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Editorial

We publish in this issue an account of the survey made by the Economic Adviser to the Government of Madras regarding the actual additional production of food crops secured through the Grow More Food Schemes in Madras. The survey was made on the pattern of a standardised technique formulated by the I. C. A. R. and the report gives a detailed account of the numerous problems that were encountered during the actual course of the survey and the deviations that were found necessary from the standardised procedure prescribed by the I. C. A. R.

Out of a total of 1,220 experiments that were programmed, only 644 were actually laid out, out of which 510 were completed and 419 experiments were actually available for inclusion in this report. The acreage increase in production (of Paddy) works out to 10.5 per cent on account of superior seed, 12.4 per cent from green manures and 12.2 to 14.1 per cent as a result of applying ammonium sulphate to the paddy crop.

When the yields obtained from plots under the different categories of G. M. F. aids and their corresponding controls are compared with those obtained from plots in the random survey of yields from the general experiments on food crops, it is found that the average yield of paddy for the whole State of Madras is only 1030 lb. per acre, which is even less than half the yield recorded in the control plots in the G. M. F. series of experiments. The factors underlying such a great disparity are not fully understood and need further scrutiny, though it is suggested by the Economic Adviser that this difference might be due to the fact that the G. M. F. aids were given only to better types of land that were owned by a better class of farmers who could commend better conditions of irrigation and general cultivation. This inference, if confirmed by the final analysis of data from all the experiments, would seem to show the immense possibilities of stepping up the production, if only the principal G. M. F. aids are capable of being extended to more areas under paddy.

The present scheme of survey, though covering nearly 80% of the additional food production targeted, is considered inadequate by the Economic Adviser for the reason that the principal G. M. F. schemes were not included and also because the cumulative effects of two or more factors were not included in the study. It has also been realised that much more detailed information is necessary on the effects of manuring, using different combinations of organic and inorganic manures, different doses thereof and of applying these manures at different stages of the crop. "Some of these experiments have been laid out in an empirical way by the Agricultural Department". The feasibility of combining all the factors in a comprehensive series of objective experiments laid out on the random sampling basis is reported to be under consideration, and it is suggested that it might be desirable to have the experiments repeated in the coming season, providing for such a broader conception.

In short, this merely means that what has actually been accomplished is just sufficient to show what a lot more remains to be done, both in the extent and the efficiency of the Grow More Food Organisation.

Cultivation of Gros Michel Banana in Jamaica

By

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The Gros Michel variety ranks as world's No. 1, commercial variety excelling other varieties in the combination of desirable characters, having quality fruits of good length, flavour, attractive skin colour, resistance to bruising, grade, yield, symmetry and strength of bunch. It is a voracious feeder with free suckering habit. Its bunch habit is markedly cylindrical, the bunch hanging down almost ideally. Even in the three-fourth mature stage it has a tough skin and so the bunches can be handled and transported naked across oceans, without bruising, in huge quantities of bunches in a ship load. Above all, this variety has proved to be the best suited variety for refrigerated transport lasting from 15—21 days to the United States of America, Canada, England and to countries on the Continent of Europe. It can be said that the banana industry has attained its highest development in Jamaica due mostly to the excellence of this one variety.

Cultivation in Jamaica: Banana is grown as a perennial crop in extensive plantations on the lower slopes and valleys of hill ranges in the island. Some of the plantations are a few square miles in extent. Though the Gros Michel banana was first introduced in Jamaica in 1830 from Martinique, its extensive cultivation commenced only in 1899 after the formation of the United Fruit Company. This company not only owned extensive production areas in Jamaica but also provided refrigerated transport for this fruit.

The details of starting new plantations are as follows. Large areas most of them virgin lands, are cleared and roadways made. Next the main blocks and main drains are demarcated. At planting sites, stakes are marked at a distance of eleven feet both ways for the Gros Michel variety. The pits for planting are nearly round holes about 18 inches in depth and 18 inches diameter. Corms with one good peg sucker just sprouting are used for planting. When the corms are big-sized they are cut from two to four bits for planting, depending upon the size of the corm. Generally corms up to 5 inches diameter are planted without cutting to bits. Those with a diameter of 5 to 7 inches are cut into two bits and those above 7.5 inches are cut into four bits. Each bit used for planting will have one good bud or sprout. The remaining buds are removed before planting. To kill the larvae and eggs of the banana

The details of the banana industry presented in this paper were gathered by the author in the course of his tour to the West Indies in 1950.

weevil (*Cosmopolites sordidus*), the corms are sometimes soaked in lime water for two days before planting. Prior to planting a fertiliser mixture compost and $\frac{1}{4}$ lb. sodium nitrate or ammonium sulphate is applied mixed with the soil. The sprout or peg sucker is planted at an incline inside the pit and covered with earth, with just the top alone exposed.

After-cultivation consists in forking the area four times a year, when the pseudostems are cleaned, dry leaves cut and all the refuse incorporated into the soil. There are natural irrigation facilities in certain plantations in the valleys. The rainfall distribution is also favourable for the growth of bananas. In certain plantations mulching with grass growing wild is practiced with success. Judicious desuckering is also attended to at the time of forking. Only one sucker is allowed as a follower for each parent clump. The position of the follower is also regulated at the time of desuckering. This is with a view to maintain the spacing between clumps, by not allowing the suckers of two adjacent clumps to approach each other.

All the plantations have adequate spraying equipment, the pipe lines for spraying running about 2-7 miles depending on the extent of the plantation and spraying with Bordeaux mixture 4 : 4 : 40 against 'Leaf Spot' (*Cercospora* sp.) disease is systematically done once in three weeks over the entire area. Main pipe lines conveying the spraying chemicals traverse the entire length of the plantation. A length of hose of about 5000-7000 feet in length is also used for spraying. The interval given between two spraying operations is only three weeks, the purpose being to keep the first 3-4 tender leaves always free from infection. Spraying with Bordeaux mixture effectively controls conidial infection on the heart leaves.

Soil conservation measures: Due to the slopy nature of many of the plantations, soil conservation methods are adopted by the leading growers. Contour trenches are dug and the earth excavated is used to erect a small bund on the upper portion of the trench and this bund is turfed. These trenches lead to a natural main drain which is also turfed on the sides. Every 2-3 years the trenches are deepened and the earth thrown down. The differences in height between the lower and higher terraces demarcated by the contour drains becomes more and more marked in course of time with the result that each terrace is reduced to a gentle slope gradually. The owners believe in mulching the banana area. The grass growth in the adjoining steep areas are cut and used as thick mulch. The response to this treatment was striking. Each bunch in the mulched area was nearly double the grade (number of hands) of those from the areas not mulched. There was no surface wash and no weeds in the mulched plots. A better and richer surface soil with very vigorous growing plants was the result.

