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Rice Deficit in Madras and its Solution.

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"Food will continue to be a weapon in all efforts towards ensuring a more orderly, prosperous and peaceful country". Thus spoke Roosevelt, one of the greatest of statesmen. There is also the recent warning by the Food and Agricultural Organization that the production deficit of rice in the world would continue for the next three years. The 1947—1948 production has attained the pre-war level but this is not sufficient to keep pace with the growing world population and by 1950, the gap between production and consumption is estimated to be of the order of 14 million tons. It is our duty, as a body of workers striving to improve the food production of the country to leave no stone unturned in bridging the gap between production and the demand for food crops. Let us see what the position of rice is like in the Madras Presidency. Rice occupies about 10·7 million acres and the production for 1947—48 was 4 million tons against a normal production figure of 4·9 million tons. The annual requirements at 12 oz. ration for the total population of the province, taking the 1941 census figures, come to 5·3 million tons. The apparent deficit of 4 lakhs of tons of rice (working out to 8% of the normal production) might seem to be quite a small one but the problem of making it up is not quite so simple. In spite of strenuous attempts in the Grow-Food-Campaign it has to be admitted that the deficit is still there. This lack of success has been ascribed to various causes such as (1) the objectives being too diversified and (2) the farmer not being approached and tackled in the right manner; but, for our purpose it is only necessary to examine how far and in what directions better results could be achieved in the matter of increasing the output of rice in the country.

There are three obvious ways, namely (1) by increasing the area by bringing more land under rice cultivation (2) by enhancing the per-acre yields of the area now being cultivated and (3) by avoiding and preventing waste during the several stages of cropping and storage.

Extension of Area. In spite of all the various concessions granted by the government it has not been possible to effect any spectacular increase in the area grown under rice. It is often claimed that the extensive area which now figures as "uncultivated wastes" in Revenue records could be brought under the plough and rice grown there, but from actual experience it is known that these are not potential assets suited for growing food crops, least of all rice. If it were possible to do this, these areas would long ago have come under cultivation, considering the pressure of population and the consequent land hunger. The question

of utilising these uncultivated wastes is one that could be tackled only as a long-term programme in relation to the various dam projects; it is therefore futile to expect any immediate increase in output from these wastelands. With minor improvements, here and there, in tanks and other irrigation systems, it may be possible to convert some single crop lands into double crop lands and there by increase the output of rice to a slight extent.

Yield per acre. It is an old complaint against the Agricultural Department that the rice yields in India are very poor when compared with those from other countries in the world. But it should be remembered that in many of the countries where high yields are recorded per acre, the total rice area may not probably be even as much as in some of the individual taluks of our Presidency. Again, rice cultivation in these countries is confined to rich virgin soils. Quite apart from such factors as the chronic poverty of our cultivators, absentee landlordism, inadequate manuring and the use of soil types not all of which are particularly suited for rice, the vital climatic and ecological factors are the major points of difference between those countries and India and more particularly Madras. In countries like Spain, Italy and California the rice-growing season is restricted to the summer months with long days, favourable for greater root development and the production of larger amounts of dry matter. Incidentally it has also to be remembered that manuring is done on a much more liberal scale in those countries than in India. In the tropics the main rice-growing season is the rainy season as only then sufficient quantity of water is available for the crop. In the main growing season for rice, therefore, the sunshine available is limited both in duration and intensity, and this factor adversely affects the crop. Along with these, we have also to bear in mind the pitifully low level of manuring that is generally practised in the majority of rice-growing areas. In spite of all such handicaps, we have recorded yields of over 6,000 lbs of paddy grain per acre from fairly large areas in the Central Farm and also from the Kistna delta region. Rice crops of 100—110 days duration grown in the summer months from June to Septemper have recorded average yields of 5,000 lbs. over large areas in the Tambraparni valley in the Tirunelveli district. This takes us to the question of devoting more area to *rice growing during the summer months by providing adequate facilities for irrigation*, but such questions of policy are beside the scope or present article.

