The Madras Agricultural Journal

(ORGAN OF THE M. A. S. UNION)

Vol. XXXV September 1948 No. 9

Editorial

The Royal Commission on Agriculture and After: Two decades have passed since the Royal Commission on agriculture presented their report on the conditions of agriculture and rural economy in British India and made their recommendations for the improvement of agriculture and promotion of the welfare and prosperity of the rural population. In so far, as the terms of reference set before them permitted, it must be admitted, that the commission accomplished the task entrusted to them exceedingly well They gathered and sifted evidence, or such of it as was available to them at that time, with meticulous care and took great pains to bring on record a considerable volume of valuable material relating to agriculture and rural economy for which future committees and commissions should feel truly grateful Their recommendations relating to many aspects of agricultural improvement and promotion of rural welfare were of far reaching character, and such that would lead to increased agricultural prosperity. A number of suggestions put forward by the commission have since been implemented and the establishment of the Indian (Imperial) Council of Agricultural Research was the outcome of one of their main recommendations, and there is no doubt, that considerable progress has been effected in many directions, relating to agricultural improvement and organisation of agricultural research But whether, as a result of their endeavours and the subsequent action taken by the central and provincial governments, the economic position of the cultivating classes as a whole has improved to any appreciable extent since the year 1926, is a matter on which there is bound to be considerable differences of opinion. The Commission rightly laid stress on the importance of changing the outlook of the peasant himself as the prerequisite of effecting any agricultural improvement of a far reaching character. They laid it down that 'the success of all measures designed for the advancement of agriculture must depend upon the creation of conditions favourable to progress'. But

unfortunately the years following the report of the commission were hardly favourable for the creation of such conditions A trade depression, the like of which the world has not felt before, struck a severe blow to the agricultural classes all over the world and the Indian cultivator was the worst to suffer and last to recover from its effects.

In India, the political atmosphere was not conducive to the launching of any large scale reconstruction programme. A large body of influential public opinion represented by the Indian National Congress, severely kept aloof from all association with the Government. And then came the war which put out of gear all normal activities. It is not surprising therefore that only limited progress has been made in the direction of raising the standard of life of the rural population

Times have changed: new problems have risen, but, as the Royal Commission rightly recognised the foundation of all prosperity and happiness in India should start with the cultivator. In order to achieve this we would urge on the Government of India to set up a new Commission and entrust them with the task of formulating a revised all India policy based on a correct appraisal of all facts relating to agricultural reconstruction. The Royal Commission laboured under certain disadvantages By the terms of reference before them they were precluded from going into such important questions as land tenure, land tax, financing of large scale multipurpose projects, state planning, regulation of crop production etc. The majority of the personnel of the Royal Commission though undoubtedly men of great ability were not entirely unbiassed in political matters and many of their recommendations were tinged with this bias, and in New India such recommendations would therefore be unacceptable. The new commission should be entrusted with the task of taking stock of the existing state of things, and formulate proposals for the future development of agriculture in the country on an all India basis, taking into consideration that a large number of the Indian states have come into the picture and the rehabilitation of the teeming millions in these areas is no less important than the welfare of the people of the rest of the Indian Union.

The Hyderabad Affair: *All is well that ends well*

Manuring of Rice in Relation to Maintenance of Soil Fertility and Increased Production *

By

P. D. KARUNAKAR and T. RAJAGOPALAN,

(Department of Agriculture, Madras)

According to the "Famine Enquiry Commission Report" recently published by the Government of India, the self sufficiency in cereals at a satisfactory level, should be the cardinal aim of Food and Agricultural Policy of our Government to solve the acute food shortage in the country. As envisaged by Dr. Burns, formerly Agricultural Commissioner with the Government of India, a 30% increase in production of cereals is urgent and there is no reason why this could not be achieved as a result of the "Grow More Food" Campaign launched by the Provincial and Central Governments on an intensive and extensive scale. Taking rice, we produce in the Province an average of only 5 million tons of rice from 10 million acres under paddy – both irrigated and dry, and this is undoubtedly the most depressing part about our agriculture. The low production is mainly due to lack of water and manure. It is the unanimous opinion of the Agricultural experts, that given ample water and manure, the rice yield can be forced up very much higher. The average yield of wet paddy lands (8 million acres) in the Province is about 1,400 lbs. per acre. The population of Madras Province is approximately 50 millions and working at the rate of 16 oz. per head, the total quantity of rice required to feed the whole population is about 8 million tons of cleaned rice per annum. In other words, we have to increase our production of the present 5 million to 8 million tons.

The improved varieties of rice could give a 10% increase. This method of augmenting our food supply has its own limitation and cannot by itself solve even the fringe of our problem. The higher yields of improved strains will also remove more of plant foods from our soils. The only alternative, therefore, for enhancing appreciably our food supply, is manuring.

The problem of increased crop production through manuring has naturally to be approached from two distinct standpoints governing the general manurial policy, namely, (1) the maintenance of soil fertility and (2) increasing the soil fertility for higher productivity. The first objective can be achieved by addition of adequate amounts of bulky organics such as green manure grown "in situ" or brought from outside, farm wastes, composts, farm yard manure etc. The increased production at desired levels consistent with soil fertility on the other hand, can be brought about by a judicious use of easily available nitrogenous and phosphatic fertilisers such as ammonium sulphate and super, over base.

* A paper read at the College day and Conference, 1948.

I. Maintenance of Fertility.

It is well known that yields of crops at increasing levels of fertility often give an S shaped curve. With soils at low as well as at high fertility levels, yield response per unit of fertiliser ingredient is short of the maximum due to the operation of limiting condition of other factors of growth. Maximum fertility level may tentatively be defined as that point at which no factor is limiting and wherein the addition of one unit of any plant nutrient is reflected best in terms of yields. Under obviously favourable conditions of cultivation and manuring, the maximum yield of paddy has rarely exceeded 4,000 lbs. per acre. The normal fertility level for most of our soils can therefore be fixed at 2,000 lbs., i,e., at 50% of maximum yield. This figure can be taken as the basic fertility level of paddy lands in the Province. The organic substances available for maintaining the basic fertility level are:— (1) Green Manure; (2) Farm Yard Manure; and (3) Composts.

Farm Yard Manure and Composts are required for dry and garden lands. It would not be right to deny their manurial requirements or augment the manurial supply to paddy lands at the expense of dry lands. Dry lands also produce important food crops and the present availability of Farm Yard Manure and compost is woefully inadequate to meet their requirements.

So then, we have to depend mainly, perhaps entirely, upon green manures for maintaining the basic fertility level. It is therefore necessary that every acre of paddy land should grow green manure which may then be expected to supply 5,000 lbs. of green leaf per acre. This is a large order but not impossible.

It has been found by actual experiments conducted for a number of years in the several Agricultural Research Stations at Anakapalle, Samalkota, Maruteru, Aduturai, Coimbatore and Pattambi that fertility of paddy soils in the Province can be kept at suitable levels to produce an average acre yield of 2,000, lbs. by incorporation of 5,000 lbs. of green leaf to supply about 30 lbs. N. per acre. On this basis, the entire needs of our paddy soils for maintaining their fertility, can be met by the application of green manure It is however desirable to exercise restraint on our optimism regarding the exclusive use of green manures and emphasise the need for proving additional reinforcements in the form of available organics such as oil cakes.

The total quantity of groundnut cakes produced is half a million tons. Fifty percent of this is earmarked for cattle feed and hence 1/4 million tons alone will be available for manurial purposes. Practically the whole of it is being used now for cash crops and very little is available for paddy.

It may be desirable to ensure the supply of this and other cakes to provide at least 15 lbs. N. per acre when addition of 2,500 lbs. of green manure supplying another 15 lbs. of N. only will be necessary.

II. Increased Production.

We have so far considered the basic fertility maintenance of our soils in terms of yield, namely 2,000 lbs. of paddy per acre. Passing now to increased production, the plan may be fixed at any suitable target. To make our province self sufficient in regard to rice required to feed a population of 50 millions at the rate of 16 oz. of rice per day per head, we have to aim at a production of 12 million tons of paddy. As this is to be obtained mainly from 8 million acres of wetlands under this crop, our target yield should be at least 3,000 lbs. or 50% increase over production at the basic fertility level of 2,000 lbs. per acre. This has to be achieved by application of artificials only, since all our natural sources of manure are earmarked for maintenance of basic fertility and for the needs of dry lands. From an examination of the yield data relating to the manurial experiments on paddy with combination of nitrogenous and phosphatic manures providing 30 lbs. N. and 30 lbs. P_2O_5, in the typical Rice Research Stations of the Province, it is seen that 3,000 lbs of paddy yield has been reached in only a few cases. It should not on this score be considered impossible to reach the target, high as it is, by adequate and timely application of the required fertilisers in their proper forms provided other conditions are not limiting. Since at the present time we are not in possession of the knowledge about the nature and amount of the fertilisers needed for arriving at the target of 3,000 lbs. per acre, we have to be satisfied for the time being with the programme for a lower target of about 2,500 lbs. that have actually been reached in the experiments conducted in the various research stations at Samalkota, Maruteru, Aduthurai and Pattambi.

TABLE I.

Results of manurial experiments on paddy.

Agricultural Research Stations.	Artificials required N. per acre in lbs.	P. per acre in lbs.	Yield obtained by manuring, lbs. per acre.
Samalkota	30	30	2,700
Maruteru	44	32	2,300
Aduturai	30	30	2,700
Pattambi	31	30	2.300

From the data furnished in the table, it may be seen that in most of these stations the supply of 30 lbs. P_2O_5 and 30 lbs. N. in easily available forms, such as super and ammonium sulphate, has given an average yield of about 2,500 lbs. per acre on these farms. To arrive at this target of production therefore 6 lakhs tons each of ammonium sulphate and super are required.

Further, the addition of phosphoric acid is also required for increased production of our paddy soils which are very deficient in phosphates. The application of phosphates in presence of sufficient quantity of organics, has invariably proved beneficial in increasing appreciably the yield of paddy crop. It is therefore absolutely essential for the maintenance and increase of soil fertility that our lands should receive a minimum basic dose of phosphates to supply at least 30 lbs. P_2O_5. Our available phosphatic resources, apart from Trichy rock phosphate, are bones and fish guano only. Exact figures for the last two are not available. It is felt, however, that the quantity of phosphates from both the sources will be far short of our basic requirements. The deficit in regard to this important fertiliser has to be made good by mineral manures to be manufactured in this country and obtained from abroad.

Thus, the total phosphoric acid requirement for increased crop production will as mentioned before be 6 lakhs tons of super. This may have to be met by starting local industries for phosphoric acid production and / or by imports. Similarly 6 lakhs tons of ammonium sulphate, required for the supply of N. have to be manufactured or obtained from outside.

Based on the above considerations the following schedule of manuring for the paddy tracts of the presidency is recommended to give an average yield of about 2,500 lbs. paddy per acre.

1. Basic —	Green manure to supply 30 lbs. N. ...	5,000 lbs.
	or	
	Green manure to supply 15 lbs. N. ...	2,500 lbs.
	Plus	
	Oil cake to supply 15 lbs. N. ...	
2.	Plus	
	Ammonium sulphate or any Nitrogenous fertiliser to supply 30 lbs. N. ...	
	Plus	
3.	Super or any phosphatic fertiliser to supply 30 lbs. P_2O_5	

The significance of adequate and proper manuring has been well understood by the advanced countries like Japan, Spain and Italy. In Japan, composting of waste materials for application to rice, growing of green manure and liberal use of the human excreta, have been practised from a very long time. Artificial fertilisers, such as, super and ammonium sulphate, are supplied with the organics and the dosage is, as much as 70 to 80 lbs. of N in the shape of sulphate of ammonia and about 50 to 60 lbs. P_2O_5 as super. The sale of the chemical fertilisers is made through Co-operative Societies. Superior varieties of paddy evolved by breeding, occupy more than 70% of the rice area in this country and the number of

strains introduced are also limited. The distribution of manure is efficiently controlled by the State. Turning to Spain and Italy in the West, it is no wonder to note that with the magnificient system of irrigation prevailing in these contries, coupled with heavy applications of artificials viz., ammonium sulphate, super and potash the average yield has gone up to the enviable figure of 5,000 lbs. per acre. The practice current in these advanced countries may be emulated to the maximum possible extent, to raise the yield of paddy in our Province.

Above all, the productive capacity of each type of soil should be assessed in relation to it environment and make up. This factor is not directly proportional to the amount of fertiliser applied. A cultivated field should be judged as a biological entity or organism and is therefore subject to the laws governing the organic. It has its critical point of inner effective power which is the resultant of a number of factors. In the words of Pfeiffer (Soil Fertility, Renewal and Preservation, Faber and Faber Limited, Lond. (1945) – pp. 148–163) " the natural fertility and production capacity are the functions of (1) the soil, (2) manuring; (3) humus; (4) rotation, (5) climate; (6) weather conditions; (7) quality of seed; (8) weed growth and a host of environmental factors ". All these shuld be borne in mind in the management of our paddy lands for maximum crop production.