In all the soil conservation methods adopted, the water is designed to be taken off from the fields slowly by laying terraces and contour drains so as to allow more time for the finer soil particles to settle in the field. But when the water reaches the main drain it is cleared quickly, as otherwise the flowing water will act for a long time on the sides and bottom thereby cause more erosion. Except in the Lower Pulneys and portions of Waynad, and the Nilgiris, soil conservation problems do not call for attention by the banana growers of our State. But wherever possible mulching with dry banana leaves or other easily available organic matter can be adopted with profit. In slopy areas formation of contour drains and bunds at suitable distances with a view to cultivation on terraces of gentle slopes should be the objective.

Manurial practices : The manurial practices in Jamaica are based on the results of manurial trials conducted by the United Fruit Company in five representative tracts of the island. In all these five places, increased yields were got by the application of nitrogen at the rate of one pound per stool per year, applied in small quantities at frequent intervals varying from four to six times a year. This is because nitrogenous fertilisers like ammonium sulphate act only for a short period. The best results were got when a continuous supply of available nitrates are maintained in the soil throughout the life of the plant. Another important inference was that the number of hands in the bunch is determined early during the life of the banana plant and after this stage any amount of application of manure will not add to the grade or number of hands. Even the first application of manures becomes important on this ground. Finger length and initial stimulus for the follower sucker are affected by the later application of manure. Sulphate of ammonia continues to be the main nitrogenous fertiliser in use. The manures are broadcast on the surface in the form of a circle round the plant, the diameter of this circle increasing up to a maximum of four feet as the plants grow. Occasionally, when the plants are growing on too slopy soils, the fertiliser is put inside shallow holes bored in the soil with a pointed iron bar.

The soils in Jamaica are sufficiently rich in available potash and phosphates and on such soils the manurial dose adopted is three ounces of sulphate of ammonia or its equivalent once in six weeks throughout the life of the plant.

Implements used in Jamaica : Of the implements used by the workers, the banana knife with a long, pointed and bent blade ($1\frac{1}{2}$ feet is the blade length) is used for desuckering, cutting bunches and mattocking. The second implement in use is the mattock with a six-inch axe on one side and an eight-inch hoe on the opposite side. This is used to clear old corms, separate good sprouts, for planting, hoeing and earthing up plants,

cutting old corms to pieces with the axe and spreading round and also for digging pits and covering. Mattocking is systematically attended to. The pseudostem after harvest is cut and removed in three stages so as to allow the follower to attain uninterrupted growth with the parental reserve food. The last bit of the pseudostem is removed only after three months from the date of harvest. The old corm and bits are cut to pieces and spread round the clump with the mattock, The digging fork is used for forking the entire area. In certain plantations, the interspace is worked by a petrol-driven, disc cultivator 'Formall Cub' manufactured by Mc-Cormick Deering, International Harvesting Company of Chicago.

Harvest and disposal of Bunches : The harvest of the bunches of Gros Michel is continuous throughout the year. This is due to the progressive fruiting of the differently aged suckers in the perennial clumps. There is a peak production period during January to March.

In every big estate the Jamaica Government Railway has laid out extensions from the main line with special banana coaches to load and carry the banana bunches according to the schedule to the ports. Loading orders in advance of the arrival of ship from United States of America, England or the Continent are received by cable and published in the dailies for the information of growers. Based on the holding capacity of the vessels each district headquarters is given cutting orders through the special staff to farms regarding the quota and dates of cutting and loading. Cutting of the fruits in a section is invariably done once a week. As soon as the bunches are cut they are carried to the banana coaches by labourers known as 'Headers'. These banana coaches after loading are immediately collected to form a fruit train and taken to the nearest port. Travelling Inspectors inspect the bunches between cutting and loading. The time taken from the commencement of cutting of the bunch to completion of loading in the ship is not more than 36 hours. The timing of the arrival of the ship in the port and the arrival of the train load of bananas is done with great care and system. The loading in the holds of the ship is done after dipping each bunch in an alkali wash tank containing sodium bisulphate solution to remove the copper sulphate spray from the bunches and then in another ordinary water tank to remove the acid. Streams of coolies work continuously to load the bunches heaped like small hillocks at the docks. The total number of bunches loaded in the ship are indicated by checking machines placed in convenient positions in the dock. The number of small metal discs in the possession of each cooly gives the total number of bunches loaded by him. All damaged bunches and over-ripe or below-grade bunches are rejected. Generally a shipload will be about 1,00,000 bunches. In some ships there are conveyer chains which take the bunches to the holds. Bunches are arranged standing end to end, each bunch resting on its butt end. After arranging one to three tiers like this one more tier of bunches is laid flat

over these. Temperature, humidity and ventilation are regulated. The holds are cooled prior to loading by air blast refrigeration. The fruits are inspected twice daily and the temperature recorded. The Banana ship, S. S. Bayano in which the author had the opportunity to travel from Jamaica to the United Kingdom took 16 days for the transport. Temperature adjustments between 53 degrees to 60 degrees are made depending on the variety, condition of ripeness of the bunch and humidity. At Avonmouth near Bristol there is a special banana pier with unloading machines at the rate of about 2,000 bunches an hour. After the arrival of the ship the bunches are distributed to different towns by the trains. The fruits are immediately sold after ripening in special ripening rooms which could regulate temperature from 66 degrees to 68 degrees F. It is estimated that the markets in England, United States of America and Canada consume about a hundred million Gros Michel banana bunches in a year.

Cultivation of Gros Michel Variety in South India: The Gros Michel variety is being successfully cultivated in a number of place in our State. At the Kallar Fruit Station, situated at the foot of the N'lgiris, this variety is leading in yield. Similarly at Wyanad, and at the Agricultural Research Station, Taliparamba in Malabar district and at the Agricultural College Orchards at Coimbatore, the Gros Michel variety is performing very well. The variety thrives under the garden system of cultivation, where there is an assured water supply. At the Central Banana Research Station, Aduthurai in Tanjore district, this variety has been recently introduced. It is coming up well in the *paduga* lands commanding irrigation facilities. The Gros Michel variety is sure to have a good future in South India. Fortunately for our country the wilt disease (*Fusarium Cubens*) which threatens the successful cultivation of this variety in Jamaica, Honduras, Columbia and other countries has not so far made its appearance here. The banana is bound to play an important part in all countries of the world where it could be successfully grown, more so in our province where there is an insistent demand for greater production of food and there can be no better selection than the Gros Michel variety for the banana growers at present.

