

Work on Rice Improvement in Tanjore Delta.*

BEFORE I begin to deal with the subject of rice improvement in the Tanjore Delta, I propose to give briefly the salient points relating to work on crop improvement in general. It is a commonly recognized fact that the agricultural prosperity of a country is dependent upon the magnitude of its crop production. The growing of better crops, the reaping of heavier harvests, and the realization of better returns, are objects that are ardently desired by all agriculturists. There are over a million acres under rice cultivation in Tanjore Delta area and if it should be possible to increase the output of paddy from this area, it would undoubtedly be a material contribution to the welfare of the country. A recognition of the following facts is a necessary preliminary to work on increasing the productivity of any crop.

It is a truism to say that no two individuals are quite alike, and this saying holds good with regard to plants as well. A close examination of a large number of individuals discloses the fact that there is a very large range of variation occurring among them. There are minor differences distinguishing one individual from another, and there are also what may be called racial differences separating one class or race of individuals from another class or race. A recognition of this fact is of great importance in work on plant-selection.

It would be futile, nay ridiculous, to think of converting a pigmy into a giant by carefully regulated nutrition. Nature is something entirely different from nurture, although the two factors co-exist in actual life. Something not inborn cannot be introduced by environment. The yield of a paddy plant is determined by the interaction of two factors, namely, heredity and environment. The environment may be favourable or unfavourable to the expression of a hereditary factor, but the factor must be there before it could be made to show itself. All paddy plants are not of the same yielding capacity, and it would be absurd to imagine that a very high yield could be produced by manuring alone, and that is rightly so, because the capacity to assimilate nutrition and build it up into paddy grains is something quite different from the supply of nutrition alone. It is a well recognized fact that different varieties or races of paddy possess different yielding capacities. It would thus be possible to get at the best yielders by judicious selection.

If we look at a paddy crop growing on a ryots' field, we notice that some plants are tall and good yielding, some short and low yielding, some sickly and producing very little grain. From the plant-breeder's point of view these seemingly different kinds represent distinct varieties. The mixture of good, bad and indifferent plants is the chief cause of the deterioration of the ryots' paddy. If the ryot had taken care to select the very best plants in his fields and used the produce of such plants for the next sowing, his crop would certainly be better. We received a sample of kuruvai seed from an ordinary ryot from the neighbourhood and when we looked at it closely in the laboratory, the so-called 'kuruvai' paddy which was supposed to be

* K. Venkataraman, M.A., in *Rural India*, Vol. 2, No. 8, February, 1928.

one variety with the ryot, really consisted of six different kinds of paddy and two different colours of rice. Some of the varieties are positively unmarketable, being either black in colour, or slender and fragile or with awns. The rice too, being a mixture of red and white rice is graded as a low class of commercial product and consequently the financial return to the cultivator is poor indeed. It may be asked what the remedy is, that will solve this problem. We do not propose to teach the ryot the details of scientific work. The State or the Government gladly undertake the trouble and expense of such work. We examine very carefully a sample of the mixed paddy grown by the ryot, separate it into its constituent pure races by single plant-selection, try these varieties one against the other with regard to yielding capacity and finally isolate the very best strain, multiply it on a large scale, and recommend the new seed to ryots for adoption. We do not wish that the ryot should give any preferential treatment to this seed, but we only ask him to grow it in place of the mixed seed which he had been growing formerly. The processes lead to the evolution of an improved strain of paddy by pure-line selection. This method can be relied on with certainty to produce good results. It stands to reason that once we fix upon an extremely good race of plants and keep them pure, they will certainly go on producing their like. It takes usually as many as six years before an improved strain of paddy could be produced by this process.

Varieties of paddies grown in various parts of the country are collected and grown here to give us an idea of their relative yielding-power under local conditions. This again affords us material for further selection work. There is yet another more interesting and absorbing line of work for effecting crop improvement. This method is known as 'hybridisation' or 'crossing', a method which holds out very great promise of future possibilities. Every mirasidar knows that if he wants to improve his breed of cattle, he should set about it by the crossing of local types with superior foreign breeds. He fully recognises for instance that it is impossible to raise the milk-yield of his cow above a certain limit, by feeding it with any amount of nutritious cattle fodder. The same fact holds good in regard to plants as well. Among paddy plants, as has been already pointed out, there are numerous varieties, the plants of each variety exhibiting definite characters. One variety is late and heavy yielding, while another is early maturing but low yielding. It may be asked how one variety of paddy may be crossed with another. It would be unnecessary for me to go into the details of this process here. There is a variety of paddy cultivated largely in the Tanjore Delta. This is the 'Korangu-samba' paddy which gives a very good yield in years in which it is free from the attack of fungal disease (paddy blast); but should the paddy be attacked by the disease, it is very badly affected and most of the grains get chaffy and sowers have to reap with regret a harvest of chaff. Another strain of paddy called 'Kichili-samba' (G.E.B. 24) appears to be rather resistant to the disease though not a very good yielder. To combine these two desirable characters of heavy yield and disease-resistance found in 'Korangu-samba' and 'Kichili-samba' respectively, a cross is made between the two types. When the progeny of the cross should be examined, we may get plants which are disease-resistant and high-yielding. It may thus be possible to produce a new type of 'Korangu-samba' which will be able to resist the disease. Work of this kind is laborious and slow, and it takes a long time (about ten years) before definite results are achieved.

Having, so far, dealt with facts relating to scientific work, let me now briefly describe what exactly has been done so far at the paddy breeding station here to improve the paddy crops of the Tanjore delta. This station was started in 1922 with the intention of increasing the outputs of paddy in the million acres of paddy-fields in the Tanjore delta. The soil at Aduturai is fairly representative of the delta soil, and improved strains of paddy reared on the station could be expected with certainty to do well anywhere in the delta tract. As a result of several years of work, seven improved strains of paddy have been distributed to the ryots and encouraging reports have been received from places where they have been tried. These strains are.

(i) Aduturai No. 1—(Red sirumani).—

This crop takes about six months from sowing to harvest and the seed of the station gives an increased yield of 16% over the ryots' sample of the same variety.

(ii) Aduturai No. 2—(White sirumani).

This is again an improved variety of white sirumani paddy and it gives an increased yield of 10% over the ryots' seed of the same variety.

(iii) Aduturai No. 3—This is a selected strain from Kuruvai taking only about 90 days to mature.

(iv) Aduturai No. 4—This is another improved Kuruvai variety giving 12% increase over the ryots' seed.

(v) Aduturai No. 5—This is a selected Nellore samba paddy which gives an increase of 25% (or 3 marakals per kalam) over the unselected variety.

(vi) Aduturai Nos. 6 and 7—These are selected ottadan varieties which give a 13% increase over the unselected ryots' crop.