Another equally important point to be considered, is the economic use of fertilisers avoiding wastage and resorting to right method of their application at the proper time. Recent work indicates that small application of fertilisers in close proximity to the seed, the pre-soaking of the seed material in nutrient solutions of phosphates etc., may be effective in increasing the crop yield. Splitting of the doses of manures and their application at different stages of plant growth, has also been found efficient in improving the yield and quality of crops.

In fine, maximum cropping which is closely allied to maintenance of soil fertility demands ingenuity on the part of the farmer, combined with a thorough understanding of his soil and its capabilities. Apart from judicious manuring, careful planning, skilful cultivation and wise selection of variety are also equally important for solving our cropping problems and food shortage.

The Present Food Crisis and its Solution

By

M. KANTI RAJ, M. A., B. Sc.,
(Head Quarters Dy. Director of Agriculture, Madras)

The few suggestions, I will be placing before this conference for consideration relate purely to personal views. I feel that too many suggestions have been offered on the subject by the public with the result that from these medley of suggestions, the State is not in a position to make out which of them are really feasible and practicable. I, therefore propose to deal only with such of the suggestions which, I feel, are feasible and have some prospects of success if taken up seriously.

I will give the pride of place to the stabilisation of prices of agricultural produce. It is the common practice with the ryots to increase or decrease the area under any crop depending on the prevailing market rate at the time of sowing. In England, the prices of agricultural produce were fixed as an emergency measure sufficiently in advance of the sowing season to give incentive to the ryots to increase the area under a particular crop. It was only by adopting such a procedure, the United Kingdom was in a position to reduce the quantity of foodstuffs imported from about 70 to 30 percent of their total requirement. This remarkable achievement should not be passed unnoticed. I am confident, given the same concession, the Indian ryot will certainly rise up to the occasion and strive his best to solve the food crisis. I, therefore, feel that, fixing a fair price taking into consideration the cost of cultivation allowing a reasonable margin of profit, will be the easiest and quickest method of increasing the area under any desired crop. Instances are not wanting to confirm this presumption of mine. We have seen during the past few years, that whenever an increase in the controlled price was made by offering a bonus, large stocks of foodgrains were released by the ryots.

The next in importance will be the provision of assured supply of water for irrigation purposes, and this is possible only by the State undertaking construction of irrigation projects. The original policy of Government was to undertake construction of only such irrigation projects from which a fair return was expected. But, the present policy of Government is to undertake construction of irrigation projects without any consideration of the return anticipated, provided a substantial area could be benefitted. This is a move in the right direction. Besides, Irrigation Conferences are held twice a year in each district to examine the possible irrigation projects that can be undertaken, The present set-up of the machinery to recommend new irrigation projects to the State is well-constituted. Due to dearth of materials and the technical personnel, the progress in the execution of irrigation projects is bound to be slow, till conditions improve.

Besides execution of irrigation projects, the present policy of subsidising part of the cost of digging wells should be continued for some more time. There is need for revising the present rate of subsidy, because it is far below the real cost of execution. It is true in some cases, the attempts made to tap subterranean supply of water have proved unsuccessful and also in some cases the subsidy given was not utilised for the purpose for which it was intended. Considering the scheme as a whole, in the Presidency, substantial progress has been made in bringing additional area under cultivation with irrigation facilities. This fact cannot be overlooked. There is bound to be failure in some of the attempts made to tap water and it cannot be helped. As regards the misuse of subsidy, it can be rectified by tightening the administrative supervision.

The next suggestion of mine relates to undertaking intensive propaganda on the advantages of using green manure or green leaf as manure in view of the dearth of other kind of manure. There is considerable scope in this field to bring to the notice of the ryots the possibilities of raising green manure crops without affecting their normal cropping schemes. Besides this, the value of planting quick growing green leaf producing plants and trees have to be brought to their notice.

Wild Indigo (Kolinji) is the green manure crop recommended for cultivation *in situ* in lands where the interval between two successive crops is over six months. This crop has two very desirable points, viz., it is not eaten by cattle and if sown once, it spreads further by its own seed dispersal. In view of these desirable characters, it is eminently suitable as green manure to be introduced in single crop wet lands where the soil is of light type.

We have intensive development work carried on in a few selected firkas in the Presidency. In such area the scheme for free distribution of Kolinji seeds can be taken up by the State. I deliberately recommend free issue of seed, because, it is only by such a step the entire area, if necessary, can be covered in one single year, otherwise it will take years before the improvement is adopted on a wide scale. I specially recommend this suggestion of mine.

The fourth suggestion of mine relates to increasing the quantity of foodgrains produced by the distribution of seeds of improved varieties of crops evolved by the department. The ryots have come to realise the advantages of sowing seeds of improved strains both from the point of view of yield and other desirable characters. In order to undertake intensive work in this direction, it is necessary to make seeds of improved strains easily available to the ryot. This is possible only if the departmental depots are located in more than one place in each taluk.

It is the usual practice with the ryot to come for seed just a day or two before sowing. It is, therefore, too much to expect him to go a long way to procure the seed. There are instances where because of the distance involved, the ryots were obliged to resort to sowing local varieties though they know as a matter of fact the advantages of growing the departmental strains.

I often remember with pride the remark made by a very rich landlord who takes personal interest and has made cultivation not as a mere subsistence farming, but as a commercialised one. He remarked that the cost of administration of the Agricultural Department incurred so far from its inception can be safely set off against the profits realised by the ryots growing improved strains.

The next suggestion of mine refers to a problem which has so far not been tapped. About 70 percent of cultivable land is now cultivated with the aid of rainfall. Due to inadequate or unevenly distributed rainfall, the yield obtained from this type of cultivation is invariably low, often resulting in famine or scarcity in certain tracts. Ryots of dry land can be assured of a safe return for their time, money and energy spent in raising crops provided the State can undertake the lay out of contour bunds. In an ordinary irrigation tank, we have three components, viz., the watershed, reservoir, and ayacut. In the case of contour bunded area, these three components are not only inter-related but located together in the interspace between two consecutive contour bunds. Herein lies the abvantages of contour bunds. The advantages of contour bunding have been so well demonstrated that the State should take steps at an early date to implement this scheme. This appears to be one of the potential methods of increasing the yield of food crops from an area, which now entirely depends on the vagaries of the monsoon.

I have now dealt with the suggestions which, I feel, are the possible lines, if taken up seriously, can solve the present food crisis.

I will now examine a few suggestions which are often made by the public. One such suggestion is that the large extent of cultivable waste lands available should be brought under cultivation.

The fact that these culturable waste lands have been lying as such in spite of the increase in population clearly shows that there are some really serious handicaps which prevent them from being exploited. The chief drawbacks are, either these lands are located far in the interior giving rise to transport and inadequate labour difficulties or the soil is so poor that they will not even pay the cost of cultivation. These are the main drawbacks that are responsible for the continuance of large area as culturable waste lands and unless these drawbacks are rectified, I feel that this suggestion is not going to be of any practical value.

Another suggestion which we often hear is the cry for the restoration and reclamation of tanks, which, of late, have gone out of usage. The terms restoration and reclamation convey different meanings. The word restoration denotes that the area which was originally part of the tank has now been brought under cultivation due to some reason or other. Such instanees are commonly met with in Zamindari areas. If such tanks are to be restored, the cultivation which is now going on in the foreshore has to be abandoned. Fortunately, cases calling for such drastic action, are few.

The term 'reclamation' means the removal of silt and repair of bunds. This is possible only in places where the tanks are small in size. In the case of large tanks, the amount of labour, time and cost involved in reclamation will be enormous. Instead of removing silt and trying to find out methods of disposal, a suggestion has been made to increase the level of surplus weir. If such a step is taken even by increasing it by a few inches, some appreciable additional area can be brought under the ayacut. This suggestion is already receiving the attention of the State and we can expect some active steps taken in this direction in the near future.

Another suggestion which is frequently made relates to increasing the quantity of groundnut oil cake produced so as to meet the demand. The production can be increased only if the area under groundnut is increased. The area under groundnut can be increased only with a corresponding decrease in area under some other crop, invariably, it will be a food crop. The possibilities of growing groundnut before and after the paddy crop in wet lands are limited, subject to availability of water.

It is often suggested that one of methods of solving the present food crisis, is to resort to Co-operative farming, joint farming, collective farming and so on. The object of this suggestion is that people should combine and cultivate together. The land in such cases will be jointly owned by them, the cultivation will be done jointly, and the profits will shared jointly. In some cases, without affecting the existing individual ownership, the people are asked to cultivate together and share the profits on the basis of area owned by each individual. The main drawback of this system is that no scope is given to give expression to the best effort that an individual can put forth. Various schemes have been tried in different parts of India and so far, nowhere any progress has been made. Even in Russia, where collective farming is reported to be progressing well, the main principle had to be remodelled and individual ryots were given scope to own something which they can call as their own property, I feel, much progress cannot be expected from this suggestion at any rate, for some time to come till the word "self" loses its significance.

The Present Food Crisis and its solution —more land for Food Crops

By

G. V. Narayana, B. Sc. (Ag.,)
Oil Seeds Specialist

The population of the country has been increasing at a rather rapid rate, but the food production is not keeping pace with it. Therefore the food problem has become chronic in our country. This fact has been recognized by experts, and now the problem seems to have reached a crisis, and various solutions have been put forth from time to time. Grow more food; grow more food crops; make available more land for food crops; decrease the area under non-food crops, grow more of improved and high yielding strains, apply more manure and get better harvests, treat crops for pests and diseases and put down the loss; provide more irrigation facilities and increase production. These, and various other aspects of the all important subject have been engaging the attention of all thinking men not only in this country but also elsewhere, for, the trouble of shortage of food is not peculiar to our country alone, but seems to be prevalent in many parts of the world to a greater or a lesser extent. And various schemes are being worked with more or less success, and the solution is yet to be reached. Because land under non-food crops which are more paying is not released for food crops; sufficient quantity of seed for sowing, not to speak of improved strains is not available; and the required quantity of any manure cannot be had or imported. Transportation is difficult and above all, labour which is the most important factor in production has, unfortunately, become scarce and refractory, inefficient and very costly.

So naturally, the cost of production of food crops has become expensive, and not remunerative; at any rate, not as profitable as certain other commercial crops and industries, involving the same amount of capital and labour. The odds against increased production become greater, as crop yields get smaller, particularly in places like the West Coast Here the soils are so poor that a harvest of even 1000 lb. of paddy grain per acre is considered to be a fairly good yield. Therefore, the food problem is much more acute there than in the richer tracts elsewhere. Then the question may be naturally asked "why does the ryot cultivate his land at all, when it does not pay?" He does it for no other obvious reason than the force of habit, he has been doing it for several generations and that is his profession; and he cannot bear to see the land lying idle, if he can possibly get at least something out of it. Though he is not conscious of it, it is this altruistic principle that has saved the country in the past and will save it in the future. So in our drive for greater food

production, we have primarily to bank on this quality of our ryot. So if we can give him more land fit for cultivation and facilities as far as possible, the ryot will certainly produce more.

This aspect of providing more land does not seem to have been gone into deeply, because it is considered by many that all the land fit for cultivation has already been brought under the plough. But it may be pointed out that large extents of land can still be made cultivable, and available for greater food production particularly for rice. The main object of this paper is to indicate the methods by which additional, cultivable area can be got, particularly in the West Coast. In this connexion a consideration of the topography of the Coast is necessary. Immediately adjoining the Arabian sea is a belt of littoral sand followed by the inter-region, adjoining which is the high land leading to the forests of the Western Ghats. It is the region in between the littoral sand belt and the high lands that is inhabited by the people and is thickly populated. And the soil consists of mostly sand or red loam, and is very light and poor. The main crop is rice in the low lying lands, it is the staple food of all classes of people, rich and poor alike; millets are practically unknown. The main source of water supply is rain and there is plenty of it during the South-west monsoon, viz., 100—150 inches in about 100 days. It is interesting to note how the rice fields or wet lands were formed in the past. They were mostly made up, by removing the soil to the required depth. This is particularly so in places near the sea. Even to-day, as population increases, we find enterprising people deepening the sites adjoining their wet lands, for the purpose of growing rice. And there is plenty of such cheap land which is now lying idle and which can be converted into rice fields. The ryot is certainly anxious to have more of rice fields, but the method of conversion by deepening the soil is not now popular, simply because the cost is prohibitive—entirely by manual labour, it may be as high as Rs. 500—1000 per acre to remove the sand to a depth of 1—2 feet. In these days of mechanical efficiency, the cost can be much reduced, perhaps to about Rs. 100/- per acre by the use of tractors. And it is certainly worth while expending Rs. 100/- to get an acre of wet land. The soil removed can be piled and levelled and used for dry crops and for the coconut in particular.