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A Preliminary Note on Germination of Papaya Seeds

By

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Papaya is a fruit crop commonly cultivated in house compounds and orchards. It requires heavy doses of manure and a plentiful supply of water for good growth and high yields. At the Agricultural Research Station, Nileswar III (Soil — barren littoral sand upto a depth of 20 feet) a variety of papaya (Washington) collected from Badagara (N. Malabar) has been grown successfully. Probably due to the poor nature of the soil at the Station, the variety took about 22 months for fruiting but good yields were obtained. One tree gave 58 fruits (during a period of 13 months) ranging in weight from 5 lb. to 11 lb. each-

With a view to raising more plants of this variety, seeds from ripe fruits were sown in the nursery immediately after extraction. This is the usual practice adopted, for the seeds are believed to lose their viability on storage. The seeds of of this variety sown immediately after extraction, however, gave poor germination and the resulting seedlings were poor and weak and did not establish well on planting. Trials were, therefore, conducted to find out a method of obtaining high germination fo the seeds of this variety. The treatments adopted and the results obtained are given in the table below :

Description of seeds	Percentage of of germination (100 seeds were soaked in all cases)		
	Control	Soaked in cow's urine for 24 hours before sowing	Soaked in pregnant cow's urine for 24 hours before sowing
1. Fresh seeds	6	15	11
2. Seeds dried in shade and stored for three months	28	37	48
3. Seeds rubbed with ash soon after extraction, dried in shade and stored for 3 months	55	67	76

Germination started on the 5th day of sowing and was completed in three weeks under all the treatments except in treatments 2 (i. e., seeds stored for three months) in which germination continued upto 32 days. From the table given above it is obvious that a higher percentage of germination was obtained when seeds were rubbed with ash to remove the gelatinous covering and stored for three months after thoroughly drying them in shade. It is not known whether rubbing with ash has got any

effect other than removing the gelatinous covering. Better germination percentage was noted when such seeds were soaked in cow's urine for 24 hours before sowing. In them germination started much earlier and more seeds germinated. Observations on the resulting seedlings for a period of one month revealed that those raised from fresh seeds did not survive for more than three weeks, while there was no mortality among seedlings raised from seeds stored for 3 months after treating with ash and soaking in cow's urine before sowing.

From the results tabulated above it appears that the seeds of this variety require a period of dormancy for good germination unlike other varieties. Further, treating with ash and soaking in cow's urine before sowing, not only increases the germination percentage, but also induces early germination and gives vigorous seedlings. The exact period of dormancy and viability in this variety and the effect of treating with ash are under study.

Propaganda Posters

By

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Propaganda is in essence the art of influencing people to do or think something which they would not do or think by themselves. Propaganda is in a way akin to advertisement. Advertisements in other fields may or may not be backed by truth. But as far as propaganda in the field of Agriculture is concerned, every idea or item must be backed up with facts and many years of experience. Only such ideas as are of real value and beyond the shadow of a doubt, are to be used for publicity. In trade, success of sales is entirely dependent upon publicity, irrespective of the intrinsic merit of a product, but we have no interest in any sort of exploitation. Our subject is to give out the experience derived at the expense of great energy, time and money for the benefit of the farmer. There is no other motive behind it. So all the ideas for the advertisement of our departmental achievements must necessarily be based on experience and truth and there need be no element of exaggeration to force their appeal.

There are certain important points to be borne in mind, to make propaganda posters successful. The posters that we prepare must have appeal, sincerity and simplicity. They must invite action and above all,

they should be attractive. Posters are meant to appeal to farmers, who as a class are not highly educated. Therefore they must be so designed as to excite a favourable response in him. The mere printing or speaking of an appeal does not guarantee such a response. And the appeal is of no value until it gets into the consciousness of the farmer. There are many who have ears but hear not, who have eyes but see not. For such persons posters full of words do not serve as a stimulus to action. There rests therefore a heavy responsibility with the designer. He must recognise that to get action, his poster must touch a chord of human responsiveness.

Attention getting or stopping effect : The first and foremost function of a poster is to attract the attention of people. People may then perhaps be induced to seeing it in detail. But this does not force them to act. All devices to serve attention should certainly be used. However, attention getting must not be emphasised to the detriment of other vital functions.

Arrangement : Casual attention to any object is momentary. An object may hold attention for about 10 or 15 seconds at the first instance. To make it a little more lasting the arrangement of the various parts of the design of the poster needs very careful consideration. The use of borders, lines drawn in certain directions, management of white space, the focus of the picture, these are all points that help a lot in fixing the reader's attention.

Illustrations : Since posters are to be pictorial this point needs careful consideration. Pictures should be full of human interest to be of any real value. They can add more to the attention value if they are carefully designed, and relevant to the theme. Pictures tell a long story in a few words, and help to create a mental picture quicker than words. Colour is closely akin to pictures as an attention catcher. The contrast as well as the intensity of the colour scheme will help a lot in attracting attention. Size of poster has also a great influence and the attention value of a poster increases with increase in size up to a certain limit.

A poster must convince : Before a farmer can be expected to imbibe an idea he must be convinced that the recommendations have the power to satisfy him which will culminate in response to the idea of trying it for himself. But belief is a matter of feeling and emotion. It varies widely in individuals. Belief is invariably born out of experience. It is difficult to convince a person merely by arguing and reasoning, even with any amount of actual evidence. For belief is more often dependent upon desire, than upon truth or reality. So illustrations must carry conviction by employing the familiar background of the farmer himself.

Satisfaction : The purpose of a recommendation is to satisfy the need of the ryot. A satisfied ryot is the best propagandist we can have. He sets in motion, "by word of mouth", spontaneous publicity. All the energy and time spent in designing a poster should be directed only on well-trying ideas or methods.

Sincerity and simplicity : These are the twin features that properly handled will enhance the value of all posters. Statements expressed must adhere to sincerity and not exaggeration. Sincerity gives life and carries a certain amount of conviction with the message. Simplicity means clear or precise in idea and easily understood posters. To attain this, the truth or idea should be clearly expressed so that it gives no room for any kind of misunderstanding of the idea. There should be only one fundamental idea expressed in a single poster. Even if there are more than one illustration in a poster, they must conform to the theme without destroying unity.

