowing transplanting and harvesting are given below :—

Particulars. (1)	Sornavari. (2)	Samba. (3)	Navarai. (4)
Seed beds	27th April to 12th June 1953.	18th July to 31st October 1953.	19th December 1953 to 8th January 1954.
Transplanting	19th May to 5th July 1953.	28th August to 30th November 1953.	18th January to 13th February 1954.
Harvesting	13th August to 3rd October 1953.	5th December 1953 to 11th May 1954.	14th April to 25th May 1954.
Total area planted in acres ..	5·92	14·61	5·03
Acre yields of bulks in pounds ..	3,395	1,428	2,495

3. *Paddy improvement—Pure-line selection*—A. *Sornavari season*—(*a*) *Sornavari.*—Selection work started in 1943 has resulted in the release of TKM 3 strain. In 1948 fresh selections were taken from ryots' sample of Sornavari with a view to evolving a strain yielding higher than TKM 3 and seven cultures were found to be promising. These seven cultures were under yield trials against TKM 3 and PLR 1251. Fishers' 'Z' test was satisfied. The performance of PLR 1251 was very poor. Two cultures have given significantly increased yield over TKM 3 standard. However, these two cultures together with four other cultures that gave better yield than TKM 3 standard were carried forward for further trial. Four best cultures have been sent for district trials. Details of experiment and summary of results and conclusions are presented in Table II.

TABLE II.—*Yield trials of Sornavari cultures—Wet* (*Sornavari season*).

Field No. 14-a.
Previous crop—Samba paddy.
Manure—Green leaf at 5,000 lb. plus ammonium Sulphate at 100 lb. per acre.
Layout—9 × 6 randomized blocks.
Size of sub-plot—20′ × 4′.
Spacing—4″ × 4″—two seedlings per hole.

Sown—14th May 1953.
Planted—8th June 1953.
Harvested—1st September 1953

Summary of results.

Particulars. (1)	1691 (2)	1768 (3)	1886 (4)	1888 (5)	8876 (6)	8897 (7)	8888 (8)
Acre yield of grain in lb.	4,648	4,136	4,945	4,370	4,310	4,623	4,805
Percentage on control	110·1	97·9	117·0	103·5	102·1	109·4	113·8
Flowering duration in days ..	79	80	81	77	78	73	75
Acre yield of grain in lb. for—							
1951–52	3,933	3,771	3,785	3,893	4,107	3,767	3,965
1952–53	4,313	4,213	4,203	4,247	4,383	4,217	4,22

	PLR 1251. (9)	TKM3 standard. (10)	General Mean. (11)	'z' test satisfied or not (P=0·05). (12)	Standard error. (13)	Critical difference. (P=0·05). (14)
Acre yield of grain in lb.	2,426	4,224	4,276	Yes.	192·4	547·3
Percentage on control	57·4	100·0	101·3		4·6	13·0
Flowering duration in days ..	90	77	..	..	..	..
Acre yield of grain in lb. for—						
1951–52	..	3,481	..	..	..	..
1952–53	..	3,957	..	..	..	..

Conclusion—1886, 8888, 1691, 8897, 1888, 8876, TKM 3 standard, 1768, PLR 1251

(*b*) *Short duration types.*—Ninety-three short duration types were under observation against Co. 13 standard. Fifty-five promising types were carried forward for further trials. The rejected types were poorer than Co. 13 standard.

(*c*) *Chinese types.*—Four Chinese types were under yield trial against Co. 13 and TKM 3 standards. 'Z' test was satisfied but none of the types out-yielded

the standards. The trial will be repeated next year. Details of experiment and summary of results and conclusions are presented in Table III.

TABLE III.—*Yield trials of Chinease types—Wet (Sornavari season).*

Field No. 12b3.
Previous crop—Samba paddy.
Manure—Green leaf at 5,000 lb. plus ammonium sulphate at 150 lb. per acre.
Layout—6 × 6 randomized blocks.
Size of sub-plot—20′ × 4′.
Spacing—4′ × 4′—doubles.

Sown—14th May 1953.
Planted—9th June 1953.
Harvested—3rd September 1953.

Summary of results.

Particulars.	CH2.	CH42.	CH62.	CH63.	TKM. 3 standard.
(1)	(2)	(3)	(4)	(5)	(6)
Acre yield of grain in lb.	3,399	3,442	3,799	2,709	3,861
Percentage on control	89·6	90·0	98·8	70·8	100·9
Flowering duration in days ..	66	79	84	80	81

	Co. 13 standard.	General Mean.	'Z' test satisfied or not (P=0·05).	Standard error.	Critical difference. (P=0·05).
	(7)	(8)	(9)	(10)	(11)
Acre yield of grain in lb.	3,825	3,502	Yes.	133·1	385·2
Percentage on control	100·0	91·6		3·1	10·1
Flowering duration in days	84	..	..	..	..

Conclusion—TKM 3, Co. 13, CH 62, CH 42, CH 2, CH 63

B. *Samba season*—(i) *Rainfed conditions*—(*a*) *Mottakar and Sembalai.*—Thirty-eight cultures of Mottakar and three in Sembalai were multiplied under wet conditions since the yield trials could not be sown for want of timely rains.

(*b*) *Bairuvadlu.*—Three hundred single-plant selections were grown under observation. One hundred and four promising selections were carried forward for further trials.

(c) *Sonapalai.*—District samples of Sonapalai were grown and from a population of about 50,000 plants studied 132 single-plant selections were taken.

(ii) *Semi-dry conditions.*—(*a*) *Vadan samba and Kaligan samba.*—Thirty-one Vedan samba cultures and five Kaligan samba cultures were multiplied under wet conditions as trials could not be conducted in semi-dry area for want of timely rains.

(*b*) *Kappa samba.*—District samples of Kappa samba were grown and out of 2,793 single-plants studied 150 single ear-head selections were taken for further study and selection.

(iii) *Wet conditions*—(*a*) *Seevan samba.*—Five cultures in Seevan samba were under yield trials against ASD 6 (Anaikomban) and Seeven samba standard. '*Z*' test was satisfied and two cultures were on a par with Seevan samba standard. ASD 6 was the poorest. Details of the experiment and summary of results and conclusions are presented in Table IV.

TABLE III.—*Yield trials of Seevan samba cultures—Wet (Samba season),*

Field No. 5-e.
Previous crop—Sornavari paddy.
Manure—Green leaf at 5,600 lb. plus ammonium sulphate at 175 lb. per acre.
Layout—7 × 6 randomized blocks.
Size of sub-plot—20′ × 4′.
Spacing—6′ × 6′—doubles.

Sown—17th September 1953.
Planted—21st October 1953.
Harvested—16th February 1954.

Summary of results.

Particulars.	4220	4268	4268	4323	4150	ASD 6
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Acre yield of grain in lb.	1 987	1,782	2,184	1,846	1,677	1,430
Percentage on control	103·3	92·7	113·6	96·0	87·2	74·4
Flowering duration in days ..	116	113	118	117	116	114
Acre yield of grain in lb. for—						
1949–50	827	775	745	706	754	1,018
1950–51	2,577	2,151	2,367	2,289	2,261	2,682
1951–52			Trials failed.			
1952–53	3,302	2,525	2,300	2,672	2,115	2,061

Particulars.	SVS Standard.	General mean.	'Z' test satisfied or not (P=0·05).	Standard error.	Critical difference. (P=0·05).
	(8)	(9)	(10)	(11)	(12)
Acre yield of grain in lb.	1,928	1,832		108·1	311·4
Percentage on control	100·0	95·3	Yes.	5·6	16·2
Flowering duration in days	114	..	..	..	..
Acre yield of grain in lb. for—					
1949-50	723	..	..	..	..
1950-51	2,474	..	..	..	..
1951-52			Trials failed.		
1952-53	1,911	..	..	..	..

Conclusion—4218, 4220, SVS Std., 4323, 4268, 4159, ASD 6

Three hundred single-plant selections in Seevan samba were under observation against Seevan samba standard. One hundred and twenty-seven promising cultures will be carried forward.

(*b*) *Chinna samba.*—Sixty cultures in Chinna samba were under preliminary yield trials against Co. 5 standard. Twenty-two cultures that gave better yield than Co. 5 standard will be carried forward for regular yield trials.

(*c*) *Kittan samba.*—Five cultures were under yield trials against Co. 19 standard. 'Z' test was not satisfied. However the trial will be repeated next year. Details of the experiment and summary of results and conclusions are presented in Table V.

TABLE V.—*Yield trials of Kittan samba cultures—Wet (Samba season).*

Field No. 5-c.
Previous crop—Sornavari paddy.
Manure—Green leaf at 5,000 lb. plus Ammonium Sulphate at 225 lb. per acre.
Layout—6 × 6 randomized blocks.
Size of sub-plot—20′ × 4′.
Spacing—6″ × 6″—doubles.
Sown—17th September 1953.
Planted—19th October 1953.
Harvested—23rd February 1954.

Summary of results.

Particulars.	8109	8331	8061	8086	8080
(1)	(2)	(3)	(4)	(5)	(6)
Acre yield of grain in lb.	2,006	2,003	2,197	2,322	2,172
Percentage on control	94·5	94·3	103·4	109·2	102·2
Flowering duration in days	121	124	123	123	121
Acre yield of grain in lb.—					
1949-50	2,875	3,250	3,190	3,218	3,330
1950-51	4,112	4,527	4,119	4,431	3,942
1951-52	3,768	2,444	3,415	3,473	2,484
1952-53	3,028	3,067	2,943	3,141	2,981

Particulars.	Co. 19 standard.	General mean.	'Z' test satisfied or not (P=0·05).	Standard error.
	(7)	(8)	(9)	(10)
Acre yield of grain in lb.	2,124	2,137	..	119·7
Percentage on control	100·0	100·6	No.	5·6
Flowering duration in days	124		..	..
Acre yield of grain in lb.—				
1949-50	3,425		..	..
1950-51	4,215		..	..
1951-52	3,743		..	..
1952-53	2,647		..	..