On a rough estimate the area that can be thus converted into wet land in the West Coast alone may run to a few lakhs.

In some places, people have already spread out too close to the sea, and now they have to turn east-wards and think of the rich high lands bordering the forests of the Ghats. Here there are very large extents of rich laterite soils, fit for cultivation and lying just within a few miles off

most west coast towns. These rich tracts are remaining un-exploited primarily for want of communications. Malaria is not a serious problem in many places. Already a number of enterprising families from Travancore have occupied a few thousand acres near about Taliparamba and Nileshwar and are reporting to be doing quite well with their new lands. Sooner or later the West Coast ryot has got to move east-wards towards the Ghats and the sooner he is helped to do it the better for him and for others. In the first place this can be achieved by opening a few good roads connecting towns.

The task of converting sandy waste lands into wet lands and establishing communications with interior parts cannot be done by individual enterprise alone. It is the work of a big organization and the working details are best left to an expert committee. The money spent on this drive for new cultivable land is well spent, for it goes to strengthen the permanent assets of the country and therefore of the people.

Grow more Food Campaign — Causes of Limited Success

By
K. C. RAMAKRISHNAN, M. A.

For over a quarter of century now, Madras has been a deficit province in respect of her requirements of rice. The demand has increased faster than production, due to the natural increase of population and the substitution of rice in place of millets in the diet of the lower middle class and even the working classes in urban and industrial areas. The shortage was not felt as long as Burma was ready to send us rice at a price cheaper than our own cost of production. The flow of imports was suddenly stopped by the conditions of war; the havoc wrought was so great not only in Burma, but in Siam and Indo-China, next largest exporters of rice, that the surplus available is still too short to meet the demand of all Asiatic countries-India, China, Japan, Ceylon, etc. Here was a challenge to our Agricultural Department to raise production to the level of our requirements, which formed only 20 per cent above our production, while the Department claimed to produce on its farms more than double the average yield of the province and nearly as much as the high yield of China and Japan. In the United Kingdom, food production was accelerated in the course of a few years of war by 30 or 40 per cent above the normal. Why could five years of strenuous and expensive propaganda and State-aid not raise the total yield by more than a few lakhs of tons?

Before examining the causes of this failure, let us enter a caveat against comparisons with the United Kingdom, China and Japan. The United Kingdom had a lot of reserve land in her pastures and wastelands devoted to sport, which were fairly fertile but not worthwhile cultivating as long as imports of grains and other food-stuffs were flowing in freely from America and other countries, whose cost of production was lower. Much of this reserve land was ploughed up during the war and cultivated with the grim determination of the united nation to produce more and win the war at any cost. Animal husbandry suffered a decline; but more grains and vegetables were produced to enable the people to survive with home production and such imports as could be got. We have no such reserve land in our country fit to be ploughed up straightaway. Most of our wastes are infertile, or fertile land is found in highly malaria-ridden Wyanad or Araku Valley, whose reclamation can be only part of a long-time programme.

China and Japan produce, no doubt, a higher output of paddy per acre, not always per man-worker. On account of more favourable conditions of soil and climate, utilisation of every scrap of manure including night soil and (in Japan) abundant use of chemical fertilisers.

There are tracts in Tamilnad, where we can claim similar yields, e. g., in the Cauvery Valley of the Trichy District, or the Tambraparani Valley of Tinnevelly. But the average is brought down by the unirrigated paddy of Malabar, Nilgiris, etc. Our double-crop wetlands and garden lands with facilities for irrigation from canal or well, produce more food grains and pulses per acre than perhaps the land of any other country, where only one crop can be raised–though considering the labour expended, our yield per *worker* may not stand comparison.

Let us briefly examine the causes of the limited success of the steps taken to grow more food by the Government, and through the Agricultural Department in particular. The inference is that the Department is not much to blame for the failure, that there are fundamental economic and social causes underlying the limited success.

Data on the possibilities of the extension of cultivation are scanty. Reclamation of cultivable wastes, known to be fertile, would be out of the question, economically if not physically, if machinery were not available–the tractor with bull-dozer, deep ploughs, harrows, etc. Hence the priority for such machinery in reclamation given even by the Government, which, in general, would not favour labour-saving machinery. But so far only about 40 tractors have been obtained, several of them without accessory implements, like ploughs and harrows. Only a few hundred acres have been reclaimed, though a few thousand acres of old land have also been tractor–ploughed. The Economic Commission for Asia and the Far East has at its last session resolved to institute a detailed enquiry into the extent of need for such agricultural requisites and the possibility of producing them locally or importing them. India is not likely to benefit much except in the long run as under the Marshall Plan the needs of Europe will be attended to first by the foreign manufacturers of heavy machinery. Lighter implements of improved type, advocated by the Agricultural Department not only for cultivation but for processing are not available for want of the required steel. It has become difficult to get enough iron and steel to make or even keep in repair indigenous implements. Last year about 40,000 tons were required, only 30,000 tons were allotted; but actually 15,000 tons alone were received! The unseemly scramble for this much of raw material, distributed through the Agricultural Department, has brought not a little disrepute to the Department.

The ryots are anxious, wherever electricity is available nearby, to instal electric pumping in place of the costly bullock-lift for irrigation from wells. The Provincial Govenment is willing to oblige but finds it impossible to do so on account of want of accessory materials.

The ryots require any quantity of oil-cakes; but the supply is woefully short-even of groundnut oil-cake, in which a black market, blacker than in rice, has developed. Two and half lakhs of tons have been supplied through the agency of the Department for over 10 million acres of paddy land.

Chemical fertilisers are available to some extent, but it is not safe to use them in our tropical climate except with green leaf manure. Strenuous propaganda for an year to grow glyricidia has unfortunately failed, partly on account of the failure of monsoon. Propaganda for the use of night-soil composted has made little head-way, due to strong social prejudice against it-unlike in China and Japan.

Seeds of certain improved strains of paddy have been quite popular in certain districts, but the arrangements for their multiplication and supply to ryots are inadequate. Our Demonstrators are saddled with so many duties-particularly trade in implements and iron and manures They have no time to attend to the regular work of propaganda and demonstration. Ryots too are hesitant to get better seeds from Taluq depots on condition that they should deliver the produce at a premium which is a poor bait in these days of soaring prices in the black or free market.

A common cause of the failure to take up any improvement, especially of an enduring character, is the system of tenancy-at-will-whether on fixed or on share lease-in vogue in paddy growing areas. The landholders seldom cultivate the land themselves but lease out to petty tenants, who are not sure of the renewal of the lease at the same rent, especially after an improvement in yield. Share lease in particular, is a poor inducement to improvement, especially where the full benefit is not reaped in the same crop. Hence the disinclination to grow trees or plants for green manure, to raise bunds for conservation of rainfall or dig drains to get rid of excess moisture.

Another serious limitation to putting in extra effort to grow more is the strained relationship between the agricultural labourer and the landlord in the last 4 or 5 years-synchronising with the Grow-More-Food Campaign. The situation is at its worst in some of the principal paddy growing areas where a system of semi-servile labour was in vogue for a long time. Added to the vagaries of the monsoons are the whims and fancies of labourers and landlords who indulge in strikes and lock-outs, neglecting sowing and reaping in the proper season.

The market too for produce is not free. Procurement by Government was felt to be harrassing at the price at which it had to be sold, considering the enhanced cost of cultivation, though the surplus was

sold by substantial ryots at exhorbitant prices, especially in deficit areas to needy consumers. Decontrol has begun; but it is partial. There is still the inter-district ban, which prevents the producer in surplus districts from getting what he thinks is his due. The price he gets is lower than what prevails in consuming centres, and what the Government is obliged to pay for imported rice.

The failure of the Government to control prices, when the shortage of rice is not after all very great, is not a little responsible for the cold, if not hostile attitude of the public to the Agricultural Department, which has not been able to step up production anywhere near the extent necessary to dispense with imports from outside.

The Role and Responsibility of the Agricultural Department in the Solution of the Food Problem

By

K. SANJIVA SHETTY, B. Sc. Ag.

Introduction. The problem of food production in our country must be enunciated and elaborated from the essential premises of a national background and economy, and this background is characterised by the inescapable fact that even under normal conditions, a majority of our population is bordering on starvation level. The acuteness of our food problem is further accentuated by the fact that we have to find sufficinet food not only to feed our teeming millions at a standard nutritional level but also for a population that increases at a normal and steady rate of about 10% every decennium. Hence it is necessary to chalk out our line of action *mutatis mutandis* with both short term and long range policies and programmes. For an agricultural country like India "Grow More Food Campaign" has a special significance in that a proper, satisfactory and expeditious solution of this issue is likely to result in its wake with the solution of the many other allied problems on which the very economic structure of rural India is built up.

The scope of planning for the solution of the food problem. It is not sufficient if we aim at self sufficiency or surplus production in a taluk or district or even a region or province. The food problem must therefore be conceived, *inter-alia* with the need of the Indian Dominion as an organic unit and the contribution of our province to the Dominion Food Pool must be the desideratum in formulating comprehensive policies and schemes. I, however, submit at the very outset, that it is not my intention to frame a food programme for the entire Indian Dominion within the frame work and ambit of suggestions made in this paper, at best mine is an attempt to indicate in general terms, the part, our province can play in solving the food crisis with particular reference to the role and responsibility of our department. May I also submit that our department as at present staffed and equipped particularly on extension work can only touch the fringe of the problem.

Methods of increasing productions. The methods by which food production can be increased are.— 1. By increasing production per unit areas by the application of all possible improvements-varietal, cultural and manurial and 2. Extending the area under food crops either by encroaching on other crops or on new lands still un-exploited. To tackle the problem on the lines indicated above it requires all the planning and thinking to arrive at any definite conclusions in regard to practical ways of solution. The Department has obviously to reorganise and re-orientate its activities for a satisfactory solution of the problem in

all its details and it must be admitted that this cannot possibly be done by fixing up an ostensible target as per comprehensive scheme now conceived and asked to be worked out with only a few maistries and fieldmen by way of increased staff and personnel. It may be said that this method cannot simply work for obvious reasons. The main burden of my paper is to indicate the possible ways of re-organising our activities with a view to achieve the target of food production efficiently and as quickly as possible.

Drawbacks of the existing methods which call for immediate change. The need for a capable and efficient staff to take the result of research and propaganda to the very door of the ryot must be admitted *prima facie*. This cannot be done with one Demonstrator for a taluk, however much he is assisted by a band of maistries and fieldmen. The very fact that the number of maistries and fieldmen entrusted with definite number of firkas and villages is increased, calls for an immediate increase in the number of Agricultural Demonstrators for each taluk and consequently for a corresponding number of District Agricultural Officers for efficient control and supervision. Whatever may be the organisation that may hereafter be charged with the distribution of manure, iron and other essential agricultural requisites, it is imperative that there is a supply depot in every firka under the effective control of a Governmental organisation and the existing system of one depot for two firkas is inadequate. We have had experience of trading scheme activities from 1943—44 and we are now in the 6th year of progress. Many things have happened which have affected the fair name of our department — perhaps this was not to our credit. But whatever it is, it must be admitted that we had unreservedly given our shoulder to the gigantic wheel of burden without adequate facilities of staff consistent with this great responsibility. But as long as controls remain unremoved and supply of materials is far short of demand, it is necessary to have Governmental control over the distribution of these materials and it matters little whether this department or that does it. Perhaps it is safer to continue an organisation that gained the experience than to hand it over to a new one which is likely to commit the mistake, all over again. What is required is to have separate organisations with better facility under the aegis of the same department.

I therefore submit that while the removal of the trading scheme activities from this Department is a desirable riddance in the interest of legitimate work, how far the ryot stands to benefit by this move, requires further and deeper consideration. It is true that it is not the business of an Agricultural Demonstrator to sell cake and iron and maintain imperfect accounts. The distribution of materials and accounting may be handed over to other organisations entirely under the control of

Agricultural Officers. Alternatively we may have two separate organisations-one for the distribution and accounting of these materials and another for regular scientific agricultural work in each taluk and separate allocation of work must be made for these two organisations under efficient supervision by redistribution work in each district

It is hoped that by the appointment of Agricultural Demonstrators for each firka with requisite number of trained maistries and fieldmen, bifurcation of districts into convenient units with a view to supervise and check the work efficiently by adequate number of District Officers, opening of sale depots in each and every firka and implementing the five year plan of Grow More Food approved by the Government of India in its entirety, the food problem can be solved to an appreciable extent. Otherwise, most of our targets and schemes will be only on paper without material results. Let us therefore appeal to our Government to pay particular attention to this Department and re-organise its activities in the light of experience gained and results aimed at.