Caption or Headline : Much of the success of a poster depends on this. The "pulling power" as it is called, lies in the right caption. It should be simple, arresting and true. A few simple words, to convey the sense without detriment to coherence and unity in the regional language, is all that is necessary. The caption must be capable of suggesting to the viewer that there is something he requires. A gloomy side should never be expressed in the picture. The caption should also be effective in suggesting that there is a quick way for adoption of the idea. A caption must be brief and to the point, but not so brief as to be obscure or ambiguous in meaning. A caption should not be casual but must have force and interest. The caption "Manure for Crops" is just casual, but when it is changed to "Swell your Yields" it is catchy with an element of interest.

Appearance of the Poster : It is well known that the sense of sight is the most important road to human consciousness and understanding. Pictures are essential in transmitting ideas. With the use of a few words an idea can be made clear by pictures, but it is necessary to see that the colour, composition, balance, contrast, proportion, and rhythm are not sacrificed in any manner.

Colour of a great influence on human behaviour, and hence careful selection of colours is essential. It should be known that red has the maximum attention value. Blue is generally liked by all. Yellow makes an object look larger, while green has the least value. But colour must be rendered as far as possible with fidelity to represent natural objects.

Composition : A few points on composition will be helpful to the designer. Avoid repetition of shapes in arranging masses. Groups or masses should be arranged in pleasing relative positions. Variety in its many forms plays a big part towards good

pictorialism. Only sufficient forms must be included to give the right atmosphere, support and balance. There must be harmony in shapes with tone values. One of the most interesting forms of pictorial construction is the diagonal scheme. It lends itself to innumerable variations and has the advantage of being attractive even in its simplest forms. Variety of direction in pictures is also necessary. Other ways of arranging or grouping forms are in radian lines, horizontal lines, pyramidal form, triangles, double curves, "S" curves etc., and a knowledge of these will make the designing of the poster easy and make it appealing.

Preliminary Report on the Survey of the Additional Production achieved by the G. M. F. Schemes in Madras State

(Economic Adviser to the Government of Madras)

Introduction : Based on a realisation of the necessity for an achievement audit of the actual additional production of food crops secured through the G.M.F. schemes in the country, a survey on the pattern of a standardised technique of random sampling evolved by the I.C.A.R. and approved by the ad-hoc Committee of experts at its second meeting at Indore was undertaken in the whole State of Madras at the commencement of the fasli (Agricultural) year 1950—51. The scheme was confined to only three of the principal measures under the G. M. F. Schemes viz. effects of superior strains of paddy seed, green manure on paddy and ammonium sulphate among the fertilisers on paddy, as these were estimated to contribute about 80 per cent of the increased production targeted under all the intensive cultivation schemes. A study of the effect of new irrigation and cumulative effects of two or more of the G. M. F. aids, though contemplated originally, was not taken up as it was considered that they would complicate the scope of the survey. This is the first year of these surveys in Madras. They may therefore be considered only as exploratory for this State.

2. **Scope of the Survey:** The scheme for the survey was finalised in consultation with the I. C. A. R. It provided for sample harvests in 400 experiments under each of the three treatments spread out over 200 villages each sampled for the State as a whole. The actual sampling was done by the I.C.A.R. from lists of villages benefiting from the G.M.F. schemes. The experiments were divided into four categories one with the improved seeds of paddy at the pre-sowing stage and two with ammonium sulphate at the pre and post-sowing stages. The instructions drafted and the proformas prescribed aimed at ascertaining only the rate of increased production under each category. A specific provision for the enumeration of the area benefited by the G.M.F. schemes was not expressly made at the start as it was then the intention to rely on a complete enumeration which had been taken up independently by the Board of Revenue (Food Production). The progress made in the survey, the problems encountered and deviations made from the standardised procedure are dealt with in this report. A review of the results gathered upto the time of reporting is also included. More detailed aspects of the survey will be included in the final report after the conclusion of the survey by June next.

3. **Sampling:** For the purpose of sampling, lists of villages benefited by each category of the intensive cultivation schemes had to be supplied to the I. C. A. R. early in the agricultural year. A complete list of villages ultimately receiving G. M. F. aids was not available. The lists had to be collected from the District Officers and had to be based on their sales records. There was naturally some delay in compiling these lists and they were therefore sent only in batches to the I. C. A. R. The sampling done by the I. C. A. R. thus corresponded to these batches and these when received were communicated to the districts. Even among the villages sampled some had to be given up for one or other of the following reasons :—

- (a) absence of more than a single person benefiting from the chosen G. M. F. aid in the village sampled.
- (b) the G. M. F. aid not having been used by the beneficiary due to,
 - (i) diversion of the aid to other purposes,
 - or (ii) diversions to other villages,
 - or (iii) the adverse seasonal conditions hampering the use of the aids.

Resampling of villages and the communication of the fresh samples to the field staff resulted in further delays. Meantime some of the crops got harvested. An attempt has been made to cover up loss of experiments brought about in this manner by resorting to further sampling. Even so a somewhat serious loss of experiments is anticipated in respect of the

category of Green Manures. After reviewing difficulties of the kind mentioned and considering the incompleteness of the Universe taken for sampling, it was finally decided, with the concurrence of the I. C. A. R., to leave the sampling to be done by the Regional District Agricultural Officers directly in charge of the experiments in the different regions. Further sampling of villages for the additional experiments planned under ammonium sulphate in the post-sowing stage was thus left to the Regional District Agricultural Officers from January 51 and will be confined to all the late crops of paddy. They have also been instructed to sample villages in substitution of those falling out of the picture for one or other of the reasons referred to earlier in this paragraph.

4. Of the four categories of experiments two are planned to be laid at the presowing stage. Delays of the kind referred to in the foregoing paragraph affected the experiments being taken up at the stage as planned. The presowing requirement in the case of the seed experiments could not be adhered to, as in most of the cases, by the time the Agricultural Demonstrators could go to the sampled villages planting of paddy had far advanced. The experiments with superior strains of paddy have therefore to be taken as conducted practically at the post-sowing stage. In the case of the experiments with ammonium sulphate it was considered that the pre-sowing requirement would not be impaired if they are laid out at a stage before the fertiliser is actually applied to the field as the application is only made as a topdressing three to eight weeks after planting. With the concurrence of the I. C. A. R. it was decided to have this category of experiments renamed as pre-manuring, the corresponding post sowing fertiliser experiments being renamed as post-manuring. In order to avoid confusion with similar experiments in other states the revised nomenclature as above will be maintained in all future reports from this State.