Conclusion—Treatment differences not statistically significant.

(*d*) *Sirumani.*—Nine cultures in Sirumani were under yield trials against Co. 19 standard. 'Z' test was satisfied. Two cultures gave significantly higher yield over Co. 19. These two cultures along with six others which were on a par with Co. 19 will be carried forward for further trials. Details of the experiment and the summary of results and conclusions are presented in Table VI.

TABLE VI.—*Yield trials of Sirumani cultures—Wet (Samba season).*

Field No. 14-a.
Previous crop—Sornavari paddy.
Manure—Green leaf at 5,000 lb. plus Ammonium Sulphate at 175 lb. per acre.
Layout—10 × 6 randomized blocks.
Size of sub-plot—20′ × 4′.
Spacing—6″ × 6″ doubles.
Sown—17th September 1953.
Planted—27th October 1953.
Harvested—1st March 1954.

Summary of results.

Particulars (1)	9047 (2)	9006 (3)	9206 (4)	8969 (5)	8966 (6)	8972 (7)	9224 (8)
Acre yield of grain in l	1,290	1,089	1,210	992	1,101	1,129	1,502
Percentage on control	124·3	105·0	116·6	95·6	106·0	108·7	144·6
Flowering duration in days	129	130	129	132	125	131	124
Acre yield of grain in lb.—							
1951–52	2,549	2,273	1,960	1,843	2,375	2,406	2,363
1952–53	3,118	3,199	2,589	958	944	1,184	2,204

Particulars.	9019 (9)	9022 (10)	Co. 19 standard. (11)	General mean. (12)	'Z' test satisfied or not (P=0·05). (13)	Standard error. (14)	Critical difference (P=0·05). (15)
Acre yield of grain in lb.	1,116	1,152	1,038	1,162	Yes.	80·2	227·8
Percentage on control	107·6	111·0	100·0	111·9	..	7·7	21·9
Flowering duration in days	131	130	131	..	..	..	..
Acre yield of grain in lb.—							
1951–52	2,116	2,536	2,443	..	..	..	..
1952–53	3,056	3,181	3,650	..	..	..	..

Conclusion—9224, 9047, 9206, 9022, 8972, 9019, 8966, 9006, Co. 19 standard, 8969.

(*e*) *Kappakar.*—Six Kappakar cultures were under yield trials against Kappakar Standard. 'Z' test was not satisfied. However the trial will be repeated next year. Details of the experiment and the summary of results and conclusions are presented in Table VII.

TABLE VII.—*Yield trials of Kappakar cultures—Wet (Samba season).*

Field No. 5-d.
Previous crop—Sornavari paddy.
Manure—Green leaf at 5,000 lb. plus Ammonium sulphate at 175 lb. per acre.
Layout—7 × 6 randomized blocks.
Size of sub-plot—20′ × 4′.
Spacing—6″ × 6″ doubles.
Sown—17th September 1953.
Planted—19th October 1953.
Harvested—1st February 1954.

Summary of results.

Particulars. (1)	7800 (2)	7767 (3)	7831 (4)	7827 (5)	7635 (6)
Acre yield of grain in lb.	1,066	1,136	1,180	911	877
Precentage on control	91·6	97·6	101·4	78·3	75·3
Flowering duration in days	100	100	97	99	100
Acre yield of grain in lb. in—					
1949–50	1,275	1,087	2,024	1,084	1,027
1950–51	2,362	2,399	2,161	2,064	2,345
1951–52			Trials failed.		
1952–53	1,786	1,812	1,647	1,665	1,801

Particulars.	7634 (7)	Kappakar standard. (8)	General mean. (9)	'Z' test satisfied or not (P=0·05). (10)	Standard error. (11)
Acre yield of grain in lb.	1,058	1,164	1,056	..	80·3
Percentage on control	90·8	100·0	90·7	No.	6·9
Flowering duration in days	100	98	..	..	..
Acre yield of grain in lb. in—					
1949–50	1,174	1,707	..	..	..
1950–51	2,316	2,146	..	..	..
1951–52			Trials failed.		
1952–53	1,909	1,647	..	..	..

Conclusion—Treatment differences not statistically significant.

(*f*) *Karthigai samba.*—Karthigai samba culture 3,345 along with culture 5,103 received from Ambasamudram was tried against Co. 2 and ASD 5 under normal and heavy manurial conditions in split-plot design. Fishers' 'Z' test was satisfied for varieties only and not satisfied for manures and interaction between manures and varieties. Details of the experiment and the summary of results and conclusions are presented in Table VIII.

TABLE VIII.—*Yield trials of Karthigai samba cultures—Wet (Samba season).*

Field No. 5-f.
Previous crop—Sornavari paddy.
Manure—As per schedule.
Layout—Split plot design—Normal and heavy manuring as main treatments and paddy strains as sub-treatments randomized and repeated six times.
Size of sub-plot—20′ × 4′.
Spacing—6″ × 6″.
Normal—Green leaf at 5,000 lb. plus super at 150 lb. plus Ammonium Sulphate at 150 lb. per acre.
Heavy—Normal plus 75 lb. Ammonium sulphate per acre.
Sown—17th September 1953.
Planted—23rd October 1953.
Harvested—17th February 1954.

Summary of results for doses only.

Particulars.	Normal dose.	Heavy dose.	General mean.	'Z' test satisfied or not (P—0·05).	Standard error.
(1)	(2)	(3)	(4)	(5)	(6)
Acre yield of grain in lb.	1,316	1,356	1,336	No.	148·3
Percentage on general mean	98·5	101·5	100·0	..	11·1

Conclusion.—Treatment differences not statistically significant.

Summary of results for varieties only.

Particulars.	Co. 2.	ASD.5.	3345	5108	General mean.	'Z' test satisfied or not (P—0·05).	Standard error.	difference (P—0·05).
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Acre yield of grain in lb.	1,154	1,409	1,305	1,475	1,336	..	72·1	207·1
Percentage on general mean	86·4	105·5	97·7	110·4	100·0	Yes.	5·6	15·5
Acre yield of grain in lb. for—								
1950–51	2,500	2,486	2,627	..	..	..	..	-
1951–52			Trials failed.					
1952–53	2,077	2.168	2,112	2,243	..	..	..	..

Conclusion.—5108, ASD. 5, 3345, Co. 2.

Summary of results for interaction between doses and varieties.

Particulars.	Co. 2.		A.S.D. 5.		3345	
	Normal.	Heavy.	Normal.	Heavy.	Normal.	Heavy.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Acre yield of grain in lb.	1,209	1,099	1,299	1,518	1,254	1,354
Percentage on general mean	90·5	82·3	97·2	113·7	93·9	101·4
Flowering duration in days.	104	106	109	112	108	106

	5108		General mean.	'Z' test satisfied or not (P—0.05).	Standard error.
	Normal.	Heavy.			
	(8)	(9)	(10)	(11)	(12)
Acre yield of grain n lb·	1,502	1,446	1,336	No.	101,0
Percentage on general mean ..	112 4	108·2	100·0	..	7·6
Flowering duration in days ..	111	113	..	..	..

Conclusion.—Treatment differences not statistically significant.

C. *Navarai season.*—(*a*) *Pullasannavadlu.*—Six cultures of Pullasannavadlu were under yield trials against Pullasannavadlu standard. 'Z' test was satisfied. Three cultures that gave significantly higher yield than standard and one culture that was on a par with the standard will be carried forward for further trials. Details of experiment and summary of results and conclusions are given in Table IX.

TABLE IX.—*Yield trails of Pullasannavadlu cultures—Wet (Navarai season).*

Field No· 10-a.
Previous crop—Samba paddy.
Manure—Green leaf at 5,000 lb. plus Ammonium sulphate at 175 lb. per acre.
Layout—7 × 6 randomized blocks.
Size of sub-plot—15′ × 4′.
Spacing—4″ × 4″ doubles.
Sown—9th January 1954.
Planted—10th February 1954.
Harvested—25th May 1954.

Summary of results.

Particulars.	8409	8571	8496	8486	8525	8555
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Acre yield of grain in lb. ..	1,919	1,752	1,624	2,181	2,177	2,000
Percentage on control	109·4	99·9	92·6	121·5	124·2	114.5
Flowering duration in days ..	94	89	89	90	89	89
Acre yield of grain in lb. for 1952–53.	1,417	1,278	1,896	1,396	1,499	1,574

	PSV. Standard.	General mean.	'Z' test satisfied or not (P—0.05).	Standard error.	Critical difference (P—0.05)
	(8)	(9)	(10)	(11)	(12)
Acre yield of grain in lb·	1.754	1.908	..	84·0	244.2
Percentage on control	100·0	108·6	Yes.	4·8	13·0
Flowering duration in days ..	89	..	..	..	..
Acre yield of grain in lb. for 1952–53.	1,114	..	..	..	..

Conclusion.—8525, 8486, 8555, 8469, PSV. Standurd, 8571, 8496.

(*b*) *Tellasannavadlu.*—Seventy-one cultures in Tellasannavadlu were under preliminary yield trials against Co. 20 as standard. Thirty cultures that gave better yield than standard were carried forward for yield trials.

(*c*) *Mottakar.*—Twenty-seven cultures in Mottakar were under yield trials against Mottakar standard in three series. 'Z' test was satisfied for all the three series. Twenty-four cultures that gave significantly higher yield than the standard will be carried forward. Details of experiment and summary of results and conclusions are presented in Table X (*a*) *to* (*c*).

TABLE X (*a*).—*Yield trials of Mottakar cultures—Wet* (*Navarai season*).

Field No. 10-b.
Previous crop—Samba paddy.
Manure—Green leaf at 5,000 lb. plus Ammonium Sulphate at 175 lb. per acre.
Layout—3 series of 10 × 4 randomized blocks.
Size of sub-plot—15' × 4'.
Spacing—4" × 4" doubles.
Sown—9th January 1954.
Planted—12th February 1954.
Harvested—20th May 1954.