Need for correct statistics. To correctly assess the quantum of our requirements or to formulate any scheme or plan of action, it is necessary to base our assumptions and calculations on correct statistics. I dare say that available figures of food consumption or total food requirements may be taken as fairly accurate as this depends on population figures and per capita requirement But I am afraid that our statistics on the production side needs greater scrutiny as the figures of total acreage of food crops as now recorded, is far from satisfactory. The statistics of crop production are in the hands of village karnams and their imperfections are well known although a better method has not yet been devised If you take the season and crop report and look into the area of crops on which no special assessment is levied by Government you will hardly find any appreciable change in the acreages for decades together. The season and crop report records that there are about 1,08,000 wells in Coimbatore District and any observer would have noticed paddy having been grown under almost each well to an extent of ½ to 1 acre if not more, during these years of war and thereafter. This must result in at least an additional acreage of about 50 to 75,000 acres under *unirrigated paddy* for this district, whereas the figures recorded in the season and crop report for 1946—47 is 1,657 acres as against 384 acres recorded in 36—37. Now take again the area under fruits. The area under Mangoes in the Presidency in the year 36—37 is 2,44,945 acres whereas in 46—47 the area is recorded as 2,43,469—a decrease of 1,476 acres. Now, how do we explain this decrease in a decade, whereas normally there should have been a significant increase, in a period of ten years. We know that the total number of mango grafts planted in a year can be estimated in lakhs for the presidency and this should have occupied several thousands of acres in a period of ten years as against which we find a decrease

recorded in the reports. You will find similar anomalies in respect of several other crops. It is true that most of the fruit plants are planted in back yards, house compounds and not on a regular garden scale — but still the plants are there-and therefore a drastic change in the system of recording such statistics is called for. It is necessary to calculate and count the number of trees for each village and reduce the total number on an acreage basis by taking 40 to 50 trees equivalent to an acre. I therefore submit that a revised outlook in the recording of primary statistics in respect of all crops which form the basis of all our schemes and plannings is necessary. The village statistician must either be replaced or assisted by an organisation for a better recording of statistics under the effective supervision of Agricultural Officers in respect of both extent and yield. The crop estimation now entrusted to inexperienced Revenue officials must be handed over to the Agricultural Department for a correct recording of production of Agricultural commodities.

Possible scope and lines of increasing production. Let us now first consider the possible scope of increasing production and the quantities that can be produced on the existing area under food crops itself. Our experience has shown that by the conjoint application of all varietal, cultural, and manurial improvements to a particular crop, the yield can be increased considerably. It can be increased in many cases by more than 50% but it should never be difficult to increase the production by 25% if we are able to put all the above improvements on to a particular holding. This is not difficult provided there is an efficient organisation of staff and equipment for each taluk.

TABLE.

Estimated increase of production of food crops on the assumption of 25% increase in yield.

Crop	Approximate area in the Presidency.	Average yield per acre lbs.	Increase in yield at 25% per acre.	Total extra yield Tons.
Paddy – Irrigated	80,00000	1787	1/5 ton	16,00000
Paddy – Unirrigated	20,00000	1300	1/7 ,,	28,5000
Cholam – Irrigated	40,0000	1465	1/6 ,,	66,000
Cholam – Irrigated	45,00000	575	1/16 ,,	28,0000
Cumbu – Irrigated	30,0000	1205	1/7 ,,	40,000
Cumbu – Unirrigated	20,00000	546	1/16 ,,	12,5000
Ragi – Irrigated	95,0000	1493	1/6 ,,	15,8000
Ragi – Unirrigated	70,0000	715	1/12 ,,	58,000
Korra	1450000	385	1/22 ,,	65,000
Varagu	92,2000	840	1/10 ,,	92,000
Others	50,0000	435	1/20 ,,	25,800
				27,94000
Paddy ...	1,88,5000 tons.			
Millets ...	90,9000 tons.			

It is therefore seen that if it were possible to increase the yield of food crops in the existing areas by 25% we would reach an extra poduction of nearly 2 million tons of paddy and one million tons of millets. It should not be difficult to produce this extra quantity of food by promulgating proper legislation and by the re-organisation of agricultural department for which details have to be worked out.

Production of food in Cultivable wastes. There is yet another field as vast if not vaster than the above for the increase of food production. Out of a total area of 80 million acres in the Presidency, about 52 million acres are said to be cultivable of which about 31 millions acres are actually cultivated every year. Thus there are 21 million acres consisting of 12 million acres under cultivable waste and 9 million acres under current fallows and the possibilities of bringing under cultivation of food crops even a portion of this area merits serious and immediate consideration. This is a gigantic task, if it is to be tackled effectively. There was a time when price of food grains was so low and production of food crops was so un-economic, that even extensive areas of fertile arable lands were abandoned in certain areas. These conditions should not exist now. Agriculture is paying under present conditions and the state must see that the price of food crops and agricultural commodities are always maintained at economic levels by proper legislation and crop planning.

Mechanised farming – the Panacea. Mechanised farming must largely come to our succour to solve the problem of tackling cultivable wastes. In the future programme of agricultural work mechanised farming must form an integral part and parcel of planning, for food production. Take any district. You have lakhs of acres under fallows and wastes. This cannot be tackled economically and expeditiously with bullock power. Tractors and Bulldozers, not in ones or twos for each district, but in hundreds are required.

It is a problem for the Agricultural Engineers to calculate the number and type of Units required for each district based on the extent of land available in each district. The tractors and Bulldozers in each taluk must be under the control of a District Engineer who will be a technical assistant to the District Agricultural Officer in arranging for programme of field work. It is very necessary to merge the Engineering section with the District Staff to achieve complete collaboration and co-operation. Certain conditions should be specified for the renting of tractors to ryots – viz. priority and concession should be given to ryots who agree to grow food crops for certain number of years. The amount of rent fixed may be collected in cash, or in instalments under sufficient security or partly subsidised by Government to encourage food production. Imagine the possibilities of food production, if even a fraction of 21

million acres is brought under cultivation. The supply of pump sets, oil engines, assistance for well digging, electric power etc., for these areas will greatly augment production.

Soil conservation Department – a separate wing to be opened. Colossal loss sustained by soil erosion is well known. Factors contributory to soil erosion are mostly agricultural practices of omission and commission. This problem must be tackled by a separate wing of the department to be called as a *Soil Conservation Department* as is done in countries like America and South Africa. We cannot achieve concrete and appreciable results by entrusting this work as a subsidiary item to the Agricultural Demonstrators engaged on general items of work in the districts.

Possibilities of Irrigation in respect of crop production. It is well known that the yield of a crop under irrigation is almost double that under dry conditions. Hence increasing facilities for bringing more area under irrigation must be a most potent single factor in increasing production. Of course there are the great river valley schemes and major irrigation works on hand which are expected to completely change the economy of Indian Agriculture when they are completed. There are long range programmes with immense possibilities for our country – both agriculturally and industrially. But, long before that, we have to think in terms of immediate attention to minor irrigation works. There are hundreds of small wells and tanks in each district which can be renovated and made useful for irrigating more land. Remember that one new well dug-means at least 5 additional acres under irrigated crops.

Extension of rural electrification scheme. Simultaneous with the extension of irrigation facilities by way of repairs to minor irrigation works and subsidised well digging, the extension of rural electrification scheme must be speeded up. Electricity has become the handmaid of agriculture as in industry.

Conclusion. In conclusion, I submit that our Department has a great and responsible role to play in the development of food production in this province. We appeal to the government and to those in authority to work the comprehensive plan of food programme, already on the anvil and take necessary steps to give practical shape and form to the various suggestions made in this paper.

The Sensitive Plant as Weed and its Control

By

K. K. NAMBIAR and P. C. SAHADEVAN,
(Agricultural Research Station, Pattambi.)

1. **Introduction.** *Mimosa pudica*, Linn., the common sensitive or touch-me-not plant, ordinarily grows in waste lands, field bunds and sides of channels on the West Coast. It is found to thrive well in hot moist situations and spreads rapidly, covering on an average 36 sq. ft. of ground. Its prickly stem and branches, procumbent habit and a hardy, tenacious root system make its eradication by ordinary, implements, troublesome as well as laborious It proves a menace particularly in house compounds and shady *porombokes* where ginger, yam and other root-crops are grown. With the first soaking rains in May every year, a large number of the plants are seen to spring up. They sprout directly from seeds or, under favourable conditions, from old stalks. The present paper deals with a study of its spread and the chemical means of control adopted at the Agricultural Research Station, Pattambi in South Malabar.

2. **Habit, Nature of Spread etc.** For the purpose of study 12 plants were selected at random and in each plant the depth of the main root, maximum spread of lateral branches, number of flowers, number of main branches and the area of spread determined. Ten heads of flowers were marked for counts of flowers in each head and 20 such flowers for counts of mature pods.

The root system is typical of the dicotyledenous plants, with a tap-root going to a depth of 5 in. to 12 in. A good number of lateral roots spreading to a distance of 1 ft. to 2 ft. give the plant a strong hold on the soil. These roots sometimes behave like stolons and give rise to shoots.

The procumbent shoot system is made up of a large number of branches, and spreads in all directions covering sometimes an area of 60 sq. ft. The branches strike roots when they touch the soil giving the plant additional strength and anchorage.

An average of 25 heads of flowers are produced by a single plant Each head is made up of about 115 flowers of which 17% get fertilised and develop pods. Of these 75% are observed to be three-seeded and the rest two-seeded pods.

Maximum flowering occurs in the months of October, November and December. By April the pod formation is complete and the seeds get

ready for dispersal within a month. Seeds are very light and the pods bear slender spines on the periphery. These facilitate their easy dispersal by wind, water, animals and man.

3. **Chemical Control.** Use of chemicals as weed killers is not much in vogue in India. In European countries they are widely used in places where much of digging of the ground is not desirable or possible. Sulphates of iron and copper, ammonium salts, sodium salts, carbolic acid and sulphuric acid are the chemicals commonly used, their strengths varying with the kind and nature of weeds. The chemical may be used as dust or sprayed in solution.

In the present study, solutions of sulphuric acid, copper sulphate and sodium arsenate in strengths of 1 per cent, 2 per cent and 3 per cent were sprayed on a random selection of three plants in each case. In the second series, a 25 per cent solution of sodium chloride and a 35 per cent solution of ammonium sulphate were tried.

The effect on the plants varied with the chemical and the strength, a three-per cent solution giving the best result in the first series. The action of sulphuric acid was evident within a few hours of application, higher strengths proving more destructive. Copper sulphate was ineffective at one per cent and two per cent levels while at three per cent level the plants showed symptoms of death a few hours later. Much quicker action was noticed in the case of three per cent solution of sodium arsenate though all the strengths were effective. The action was slow in the case of ammonium sulphate and sodium chloride since complete destruction was noticed only after three days of their application (Table I.)

TABLE I.

Chemical	Strength		Action	Remarks
Sulph. Acid	1%	Soln.	Plants died after 2 days.	
	2%	,,	Do.	
	3%	,,	Plants died after 1 day.	
Copper Sulph.	1%	,,	Plants withered only.	
	2%	,,	Plants died after 3 days.	
	3%	,,	Plants died after 1 day.	
Sodium Arsenate	1%	,,	Plants died after 2 days.	
	2%	,,	Do.	
	3%	,,	Plants died within a few hours of application.	
Ammonium Sulph.	35%	,,	Plants died after 3 days	
Sod. chlor.	25%	,,	Do.	

4. Summary.

(1) In the West Coast District of Malabar, large umbers of the sensitive plants are seen to sprout from seeds or old stalks with the first soaking showers in May every year. They make quick growth and a single plant covers on an average 36 sq. ft. of ground.

(2) Nature and spread of this weed was studied in detail and an attempt was made to eradicate it by chemicals.

(3) Of the five different chemicals tried in different strengths, sodium arsenate at three per cent strength was found to give the best result.

[Sodium arsenate should be used with great care and precaution, as it is highly poisonous to humans and cattle. Ed. M. A. J.]

The Madras Agricultural Journal

Instructions to Contributors.

Articles for publication should be submitted addressed to the Editor, Madras Agricultural Journal, Lawley Road P. O, Coimbatore, South India. They should be neatly typewritten on only one side of the paper, with double-spaced lines, wide margins and numbered pages. Articles should not ordinarily exceed 5,000 words or 12 pages of printed matter, including tables and illustrations in the Journal. Clearness and brevity are essential and in form, style, punctuation and spelling, the manuscript should conform to the best usage in the leading journals published in India and abroad.

Main headings in the text should be typed in capitals with paragraph indentations and followed by a period and two hyphens. Sub heads should be lower case and be underlined to indicate italics. Botanical names and local terms etc., should be in italics.

Numerical data and calculations should be very carefully checked. Each paper should conclude with a summary of not more than 300 words, giving a complete and clearly written digest of the original paper.

Tables. The number of tables should be restricted to those absolutely necessary, as numerous tables detract from the readability of the article. Each table should be numbered consecutively from I up and must have a heading stating its contents clearly and concisely. The tables are to be typed on separate sheets, with their positions marked in the text.