Water and Manure. In any scheme for increasing food production, the highest priority should be given to irrigation first and next to manuring. Unfortunately the Agricultural Department has no control over irrigation facilities, so the other aspect alone, namely that of manuring will be considered here. Two quick-acting and profitable manures for rice are oilcakes and ammonium sulphate, but here again we are confronted

with the handicap that the allotment of 20,000 tons of ammonium sulphate for the Madras Presidency is only a fraction of what is actually required for the needs of the province. In the case of oil-cakes too, the quantity available is less than a tenth of what is required for manuring paddy in the Province. A portion of edible oil-cakes has also to be diverted for feeding live stock. Under such limitations the only alternative is green manuring. It has been proved beyond all doubt that application of green leaf manure is a very effective method of improving paddy yield on all types of soils. Each tract has to select the green manure crops that are best suited for the tract from the various green manure crops now available. It is estimated that the area under green manure crops is about 1¼ million acres which is only one eighth of the rice area of the Presidency. Propaganda in extending the area under green manure crops has not been as fruitful of results as one would wish due to a variety of reasons, such as, for example the non-availability of green manure at the proper time, limitations of moisture in the soil and water supply for ploughing in and so on. These impediments are not however insurmountable. A quickening of the production of green manures seeds in cultivable wastes, subsidising the sale of seeds till such time as they become more popular, a nominal bonus to the growers of green manure crops, either for manuring paddy or seed production are all ways of encouraging a wider use of green manure crops. These measures have been put into action and should result before long in a considerable increase in the area under green manure crops. The growing of quick-growing trees and shrubs like Glyricidea and Calotropis on waste lands and paddy-field bunds has also been taken up, and would go a long way in providing more green leaf manure for paddy fields in due course.

Improved Varieties: Next in importance to water and manure is the substitution of unselected varieties of rice by types improved by plant breeding and selection. The total rice production in the province can be increased by not less than 10% by this method alone, if all the area is covered by improved strains. From the work done at the several rice research stations in different parts of our province nearly 150 new and improved strains have been evolved, suited to various types of soils and conditions. Some of these combine earliness, a better quality of rice and other desirable features. If the varieties now used by the cultivators are all replaced by these improved strains, by means of a well-planned and comprehensive scheme of seed multiplication and distribution, the present deficit in rice-production in the province can easily be wiped out. We have started now in Madras, such a comprehensive seed multiplication scheme, designed to cover the entire area by improved strains in the course of the next five years.

Reduction of losses Waste: That pests and diseases take a heavy toll from the potential output of this important crop both in the field and in

storage is a well-known fact. From a practical aspect it is not easy to prevent or cure any major disease under field conditions and breeding for disease-resistant types would seem to be a more promising line of attack, as it has been found that resistance to disease is a heritable character, governed by major genes in the chromosomes. How a combined attack by the plant breeder and pathologist in breeding resistance can be fruitful is evident from the two blast-resistant paddy strains, Co. 25 and Co. 26, that have been evolved for the southern districts of the Province where long-duration strains are in demand. Two resistant strains have also been evolved from the famous Molakolukulu type, suited to the blast-stricken areas of the central districts of the Presidency. Work is also being continued to breed suitable strains for other parts of the Presidency where a shorter duration is desired. The work of breeding strains resistant to other diseases like Foot-rot and Rusts has also been recently taken on hand in the Paddy Section.

With regard to the insect pests of paddy, complete life histories of all the major pests have been worked out in Madras, but the task of breeding resistant types, has not been taken up, owing chiefly to the unavailability of the elaborate insect-proof equipment and controlled conditions that are necessary for this type of study.

Mention may be made in passing about losses due to physiological causes, such as lodging of crop due to weak straw, too much shedding of grain, sterility and lack of setting, etc. but it has to be admitted that our knowledge regarding the physiology of the rice plant is meagre when compared to that available for other important crops of the world. Attempts are however being made to breed in the Paddy Section, types that are resistant to physiological factors; for example a variety from Bengal, S. R. 26 B, which is found to be fairly resistant to saline conditions is being recommended for some areas. Another variety from Maruteru MTU. 1. Akkullu, is also resistant to saline conditions. Crosses between these and other rice varieties are under way. It can be claimed that the production of higher yielding varieties by plant breeding methods is a sure and in the long run one of the least expensive methods for improving the productivity of the province. While the achievements in respect of rice are quite considerable in our Province, there is still a vast scope for further improvement. The evolution of improved types suitable for growing on marginal lands with a precarious water supply is one such item. Breeding is a continual process and the advances in knowledge in various associated fields, like Genetics, Cytology and Geobotany open up an ever-increasing and wider field for the plant breeder to broadbase his work for a successful end.