Summary of results.

Particulars.	7411	7478	10132	7435	7441	10144	7399
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Acre yield of grain in lb.	3,238	3,770	3,637	3,432	3,667	3,325	3,585
Percentage on control	108·7	126·7	122·2	115·3	123·2	111·7	120·4
Flowering duration in days	97	98	95	93	95	99	101

	7521	7511	Mottakar standard.	General mean.	'Z' test satisfied or not (P = 0·05).	Standard error.	Critical difference (P = 0·05).
	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Acre yield of grain in lb.	3,524	3,273	2,977	3,442	Yes.	123·9	354·5
Percentage on control	118·4	110·0	100·0	115·6	..	4·2	11·9
Flowering duration in days	97	97	94	..	..	..	..

Conclusion.—7478, 7441, 10132, 7399, 7521, 7435, 10144, 7511, 7411, Mottakar Standard.

TABLE X (*b*).—*Summary of results.*

Particulars.	10185	10177	10241	10178	10174	10151	10198
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Acre yield of grain in lb	3,493	3,260	3,918	3,527	3,555	3,452	3,390
Percentage on control	124·6	116·2	139·7	125·7	126·8	123·1	120·9
Flowering duration in days ..	97	97	94	92	95	95	95

	10147	10201	Mottakar standard	General mean	'Z' test satisfied or not (P = 0·05).	Standard error.	Critical difference (P = 0·05).
	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Acre yield of grain in lb.	3,339	3,647	2,805	3,440	..	144·5	416·2
Percentage on control	119·1	130·0	100·0	122·7	Yes	5·2	14·8
Flowering duration in days ..	98	95	96	..	..	..	..

Conclusion.—10241, 10201, 10174, 10178, 10185, 10151, 10198, 10147, 10177, Mottakar standard.

TABLE X (*c*).—*Summary of results.*

Particulars.	10319	10315	10278	10307	10252	10249	10255
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Acre yield of grain in lb.	3,482	3,457	3,316	3,373	3,390	3,931	3,388
ercentage on control	121·2	120·3	115·4	117·4	118·0	136·8	118·0
Flowering duration in days ..	98	93	105	97	97	97	95

	10275	10115	Mottakar standard.	General mean.	'Z' test satisfied or not (P = 0·05).	Standard error.	Critical difference (P = 0·05).
	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Acre yield of grain in lb.	3,365	3,740	2,874	3,432	Yes	109·8	322·6
Percentage on control	117·1	130·1	100·0	119·4	..	3·8	11·2
Flowering duration in days ..	104	98	95	..	..	..	..

Conclusion.—10249, 10115, 10319, 10315, 10252, 10255, 10307, 10275, 10278, Mottakar standard.

(*d*) *Sathikam.*—Nine cultures in Sathikam were under yield trials against Co. 13 standard which is shorter in duration than the cultures. 'Z' test was satisfied and all the nine cultures gave significantly higher yield than the standard. It is proposed to repeat the trial next year with Co. 18 as standard which is about the same duration as the cultures under trial. Details of experiment and summary of results and conclusions are presented in Table XI.

TABLE XI.—*Yield trials of Sathikam cultures—Wet (Navarai season).*

Field No. 10-b
Previous crop—Samba paddy.
Manure—Green leaf at 5,000 lb. plus Ammonium Sulphate at 175 lb. per acre.
Layout—10 × 4 randomized blocks.
Size of sub-plot—15′ × 4′
Spacing—4″ × 4″ doubles.

Sown—9th January 1954.
Planted—13th February 1954.
Harvested—5th May 1954.

Summary of results.

Particulars.	10364	10349	10350	10363	10371	10358	10336
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Acre yiled of grain in lb.	3,344	2,754	3,099	2,992	2,925	2,805	3,101
Percentage on control	143·5	118·1	132·9	128·3	125·5	120·3	133·0
Flowering duration in days ..	89	87	92	89	88	90	85
Acre yield of grain in lb. for 1952-53.	2,021	1,960	2,200	2,005	2,154	2,074	2,260

	10332	10361	Co. 13 standard.	General mean.	'Z' test satisfied or not (P=0·05).	Standard error.	Critical difference (P=0·05).
	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Acre yield of grain in lb.	3,086	2,980	2,331	2,943	Yes.	105·9	309·0
Percentage on control	132·4	127·8	100·0	126·3	..	4·5	13·3
Flowering duration in days ..	91	88	79	..	..	..	..
Acre yield of grain in lb. for 1952-53.	2,025	2,113	2,066	..	..	..	..

Conclusion—10364, 10336, 10350, 10332, 10363, 10361, 10371, 10358, 10349, Co. 13.

(*e*) *Chittada.*—Three cultures in Chittada were under yield trials against Co. 13 standard. 'Z' test was satisfied but all the cultures were far below the standdard as in the previous year. The trial will be continued. Details of the experiment and summary of results and conclusions are presented in Table XII.

TABLE XII.—*Yield trials of Chittada cultures—Wet (Navarai season).*

Field No. 10-a
Previous crop—Samba paddy.
Manure—Green leaf at 5,000 lb. plus Ammonium sulphate at 175 lb. per acre.
Layout—4 × 6 randomized blocks.
Size of sub-plot—15′ × 4′.
Spacing—4″ × 4″ doubles.

Sown—9th January 1954.
Planted—10th February 1954.
Harvested—24th April 1954.

Summary of results.

Particulars.	10391	10397	10402	Co. 13 standard.	General mean.	'Z' test satisfied or not (P=0·05).	Standard error.	Critical difference (P=0·05).
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Acre yield of grain in lb.	1,762	1,962	1,967	2,585	2,069	Yes	43·4	136·6
Percentage on control	68·2	75·9	76·1	100·0	80·1	..	1·7	5·3
Flowering duration in days.	77	77	77	84	..	..	..	..
Acre yield of grain in lb. for 1952-53.	2,223	2,367	2,238	3,336	..	..	..	..

Conclusion—Co. 13 standard, 10402, 10397, 10391.

(*f*) *Kesari.*—Eight cultures in Kesari were under yield trials against Co. 13 standard which is shorter in duration than the cultures. 'Z' test was satisfied and all the cultures gave significantly higher yield than Co. 13. It is proposed to repeat the trial next year with Co. 18 as standard which is about the same duration

as the cultures under trial. Details of experiment and summary of results and conclusions are presented in Table XIII.

TABLE XIII.—*Yield trials of Kesari cultures—Wet (Navarai season).*

Field No. 10-b.
Previous crop—Samba paddy.
Manure—Green leaf at 5,000 lb plus Ammhnium Sulphate at 175 lb per acre.
Layout—9 × 4 randomized blocks.
Size of Sub-plot—15′ × 4′.
Spacing—4″ × 4″ doubles.

Sown—9th January 1954.
Planted—13th February 1954.
Harvested—6th May 1954.

Summary of results.

Particulars.	10430/2	10430/6	10438	10448	19435	10428	10450
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Acre yield of grain in lb.	3,883	4,112	4,112	3,497	3,783	4,135	4,455
Percentage on control	164·4	174·2	174·2	148·1	160.3	175·2	188·7
Flowering duration in days ..	88	90	88	86	94	88	89

..	10441	Co. 13 standard.	General mean.	'Z' test satisfied or not (P—0·05).	Standard error.	Critic difference (P=0·05).
	(9)	(10)	(11)	(12)	(13)	(14)
Acre yield of grain in lb.	4,021	2,361	3,819	Yes	91·7	271·1
Percentage on control	170·3	100·0	161·7	..	3·9	11·5
Flowering duration n days ..	89	82	..	..	..	..

Conclusion—10450, 10428, 10430/6, 10438, 10441, 10430/2, 10435, 10448, Co. 13 standard.

(*g*) *Short duration types.*—Seventy-eight short duration types were under preliminary yield trials against Co. 18 standard. Twenty-one promising types will be carried forward for further trials.

4. *Paddy Improvement—Hybridization*—A. *Sornavari season*—(i) *Season and period bound cross progenies.*—Two cultures of crosses between Kar duration strain and Samba strain were under yield trial against TKM 3 and TKM 6 as standards. 'Z' test was satisfied and one culture gave significantly higher yield than the standard. The trial will be repeated next year. Among 55 secondary selections of the same set of crosses that were under observation twenty-two promising progenies and six single plant selections were taken for further study and observation. Details of experiment and summary of results and conclusions are presented in Table XIV.

TABLE XIV.—*Yield trials of Season and Period bound cross progenies—Wet (Sornavari season)*

Field No. 12-b-2.
Previous crop—Samba paddy.
Manure—Green leaf at 5,000 lb plus Ammonium Sulphate at 150 lb. per cre.
Layout—4 = 6 randomized blocks.
Size of Sub-plot—20′ × 4′.
Spacing—4′ × 4′ doubles.

Sown—14th May 1953.
Planted - 9th June 1953.
Harvested—8, 10, 17th September 1953.

Summary of results.

Particulars.	6803	6810	TKM 13 standard.	TKM 6 stundard.	General mean.	Z' test satified or not.	Standard error.	Critical difference (P=0·05).
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Acre yield of grain in lb.	4,418	4.203	3,931	3,264	3,954	Yes	122·6	367.7
Percentage on control	135·3	128.7	120.4	100·0	121·2	..	3·8	11·3
Flowering duration in days.	84	85	84	93	..	..	..	
Acre yield of grain lb.—								
1951–52	4,509	4,511	..	4,086	..	..	..	..
1952–53	3,664	3,681	3,716	2,838	..	..	..	..

Conclusion—6803, 6810, TKM 3 standard, TKM 6 standard.