5. **Organisation:** The scheme in the whole State along with other surveys on food crops and oilseeds is under the direct control of a Deputy Director of Agriculture and he is assisted by eight Regional District Agricultural Officers who have each a jurisdiction extending over three to four districts. A statistician is also attached to the scheme and he is assisted by a small team of statistical assistants and computers. The work of the entire staff is co-ordinated and controlled by the Economic Adviser to the Government of Madras. The sample harvests in the allotted villages are attended to by the Agricultural Demonstrators and they furnish the results in the proforma prescribed. They are received simultaneously by the Regional District Agricultural Officers of the regions concerned, by the Economic Adviser at the State Headquarters and by the I. C. A. R. They are scrutinised both at the district and state levels and defects got rectified. Procedural correctness is tested by spot check of a few experiments in each taluk by the Regional District Agricultural Officers. The administrative officers of the Agricultural Department directly controlling the

work of the Agricultural Demonstrators are also required to check a few of the experiments. By all these means every attempt is made to ensure correctness of procedure and a high level of accuracy in the result.

6. **Progress with the experiments:** An abstract statement showing the details of the number of experiments planned and those completed in the State as a whole up to 15—2—51 is given below.

Category of experiments (1)	Coverage with reference to area targeted (2)	No. of districts included (3)	Number of experiments		
			Planned. (4)	Laid. (5)	Completed. (6)
(i) Superior strain of paddy seeds. (Post-sowing)	53	11	354	281	239
(ii) Green Manures (Post-sowing)					
(iii) Ammonium sulphate (Pre-manuring)	71	16	176	137	90
(iv) Ammonium sulphate-(Post-manuring)	94	21	530	155	125
Total ...			1220	644	516

The harvests are still in progress in some of the southern delta areas and a further complement of results in respect of the category seed are expected in the course of March 1951. In the case of green manures many experiments were lost as the green manure seeds supplied by the Government Depots were not sown and in some cases the crops had been harvested before the experiments could be taken up. A large number of experiments under the last category - ammonium sulphate (post manuring) - was allotted only in January and many of them had therefore to be taken up in the second or third crop season for paddy sown between January and April. These results may therefore become available only by about June next. Except for the green manure category the final results are anticipated for very nearly the full number of experiments planned in the other categories. If the scope of the experiments under green manure could be extended to cover fields benefiting from green manure applications made by the ryots themselves independently of the Government Depots a fuller quota of results could be ensured under this category also. The number of districts included in the sampling for the first three categories is perhaps low. It has been brought about by the sampling delays referred to in para 3 ante. If these experiments come to be repeated in the coming year the above defects can be avoided.

7. **Trend of the Results from the Survey:** Of the experiments shown as completed in the foregoing paragraph those for which results were available at the end of January 1951 were 419 in number and

these have been taken up for a preliminary analysis. The relevant data are furnished in the tabular statement below.

Category of the experiments	No. of districts covered	No. of experiments included	Average yield of undried Paddy - Lb./Acre						Average increased production	
			Recipient Plot.			Control Plot.			Lb. Acre.	% S. E.
			Yield.	S. E.	% S. E.	Yield.	S. E.	% S. E.		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(i) Superior seed	10	197	2269	63.3	2.8	2054	56.7	2.8	215	10.5
(ii) Green Manure	5	33	2074	120.2	5.8	1846	104.2	5.8	228	12.4
(iii) Ammonium sulphate (Pre-Manuring)	9	89	2177	82.3	3.8	1908	79.1	4.1	269	14.1
(iv) Ammonium sulphate (Post-Manuring)	6	100	2388	87.9	3.7	2129	84.0	3.9	259	12.2

As the number of results, with reference to the total due, included in the analysis shown above is so few, any inference as to the trend of the results can only be taken as tentative.

The increased production shown in col. 10 of the above statement may be compared with that assumed for each item in the three-year plan of intensive cultivation schemes. The data are shown below :

Category	Increased production per acre in lb.		
	as revealed in the random sample experiments		as assumed for the 3-year plan
	Paddy.	Rice equivalent.	Rice.
Paddy - Improved seed	215	152	120
Green Manure on paddy	228	153	224
Ammonium Sulphate on paddy	259	174	204

It will be seen from the above statement that the rate of increase assumed in the case of improved paddy seed is only about 80 per cent of the actual as observed from the experiments. The rates assumed in the case of green manures and ammonium sulphate are, however higher than the actuals by about 49 per cent and 17 per cent respectively.

It might be pertinent here to compare the yields obtained from the plots under the different categories of G.M.F. aids and their corresponding controls with those obtained from the plots in the random survey of yield from the general co-ordinated experiments on food crops. An analysis of the results from 600 plots in 17 districts gives the State average of production in the current year is 1030 lb. of paddy per acre. This yield is less than a half of that from the control plots in the G. M. F. series of experiments. This great disparity might perhaps be due to the fact the G.M.F. aids are applied to better classes of land which are attended to by a better class of farmers. The conditions of water supply and general cultivation may also be better in this case than in the generality of lands under paddy. This possible inference, if confirmed by the final analysis of the data from all experiments, might point at once to the immense possibilities of stepping up production if only the principal G.M.F. aids are capable of being extended to more areas under paddy.

8. **Enumeration of area benefited by the G.M.F. Schemes:** Reference has been made earlier in this report to an independent arrangement by the Board of Revenue (Food Production) for getting all areas benefited by the G.M.F. measures correctly and completely recorded. The arrangement in outline can be summarised as follows. The agencies responsible for distributing G.M.F. aids furnish data of the aids distributed to the Taluk Supply Officers direct once a week. These are sorted and sent to the concerned villages where they are entered in a special Village Food Production Register which is designed to give particulars of the names of the cultivators receiving the G.M.F. aids in the village and the survey numbers and extents of the fields receiving such aids. The particulars so entered are subsequently verified by a spot check by Karnams and taken to the village account No. 2 which shows the details of general cultivation by each field. Additional production ensured is recorded for each field benefited by a visual estimation of the harvested crop. The total additional production is compiled once a month in a Target - Achievement sheet and used as basis for procurement. The scheme though sound in theory, has in practice been found to be difficult to enforce, as it involves considerable additional work to all concerned in the chain. This became apparent during inspections made by the officers concerned with the yield estimating surveys. The necessity of an independent survey, by the random sampling technique, of the areas benefited by the principal categories of the G. M. F. aids therefore became self-evident. The results of this survey could also be used to check the completeness and reliability of the over-all enumeration taken up by the Board of Revenue (Food Production). Details of scheme adopted are found in the copy of instructions on the subject enclosed. A total of 450 villages has been fixed as the number to be surveyed in detail and their number per taluk has been distributed