Illustrations. Wherever possible illustrations should be made with pen and Indian ink, for reproduction as line blocks. Photographs and wash drawings are more expensive as half-tone blocks are necessary. The cost of blocks is chargeable to the author of the article. Photographs submitted as illustrations should be unmounted, glossy prints of good quality, with strong contrasts, trimmed so as to include only the essential features to be illustrated. They should preferably be of the same size as desired in the printed paper. Line drawings, graphs, and charts should be prepared in twice the scale desired in the printed form. Graphs should be drawn on plain drawing paper in Indian ink and not on squared paper. All letterings, figure numbers and explanatory letters in graphs should be light face and large enough to be 1/16" high in the finished illustrations. Figures and charts are also to be numbered consequtively and their positions clearly indicated in the typescript. The name of the author, title of the article and figure number should be written on the back of each figure in black lead pencil. Each figure should have a legend typed on a separate sheet. Photographs should always be packed flat, never rolled or folded.

References. References and reviews of literature should relate only to closely pertinent papers. The list of references should come at the end of the article, after the summary and should be arranged in alphabetical order of the authors' names followed by the year of publication in brackets, and then the title of the paper, name of the periodical, volume number in bold face type and then the page number. e. g. Darlington, C. D. (1944) Heredity, development and infection. *Nature* **154**, 164-9 Abbreviations for names of journals are to be in the approved form as given in the World List of Periodicals.

The responsibility for statements, whether of fact or of opinion rests entirely with the author of the article and not with the Editorial Board of the Madras Agricultural Journal.

"Science is of no country. But though science has no country, the man of science must keep in mind all that works towards the glory of his country. In every great man of science will be found a great patriot. The thought of adding to the greatness of his country sustains him in his long efforts, and throws him into the difficult but glorious scientific enterprises which bring about real and durable conquests". *Louis Pasteur.*

Symposium on the Present Food Crisis and its Solution

Abstracts of Papers presented for the 31st College Day and Conference.

M. B. V. Narasinga Rao: *Rice deficit in Madras and its solution.* It is now recognised that a world deficit of about 14 million tons of Rice would continue for at least the next three years. In Madras Province our deficit in rice is about 4 lakhs of tons. The Grow More Food Campaign was only a partial success due to several factors such as (1) the objectives being too diversified (2) the farmer not being approached in the most effective manner, (3) the vagaries of the monsoons and (4) economic factors like relative price levels of food and money crops. Three ways are suggested for increasing the total output of rice in the Presidency viz., (1) bringing more land under cultivation, (2) by enhancing the per acre yields in the areas now being cultivated, by a more general use of the high yielding improved varieties available from the Paddy Breeding Station at Coimbatore and the substations in different parts of the Presidency and (3) a stricter control over wastages at various stages of crop-production as well as in storage.

P. Krishna Rao: *The role of Millets in increasing Food Production in Madras.* Millets being mainly rainfed crops that are grown in the drier and poorer areas of our Province, the chief direction in which production can be increased in these crops, is in organising the wider use of improved strains. In cholam, twenty four such improved strains are available, suited for different tracts in the Province, in *cumbu* there are eight strains, ragi twelve strains and in *tenai* seven strains have been released that are capable of yielding more than the respective local types.

D. Marudarajan: *Plant diseases and their control in relation to increased crop production.* An account is given of the various measures by which loss of crop yield by fungus and virus diseases could be prevented and thereby increase our food production and tide over the food crisis that exists at present.

S. Ramachandran: *The food crisis and its solution— The role of the Entomologist.* All food grains are subject to damage by insect pests, both in the field and in godowns and the role of the Entomologist is in devising effective measures of protecting the crop in the field during the pre-harvest stages and also in protecting the grain in storage, until it is distributed through the various rationing organisations.

C. Balasubramaniam Mudaliar and M. B. V. Narasinga Rao: *The role of Meteorlgist in a scheme of Grow More Food-Crops.* The knowledge of the Meteorologist can be helpful in the following ways (1) Suggesting localities with known weather conditions that are suited for the

cultivation of particular crops (2) in issuing reliable weather forecasts to enable the farmer to adjust his field operations and avoid loss of yield by adverse weather, and (3(in predicting from weather conditions the degree of virulence of insect pests and crop diseases to enable preventive and remedial measures to be taken in good time.

S. N. Chandrasekara Ayyar: *How best the Botanist can help in solving the food crisis.* The paper is mainly a plea for organised tree planting so as to build up a reserve for green leaf manure and serve as a preventive against soil erosion and in the long run furnish a greater store of humus to serve as a natural fertilizer. There is also a great need for popularising some of the little-known grasses as fodder and pasture crops in appropriate regions.

R. Balasubramaniam: *Cotton Seed.* Though emergency measures like procurement and rationing were effective in tiding over the food crisis so far as human beings were concerned, the health of the cattle population did not receive the same consideration. The role of cotton seed as a rich source of protein for cattle is emphasised. The adverse effect of restricting the area under cotton on the well-being of cattle is pointed out, as well as the need to include it as a means of securing the full target of protein requirements of cattle population of the Province.

P. N. Nayar: *Role of Potato in the solution of the present food crisis.* The utility of the potato as a food crop is not sufficiently recognised in this country—as it is included as only one among the vegetable crops. In western countries the potato constitutes nearly 25% of the food consumed. The total world production of potatoes far exceeds that of cereal grains but in India, the area under potatoes is only 1% of the total world area. The various ways in which the potato can be made use of as a food-crop are indicated in this paper and a number of suggestions made for increasing the yield and also the acreage under the potato crop as a means of surmounting the present food crisis.

T. K. Balaji Rao: *Increase in pulses an imperative necessity* The Province of Madras is in deficit with regard to pulses to the extent of nearly three lakhs of tons. So there is an urgent need to explore all possibilities of increasing the area under the chief pulse crops viz., red gram, black gram and bengal gram to improve the stock position of these vital protein supplying food crops. The details of working the innovations suggested in this paper have to be adjusted to suit particular localities and particular conditions of growth.

V. N. Subbanacharya: *Present food crisis and its solution.* This is a general review of the present food position and the remedial measures suggested include a proper crop-planning organization, a wider adoption

of improved seeds and strains, digging more wells, using more manures, co-operative marketing and avoiding waste during harvest and storage of food grains.

T. R. Narayanan: *The place of minor elements in growing food with special reference to rice.* The nutrient roles of different trace elements in growth of crop plants are briefly indicated. Where new areas are to be reclaimed and put under food crops many of the nutrient elements and particularly the trace elements are likely to be in a form unavailable for plant growth. In the case of rice, iron and manganese are required in much larger quantities than for other crops.

These two elements also function as a complementary pair; thus an excess of manganese makes iron unavailable and leads to iron deficiency symptoms of chlorotic plants. Judging from the remarkable results obtained in England during the war years—on potatoes grown on newly reclaimed waste lands, the possibility of increasing rice yields by spraying with suitable concentrations of trace element salts is one that deserves detailed study.

S. V. Doraiswamy Iyer: *Plea for intensive survey of resources of maximising production.* A detailed survey is suggested on the following aspects taking the taluk as the unit of area for study and future development:— The best combination of manures, maximum area that could be brought under cultivation and under improved strains, scope for introducing new crops and new green manure crops, sinking new wells and the scope for co-operative farming. Such a survey may not solve the food crisis in the near future, but it would serve as a foundation to build up the edifice of self-sufficiency in food for our Province.

M. Satyanarayana: *Improving Crop estimation to combat the food crisis and an organisation to check the present food crisis* An eloquent plea is developed by the author, for improving the methods of crop estimation, touching upon such diverse aspects as the following:— Agricultural crisis in retrospect, remote and immediate, causes of the present food crisis, unbalanced agricultural economy, causes of the present food crisis, unbalanced agricultural economy, manure — starved land, best paddy lands diverted to nonfood crops, inadequate subsidies, irrigation projects, erosion control, grain banks, mergers of food organisation, markets and prices in Firka Development schemes and the political repercussions in indigenous paddy production.

N. Sankaranarayanan: *Soil and water conservation.* Increase in agricultural production is possible only by a proper use and upkeep of our natural resources namely soil and water. At present we are allowing soil fertility to get depleted both by soil exhaustion and by soil erosion

The former can be arrested by a judicious use of chemical and organic manures including green manures. Proper measures for conserving cattle manure and urine in rural areas and sewage wastes in towns can help a lot in maintaining soil fertility. Soil erosion, i. e., removal of soil by wind and rain should be controlled by biological measures like cover crops mixed cropping and proper rotations, regulated grazing and mechanical means such as terracing and contour bunding.

N. C. Thirumalacharya: *Present food crisis and its solution.* The method suggested for increasing food production is by "adjustment of cropping" i. e., diversion of lands now under commercial crops and millets for growing paddy instead. This would be possible only by legislative enforcement As a long-term measure it is suggested that production can be increased by distributing seed of better-yielding strains, by a more liberal supply of manures and by bringing waste lands under cultivation.

S. Varadarajan: *Legumes for increased crop Production.* Lack of nitrogen is the commonest limiting factor in crop production. Bacteria play an important part in maintaining soil fertility, particularly the non symbiotic nitrogen fixers of the Azotobacter type and the symbiotic nitrogen fixing bacteria found in the root nodules of leguminous plants. The nitrogen fixed by the symbiotic group can be utilized by non-leguminous crops as well, by incorporating the legumes into the soil as green manure. The amount of nitrogen fixed per acre by such leguminous crops can be put at 50 to 200 lbs. i. e., equivalent to his application of 2 to 8 cwts. of ammonium sulphate per acre.

For maximum fixation of nitrogen it is necessary to inoculate the crop with a culture of the specific bacteria associated with that particular legume. It is also necessary to keep up in the soil adequate levels of phosphrous and lime by a dressing of superphosphate. The need is stressed for an all out effort for encouraging the cultivation of legumes as a means of renovating soil fertility and thereby increase the production of food crops in our Province.

M. V. Mohan Rao and S. V. Parthasarathy: *More sugar per acre.* Compared to Bihar and the United Provinces Madras has the fewest sugar factories and the recovery percent is also much lower. The yield of cane and sugar per acre and the factory efficiency are all capable of further improvement. High yielding and early-maturing varieties should be popularised, by offer of bonuses if needed, so as to keep the factories working for a longer period and thereby increase sugar production, the Variety Co. 527 for early season, Co. 449 for mid-season and Co. 419 for late season planting are recommended.

M. K. Krishna Marar: *The groundnut and the food crisis.* All money crops are to be encouraged only with due caution. For example the acreage under groundnut has in the course of 35 years, increased by nearly 25 times and this has led to a progressive displacement in the area normally sown to millets. This in turn has contributed to the present food crisis. In normal times the increase in the area under groundnut is to be welcomed but in times of scarcity like the present, there is justification for the clamour that the groundnut area should be curtailed.

The use of better-yielding improved strains of groundnut evolved by the Agricultural Department is advocated, to avoid loss of production by restricting the area under groundnuts.

Correspondence

To

The Editor, The Madras Agricultural Journal,
Lawley Road P. O., Coimbatore.

Sir,

In the last two or three issues of your magazine to reach me there were several articles of great interest and value to the farmer. In one it was stated that the Kudzu Vine is under trial As I have had this vine under trial for very nearly four years my experience with it might be of some interest to others. My observations have been made only in soil and climatic conditions of my farm which are:—

Situation:— Southern most part of S Kanara-Coastal-belt at sea level-about half a mile inland from the sea shore, contiguous with and north of Agricultural Research Station, Nileshwar III.

Climate:— South West Monsoon with occasional light showers of the North East Monsoon

Soil.— Pure sand down to a depth of 20 feet which is as far as I have dug. Practically devoid of organic matter and plant nutrient material including Calcium and magnesium.

1. The Kudzu Vine makes marvellous vegetative growth. The rate of growth is most rapid when the rain is at its heaviest in June and July. I have marked and measured repeatedly and have noted growing tips elongate 12 inches in 24 hours during the heavy down pours in June and July.

2. It begins to enter on a resting period about September, sheds it leaves and to all intents and purposes consists of nothing but dry stems till the weather begins to warm up in February when the resting buds begin to shoot out. It makes good growth throughout the dry summer without irrigation

3. It does not flower at all, even in Poona, where Professor Joshi of the Ferguson College, has been experimenting with it for years to make it flower and bear, but without success.

4. I have failed signally in my attempts to make cuttings strike root.

5. Propagation by layering and natural suckers is successful but too slow, laborious, and expensive a process when one wishes to cover a few acres with some 500 plants to an acre.

6. From (2) above I surmise that the plant will be of no use in parts of our Province where the rainy season coincide with the resting period of the plant, viz., September to February

But let not my surmises discourage anyone one who wants to try it.

Owing to the difficulty in propagating it I have been unable to get more than a hundred plants to survive in the open where I planted them during three monsoons which have passed since I got a rooted cutting from Professor Joshi from Poona.