(ii) *Co.* 13 × *Co.* 4 *progenies.*—Two progenies 6,522 and 6,517 were compared against Co. 13 mutant and Co. 13 Standard 'Z' test was satisfied and the progeny 6,522 gave significantly higher yield than the standard. The trial will be

repeated next year. Details of the experiment and summary of results and conclusions are presented in Table XV.

TABLE XV.—*Yield trials of* 6517, 6522 *(Co.* 13 × *Co.* 4) *progenies Wet (Sornavari season).*

Field No. 12-b-b
Previous Crop—Samba paddy.
Manure—Green leaf at 5,000 lb. plus Ammonium Sulphate at 150 lb. per acre.
Layout—4 × 6 randomized blocks.
Size of sub-plot—10′ × 4′.
Spacing—4′ × 4′ doubles.
Sown—14th May 1953.
Planted—10th June 1953.
Harvested—3rd September 1953.

Summary of results.

Particulars.	6517	6522	Co. 13 Mutant.	Co. 13 standard.	General mean.	'Z' test satisfied or not (P=0.05).	Standard error.	Critical difference (P=0.05).
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Acre yield of grain in lb.	3,901	5,511	3,697	4,068	4,047	Yes	145·7	437·0
Percentage on control.	95·9	110·9	90·9	100·0	99·5	..	3·6	10·7
Flowering duration in days.	97	79	94	83	..	..	..	..
Acre yield of grain in lb. for 1952-53.	4,410	3,738	..	3,905	..	..	..	..

Conclusion—6522, Co. 13 std, 6517, Co. 13 Mutant.

(iii) *Gurmatia* × *Luchai* × *Burma progeny.*—The cross progeny from Madhya Pradesh which is reputed for high yields was tried against Co. 13 and Co. 18 as standards. It did not come to flower at all while Co. 13 and Co. 18 gave normal yields.

(iv) *Sornavari* × *Samba paddies.*—Sornavari crop when fully ripe usually lodges completely and when there is rain the grains in earheads in the lodged crop germinate resulting in great loss. The quality of rice also is poor. Cross were effected between TKM 3 and ASD 5 in 1952–53 samba season with a view to evolve a short duration strain with quality rice that is non-lodging and that does not germinate in the earheads. Three grains obtained were sown but the seedling failed to establish. Again 129 individual flowers were crossed with TKM 3 and ASD 5. Four hybrid seeds were obtained.

B. *Samba season* (*a*) *Rainfed conditions*—(i) *GEB* 24 × *T.* 260 (Oryza longistaminata).—Eleven progenies that were under yield trials in the previous year were multiplied under wet conditions due to limited area sown under rainfed conditions.

(ii) *TKM* 2 × *BAM and MTU.* 4.—Forty-six hybrid seeds obtained were grown for observation. Six plants in TKM × BAM 2, four plants in TKM 2 × MTU. 4 and one in MTU. 4 × TKM. 2 established. Seeds have been collected from individual plants for further observation and study.

(iii) *TKM.* 2 × *wild paddy.*—Nine hybrid seeds were obtained and grown. Three plants established and seeds have been collected for further study and observation.

(iv) *TKM.* 1 × *wild paddy.*—Four hybrid seeds were obtained and sown None established.

(v) *Bairuvadlu* 2,999 × *wild paddy.*—Parents were grown and 32 individual flowers were crossed and four hybrid seeds were collected.

(vi) *Coimbatore strains* × *wild paddies.*—One hundred and twenty single plant selections taken during the previous year where multiplied under wet conditions due to the limited area sown under rainfed conditions. Eighty-four promising progenies have been carried forward for further trials.

(vii) *Maruteru strains* × *wild paddies.*—Fifty single-plant selections taken during the previous year were multiplied under wet conditions and 49 promising progenies have been carried forward.

(*b*) *Semi dry conditions*—(i) *Adt.* 22 × *BAM* 3.—Out of seven hybrid seeds sown none germinated. Fresh crosses were effected and out of 68 flowers crossed five seeds were obtained.

(ii) Co. 4 × Vadan samba to induce blast resistance in Vadan samba.

(iii) Co. 10 × T. 892 to evolve saline resistant strain of short and medium durations.

(iv) Co. 17 × SR. 26-B to evolve saline resistant strain of short and medium durations.

(v) Co. 17 × 10,783 to improve the yield of Co. 17.

(vi) Multiple crosses between Co. 2, Co. 3, Co. 5, Co. 7, Co. 17 and 10,783 to evolve a strain that can come up under varying conditions.

One progeny of Co. 4 × Vadan samba, two of Co. 17 × 10,783, two of multiple crosses were multiplied under wet conditions as the trials could not be taken up under semi dry conditions.

Six progenies of Co. 10 × T. 892 and 20 of Co. 17 × SR. 26-B were sown in observation plots under semi dry conditions. Due to unfavourable season the crop was very poor and the seed materials were collected from the crop grown under wet conditions.

(vii) *Coimbatore strain* × *wild paddies.*—One hundred and eighty-three single plant selections taken during the previous year were grown under wet conditions for seed multiplication. One hundred and thirty-eight promising selections were carried over for further study.

(viii) *Natural crosses in wild rices from Cuttack.*—Fifty-two single-plant selections taken during the previous year were grown under wet conditions and forty-nine promising selections were carried forward for further study.

(c) *Wet conditions.*—(i) *Indica* × *Japonica.*—One hundred and eighteen single plants selected during the previous year were grown under normal and heavy manuring for studying their response to manuring. Seven progenies of crosses between Japanese varieties and Adt. 12 in F-2 generation received from the Paddy Specialist were also grown and studied. Three hundered and seventy-five single plants from the former and 15 single plants from the latter were again taken for further study and observation.

(ii) *Co.* 26 × *Co.* 19.—Thirty-six progenies in F-5 generation were under observation against Co. 19 under high dose of Nitrogenous manure. Twenty-four progenies that gave better yield than Co. 19 and that were resistant to blast were carried forward for further trial and examination.

(iii) *Gurmatia* × *Luchai* × *Burma.*—This cross progeny from Madhya Pradesh was tried against Co. 2 and Co. 5 in 3 × 8 randomized blocks. 'Z' test was satisfied and the performance of the cross progeny was significantly poorer than Co. 2 and Co. 5 which were on a par among themselves. Details of the experiment and the summary of results and conclusions are given in Table XVI.

TABLE XVI.—*Yield trials of Gurmatia Luchai* × *Burma with Co. 2 and Co. 5—Wet (Samba season).*

Field No. 14-a.
Previous crop—Sornavari paddy.
Manure—Green leaf at 5 000 lb plus Ammonium Sulphate at 175 lb. per acre.
Layout—3 × 8 randomized blocks.
Size of sub-plot—10′ × 4′.
Spacing—6″ × 6″ doubles.
Sown—17th September 1953.
Planted—27th October 1953.
Harvested—18th February 1954.

Summary of results.

Particulars.	Gurmatia × Luchai × Burma.	Co. 2.	Co. 5.	General mean.	'Z' test staisfied or not (P=0·05).	Standard error.	Critical difference (P=0·05).
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Acre yield of grain in lb. ..	245	1,003	1,016	755	..	108·0	328·4
Percentage on control (Co. 2).	24·4	100·0	101·3	75·2	Yes.	10·8	32·7
Flowering duration in days. ..	97	113	115	..	..	..	..

Conclusion—Co. 5, Co. 2, Gurmatia × Luchai × Burma.

C. *Navarai season.—Co.* 10 × *Burma types* (*T.* 285 *and T.* 301).—Five progenies were under yield trials against Co. 10 and Co. 18 standards. 'Z' test was satisfied and none of the progenies were able to outyield either of the standards. Two progenies were on a par with Co. 10 standard. Trial will be repeated next year.

Out of 185 secondary selections of the same sets of crosses that were under observation 192 single-plant selections were taken from 48 promising and early progenies. Details of the experiment and summary of results and conclusions are given in Table XVII.

TABLE XVII.—*Yield of trials of progenies of Co. 10 × Burma types—Wet (Navarai season).*

Field No. 10-a.
Previous crop—Samba paddy.
Manure—Green leaf at 5,000 lb. plus Ammonium Sulphate at 175 lb. per acre.
Layout—7 × 6 randomized blocks.
Size of sub-plot—10′ × 4′.
Spacing—4″ × 4″ doubles.
Sown—9th January 1954.
Planted—10th February 1954.
Harvested—15th May 1954.

Summary of results.

Particulars.	4728/1.	4504.	4495.	4714/1.	4476.	Co. 10 standard.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Acre yield of grain in lb	2,554	2,336	2,407	2,651	2,256	2,839
Percentage on control	90.0	82·3	84·8	93·4	79·5	100·0
Flowering duration in days	91	88	89	91	88	90
Acre yield of grain in lb.—						
1950–51	..	2,314	2,200	..	2,443	2,321
1951–52	Trials not conducted.					
1952–53	..	1,100	1,196	..	1,192	1,426

Particulars.	Co. 18 standard.	General mean.	'Z' test satisfied or not (P=0·05).	Standard error.	Critical difference (P=0·05).
	(8)	(9)	(10)	(11)	(12)
Acre yield of grain in lb.	2·998	2,577	Yes.	103·1	296·4
Percentage on control	105·6	90·8	..	3·6	10·4
Flowering duration in days	95	..	..	..	..
Acre yield of grain in lb.—					
1950–51	..	..	..	..	..
1951–52	Trials not conducted.				
1952–53	995	..	..	..	..

Conclusion—Co. 18, Co. 10, 4714/1, 4728/1, 4495, 4504, 4476.

5. *Introductions.*—D.S. 1. (Origin—Hungary and being tried under Swaziland Irrigation Schemes, South Africa) which is reputed to be capable of being cultivated in all three seasons of the year and which is reported to ratoon very well with a capacity for yield equal to the first crop was tried against Co. 13 and Co. 18 standards in the samba season. The performance of D.S. 1 was found to be definitely poorer than Co. 13 and Co. 18 standards.