according to the intensity of the distribution of the Grow More Food aids according to the targets fixed. The required number of villages in each taluk is then sampled at random and complete enumeration is made by spot check supplemented by interrogation of the beneficiaries. The work is attended to by the eight Regional District Agricultural Officers and eight Economic Investigators of the Public (Economics and Statistics) Department. The work was taken up only in January 1951 and is expected to be completed by April 1951. So far data of the enumeration work from five taluks of three districts have been received. Of the 484 villages in these five taluks, 358 (74%) have received G. M. F. aids. Out of these 16 villages (4.5%) have been sampled for detailed enumeration. The I. C. A. R. have suggested that 10 per cent of the villages benefited by the G. M. F. aids may have to be taken up in the survey. This requirement will be borne in mind. It is anticipated that the number of villages already selected might cover about 10 per cent of the total number of villages benefited, though the exact coverage can be known only when a complete list of villages is available.

9. Plan of further work for the coming season: The survey undertaken now, though covering schemes responsible for 80 per cent of the additional production, is considered inadequate as —

(a) Other principal G. M. F. schemes are not included and
(b) the cumulative effects of two or more factors are not included in the study.

The need for more detailed information on the effects of manuring, using different combinations of organic and mineral manures, different doses thereof and application at the different stages of the crop has been realised from enquiries by some legislators and discriminating cultivators. Some of these experiments have been laid out in an empirical way by the Agricultural Department. The feasibility of combining all the factors in a comprehensive series of objective experiments laid out on the random sampling basis is under consideration. In the plan of work for the coming season it might be desirable to have the experiments repeated providing for such a broader conception.

Research Note

Note on Minimum Temperatures at Coimbatore

Minimum temperature data collected over a period of thirty-seven years in the observatory attached to the Agricultural College and Research Institute were analysed statistically and the summarised data are presented in the following table :—

S. No.	Month	Mean of monthly Means °F	Particulars of variation °F	Coefficient of variability.	Remarks.
1.	January	64.1	63.2 ± 4.1	3.00	
2.	February	65.6	65.0 ± 4.0	2.86	°1-Sudden rise (3.4 F.)
3.	March	69.0	68.7 ± 3.0	2.00	
4.	April	73.1	73.4 ± 1.9	1.11	
5.	May	73.4	73.0 ± 2.7	1.16	
6.	June	73.3	73.3 ± 3.1	1.79	
7.	July	72.1	72.1 ± 1.2	0.84	
8.	August	71.7	71.7 ± 1.4	0.92	
9.	September	70.9	71.2 ± 3.5	1.76	
10.	October	70.4	70.1 ± 1.3	0.95	
11.	November	68.6	68.3 ± 2.3	1.94	°2-Sudden Fall (3.4 F.)
12.	December	65.2	65.0 ± 3.6	2.41	

January is the coldest month at Coimbatore. Another feature is that both the sharp rise in the month of March preceding the bigger rise in April, and the sudden fall in the month of December are of the same magnitude, being 3.4°F. During the summer months of April, May and June the mean minimum temperature is high as well as steady. In July and August, which are the South-West Monsoon months and in October, the active North-East Monsoon period, the temperatures are steady, with the coefficient of variability very low.

To gain an insight into the nature of the correlations existing between the minimum temperatures of the various months in the year, sixty-six total correlations were worked out. Only four combinations, namely, February-March, May-August, June-September, and September-December were found to have significant correlations. The last one was negative and significant. The combination which involved the adjacent months, namely, February and March was studied in detail by working

out the 28 inter-weekly correlations of these two months. Except the correlation of February first week and March last week, positive significant correlation exists only within the first five weeks of this period, namely February and March. It may therefore be inferred that if the minimum temperature is low in February, it will continue to be so in the first week of March also and the sudden increase characteristic of Coimbatore weather, will be only in the second and subsequent weeks of March.

In the months of August and November a positive significant correlation exists between minimum temperature and rainfall. These two months are, of course, typical rainy months in Coimbatore. Its relationship with the maximum temperature and relative humidity seems to be of a variable nature.

The following conclusions may be drawn from this preliminary study :—

- (i) Minimum temperature is a fairly well-defined weather factor in Coimbatore,
- (ii) January is the coldest month. In the preceding and succeeding months also, the minimum temperature will be rather low.
- (iii) If the minimum temperature in February is low, it is an indication that the usual sharp rise of 3.4 °F. in March will be only after the first week of March.
- (iv) In the rainy months of August and November the minimum temperature is positively and significantly correlated with rainfall.

Acknowledgement : The authors are thankful to all those who have been responsible for the collection of the data forming the basic material for this short note and to Miss. T. P. Anna, the computer, for her help in compiling the data.