I have however found from extensive trial that a closely allied variety viz., *Pueraria javanica (P. Phaseoloides)* has most of the good qualities of *P. Thunbergiana* with none of its defects with the additional advantage that it remains green and grows all the twelve months. My cattle relish it as much as they do the Kudzu and it stands up very well to punishment from grazing cattle. It has survived even the prolonged drought of 1947—48 when the North-East-Monsoon failed and not a drop of rain fell on my farm from September 1947 till the first week of June 1948. So, this year I have gone all out for *P. javanica,* the tropical Kudzu.

To those who would like to try it, one piece of warning. The early growth from seed is disappointingly slow. I almost threw away the few seedlings, I first raised in pots from the thimble full of seed, the then Director of Agriculture sent me two years ago. I am glad I did not.

However to any one in a hurry-which cultivator is not who has to make a living from the soil? I would suggest a trial of the velvet bean *(Stizolobium Deeringianum)* Its growth has to be seen to be believed even on my barren sands.

Y R Farm, Nileshwar,
S. Kanara, 5—8—1948

Yours truly,
R. M. SAVUR.

Gleanings

Agricultural Expenditure in India. The complaint about the paucity of funds for Agricultural deevlopment is an outstanding one. But it is unfortunate that the first budget of Free India should suffer from the same drawback in this important sphere of economic activity as that which characterised the budgets under the alien rule The allotment in the budget for 1948—49 compares very unfavourably with the provisions made, for instance, in the budgets of the United States, Canada and even Britain. As compared with eleven pies per head in India the expenditure in the United States in 1943—44 was Rs 77—9—11 In Canada in 1943, the expenditure per head was Rs 20—14—5. In the United Kingdom the allotment in 1945—46 was Rs 2 per head. It might be thought that since Agriculture is a provincial subject the extent of financial provision made for developmental expenditure in the provincial budgets would substantially improve this situation But the picture is gloomy here too as would be revealed from the following table:—

Provinces.	Net cultvated area '000 acres	Total Expenditure in lakhs	Expenditure on agriculture (in lakhs.)	Percentage of column 4 to 3.
(1)	(2)	(3)	(4)	(5)
Madras ..	30,534	5,594	169	3 02
Bombay ...	27,557	4,402	249	5·65
West Bengal ...	9,242	3,196	231	7·23
C. P. Berar ...	24,302	1,574	57	3·62
East Punjab ...	11,617	1,732	58	3 26

It is not the paucity of absolute funds for agriculture development that is the only trouble. The more significant point is that expenditure on its extremely beneficial activities is being starved. For instance, the Central Ministry of Agriculture has sanctioned the enormous sum of Rs. 11,46 lakhs to the U P to put into effect its grow more food campaign for the year 1948-49 Since the allotment is on the assumption that the province will contribute an equal amount of its own for expenditure on grow more food the total would work out to just about Rs. 23 lakhs. It is obvious that this expenditure is extremely inadequate and if expenditure on the construction of tube wells, for instance is to be of the order of or seven lakhs as proposed in next year's scheme of things, any hope of relief through increased agricultural output must prove illusory. The Agriculture Minister was right in emphasising that agricultural expenditure must be stepped up if we are to expect results In this connection mention of the sum which we have been spending on subsidising imports Rs' 15 crores – is instructive. [Eastern Economist Vol. X 1. 7. 15-8-47 Independence Number.]

Success attained with hybrid maize (corn) Outstanding successes with hybrid maize (corn) are reported frnm two Australian States, Queensland and New South Wales, where new developments are expected to revolutionise the Australian maize-growing industry. In Queensland, a hybrid maize has been developed that is confidently expected to ensure an average increased yield of at least 15 percent, over established commercial varieties. Two other striking gains are that the husk covering has been improved, giving added protection against weevils, birds and weather, and types of hybrids being produced have greatea resistance to hot weather conditions. Mr. W W. Bryan, plant breeder and lecturer in plant industry at the Gatton Agricultural College, Queensland, began in 1930 by breeding nine maize varieties. Since then 984 different kinds of maize have been introduced into the college plots In recent years, 15,000 hand pollinations have been undertaken annually. Now the first step in hybrid maize production by private enterprise has begun Three growers have passed a probationary planting test and two of them will grow 13 acres of seed this year. This should yield sufficient seed to plant 2,000 acres of hybrid maize in 1949, and possibly 6,000 acres in 1950 In the northern districts of New South Wales, it appears that the average increase of yield from the use of hybrid maize will be up to 40 per cent In the worst maize-growing year on record, some phenomenal results have been achieved.

Crops generally were handicapped by excessive spring and early summer rain, which produced such extraordinary weed growths that they prevented the use of agricultural machinery to eradicate them. The result was that the maize plants were partially stunted in growth, a condition intensified by "setting down" of the ground, and by absence of heat during an abnormally mild summer. Despite these handicaps, yields have been extremely high A farmer at Armidale got 45 bushels to the acre from hybrid as against 30 bushels from standard maize At Mudgee, a crop of hybrid maize yielded 85 bushels to the acre In the Grafton district, where growing conditions this season were almost normal, one farmer got 130 bushels to the acre from hybrid maize as against 56 bushels

from standard varieties and another harvested 120 bushels of harvest hybrid against 90 bushels to the acre from Manning Pride and Fitzroy, though both crops were grown on similar soil and with the same climatic conditions. Hybrid maize and Golden Superb were planted in alternate rows at Wollomombi on land that had been previously cropped to soy beans. To use the farmer's own words, the two varieties when harvested were as different as chalk from cheese and the comparative yield was at the rate of 6½ bags of hybrid to 2½ bags of Golden Superb Apart from that, the hybrid had a loose husk that came away easily, and its characteristic even height from the ground facilitated harvesting either by machine or by hand.

Inquiries for hybrid seed have been received from India and South Africa but local demands will have to be met before seed can be exported. This season sufficient commercial hybrid maize seed will be produced to sow 14,000 acres in New South Wales. [Agricultural News letter AGN/206.]

Automatic Irrigation Device Offers Great Possibilities.

Great possibilites are forecast for an automatic irrigation spraying device invented by an Australian production engineer. At a low cost, it makes possible the irrigation of land by a series of fine rain-like sprays that do not require constant attention. Valves controlling the flow of water to sprinklers open and close themselves according to the dryness or wetness of the soil. Once the irrigation unit has been turned on, it needs no further attention as each individual spray will stop working when the ground is sufficiently watered. After extensive trials, the inventor and his associates have made sprays so effective that one will water a whole acre with the thoroughness of rainfall

Fertilisers have been dissolved in the irrigation water and distributed over the ground in the watering process. Irrigation plant itself is capital cost and at Rs. 52 to 63 per acre yield of crop is such that this capital has been written off in dividends from harvests within two or three years.

Operating costs are low. Where water can be supplied under its own natural pressure, running cost is nil. Where motive power had to be used one inch of rain, over 25 acres could be bought at a cost of 2 shillings an acre. In wages alone, by older methods of irrigation charge would have been at least £10.

Manufacturers of the automatic irrigation plant are Die Casters Ltd., of Richmond, Victoria For use with their irrigation plant they make plastic water piping which is non-corrosive and 90 per cent. lighter than metal piping. [Agricultural News letter No. AGN/205,]

Bees Travel Well by Air.

The transport of queen bees by air mail over long distances to and from Australia has been successfully carried out over the last 12 months. A consignment of queens and escorts was sent by the New South Wales Department of Agriculture to Russia, and two nucleus colonies were despatched to Indo-China. Thirty queen bees came to New South Wales by air from the United States without a single loss, although some Grey Caucasian queens sent from Russia did not survive the trip. Quarantine regulations must be strictly observed when bees are imported into Australia. The cages containing the queen bees and worker escorts are forwarded to the Chief Quarantine Officer at the place of entry into the country, and the insects are examined for disease. The two consignments of queen bees to Russia travelled in well-ventilated cages 6 inches long x 2 inches wide x 2 inches deep. Each cage had food chambers at each end, and three short frames across the centre, and housed a queen with 80 escort bees They were despatched during the Australian winter so that they would arrive in Russia at a favourable time. They were delivered to the Scientific Institute of Bee Culture near Moscow.

Transport of nucleus hives to Indo-China provided something of a problem. The bees had to travel by air to Singapore, and then on to Saigon From Saigon, the colonies had to be carried about 100 miles over a very rough road, but they survived the journey When bees are to be sent abroad, escorts are carefully chosen from workers about the age of those taking play flights. Combs are selected for strengh Those with brood and stores that have been in use for some time stand up to reasonably rough handling while travelling. [Agricultural News letter No. AGN/207.]

College - Day Sports, 1948

Champion: K. VENKATACHALAM.

Cross Country Race:— (5 Miles)
The Norris Cup. (37 mts.)
1. K. T. Mathew.
2. J. Ebenezer.

Pole Vault: (8'-11")
1. P. S. Krishnamurthy.
2. K. M. Balasubramaniam.

Childrens' Race: (Girls over 7 years)
1. M. Parvathy.
2. Pankajam.

110 Metres Hurdles:
The Ramaswamy Sivan Cup.
(19 3/5 Sec.)
1. K. Venkatachalam.
2. V. N. Lakshmanan.

Shot Put: (27'-4 3/4)
1. K. T. Mathew.
2. K. M. Appaih

Childrens' Race: (Boys' over 7 years)
1. Ratnam.
2. Rajagopal.

100 Metres Dash
The Saidapet Old Boys' Cup.
(10 2/5 Sec)
1. K. Venkatachalam.
2. J. Knight.

Long Jump: (16'-11 1/4")
1. V. N. Lakshmanan.
2. K. Venkatachalam.

Childrens' Race: (Under 7 years Girls)
1. Rajeswari.
2. Sherin.

Cricket Ball Throw: (98 yds.)
1. Gopinath Rao.
2. K. C. V. Rajah.

Childrens' Race: (Boys under 7 years)
1. Damodaran
2. Balasundaram.

200 Metres Hurdles: (33 1/5 Sec.)
1. J. B. Joseph.
2. K. Venkatachalam.

High Jump: The Thadulingam Cup.
(5 ft 2")
1. K. Venkatachalam.
2. P. Paramanandam.

Invitation: Race.
1. Garret. (Govt. Arts College)
2. Venugopal. (Co-operative Training Institute)

Hop step and Jump: (36'-9 1/4")
1. J. Knight.
2. Gnanavaram.

400 Metres Race: (1 mt.)
1. K. Venkatachalam.
2. J. Ebenezer.

Javelin Throw: (108')
1. K. M. Appayya.
2. J. Arasamani.

1,500 Metres Race:
The Anstead Cup. (4 mts. 59 2/5")
1. K. T. Mathew.
2. N. Gopalan.

Old Boys' Race:
1. K. Varadachary, D.A.O,. Trichy.
2. K. Sundaram, Ento. Myco. Demonstrator.
3. Rao Bahadur, V. Ramanatha Iyer, Rtd Dy. D. A.

Peons' Race:
1. P. Nalappan—Pulse's Section.
2. V. Rangan—Mycology Section.

4 x 400 Metres Relay Race:
The Chunampet Shield.
(Inter tutorial)
1. P. Krishna Rao's Ward.

Tug of War: The Ramnad Shield.
(Inter tutori)
1. N. Sankaranarayana Reddy's Wary.

Obstacle Race:
1. S. N. Ail.
2. R. Rajagopalan.

Crop and Trade Reports

Statistics—Crop—Groundnut—1948—Madras Province—Second Forecast Report.

Summer Crop: Area and yield: The area under the summer crop of groundnut in parts of the Madras Province during the five months January to May 1948 is estimated at 81,100 acres as against 80,700 acres estimated for the corresponding period of last year, representing an increase of 0·5 per cent. The increase is due mainly to the prevalance of high prices for groundnut. The yield per acre is expected to be normal in Trichinopoly and Tanjore and below the normal in the other districts of the Province The total yield is estimated at 65,300 tons of unshelled nuts as against 68,100 tons estimated for the corresponding period of last year representing a decrease of 4·1 per cent.

Early Crop: The area under the early crop of groundnut (mostly irrigated) up to 25th July 1948 in the districts of Salem ond Coimbatore is estimated at 1,43,500 acres. When compared with the area of 1,37,400 acres estimated for the corresponding period of last year, it reveals an increase of 4 4 per cent. The increase is due to the prevalance of high prices for groundnut The yield per acre is expected to be normal in Salem and below the normal in Coimbatore. The yield in these two districts is estimated at 71,200 tons of unshelled nuts as against 68,200 tons estimated for the corresponding period of last yar representing an increase of 4·4 per cent. The wholesaleprice of groundnut (machine shelled) per imperial maund of 82 2/7 lbs. or 3,200 tolas as reported from important market centres on 9—8—1948 was Rs. 24—0—0 in Salem, Rs 23—15—0 in Erode, Rs 23—12—0 in Guntur, Rs 22—10—0 in Adoni. Rs 22—9—0 in Guddalore, Rs. 22—5—0 in Vellore, Rs. 22—0—0 in Tadpatri, Rs. 21—14—0 in Nandyal Rs 20—15—0 in Cuddapah and Rs 20—7—0 in Bellary. When compared with the prices published in the last report ie. those which prevailed on 10—4—1948, these prices reveal a rise of 15 per cent in Salem, 13 per ceut in Guntur, 8 per cent in Erode and Vellore, 7 per cent in Cuddalore, 5 per cent in Nandyal and Bellary, 4 per cent in Adoni, 3 per cent in Tadpatri and 2 per cent in Cuddapah.