6. *Manurial Experiments—(a) Semi-dry conditions.*—Green manuring semi-dry paddy : To find out a suitable method of green manuring semi-dry paddy the experiment was conducted during the samba season with Adt. 22. The treatments were (i) sowing paddy alone, (ii) sowing paddy with sunnhemp in between the lines of paddy two feet apart, pulling out and trampling in the sunnhemp plants between the lines of paddy six to eight weeks after sowing at the time of irrigation.

Owing to continuous wet weather after sowing both the green manure and paddy crops were affected adversely. The crops were poor and reliable data could not be obtained. 'Z' test was not satisfied. In the previous year 'Z' test was satisfied for both grain and straw yields. The plot treated with green manure gave 46·1 per cent and 64·9 per cent incereased yields of grain and straw respectively over no manure plots. Details of the experiment and summary of results and conclusions are given in Table XVIII.

TABLE XVIII.—*Sunnhemp manurial experiment—Semi-dry (Samba season).*

Field No. 4-b.
Previous crop—Navarai paddy.
Manure—Super phosphate to supply 30 lb. P205.
Layout—2 × 12 randomized blocks.
Size of sub-plot—42′ × 12′ (outer rows rejected).
Spacing—6″ × 6″ (Drill sowing).
Variety—ADT. 22 (Vadan samba).
Sown—25th September 1953.
Sunhemp pulled out and trampled on 28th November 1953 (average acre yield worked to 1,840 lb.).
Harvested—22nd February 1954.

Treatments—
(A) Paddy sown alone.
(B) Paddy sown with sunnhemp in lines 2′ apart, pulling out and trampling in the sunnhemp plants between the lines of paddy 6 to 8 weeks after sowing at the time of irrigation.

Summary of results.

Particulars.	Treatments. A.	Treatments. B.	General mean.	'Z' test satisfied or not (P—0·-).	Standard error.
(1)	(2)	(3)	(4)	(5)	(6)
Acre yield of grain in lb.	290	297	294	No.	8·8
Percentage on control (A)	100·2	192·5	101·3	..	3·0
Acre yield of straw in lb.	920	959	939	..	38·5
Percrntage on control (A)	100·0	164·1	102·1	No.	4·2
Flowering duration in days	110	100	..	..	..
Acre yield of grain in lb. for 1950–51	738	941	..	..	
,, straw in lb. for 1950–51	3,750	4,066	..	..	
,, straw in lb. for 1951–52	1,327	816	..	..	
,, straw in lb. for	3,712	2,407	..	..	
,, grain in lb. for 1952–53	1,022	1,493	..	..	
,, straw in lb. for	2,153	3,550	..	..	

Conclusion—Grain and straw: Treatment differences not statistically significant.

(*b*) *Wet condition.*—(i) *Nightsoil compost experiment.*—To find out the relative merits of nightsoil compost and farm-yard manure when applied on equal nitrogen basis the experiment was conducted during sornavari season 1952–53 in double-crop wet land. During sornavari season 1953–54 the residual effect was tested. 'Z' test was satisfied for grain yield only. The residual effect of nightsoil compost and farm-yard manure were on a par and significantly superior to no manure. The residual effect tested in the previous year in single-crop wet land showed the farm-yard manure was the best and no manure and nightsoil compost were on a par for grain yield. For straw yield treatment differences were not satistically significant. Details of experiment and summary of results and conclusions are presented in Table XIX.

TABLE XIX.—*Residual effect of night soil compos experiment—Double-crop wet land (Sornavari season).*

Field No.—15-ac.
Previous Crop—Fallow.
Layout 3 × 6 randomized blocks.
Size of sub-plot—67′ × 13′ (outer rows rejected),
Spacing—4″ × 4″ Bulk planting in doubles.
Variety—Co. 13 (Arupathamkodai).
Previous treatments—
(1) No manure.
(2) Nightsoil compost to supply 60 lb. N per acre.
(3) Farm yard manure to supply 60 lb. N per acre.

Sown—4th May 1953.
Planted—28th May 1953.
Harvested—21st August 1953.

Particulars.	Treatments. (2)	(3)	(4)	General mean.	'Z' test satified or not (P=0·05).	Standard error.	Criticals difference (P=0·05).
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Acre yield of grain in lb. ..	2,880	3,133	2,077	3,033	..	86·6	112·2
Percentage on control (1) ..	100·0	109·0	106·9	105.	Yes.	1·3	3·9
Acre yield of straw in lb. ..	5,304	5,597	5,837	5,578	..	113·9	..
Percentage on control (1) ..	100·0	105·5	110·1	105.2	No.	2·5	..
Flowering duration in days ..	82	82	82	..	..	..	..

Conclusion—
Grain yield—2, 3, 1.
Straw yield—Treatment differences not statistically significant.

(ii) *Co-ordinated set of manurial experiment on rice.*—To find out the effect of the application of phosphatic manure direct to paddy crop and through the green manure crop preceding paddy crop and experiment with the following treatments was conducted during the samba season with three green manures, sunnhemp, daincha and sesbania at two levels of P_2O_5, and 45 lb. in split-plot design:—

(1) Sunnhemp with 45 lb. P_2O_5 as super and paddy transplanted without P_2O_5

(2) Sunnhemp without P_2O_5 45 lb. of P_2O_5 as super applied to paddy after the incorporation of green manure.

(3) Sunnhemp without P_2O_5 and transplanting paddy without P_2O_5.

(4) Daincha with 45 lb. P_2O_5 as super and paddy transplanted without P_2O_5.

(5) Daincha without P_2O_5 but 45 lb. P_2O_5 as super applied to paddy after incorporation of green manure.

(6) Daincha without P_2O_5 and transplanting paddy without P_2O_5.

(7) Sesbania with 45 lb. P_2O_5 as super and paddy transplanted without P_2O_5.

(8) Sesbania without P_2O_5 but 45 lb. of P_2O_5 as super applied to paddy after incorporation of green manure.

(9) Sesbania without P_2O_5 and transplanting paddy without P_2O_5.

The yield data of green manures were analysed and 'Z' test was satisfied. Among green manures sesbania gave significantly the best yield of green matter followed by daincha and sunnhemp. The yields of green matter form plots receiving phosphate and no phosphate were on a par. The green manures were applied to respective plots and Co. 2 paddy was planted. In regard to yield of paddy treatment differences were not satistically significant either for grain or straw. Since the crop had a severe attack of stem-borer results have to be taken with caution. Details of the experiment and summary of results and conclusions are given in Table XX (*a*) and (*b*).

TABLE XX (*a*).—*Co-ordinated set of manurial experiments on rice—Wet (Samba season).*

Field No. 15-bdfh.
Previous crop—Ragi.
Manure—As per schedule.
Layout—Split plot design—Green manures as main plots and doses of phosphatic manure as sub-plot, randomised and repeated four times.
Size of sub-plot—75′ × 14′.
Sown—6th September 1953.
Harvested—19th November 1953.

Treatments—
(1) Sunnhemp with 45 lb. P205 as super and paddy transplanted without P205.
(2) Sunnhemp without P205 but 45 lb. P205 as super applied to paddy after the incorporation of green manure.
(3) Sunnhemp without P205 and tra spla t g paddy w thout P205.
(4) Da ncha with 45 lb. P205 as super a d paddy transplan ted without P205.
(5) Daincha without P205 but 45 lb. P205 as super applied to paddy after the incorporation of green manure.
(6) Daincha without P205 and transplanting paddy without P205.
(7) Sesbania with 45 lb. P205 as super and paddy transplanted without P205.
(8) Sesbania without P205 but 45 lb. P205 as super applied to paddy after the incorporation of green manure.
(9) Sesbania without P205 and transplanting paddy without P205.

Summary of results for green leaf only.

Particulars.	Treatments.						
(1)	(2)	)	(4)	(5)	(6)	(7)	(8)
Acre yield of green leaf in lb. ..	5,156	4,854	5,083	6,566	8,381	8,123	14,680
Percentage on general mean ..	56·0	52·7	55·2	71·3	91·0	88·2	159·4

Particulars.	Treatments—*cont.*		General mean.	'Z' test satisfied or not. (P=0·05).	Standard error.	Critical difference (P=0·05).
	(9)	(10)	(11)	(12)	(13)	(14)
Acre yield of green leaf in lb. ..	15,530	14,500	9,206	Yes.	929·8	2,706·6
Percentage on general mean ..	168·7	157·4	100·0	..	10·1	29·4

Conclusion—8, 7 9, 5, 6, 4, 1, 3, 2.

TABLE XX (*b*).—*Co-ordinated set of manurial experiments on rice—Wet (Samba season).*

Field No. 15-bdfh.
Previous crop—Green manure crops.
Manure—As per schedule.
Layout—Split plot design—Green manures as main plots and phosphatic manure as sub-plot randomised and repeated four times.
Size of sub-plot—75′ × 14′ (outer rows rejected).
Spacing—8′ × 6″ Bulk planting in doubles.
Variety—Co. (2 Poombalai).
Sown—24th October 1953.
Planted—30th November 1953.
Harvested—24th March and 8th April 1954.

Treatments.—Same as above.

Particulars.	Sunnhemp.	Daincha.	Sesbania.	General mean.	'Z' test satisfied or not (P=0·05).	Standard error.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Acre yield of grain in lb.	805	903	916	875	No.	120·8
Percentage of general mean ..	92·0	103·2	104·7	1 00·0	..	13·8
Acre yield of straw in lb.	1,964	2,189	2,281	2,144	No.	203·7
Percentage on general mean ..	91·6	102·1	106·4	100·0	..	9·5

Conclusion—
Grain and straw—Treatment differences not statistically significant.

Summary of results for phasphates only.