Agricultural Meteorology }
 Section }
 Coimbatore. }

C. Balasubramaniam
 &
 M. B. V. Narasinga Rao.

Weather Review — For May 1951

RAINFALL DATA

Division	Station	Total rain-fall for the month	Departure from normal in inches	Total since January 1st in inches	Division	Station	Total rain-fall for the month	Departure from normal in inches	Total since January 1st in inches	
Orissa & Circars.	Gopalpur	1.6	-0.5	5.3	Central Contd.	Coimbatore	1.9	-0.6	7.0	
	Calinga-patnam	1.5	-1.1	2.5		Tiruchirapalli	6.4	+3.8	11.3	
	Ceded Dists.	Visakha-patnam	3.3	+1.3	4.1	South	Naga-pattinam	5.0	+3.4	11.9
		Anakapalle*	6.4	+4.6	8.0		Aduthuari*	2.3	-0.5	4.0
		Samalkot*	3.2	+1.9	5.5		Pattukottai*	0.5	-1.3	5.1
		Kakinada	3.8	+2.3	4.7		Madhurai	0.6	-2.1	7.4
		Maruteru*	§	-1.1	0.2		Pamban	0.5	-0.5	14.1
		Masulipatnam	0.7	-0.6	1.8		Koilpatti*	3.2	+0.8	11.1
		Guntur*	2.6	-0.0	7.0		Palayam-cottai	2.0	+0.4	10.6
		Agri. College, Bapatla*	0.2	-0.8	2.2		Amba-samudram*	2.9	+0.6	13.5
Agri. Farm Bapatla*	0.1	...	2.7	West Coast	Trivandrum	6.8	-2.0	14.2		
Rentachintala	1.3	-1.2	4.4		Fort Cochin	3.7	-8.0	11.6		
Kurnool	2.7	+1.6	7.4		Pattambi*	3.6	-6.4	8.8		
Nandyal*	3.1	+1.5	4.7		Kozhikode	6.0	-2.9	9.9		
Hagari*	1.2	-0.7	5.0		Taliparamba*	6.1	-2.9	12.3		
Siruguppa*	0.5	-1.2	1.4		Nileshwar*	3.0	-7.1	7.5		
Bellary	3.6	+1.7	5.4		Pilicode*	2.0	-7.2@	6.0		
Cuddapah	0.7	-0.8	3.2		Mangalore	3.9	-3.8	5.9		
Kodur*	0.7	-1.8	2.2		Kankanady*	2.8	-6.0	5.6		
Carnatic	Nellore	0.4	-0.7		2.2	Mysore & Coorg.	Chitaldrug	4.6	+1.7	6.4
	Buehireddi-palem*	0.4	-1.2	1.5	Bangalore		6.6	+2.4	7.1	
	Madras (Meenam-bakkam)	0.4	-0.6	4.2	Mysore		5.0	-0.6	8.7	
	Central	Tirurkuppam*	0.1	-2.8@	4.5	Hills	Mercara	3.6	-1.6	9.3
		Palur*	4.3	+0.1	7.7		Kodaikanal	7.6	+1.2	34.5
		Tindivanam*	2.1	-1.8	4.1		Coonor*	5.2	+1.1	27.7
		Cuddalore	0.1	-0.9	3.7		Ootacamund*	5.2	-1.0	14.1
		Vellore	6.2	+3.9	11.5		Nanjanad*	5.3	+§	14.4
	Gudiyatham*	1.6	-1.9	4.7						
	Salem	3.6	-1.0	9.4						
Coimbatore										
A. M. O.*	1.4	-0.4	4.1							

- Note:—**
1. * Meteorological stations of the Madras Agricultural Department.
 2. Average of ten years' data is taken as normal.
 3. @ Average of eight years' data for Tirurkuppam and nine years' data for Pilicode is given as normal.
 4. ... Taluk office normal is 0.88" and rainfall is 0.26"
 5. § Actual figure is 0.03".

Whether Review for May 1951.

The month began with local thundershowers in Tamilnad, Rayalaseema and in a few places in Coastal Andhradesa, Mysore and Travancore-Cochin. This sort of localised precipitation in isolated localities in the Madras State continued till 7-5-1951. Even in this period places like Rentachintala and Cuddapah recorded respectively 107 °F. and 106 °F. as maximum temperature.

On 8-5-1951 the weather became dry over the region. Day temperatures, which were invariably below normal during the first seven days, began to show a general increase above normal. Barring a few localised mild thundershowers dry weather persisted in the region till 12-5-1951. During this period Rentachintala and Nellore recorded the highest maximum temperature of 110 °F.

Mysore had fairly widespread thundershowers on 13-5-1951 and localised mild thundershowers were received in a number of places in the region. For four subsequent days weather was mainly dry, excepting of course, the scattered mild showers. During this period Rentachintala recorded very high maximum temperatures ranging from 109 °F to 112 °F.

In Rayalaseema, Malabar and South Kanara widespread thundershowers occurred on 18-5-1951 besides the isolated showers in other parts of the Madras State. This type of weather persisted for seven days in different localities with varying intensities. Cuddapah and Kurnool recorded the highest maximum temperature of 109 °F on 18-5-1951.

Thundershowers were widespread along the West Coast and local in Mysore and South Tamilnad on 25-5-1951. Day temperatures showed on appreciable decrease below normal particularly in Coastal regions. The succeeding three days passed without much appreciable change in weather conditions.

Fairly widespread thundershowers occurred in Coastal Andhradesa and Rayalaseema on 29-5-1951. On this day Nellore recorded the highest maximum temperature of 108 °F. On the next day thundershowers were widespread in Mysore and local in Rayalaseema, Tamilnad and Travancore-Cochin. On the last day of the month weather conditions indicated that the South-West monsoon had set in along the South Malabar Coast.

Particulars regarding the noteworthy falls and zonal rainfall during the month are furnished below :—

S. No.	Date	Place	Rainfall in inches for the past 24 hours
1.	1-5-1951	Tiruchirapalli	... 2.7
2.	3-5-1951	Kakinada	... 3.3
3.	20-5-1951	Mangalore	... 2.0
4.	23-5-1951	Kodaikanal	... 2.2
5.	25-5-1951	Nagapattinam	... 3.5
6.	26-5-1951	Mercara	... 2.1
7.	31-5-1951	Minicoy (Laccadives)	... 5.0
8.	"	Arogyavaram	... 3.2
9.	"	Vellore	... 2.5

Zonal Rainfall.

S. No.	Name of the Zone	Total precipitation
1.	Orissa and Circars	... Above normal
2.	Ceded districts	... Just normal
3.	Carnatic	... Below normal
4.	Central	... Slightly above normal
5.	South	... Slightly above normal
6.	West Coast	... Far below normal
7.	Mysore and Coorg	... Slightly above normal
8.	Hills	... Slightly above normal

Agricultural Meteorology Section,
Lawley Road P. O., Coimbatore,
Dated, —6-1951.

M. B. V. N., C. B. M. & M. V. J.,

Weather Review — For June 1951.