Figures by districts are given below.

Area in hundreds of acres ie. 00 being omitted, yield in hundreds of tons of unshelled nuts ie. 00 being omitted in Groundnut II Report.

District.	Area sown with Groundnut in		Percentage of the estimated yield per acre in the current year as compared with the yield per acre in a year of average season.	Estimated yield corresponding to	
	1947	1948		Col. 2	Col. 3
1	2	3	4	5	6
	Acs.	Acs.		Tons.	Tons.
Anantapur	—	1	70	—	1
Cuddappah	17	19	90	15	15
Nellore	4	4	85	4	3
Chingleput	50	51	80	40	36
South Arcot	440	443	90	373	356
Chittoor	48	24	90	39	19
North Arcot	21	20	90	17	16
Trichinopoly	48	48	100	41	43
Tanjore	74	68	100	63	61
Madura	90	104	90	76	84
Ramnad	15	29	75	13	19
Total Summer Crop January—May	807	811	90	681	653
Salem	225	314	100	107	157
Coimbatore	1149	1121	99	575	555
Total Early Crop sown upto 25th July	1374	1435	99	682	712
Grand Total	2181	2246	—	1363	1365

Statistics—Crop—Gingelly—1948-49 Madras Province—First forecast Report

The average area under gingelly in the Madras Province during the five years ending 1944—45 represents 14·7 per cent of the total area under gingelly in India. The area under gingelly up to 25th July 1948 is estimated at 2,45,700 acres. Ween compared with the area of 2,38,500 acres estimated for the corresponding period of last year, it shows an increase of 3·0 per cent. The estimated area is the same as that of last year in Guntur, Chingleput, Chittoor and South Kanara. A decrease in area is estimated in East Godavari, Kistna, Bellary, Cuddapah, Nellore, Tanjore, Madura, Ramnad and Malabar and an increase in area in the other districts of the Province due mainly to the prevalence of attractive prices for gingelly seeds. The increase in area is marked in Salem (+2,900 acres) and in Coimbatore (+3,000 acres). The condition of the crop is reported to be generally satisfactory except in the district of West Godavari where the crop had a set back on account of scanty rains during the period of its growth. The yield per acre is expected to be normal except in West Godavari, Chingleput, Madura, Ramnad and Malabar. The wholesale price of gingelly seed per imperial maund of 82 2/7 lbs. (or 3,200 tolas) as repoted from important market centres on the 9th August 1948 was Rs. 36—3—0 in Trichinopoly, Rs 33—10—0 in Salem, Rs. 31—0—0 in Cocanada, Rs. 29—12—0 in Ellore, Rs. 29—10—0 in Tuticorin, Rs. 28—12—0 in Rajahmundry and Rs. 27—10—0 in Vizagapatnam. When compared with the prices published in the report for the corresponding perid of last year i.e., those which prevailed on 12th August, 1947, these prices reveal a rise of approximately 22 per cent in Trichinopoly, 11 per cent in Salem, 6 per cent in Rajahmundry and 4 per cent in Tuticorin and Ellore and a fall of 4 per cent in Cocanada.

Figures by districts are given below.

GINGELLY.

(Area in hundreds of acres, ie., 00 being omitted.)

District and Tract.	Estimate of area sown up to the end of July		Increase (+) or decrease (—) of the area in col. 3 as compared with the area in col. 2.
	1947	1948	
(1)	(2)	(3)	(4)
Vizagapatam ...	670	682	+ 12
East Godavari ...	340	330	— 10
West Godavari ..	290	298	+ 8
Kisna ...	18	17	— 1
Guntur ...	4	4	
Circars ...	1322	1331	+ 9
Kurnool ...	3	4	+ 1
Bellary ...	60	59	— 1
Anantapur ..	50	55	+ 5
Cuddapah ...	8	5	— 3
Deccan ...	121	123	+ 2
Nelloor ...	28 (r)	27	— 1
Chingleput ...	91	91	...
South Arcot ..	70	81	+ 11
Carnatic ..	189	199	+ 10
Chittoor ...	22	22	...
North Arcot ...	84	89	+ 5
Salem ..	261	290	+ 29
Coimbatore ...	206	236	+ 30
Trichinopoly ...	15	20	+ 5
Central ...	588	657	+ 69
Tanjore ...	14	11	— 3
Madura ...	75	60	— 15
Ramnad ...	24	11	— 13
Tinnevelly ...	32	46	+ 14
South ...	145	128	— 17
Malabar ...	4	3	— 1
South Kanara ...	16	16	...
West Coast ...	20	19	— 1
Province ...	2385	2457	+ 72

(r—revised figure.)

(From the Economic Adviser, Madras.)

Cotton Raw in the Madras Province

The receipts of loose cotton at presses and spinning mills in the Madras Presidency from 1st February 1948 to 3rd September, 1948 amounted to 317,758 bales of 400 lb. lint as against an estimate of — bales of the total crop of 19 — The receipts in the corresponding period of the previous year were 258,847 bales, 327,007 bales mainly of pressed cotton were received in spinning mills and 27,613 bales were expected by sea while 68,922 bales were imported by sea mainly from Karachi and Bombay. (From the Director Agriculture, Madras)

Weather Review—For August, 1948.

RAINFALL DATA.

Division	Station	Actual for month in inches	Departure from normal in inches	Total since January 1st in inches	Division	Station	Actual for month in inches	Departure from normal in inches	Total since January 1st in inches
Orissa & Circars.	Gopalpore	10·3	+2·6	23·0	South.	Negapatam	0·0	−3·1	12·0
	Calingapatam	4·4	−2·4	18·8		Aduturai*	0·7	−2·8	6·7
	Vizagapatam	1·9	−3·3	10·9		Pattukottai*	2·5	−1·3	12·1
	Anakapalle*	5·4	+0·8	13·8		Madura	3·4	−0·7	12·3
	Samalkota*	2·8	−2·4	13·6		Pamban	0·0	−0·6	4·3
	Cocanada	3·5	−2·1	20·7		Koilpatti*	7·8	+5·9	16·6
	Maruteru*	2·1	−4·2	14·0		Palamkottah	1·9	+1·2	13·6
	Masulipatam	2·1	−4·2	11·9		Amba-samudram*	1·3	+0·7	13·3
	Guntur*	2·2	−3·5	13·7					
	Agri. College, Bapatla*	...	...	...	West Coast.	Trivandrum	7·8	+3·1	50·9
	Veeravanam, College Farm.	3·0	...	18·0		Cochin	16·5	+2·6	95·1
						Calicut	12·9	−4·2	101·2
Ceded Dists.	Kurnool	5·1	+0·6	11·5		Pattambi*	13·4	+0·7	78·3
	Nandyal*	...	..	..		Taliparamba*	24·3	+1·1	122·7
	Hagari*	4·1	+0·9	8·8		Nileshwar*	25·7	+2·4	124·5
	Siruguppa*	3·3	+0·9‡	9·7		Pilicode*	21·6	+0·4§	124·7
	Bellary	6·5	+4·1	11·9		Mangalore	29·9	+4·4	99·4
	Rentichintala	3·9		14·3		Kankanady*	30·2	+4·7	100·2
	Cuddapah	5·0	−0·2	11·7	Mysore & Coorg.	Chitaldrug	7·0	+3·6	22·9
	Anantharajpet*	3·9	+0·9§	11·8		Bangalore	11·2	+6·2	29·8
						Mysore	6·2	+2·9	22·7
Carnatic.	Nellore	5·2	+2·2	10·0					
	Buchireddi-palam*	2·5	+0·5	10·3					
	Madras	3·5	−1·1	10·5	Hills.	Mercara	42·8	+16·0	112·5
	Tirurkuppam*	2·8	−2·9§	11·6		Kodaikanal	7·5	+0·5	35·9
	Palur*	4·7	−0·1	17·6		Coonoor*	2·3	−2·3	24·2
	Tindivanam*	0·5	−3·9	8·2		Ootacamund*	4·5	−1·4	29·3
	Cuddalore	5·2	+0·4	12·7		Nanjanad*	8·0	+0·7	52·4
Central.	Vellore	2·3	−3·4	10·2					
	Gudiyattam*	2·3	−2·0	13·1					
	Salem	4·1	−2·5	18·2					
	Coimbatore (A C R I)*	2·3	+0·8	11·6					
	Coimbatore (C. B. S)*	2·1	+0·7	12·7					
	Coimbatore	2·0	+0·8	9·2					
	Tiruchirapalli	0·8	−3·2	12·0					

Note — (1) * Meteorological stations of the Madras Agricultural Department.

(2) Average of ten years data is taken as the normal.

(3) § Average of five years in Tirurkuppam, and Anantharajpet and six years in Pilicode.

(4) ‡ Taluk office rainfall being.....

(5) .. Figures not available.

Weather Review for August 1948

During the first few days in the month the monsoon was weak except over the region from the East Punjab to Assam and the Chittagong Coast. On the 7th day of the month the monsoon strengthened in North Malabar and the South Konkan. The next day it spread to the east United Provinces also. A day later it became active in the east Central Provinces. It strengthened in the north Konkan and extended into west Gujarat under the influence of a trough of low pressure found over the Kathiawar-North Konkan coast.

The Bay of Bengal depression, centered at 08-00 hours I. S. T. on 12—8—1948 near Lat. 19°N, Long. 86°E, intensified on the fourteenth day of the month into a cyclonic storm about 150 miles south-west of Calcutta. On the same day the monsoon was very vigorous along the Orissa—Circars coast and the Konkan.

The shallaw depression, formed three days earlier, passed inland on 20—8—1948 and remained on 21—8—1948 as a diffuse low-pressure area over Chota Nagpur and the adjoining parts. Under its influence there had been wide-spread rains in the region from west Central India to Gangetic West Bengal.

The unsettled conditions in the north-west angle of the Bay of Bengal, detected on 22—8—1948, resulted in a shallow depression centered about 100 miles south of Calcutta. Five days hence it ended as an unimportant trough of low pressure over Chota Nagpur and its neighbourhood.

On 28—8—1948 a trough of low pressure extended from the North Central Provinces to the Orissa coast. It ended in a "low" over east Central India on 31—8—1948 and it was noted to move slightly west-north-westwards and the neighbourhood. As a consequence, conditions became unsettled in the north Bay of Bengal.

MONSOONIC RAINS

Practically throughout the month there had been light, moderate to heavy showers along the west coast, many parts of Andhradesa, Rayalaseema and Tamilnad. The notable falls in the month are as detailed below.—

S. No.	Place.	Date.	Rainfall in inches.
1.	Cochin	2—8—1948.	4·3
2.	Alleppey.	3—8—1948.	3·7
3.	Bellary	4—8—1948.	4·1
4.	Bangalore	6—8—1948	4·4
5.	Mangalore	10—8—1948.	4·0
6.	Karkal (S. Kanara).	10—8—1948	11·4
7.	Mercara	13—8—1948.	5·4
8.	Calingapatam.	14—8—1948.	4·1

Summary of Monsoon Forecasts for August—September.

The chance is only a four to one that a rainfall during August and September 1948 will not exceed 112% of the normal in the Peninsula comprising Gujarat, Konkan, *Bombay Deccan*, Central Provinces and Hyderabad and 116% of the normal in North West India comprising United Provinces, East Punjab, West Punjab, North-western Frontiner Province and Rajputana.

Weather Report for the Meteorological Observatories at the Agricultural College and Research Institute and Cotton Breeding Station at Coimbatore for the month of August 1948

Report No. 6/48.