Particulars.	P205 to green manure.	P205 to paddy.	No. P250.	General mean.	'Z' test satisfied or not (P—0·05).	Standard error.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Acre yield of grain in lb.	845	947	833	875	No.	70·9
Percentage on general mean ..	96·6	108·2	95·2	100·0	Ns.	8·1
Acre yield of straw in lb. ..	2,071	2324	2,037	2,144	Ns.	87·9
Percentage on general mean ..	96·6	108·4	95·0	100·0	..	4·1

Conclusion—
Grain and straw—Treatment differences not statistically significant.

Summary of results for inter action between Green manures and Phosphate only.

Particulars.	Sunneemp			Daincha		
	P205 to green manure.	P250 to paddy.	No. P205.	P205 to green manure.	P205 to paddy.	No. P205.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Acre yield of grain in lb. ..	81·8	780	320	899	942	872
Percentage on general mean ..	93·4	89·1	93·7	102·7	107·6	99·6
Acre yield of straw in lb.	1,905	1,927	2.057	2,187	2,393	1,982
Percentage on general mean ..	88·9	89·9	96·0	102·1	111·6	111·6

Particulars.	Sesbania.			General mean.	'Z' test satisfied or not (P=0·05).	Standard error.
	P250 to green manure.	P205 to paddy.	No. P205.			
	(8)	(9)	(10)	(11)	(12)	(13)
Acre yield of grain in lb	820	1,120	810	875	No.	123·4
Percentage on general mean ..	93·7	128·0	92·5	100·0	..	14·1
Acre yield of straw in lb.	2,122	2,653	2,067	2,144	No.	152·2
Percentage on general mean ..	99·1	123·7	96·5	100·0	..	7·1

Conclusion.—
Grain and straw—Treatment differences not statistically significant.

(ii) *Dicalcium phosphate experiment.*—To find out the relative merits of dicalcium phosphate and super phosphate and their placement effect, an experiment with the following treatments was conducted during the navarai season :—

Treatments.—

(1) Control.

(2) Groundnut cake at 40 lb. N per acre.

(3) Groundnut cake at 40 lb. N per acre plus super at 80 lb. P_2O_5 per acre (broadcast).

(4) Groundnut cake at 40 lb. N per acre plus Dicalcium phoshate per acre (broadcast).

(5) Groundnut cake at 80 lb. per acre plus super at 80 lb. P_2O_5 per acre (placed).

(6) Groundnut cake at 40 lb. N per acre plus Dicalcium phosphate at 80 lb. P_2O_5 per acre (placed).

For placement fertilizers the manures were applied in furrows by means of an 'akkadi' tied behind the country plough and covered on 12th January 1954. For treatments (3) and (4) the phosphatic fertilizers were applied at the time of planting and groundnut cake was applied at the time of planting. Fishers 'Z' test was satisfied for both grain and straw yields. With regard to grain yields broadcast application of phosphates is a better method than placing the phosphate three to four inches below ground-level. Secondly super and dicalcium phosphate are on a par both when they are applied broadcast and when placed. When placed the application of phosphatic manures do not have any effect on grain yield since both the fertilizers when placed are on a par with groundnut cake alone. The same results were obtained in the previous year also. With regard to straw yield super and dicalcium phosphate broadcast and super placed are on a par. Super and dicalcium phosphates placed are on a par with groundnut cake alone. Super and dicalcium phosphate broadcast gave significantly higher yield than groundnut cake alone which

on a par with super and Dicalcium phosphate placed. Details of the experiment and summary of results and conclusions are presented in Table XXI.

TABLE XXI.—*Dicalcium phosphate experiment—Wet (Navarai season),*

Field No. 11-a, c to f.
Previous crop—Fallow.
Manures—As per Schedule.
Layout—6 × 5 randomized blocks.
Size of sub-plot—40' × 20' (outer rows rejected).
Spacing—4" × 4" bulk planting in doubles.
Variety—Co 13 (Arupatham kodai).
Sown—19th December 1953.
Planted—18th and 19th January 1954.
Harvested—14th April 1954.

Treatments—
(1) Control (no manure).
(2) Groundnut cake at 40 lb. N per acre.
(3) Do. plus Super at 80 lb. P2O5 per acre (broadcast).
(4) Do. plus Dicalcium phosphate at 80 lb. P2O5 per acre (broadcost).
(5) Do. plus Super at 80 lb. P2O5 per acre (Placed).
(6) Do. plus Dicalcium phosphate at 80 lb. P2O5 per acre (placed).

Summary of results.

Particulars.	Treatments.						General mean.	'Z' test satisfied or not (P—0·05).	Standard error.	Critical difference. (P—0·05)
	1.	2.	3.	4.	5.	6.				
Acre yield of grain in lb.	1,300	2,276	2,683	2,619	2,440	2,292	2,283	..	59·4	178·1
Percentage on control (1)	100·0	163·7	193·0	188·5	175·6	164·8	164·3	Yes.	4·3	12·8
Acre yield of straw in lb.	1,954	3,016	3,629	3,518	3,317	2,971	3,068	Yes.	138·1	408·0
Percentage on control (1)	100·0	1,544	1,858	180·1	169·7	152·0	157·0	..	7·1	20·5
Flowering duration in days.	87	86	86	86	86	86	..	..	..	..
Acre yield of grain in lb. for 1952–53.	1,026	1,729	2,154	2,106	1,891	1,783	..	..	..	..
Acre yield of straw in lb. for 1952–53.	1,671	2,530	2,935	2,646	2,646	2,741	..	..	..	..

Conclusion—
Grain yield—3, 4, 5, 6, 2, 1.
Straw yield—3, 4, 5, 2, 6, 1

(iv) *Japanese method of rice cultivation* versus *Farm method of cultivation.*—The experiment is to test the suitability or otherwise of the Japanese method as adopted by Kora Gramodhyog Kendra, Bombay. The experiment was intended to compare the Japanese method as practised in Kora Kendra with the farm method of cultivation The important aspects of Kora Kendra method are: (1) Raising the wet nursery at the seed rate of 1½ lb. per cent of nursery and keeping the nursery free from weeds, (2) manuring the nursery with 40 cart-loads of farmyard manure, well sieved compost and wood ash at 2,000 lb. each per acre and a manure mixture of 2 lb. of super phosphate and ammonium sulphate in equal ratio per pound of seed, one dose at the time of sowing and another ten days after sowing, (3) treating the seed with salt solution and later with Agrosan GN, (4) pulling the seedlings one by one carefully without disturbing the roots, (5) transplant field to be manured, with 20 cart-loads of farmyard manure, 30 lb. N as ammonium sulphate, 30 lb. P_2O_5 as super phosphate to be applied at planting time. A second dose of 15 lb N as ammonium sulphate and 15 lb. P_2O_5 as super applied broadcast 15 days after planting and a similar dose another 15 days after the application of second dose—One month interval in the case of medium and long duration varieties, (6) planting done in lines spaced 10" between rows and 6" in the row for short duration strains and 10" × 10" for long and medium duration strains, (7) inter culturing by an inter-cultivator or by working with hands at intervals of 15 days till two weeks before flowering (8) preventing of lodging by tying ropes across the field. In the farm method the usual practice are: (1) raising wet nursery with 3 lb. of seed per cent of nursery after applying 10,000 lb. of green manure per acre, (2) treating the seed with Agrosan GN, (3) manuring the transplanting field with 5,000 lb. green manure and applying 30 lb. P_2O_5 as super at the time of last ploughing and 30 lb. N as ammonium sulphate broadcost three to four weeks after planting, (4) planting as usual in bulk with spacing 4" × 4" for short duration and 6" × 6" for medium and long duration strains and (5) weedings to be done when necessary.

The experiment was conducted in all the three seasons of the year, namely, sornavari, samba and navarai. The results of the experiment go to show that the Japanese method has recorded higher grain yield than the farm method; the profit

obtained is less than in the farm method. Details of experiment and summary of results and conclusions are presented in Table XXII *A*, *B*, *C*.

TABLE XXII (A).—*Japanese method of Rice cultivation* versus *farm method—Wet (Sornavari season).*

Field No 4-de.
Previous crop—Samba paddy.
Manure—As per schedule.
Layout—Split plot design—Strains main plots, methods sub-plots, randomized and repeated eight times.
Size of sub-plot—57′ × 10′ (outer rows rejected).
Spacing—
Japanese method—10″ × 6″—4 seedlings per hole.
Farm method—4″ × 4″—2 seedlings per hole.
Varieties—Co 13 (Arupatham kodai) and TKM 3 (Sornavari).
Sown—12th June 1953.
Planted—3rd to 5th July 1953.
Harvested—2nd and 3rd October 1953.

Summary of results for strains only.

Particulars	Co 13.	TKM 3.	General mean.	'Z' test satisfied or not (P = 0·05).	Standard error.
(1)	(2)	(3)	(4)	(5)	(6)
Acre yield of grain in lb.	3,009	3,089	3,049	No.	48·8
Percentage on general mean ..	98·7	101·3	100·0	..	1·6
Acre yield of straw in lb.	4,811	4,659	4,735	No.	133·1
Percentage on general mean ..	101·6	98·4	100·0	..	2·6

Conclusion—
Grain and straw—Treatment differenee not statistically significant

Summary of results for methods only.

Particulars.	Japanese method.	Farm method.	Geaneral mean.	'Z' test satisfied or not (P = 0·05).	Standard error.
(1)	(2)	(3)	(4)	(5)	(6)
Acre yield of grain in lb.	3,092	3,006	3,049	No.	30·5
Percentage on general mean ..	101·4	98·5	100·0	..	1·0
Acre yield of straw in lb.	4,692	4,778	4,735	No.	56·3
Percentage on general mean ..	99·1	100·9	100·0	..	1·2

Conclusion—
Grain and straw—Treatment differences not statistically significant.

Summary of results for inter-action between strains and methods only.