RAINFALL DATA

Division	Station	Total rain-fall for the month	Departure from normal in inches	Total since 1st January in inches	Division	Station	Total rain-fall for the month	Departure from normal in inches	Total since 1st January in inches	
Orissa & Circars	Gopalpur	8.9	+3.4	14.3	Central Contd.	Coimbatore	1.2	-0.7	8.2	
	Calinga-patnam	6.8	+2.1	9.3		Tiruchirapalli	0.3	-1.5	11.5	
	Ceded Districts	Visakha-patnam	2.9	-1.2	6.9	South	Naga-pattinam	0.7	-0.5	12.5
		Araku Valley*	7.6	+1.5	20.0		Aduturai*	0.2	-0.8	4.2
		Anakapalle*	2.9	-0.5	10.8		Pattukottai*	0.9	+0.1	6.0
		Samalkot*	4.7	+0.3	10.2		Madhurai	Tr.	-1.6	7.5
		Kakinada	3.7	-1.0	8.3		Pamban	0.0	-0.2	14.1
		Maruteru*	10.3	+6.0	10.5		Koilpatti*	£	-0.3	11.1
		Masulipatnam	10.5	+6.3	12.2		Palayam-cottai	0.1	-0.3	10.8
		Guntur*	4.2	+0.3	11.2		Amba-samudram*	2.2	+0.9	15.8
Agri. College, Bapatla*		7.1	+4.9	9.5	West Coast		Trivandrum	18.5	+5.3	42.7
Agri. College, Farm, Bapatla*		7.2	X	10.0			Fort Cochin	38.2	+9.7	49.8
Rentachintala	2.9	-0.7	7.3	Kozhikode		37.0	+2.2	47.0		
Carnatic	Kurnool	2.7	-0.2	10.1		Pattambi*	27.4	-3.0	36.2	
	Nandyal*	5.0	+1.3	9.6		Taliparamba*	37.5	-4.9	49.8	
	Hagari*	1.9	0.0	7.0		Nileshwar*	39.6	-3.9	47.1	
	Siruguppa*	3.6	+0.4(a)	5.0		Pillicode*	41.9	-0.2@	47.9	
	Bellary	1.1	-0.6	6.5		Mangalore	43.5	+3.3	49.4	
	Cuddapah	4.7	+1.7	8.0		Kankanadi*	43.0	+2.3	48.6	
	Kodur*	2.9	-0.6	5.1		Mysore & Coorg.	Chitaldrug	4.4	+1.8	10.8
	Nellore	1.1	-0.2	3.3	Bangalore		2.2	-0.7	9.3	
	Buchireddipalem*	1.8	+0.3	3.3	Mysore		1.4	-1.1	10.5	
	Mercara				21.9		-3.6	31.5		
Central	Madras Meenam-bakkam)	1.4	-0.5	5.6	Hills	Kodaikanal	2.5	-1.7	37.1	
	Tirukkuppam*	1.7	-1.1@	6.1		Coonoor*	1.7	-1.2	29.4	
	Palur*	0.8	-0.8	8.6		Ootacamund*	3.3	-1.6	17.4	
	Tindivanam*	0.2	-1.5	4.3		Nanjanad*	5.7	-0.8	20.2	
	Cuddalore	2.5	+1.1	6.2						
	Vellore	2.9	+0.1	14.4						
	Gudiyatham*	0.0	-2.4	4.7						
	Salem	0.6	-2.5	10.0						
Coimbatore* (A. M. O.)	1.0	-0.5	5.0							

- Note:—
1. * Meteorological Stations of the Madras Agricultural Department.
 2. @ Average of eight years data for Tirukkuppam, nine years data for Pillicode and six years data for Araku Valley is given as normal.
 3. Average of ten years data is taken as normal.
 4. (a) Taluk Office normal is 3'01" and Rainfall is 3'08".
 5. £ Actual Rainfall 0'04".
 6. X The farm was started only this year.

Weather Review For June, 1951

An advance of the South-West Monsoon was taking place in Malabar, South Kanara and adjoining areas on the first day of the month. On the same day a trough of low pressure extended from the North Andaman Sea to the Orissa Coast, concentrated into a shallow depression on 5-6-1951, and rapidly moving towards North West, passed inland and became unimportant on 6-6-1951. In association with this the monsoon extended to Mysore and South Deccan on 2-6-1951 and strengthened along the West Coast.

A trough of low pressure in the east Arabian Sea off the Kathiawar-Konkan Coast which formed on 7-6-1951 became well marked on the very next day, slightly moved towards north west, persisted and concentrated into a depression at its Southern end on 11-6-1951 but only to weaken on the next day into a trough which became unimportant on 14-6-1951 off the Sind-Mekran Coast. This caused active monsoon along the West Coast of the Peninsula.

On 11-6-1951 conditions became unsettled in the Bay of Bengal off the Circars - Orissa coast, extended off the Orissa coast on 13-6-1951 and became unimportant afterwards. The Arabian Sea branch of the monsoon became shallow on 16-6-1951, continued to be weak for two days and strengthened on the 19th.

A low pressure wave moved westwards across Lower-Burma on 18-6-1951. entered the Gangetic West Bengal through the east-central and north east Bay and became unimportant on 21-6-1951. In association with it the Bay of Bengal branch of the monsoon strengthened on 18-6-1951 and the Arabian Sea branch strengthened on 20-6-1951.

A cyclonic circulation appeared at 7000' a. s. l. over the Deccan plateau on 20-6-1951 and became unimportant on the next day.

Pressure changes were unfavourable for further advance of the monsoon over the country for two days from 21-6-1951. A cyclonic circulation again appeared over the Deccan plateau on 23-6-1951, moved eastwards and became more pronounced on the next day. A well-marked trough of low pressure lay in the Bay of Bengal off the Orissa-Circars coast on the 25th, which concentrated into a depression and crossed the Coast near Balasore on the 26th.

Rainfall has been widespread along the West Coast throughout the month except on 17th and 18th when rainfall occurred only at a few places. But the monsoon in the inland became very weak and no rainfall worth mentioning has occurred. The Bay of Bengal branch, however, brought some rains in the East Coast.

Day temperatures were below normal generally throughout the region except on the 17th, 18th and 30th, when they were above normal. Rentachintala recorded a maximum of 105°F. on 15-6-1951 and Kallakurichi 104°F. on 29-6-1951.

The note-worthy falls for the month are furnished below :—

S. No.	Date	Place.	Rainfall in inches.
1.	1-6-51	Mangalore	6.5"
2.	„	Kozhikode	4.8"
3.	„	Masulipatnam	4.8"

S. No.	Date	Place	Rainfall in inches
4.	1-6-51	Arogyavaram	2.5"
5.	„	Palghat	2.3"
6.	2-6-51	Chitaldrug	2.9"
7.	3-6-51	Trivandrum	2.1"
8.	6-6-51	Calingapatam	3.3"
9.	9-6-51	Fort Cochin	4.3"
10.	11-6-51	Alleppey	4.6"
11.	24-6-51	Nagercoil	2.6"

ZONAL RAINFALL

S. No.	Name of Zone	Total precipitation
1.	Orissa and Circars	Above Normal
2.	Ceded Districts	Just Normal
3.	Carnatic	Below Normal
4.	Central	Far Below Normal
5.	South	Below Normal
6.	West Coast	Just Normal
7.	Mysore and Coorg	Below Normal
8.	Hills	Far Below Normal

Agricultural Meteorology Section,
Lawley Road Post, Coimbatore }
Dated, 13-7-1951.

M. B. V. N., C. B. M., & M. V. J.,