		Observatories at	
		A. C and R I. (08-22 hours) (Average of 10 years).	C B S (07-22 hours) (Average of 9 years).
		2	3
1	Absolute Maximum in shade ..	90°F.	90 7°F.
2.	Absolute Minimum ..	69·8°F.	68·8°F.
3.	Mean Maximum in shade ...	86 1°F.	87·1°F.
4.	Departure from normal ..	—1·2°F.	—0 7°F.
5.	Mean Minimum in shade .	72·9°F.	72 6°F
6.	Departure from normal ..	+0 6°F.	+0 5°F.
7.	Total rainfall for the month ...	2·30".	2 09".
8.	Departure from normal .	+0·83".	+0 69"
9.	Heaviest fall in 24 hours ..	0·81".	0 52"
10.	Total number of rainy days .	4	4
11.	Mean daily wind velocity ...	6·4 MPH.	7 8 MPH.
12.	Departure from normal ..	+1·7 MPH.	+1 4 MPH
13.	Mean humidity ...	72%	80%
14	Departure from normal ...	—1%	+3%
15	Mean grass Minimum .	—	69 8°F.
16	Departure from normal	—	+1 6°F.
17.	Mean wet minimum ...	—	67·8°F.
18.	Departure from normal ..	—	+0·1°F.
19.	Mean solar Maximum ...	—	95·4°F.
20.	Departure from normal .	—	—13·5°F.
		Morning.	*Evening*
21.	Mean soil temperature 5 cms ...	76 8°F	91 1°F.
22.	Departure from normal .	+0·2°F	—2·0°F.
23.	Mean soil temperature 10 cms	77·6°F.	81 5°F.*
24.	Departure from normal ..	—1·9°F	—3 0°F
25	Soil temperature 30 cms. ..	80·2°F.	82 5°F †
26.	Departure from normal	—1·3°F.	—0 1°F.
27.	U. S. A Open Pan Evaporimeter Mean Evaporation ...	9·91 m m	
28.	Departure from normal ..	—0 37 m m.	

* — 8 years average

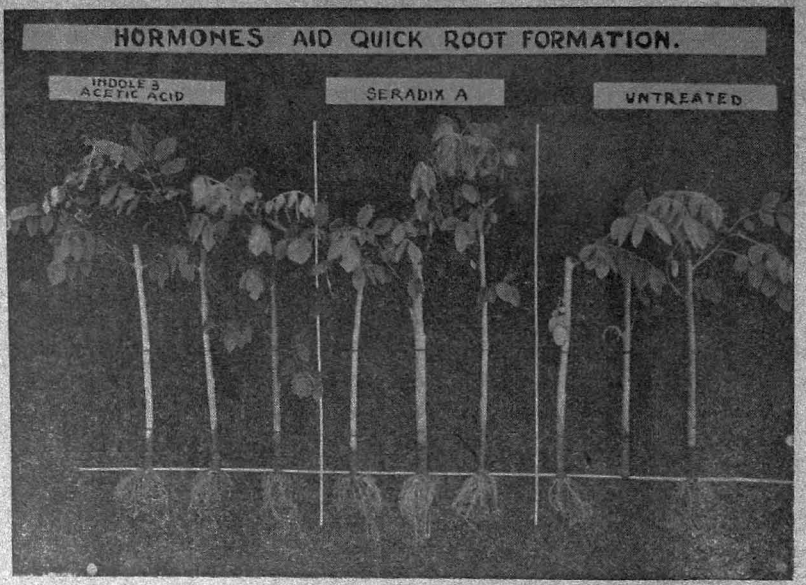
† — 5 years average.

Summary.

The weather at Coimbatore during August 1948 was fairly pleasant since the rains received happened to be in slight excess over the normal for the tract for this particular month. To add to the rainfall the mean maximum in shade also happened to be lower than the normal. The weather was windy and hence the wind's velocity happened to be in excess over the normal for the month of August

M B V. N. and C B M

Research Notes



Hormones and Root Formation in Green-manure Plants. In the recent drive for producing more green manure, various plants capable of quick growth, resisting drought, escaping damage by grazing animals and yielding large quantities of green leaf per year, have been recommended and are under propagation. Among the different plants, some lend themselves for propagation by seed and some others by cuttings while a few can be propagated by both methods. Stumps capable of rooting quickly, give appreciable quantities of leaf even after six months. It was found that a large percentage of the cuttings of *Glyricidea maculata* failed to root readily and there were many gaps in the planted holes. Two hormones viz., Indol 3 acetic acid, and Seradix A were tried in order to find whether there was any acceleration of root formation in treated cuttings. The cut ends were kept immersed in 0·005 per cent or 1/4 gramme indol-3-acetic acid in a gallon of water and 0·1 per cent or 192 drops Seradix A in a gallon of water for twenty-four hours, and planted in a small bed which was irrigated periodically for sixty days. The cuttings were pulled out at random to find the extent of root growth in the several treatments and the percentage of false shoots. The photograph given above details the information collected on the two aspects. The two hormones aided root formation to a remarkable degree and the percentage of rooted cuttings was over ninety per cent while the untreated control was poor in rooting both in number and growth. The pretreatment is recommended as an efficient method for propagating cuttings and stumps which are not capable of rooting easily.

Coimbatore,
15-5-1948.

R Balasubrahmanyan,
Cotton Specialist.

N. B.:— Seradix A is available with May & Baker Ltd. Indol-3-acetic acid is found in the urine of cows in calf.

Departmental Notifications

GAZETTED SERVICE—POSTING AND TRANSFERS.

Mr. Abraham, P	On leave	Asst. Cotton Specialist Palur

SUBORDINATE SERVICE.

APPOINTMENTS.

Sri V P. Sivasankara Menon is appointed as Upper Subordinate and posted as Assistant in Chemistry, Agricultural College, Coimbatore

Sri K Ramanarayana Menon and Sri S Venkataramanappa, Upper Subordinates are appointed as Technical Officers under the Regional Food Commissioner, Madras for a period of one year from the date of relief.

CONFIRMATION OF UPPER SUBORDINATES.

The following are appointed substantively as Upper Subordinates in Category I of Class I of the Madras Agricultural Subordinates Service

Sri Adisesha Reddy, A B, Janab Azimuddin, A, Sri Anantham Pillai, S, Sri Alagiamanavalan, R, Janab Ali Hyder; Albuquereque, S D S, Sri Arunachalam, T, Sri Balasubramaniam, C, Bennet P Masilamani, Sri Bhujanga Rao, C, Sri Chelapathi Rao, K V; Sri Dhakshanamurthi, T S, Doraiswami, G, Edwin Amirtharaj, Sri Ekambaram, C; Sri Ganeshamurthi, N, Sri Govindakurup, K, Sri Govinda Rao, P, Sri Gaurangamurthi, K V, Sri Hanumantha Rao, D C; Sri Jagannatha Rao, V V, Sri James Colaco; Sri Joshua Moses, Sri Kankaraj David, S, Sri Krishna Menon, K M, Sri Krishnamurthi Rao, S; Sri Krishnamurthi, S; Sri Kandaswami M, Sri Krishnamurthi, K, Sri Krishnaswami P, Sri Krishna Marar, M. M, Sri Kutti Mudaliar, K S, Sri Kasiviswanathan M, Sri Krishnamurthi, C, Sri Lakshmikantham, M, Sri Meenakshisundaram, K; Sri Mariakulandai, A, Sri Muthuswami, S, Sri Narayana Menon, B.G, Sri Narayanan, K M, Sri Narasinga Rao, U, Sri Rami Reddi, M, Sri Rangaswami Ayyangar, K, Sri Ramakrishna Reddy, B, Sri Rajagopalan, V V, Sri Ramanujalu Naidu, T. Sri Sambasiva Rao, I, Sri Shanmugasundaram, A, Sri Sobhanadri, N, Sri Sitaramayya, P, Sri Sahadevan, P C, Sri Satyanarayana G, Sri Subba Reddy, M, Sri Subramania Chetty, M, Sri Subramaniam, A Sri Subbiah Pillai, R; Sri Srinivasa Rao, D, Sri Srinivasan, V, Sri Srinivasa Rao, M, Sri Tejappa Shetty, K, Sri Tirumala Rao, W, Sri Uchil Ananda, Sri Varadarajan, S, Sri Vadamalai, C, Sri Venkatareddi Naidu, K; Sri Venkataramanappa, S, Sri Venkataswami, Y, Sri Venkataswami, K, Sri Venkataramiah, M, Sri Venkataratnam, G. *Note* — Five posts are reserved for War Service Candidates

Sri N Muthuswami Naidu, a permanent Laboratory Assistant in Entomology is confirmed as Assistant in Entomology of the Madras Agricultural Subordinate Service with effect from 2—12—1946.

POSTINGS AND TRANSFERS.

Name of Officers	From	To
Sri Adiseshaiah, H.	On leave,	A. D., Vegetables, Madras
Janab Ali Hyder Sahib, R.	On leave,	A D., Anakapalle
Sri Anantha Padmanabha Pillai, R.	On leave,	A D., Sattur

Name of Officers	From	To
Sri Bhaskara Rao, K.	Marketing Asst. Amudalavalasa,	A. D., Allagadda.
,, Bhima Raju, S.	A. D., Arupukottai,	A. D., Melur.
,, Danvantari Reddy, M.	A. D., Kovur,	F M., Siruguppa.
,, Ganeshan, K. R.	A D., Shiyali,	A. D., Arni.
,, Gopala Rao, M	On leave,	Special A. D, Seethampet.
,, Janardhana Rao, K	Marketing Asst Guntur,	F. M., A. R S., Hagari.
,, Kameswara Rao, G.	A. D, Pithapuram,	A. D, Kavili.
,, Kunhikannan Nambiar.	O S. S. Section,	Indian Central Cocoanut Committee, Ernakulam.
,, Krishnaswami Sarma, M. C.	Asst F. M., A. R S., Koilpatti,	Asst. A. D., Srivilliputhur.
,, Kumaraswami, V.	On leave,	A. D, Narasapur.
,, Lakshmi Reddy, M	Asst. in Cotton, A. R. S., Lam P. O.,	Asst. in Cotton A. R. S., Narasaraopet.
,, Meenakshisundaram, D.	Asst. in Paddy, Aduthurai,	Asst. in Botany, Coimbatore.
,, Navaneethakrishnan T. V.	F. M., Aduthurai,	A. D., Adirampatnam.
,, Narayana Nambiar, M.	On leave,	Asst. in Oil Seeds A. R. S., Nileshwar.
,, Neelakantan, L.	Asst. Cotton Specialist, Palur,	Asst. in Cotton, Coimbatore.
,, Narasimhamurthi, H	Asst. in Sugarcane, Hospet,	A. D., Gooty.
,, Narasimha Rao,	Marketing Asst. Vijayanagaram,	A. D., Kovur.
, Narasimhamurthi, R.	,, Asst. Kurnool,	A. D., Ellore.
,, Narasimha Rao, G. L.	,, Asst Anantapur,	A. D., Palagonda.
,, Padaki, G. R.	Asst. in Cotton, Narasaraopet,	Asst in Cotton A. R. S., Nandyal.
,, Ranga Rao, K.	On leave,	A. D, Koilguntla.
,, Rama Rao, D.	A. D., Rapelle,	F. M., Arakuvalley.
,, Raman, K	Marketing Asst. Madras,	Asst. in Chemistry, Coimbatore.
,, Ramasomayajulu, M V.	F. M., Arakuvalley Scheme,	A D., Chodavaram.
,, Ramasubba Ayyar, A. K.	D. A. O, Tinnevelly,	A. D., Kollegal
,, Raghunatha Reddy, K.	Marketing Asst. Gooty,	A. D., Hospet.
,, Ramajaneyulu, S.	Marketing Asst. Narasaraopet,	A D., Nandyal.
,, Radhakrishnan, T. V.	Asst. in Chemistry, Coimbatore,	Asst. in Paddy A. R. S., Pattambi.
,, Ramanathan, W. S.	On leave,	A D, Wandiwashi.
,, Raghunatha Reddy, K.	Marketing Asst.,	A. D., Kalyandrug.
,, Shanmughasundaram, D.	Asst. Marketing Officer, Madras,	A. D., Sankarankoil.
,, Satyanarayana, P.	On leave,	A D., Tenali.
,, Sankara Reddy, G. H.	A. D., Kavili,	Asst. in Chemistry, Coimbatore.

Name of Officers	From	To
Sri Subaramania Chetty,	On leave,	Special A. D., Karur.
,, Somayajulu, P.	P A., to D A. O., Chicacole,	A. D., Guntur.
,, Subramanian, R.	On leave,	A. D., Melur.
,, Somayya, M.	Agronomist, A. R S., Sirug ippa,	F. M., A. R. S., Siruguppa.
,, Subramania Sarma,	Asst. Marketing Officer, Coimbatore,	Dairy Manager, Coimbatore.
,, Seethapathi Rao, S.	On leave,	A. D , Pithapuram.
Mr. Thomas, N. K.	A. D., Avanashi,	Marketing Asst. Salem.
Sri Vaidyanathan, M.	P. A., to D. A. O., Vellore,	F. M., A R. S., Tindivanam.
,, Venkatasubramania, P. S.	F. M , A. R S., Tindivanam,	P. A., to D. A. O., Vellore.
,, Vaidyanathan, S.	On leave,	Botanical Asst. S. R. S., Gudiyattam.
,, Venkoba Rao, M	Asst. in Cotton, Nandyal,	Asst. in Cotton, A. R. S., Lam.
,, Venkoba Rao, K.	D A. O., Nellore,	A, D , Koilkuntla
,, Venkataramanappa, S.	On leave,	A. D., Puthur.