Particular	TKM 3.		Co. 13.		General mean.	'Z' test satified or not (P = 0·05).	Standard error.
	Farm method.	Japanese method.	Farm method.	Japanese method.			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Acre yield of grain in lb.	3,056	3,123	2,956	3,060	3,049	No.	42·7
Percentage on general mean.	100·2	102·4	97·0	100·4	100·0	..	1·4
Acre yield of straw in lb.	4,768	4,551	4,788	4,828	4,735	No.	80·5
Percentage on general mean.	100·7	96·1	101·1	102·0	100·0	..	1·7
Flowering duration in days.	78	75	77	78	..	..	..

Conclusion—
Grain and straw—Treatment difference not statistically significant.

TABLE XXII (B).—*Japanese method of rice cultivation* versus *farm method—Wet (Samba season).*

Field No. 12-a.
Previous crop—Sornavari paddy
Manure—As per schedule.
Layout—Split plot design—Strains main plots, methods sub-plots, randomised and repeated eight times.
Size of sub-plot—40′ × 15′ (Outer row srejected).
Spacing—Japanese method—10″ × 10″—4 seedlings per hole.
Farm method—6″ × 6″—2 seedlings per hole.
Varieties—Co. 19 (Chingleput Sirumani) and Co. 25 (Blast resistant strain).
Sown—19th September 1953.
Planted—28th to 30th October 1953.
Harvested—8th March 1954.

Summary of results for strains only.

Particulars.	Co. 25	Co. 19	General mean.	'Z' test satisfied or not (P=0·05).	Standard error.	Critical difference, P=0·05.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Acre yield of grain in lb.	1,749	1,241	1,495	Yes.	31·4	106·1
Percentage on general mean	117·0	83·0	100·0	..	2·1	7·1
Acre yield of straw in lb.	3,346	3,040	3,193	No.	137·3	..
Percentage on general mean	104·8	95·2	100·0	..	4·9	..

Conclusion—
Grain yield—Co. 25, Co. 19, *Straw yield*—Treatment difference not statistically significant.

Summary of results for methods only.

Particulars.	Japanese method.	Farm method.	General mean.	'Z' test satisfied or not (P=0·05).	Standard error.	Critical difference (P=0·05).
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Acre yield of grain in lb. ..	1,531	1,458	1,495	No.	28·4	..
Percentage on general mean ..	102·4	97·5	100·0	..	1·9	..
Acre yield of straw in lb. ..	2,985	3,400	3,193	Yes.	51·1	153·3
Percentage on general mean ..	93·5	106·5	100·0	..	1·6	4·8

Conclusions—
Grain yield—Treatment difference not statistically significant.
Straw yield—Farm method, Japanese method.

Summary of results for inter-action between strains and methods only.

Particulars.	Co. 25.		Co. 19.		General mean.	'Z' test satisfied or not (P=0·05).	Standard error.	Critical difference (P=0·05).
	Japanese method.	Farm method.	Japanese method.	Farm method.				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Acre yield of grain in lb.	1,803	1,692	1,257	1,224	1,495	No.	40·4	..
Percentage on general mean.	120·6	113·2	84·1	81·9	100·0	..	3·7	..
Acre yield of straw in lb.	3,231	3,459	2,737	3,346	3,193	Yes.	70·2	217·1
Percentage on general mean.	101·2	108·3	85·7	104·7	100·0	..	2·2	6·8
Flowering duration in days.	117	122	123	123	..	..	..	..

Conclusions—
Grain yield—Treatment difference not statistically significant.
Straw yield—Co. 25, FM, Co. 19 FM, Co 25 J.M., Co 19 J.M.

TABLE XXII (C).—*Japanese method of rice cultivation* versus *farm method—Wet (Navarai season).*

Field No. 10 c.
Previous crop—Samba paddy.
Manure—As per shedule.
Layout—Split plot desigh—Strains main plots, methods sub-plots, randomised and repeated eight times.
Size of sub-plot—35′ × 10′ (Outer rows rejected).

Spacing—
Japanese method—10″—6″—4 seedlings per hole.
Farm method—4′ × 4′—2 seedlings per hole.
Varieties—TKM 5 (Manakkatai) and Co. 18 (Vellakar).
Sown—8th January 1954.
Planted—29th and 30th January 1954.
Harvested—21st April 1954 and 8th May 1954.

Summary of results for strains only.

Particulars.	TKM. 5.	Co. 18.	General mean.	'Z' test satisfied or not (P=0·05).	Standard error.	Critical difference (P=0·05).
(1)	(2)	(3)	(4)	(5)	(6)	
Acre yield of grain in lb.	2,746	2,476	2,606	Yes.	39·0	130·2
Percentage on general mean ..	94·5	105·5	100·0	..	1·5	5·0
Acre yield of straw in lb.	3,713	4,539	4,126	Yes.	61·9	206·3
Percentage on general mean ..	90·0	110·0	100·0	..	1·5	5·0

Conclusions—
Grain and straw yields—Co. 18, TKM 5.

Summary of results for methods only.

Particulars.	Japanese method.	Farm method.	General mean.	'Z' test satisfied or not (P=0·05).	Standard error.	Critical difference (P=0·05).
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Acre yield of grain in lb.	2,686	2,520	2,603	Yes.	22·1	67·7
Percentage on general mean ..	103·2	96·8	100·0	..	0·9	2·6
Acre yield of straw in lb.	4,076	4,176	4,126	No.	45·4	..
Percentage on general mean ..	98·8	101·2	100·0	..	1·1	..

Conclusion—
Grain yield—Japanese method, Farm method.
Straw yield—Treatment difference not statistically significant.

Summary of results for interaction between strains and methods only.

Particulars.	TKM 5.		Co. 18.		General mean.	'Z' test satisfied or not (P=0·05).	Standard error.
	Farm method.	Japanese method.	Farm method.	Japanese method.			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Acre yield of grain in lb.	2,364	2,555	2,675	2,818	2,603	No.	31·2
Percentage on general mean ..	90·8	98·1	102·8	108·2	100·0	..	61·9
Acre yield of straw in lb.	3,801	3,622	4,548	4,533	4,126	No.	1·2
Percentage on general mean ..	92·1	87·8	110·3	109·8	100·0	..	1·5
Flowering duration in days ..	79	80	92	92	..	..	..

Conclusion—

Grain and straw.—Treatment differences not satistically significant.

7. *Mixed cropping—MCU. 1 cotton as a mixed crop with rainfed paddy.*—One plot in the rainfed area was divided into three sub-plots 12·9 cents each. Cattle manure at 10 cartloads per acre was applied. TKM. 1 rainfed paddy was sown by means of country drill at 60 lb. per acre on 24th September 1953. In two sub-plots MCU. 1 was sown in lines 8' apart spacing within the line being one foot at two to three seeds per hole. Cotton was dibbled on the same day when paddy was sown. The third sub-plot which was in between these two cotton plots was used as control with paddy alone. Due to continuous wet weather after sowing, cotton crop did not progress well. The stand of the cotton crop was stunted. Cotton crop came to flower by the first week of January. During the last week of January paddy, was harvested. Acre yields of 190 lb. and 209 lb. of paddy were obtained in cotton and control plots respectively. The yield of cotton worked to 23 lb. per acre. In the previous year paddy crop failed completely and cotton gave 327 lb. of kapas per acre.

8. *Other crops*—(i) *Cereals.*—Three Coimbatore strains of ragi and three promising cultures of ragi from Coimbatore were tried in observation plots. Acre yields of 1,700 lb., 1,790 lb., 1,750 lb., 1,100 lb., 1,870 lb. and 2,000 lb. were obtained in Co. 1, Co. 2, Co. 3, E.C. 4310, E.C. 4573 and E.C. 4601, respectively. Culture E.C. 4601 is shorter in duration and has given the highest yield.

(ii) *Pulses.*—Horsegram D.B. 7 was sown in 3·19 acres and an acre yield of 209 lb. was obtained. Blackgram sown in 45 cents gave an acre yield of 507 lb. per acre.

(iii) *Oilseeds.*—Gingelly TMV. 3 was grown in 43 cents late in July for want of timely rains and an acre yield of 258 lb. was obtained.

(iv) *Fodder crops.*—Guinea grass, water grass, blou buffel, thin napier grass, F. 1 of cumbu × elephant grass and Australian drought resistant grass were grown and the yields came to 59,182 lb., 32,930 lb., 24,800 lb., 39,368 lb., 10,195 lb. and 29,500 lb., respectively per acre.

(v) *Green manure crops.*—Green manure crops of Sesbania and Sunnhemp were grown in 5·94 acres and 2·86 acres respectively. Average acre yield of green matter was 34,620 lb. in Sesbania and 6,739 lb. in Sunnhemp. A total quantity of 465 lb. of Sesbania seed was collected from Sesbania plants planted all along the roguing lines and field bunds. Sixteen and half pounds of Gliricidia seed were collected.

(vi) *Vegetables.*—Cucumber, cowpea, bitter gourd, snake gourd, ribbed gourd, water melon, etc., were grown for collection of seeds. Twenty-nine pounds of vegetable seeds were collected.

(vii) *Tapioca.*—Malavellai tapioca planted in 43 cents gave an acre yield of 12,339 lb. of tubers. Cuttings were again planted in an area of 81·1 cents.

(viii) *Fibre crops.*—P. 216 F cotton sown in rice fallows in an area of 9·6 cents gave an acre yield of 1,000 lb. of kapas. Again P. 216 F cotton was sown in 1·92 acres in January 1954 and the picking of kapas is in progress.

(ix) *Fruit plants.*—All the three Singapore jack trees bore fruits. Tree No. 1 bore two fruits and tree No. 2 bore 30 fruits. the bearing being for the fourth year in succession. The fruits weighed 7 to 8 lb. one foot long and 6 inches to 8 inches thick,

lacked sweetness and flavour. Tree No. 4 bore five fruits for the first time. One fruit weighed 46 lb. and was 16 inches long and 12 inches thick. Other fruits were smaller. The fruit was sweet but it was fibrous and not crisp. Seville lemon, Rajahmundry lemon, Nepali lemon and Custard apple are bearing for the fifth year. Acid limes and citrons are bearing for the fourth year. The average yields per tree in Acid lime, Nepali lemon and Citron (Hawaii) were 35 lb., 65 lb., and 87 lb., respectively.

Seed materials distributed are given in Table XXIII.

TABLE XXIII.—*Seed distribution.*

Paddy seeds	15,194	lb.
Ragi seeds	2,076	,,
Gingelly TMV-3	38	,,
Groundnut TMV-2 pods	50	,,
Vegetable seeds	64	,,
Sesbania	27	,,
Glyricidia	6	,,
Glyricidia seedlings	150	nos.
Mango grafts (Beneshan)	22	,,
Nepali lemon layers	184	,,
Citron layers	22	,,
Rajahmundry lemon layers	2	,,
Citrus sp.	3	,,
Singapore Jack seedlings	85	,,
Plantation suckers	22	,,
Grape vine cuttings	1	,,
Tapioca cuttings	5,400	,,
Guinea grass slips	2,800	,,
Water grass slips	1,000	,,
Napier grass slips	2,000	,,
Sweet potato vines	1,589	,,
Glyricidia cuttings	20,000	,,
Sesbania seedlings	1,300	,,
Paddy seedlings	56	cents.
Sesbania seedlings	15	,,

M. K. VENKATASUBRAMANIAN,
Superintendent.

RICE RESEARCH STATION, TIRUR P.O.
(CHINGLEPUT DISTRICT),
10*th December* 1954.

K. RAMASWAMY,
Paddy Specialist.

LAWLEY ROAD POST, COIMBATORE,
12*th January* 1955.

FINANCIAL STATEMENT OF THE RICE RESEARCH STATION, TIRURKUPPAM, FOR THE YEAR 1953–54 (FASLI 1363).

A. Expenditure.

	Rs.	A.	P.
40-C. Agriculture—Experimental Farms—Agricultural—			
Research Stations—Authorised—			
1. Pay of officer	3,568	5	0
Pay of establishment	8,002	6	0
Dearness allowance	3,514	14	0
Travelling allowance	1,160	9	0
2. Office contingencies—			
Dearness allowance to menials	3,741	4	0
Service postage	350	0	0
Other contingencies	195	4	6
3. Other charges—			
Working expenses	18,884	4	9
Live and deadstock	1,261	6	6
Apparatus and materials	49	11	0
Petty construction and repairs	738	3	9
Total ..	41,466	4	6

B. Receipts.

	Rs.	A.	P.
XXIX. Agriculture—			
I. Cash receipts—			
Agricultural Stations	3,419	14	3
Miscellaneous	409	5	3
Rent on rest-house	39	6	0
Recovery of overpayments	90	8	3
II. Cost of seed materials transferred	5,998	10	6
Total ..	9,957	12	3

APPENDIX I.

Details of Receipts from Bulk Crops.

Serial number and details of the crop.	Area in acres.	Seed. Yield in lb.	Seed. Value.	Grain. Yield in lb.	Grain. Value.	Straw. Yield in lb.	Straw. Value.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			Rs. A. P.		Rs. A. P.		Rs. A. P.
1 Paddy	27·2	29,426	5,977 2 6	8,847½	1,136 10 3	58,830	588 4 9
2 Ragi	1·76	3,077	576 15 0	..	..	..	..
3 Cotton (kapas)	1·92	855	374 1 0	..	..	..	..
4 Vegetables	0·44	74	384 0 0	..	..	..	..
5 Gingelly	0·43	111	58 15 6	..	..	..	..
6 Groundnut	1·43	512	128 0 0	..	..	2,860	2 14 0
7 Fodders and Tuber crops	1·24	13,525	845 5 0	..	..	..	..
8 Seedlings and Plants	..	34,580	183 6 0	..	..	..	..
Total	34·42	..	8,527 13 0	..	1,136 10 3	..	591 2 9

	Total receipts for the year 1953-54.	Total receipts for three years. 1950-51.	1951-52.	1952-53.
	(9)	(10)	(11)	(12)
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
1 Paddy	7,702 1 6	3,995 1 9	3,684 11 4	4,101 15 0
2 Ragi	576 15 0	101 13 0	63 14 5	693 4 3
3 Cotton (kapas)	374 1 0	..	..	238 0 2
4 Vegetables	384 0 0	143 0 0	532 2 0	395 8 0
5 Gingelly	58 15 6	190 5 0	166 12 9	34 8 6
6 Groundnut	130 14 0	190 2 0	97 3 2	523 1 0
7 Fodders and Tuber crops	845 5 0	64 3 0	..	..
8 Seedlings and Plants	183 6 0	292 14 6	122 12 0	137 5 6
Total	10,255 10 0	4,977 7 3	4,667 7 8	6,123 10 5

APPENDIX II.

Details of disposals of grain and straw received from Bulk Crops.

Crop.	Seed. Retained on the station. Quantity.	Seed. Retained on the station. Value.	Seed. Transferred or sold. Quantity.	Seed. Transferred or sold. Value.	Grain. Retained on the station. Quantity.	Grain. Retained on the station. Value.	Grain. Transferred or sold. Quantity.	Grain. Transferred or sold. Value.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Rs. A. P.		Rs. A. P.		Rs. A. P.		Rs. A. P.
1 Paddy	14,232	2,890 14 6	15,194	3,086 4 6	..	..	8847·5	1,136 10 3
2 Ragi	1,001	187 11 0	2,076	389 4 0	..	..	..	..
3 Cotton (kapas)	855	374 1 0	..	..	..	..	..	..
4 Vegetables	10	60 0 0	64	324 0 0	..	..	..	..
5 Gingelly	73	37 10 9	38	21 4 9	..	..	..	..
6 Groundnut	462	115 8 0	50	12 8 0	..	..	..	..
7 Fodders and Tuber crops.	..	..	13,525	845 5 0	..	..	..	..
8 Seedlings and Plants.	..	..	34,580	183 6 0	..	..	..	..
Total	..	3,665 12 9	..	4,862 0 3	..	..	..	1,136 10 3

	Straw. Retained on the station. Quantity.	Straw. Retained on the station. Value.	Straw. Transferred or sold. Quantity.	Straw. Transferred or sold. Value.	Total Value.	Total receipts for three years. 1950-51.	1951-52.	1952-53.
	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
		Rs. A. P.			Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
1 Paddy	58,830	588 4 9	..	..	7,702 1 6	3,995 1 9	3,684 11 4	4,101 15 0
2 Ragi	..	..	..	..	576 15 0	101 13 0	63 14 5	693 4 3
3 Cotton (kapas)	..	..	..	..	374 1 0	..	..	..
4 Vegetables	..	..	..	..	384 0 0	143 0 0	532 2 0	395 8 0
5 Gingelly	..	..	..	..	58 15 6	190 5 0	166 12 9	34 8 6
6 Groundnut	2,860	2 14 0	..	..	130 14 0	190 2 0	97 3 2	523 1 0
7 Fodder and Tuber crops.	..	..	..	..	845 5 0	64 3 0	..	..
8 Seedlings and Plants.	..	..	..	..	183 6 0	292 14 6	122 12 0	137 5 0
Total	..	591 2 9	..	..	10,255 10 0	4,977 7 8	4,667 7 8	6,123 9 9

APPENDIX III.

PRO FORMA OF COST OF CULTIVATION FOR BULK CROP.

Serial number and details of expenditure.	Actual expenditure for three years.		
	1950–51.	1951–52.	1952–53.
	RS. A. P.	RS. A. P.	RS. A. P.
Pay and allowances of the Staff—			
1 (1/3 of actuals) Farm manager and maistry	788 0 0	696 0 0	705 0 0
2 Miscellaneous cultivation expenses (1/3 of actuals) ..	340 0 0	368 0 0	349 0 0
3 Working expenses (Actuals)	4,375 4 4	2,354 11 5	3,431 0 0
4 1/10 of Expenditure on Live and Dead stock	187 0 0	373 0 0	201 0 0
5 Proportionate rent for the lands of the station is on leased land; if it is Government Farm the normal rental value of the tract subject to 15 times the land assessment per acre to be debaited as expenditure.	801 15 3	707 3 0	739 12 8
Total ..	6,492 3 7	4,498 14 5	5,426 12 8

APPENDIX IV.

STATEMENT OF ABSTRACT EXPENDITURE AND RECEIPTS.

Serial number and particulars.	1950–51.	1951–52.	1952–53.
	RS. A. P.	RS. A. P.	RS. A. P.
Expenditure	6,492 3 7	3,498 14 5	5,426 12 8
Revenue	4,977 7 3	4,667 7 8	6,123 10 5

APPENDIX V.

STEPS TAKEN TO INCREASE THE REVENUES OF THE STATION.

The chief limiting factor in stepping up production in this tract being the lack of assured water-supply, the scope for installation of filter points was explored and the maximum area that could be commanded by the wells was cultivated. Ragi, groundnut, gingelly, cotton in rice fallows and tapioca were the crops that were cultivated. Larger areas were sown to green manure than ever before and larger number of Glyricidia plants were planted with a view to achieving self-sufficiency in green manures and eliminating groundnut cake as manure.

The area under each of the crops is given below :—

	ACS.
Ragi	1·72
Gingelly	0·43
Groundnut	1·43
Cotton in rice fallows	0·44
Tapioca	0·43
Green manures	8·80
Horse-gram	3·19

Layers of citrus varieties and mango grafts were prepared and distributed. Since the cropping in rainfed area is often a failure about two acres in rainfed area have been converted into an orchard and mango and citrus plants have been planted.

Raising Live fence of Prosopis Juliflora.—Prosopis Juliflora seedlings have been planted along the boundary of the farm close to the wire fence. The live fence raised around the quarters site was kept in good condition.

RICE RESEARCH STATION, TIRUR P.O.
(CHINGLEPUT DISTRICT),
13th September 1954.

M. K. VENKATASUBRAMANIAN,
Superintendent.