

Practical Methods of Improving Paddy Yields

By

A. ABDUL SAMAD, B. A., B. SC. (Ag.),
Assistant Paddy Specialist A. R. S. Pattambi

An attempt is made in the following article to discuss some of the main aspects of crop improvement, with particular reference to paddy and the experience gained at the Aduthurai Agricultural Research Station.

Even after a superior strain or variety of crop plant is evolved, the plant breeder cannot rest in peace. The requirements of people and the agricultural conditions are continually changing and as such the plant breeder must be alert to the changing conditions. The strain itself may undergo natural changes and may deteriorate. Ordinarily, the complaints of deterioration from ryots are due to (1) seed admixture due to careless handling and (2) extension of cultivation of the strain to localities not suited to them. Rarely the deterioration is attributable to genetic causes, viz., segregation to inferior type. The admixture may take place in nurseries, transplant fields, threshing floors and seed store. If the deterioration is due to genetic causes, the breeder resorts to reselection to establish purity.

Agronomic Experiments: There is another important aspect of crop improvement, i. e., the agronomic practices which are responsible for increasing the yield. By the improvement of cultural practices in raising proper seed beds by adopting proper spacing between plants at planting time, by planting seedlings of the proper age, by judicious manuring of seed-beds and transplant fields and by harvesting at the proper time, the yield can be raised by as much as 20 to 25%, and this, combined with the growing of improved strains should enhance the yields, still further.

It was observed at the Agricultural Research Station, Aduthurai, that by sowing thin nurseries with a low seed rate, strong and sturdy seedlings are obtained, which when planted in singles or doubles with fairly close spacing, increases the yield, at the same time resulting in the saving of considerable quantity of seed. The cultivators in the Tanjore district even today use for sowing paddy, twice or even three times the quantity of seed actually needed for planting an acre. If the improved method of this sowing were to be adopted, there would be a saving as shown below, of 519 lakhs of pounds of seed to the value of Rs. 34/- lakhs per year, in the Tanjore district alone.

Season.	Seed used for planting one acre.				Excess seed used by the cultivators for planting one acre	
	on the farm. M. M.	lb.	Local cultivation M.M.	lbs.	M. M.	lb.
Kuruvai	15	37.5	48	108	33	82.5
Thaladi	8	20	24	60	16	40
Samba	8	20	18	45	10	25

It is estimated that out of 11.0 lakhs of acres under paddy in the Tanjore district, 2.5 lakhs are under double crops, i. e., 8.5 lakhs under Samba, 2.5 lakhs under Kuruvai and 2.5 lakhs under 'Thaladi'. The loss of paddy seed by waste in the nursery is:—

Kuruvai: 2.5 x 33 lakhs of M. M. = 82.5 lakhs of M. M. or 206.25 lakhs of lb.
 Thaladi: 2.5 x 16 do. = 40 do. or 100 do.
 Samba: 8.5 x 10 do. = 85 do. or 212.5 do.

The total loss works out to 207.5 lakhs Madras measures or approximately 519 lakhs of pounds of paddy seed. When valued at Rs. 3—12—0 per Kalam of 60 lb. of Kuruvai and Rs. 4/- per Kalam of Samba paddy, the value works out to Rs. 33,72,396 or Rs. 34,00,000 for the Tanjore district alone. Similarly, by adopting other improved cultural practices, it would be possible to solve the food problem to a very great extent.

The plant breeder's work is concerned with the changing of the characteristics of living plants and as such his work is different from that of a mechanic who can fit in new parts to his machine. The process of fitting in new characters into plants is both elaborate and time-consuming and it takes a long time before a strain can be evolved. The plant breeder must be continually at work because of ever-changing needs of society and also because the strain itself is liable for genetic changes and deterioration.

While the work is elaborate and time consuming, the results are not without adequate rewards. The evolution of 22 strains from the Agricultural Research Station, Aduthurai, far better in quality and yield than the local strains may be taken to have increased the paddy yield in the district by 10 to 25% and this is many times more than the money spent on the Agricultural Research Station. If the Agriculture of our country is to progress, our research stations should be helped to expand their scope of work, and scientifically-minded farmers must make it a point to be in constant touch with these research stations and translate the results observed in such stations, to large-scale practice in their own lands.

After all that is said and done, many persons still do not believe that much benefit has occurred from plant breeding work. They often compare the standard yields of crops per acre as published in the crop statistics of India with those of other countries to support their case. In the case of rice, for instance, the average acre yield in India which was 825 lb. in 1937-1938 is about 1/3 to 1/5 of yields reported from Spain, Italy and Japan. It is not fully realised, however, that India is a very large sub-continent, with a wide range of rainfall and climatic conditions, as compared to countries like Spain and Italy where high yields are reported from very much smaller areas. It is hardly legitimate to make such an unfair comparison between these countries and our Indian yields, as the variation in yields obtained in the different tracts of these small countries will not be appreciable and as such the average may be high. But in India the yields range from 300 lb. per acre in the dry areas to about 7000 lb. per acre in fertile deltaic lands, with the results that the average yield gets reduced considerably. Even in the West, the actual increase in yield as a result of plant-breeding is generally not higher than 20%. If Indian acre-yields are still low, the reasons have to be sought elsewhere. In certain areas of Madras where suitable conditions exist, it has been demonstrated by growing improved strains combined with intensive methods of culture, that the acre-yields could be increased to 3000 to 4000 lb. per acre, comparable to those obtained in Japan. The acre-yields recorded at the Agricultural Research Station, Aduthurai, are fairly high and yields between 4000 and 5000 lb. per acre in *Kuruvai* are not uncommon and the yield in the double crop is generally over 5000 lb. per acre as shown below :

Samba : Yields & Cost of Cultivation.

Season.	Acre yield in lb.	Cost of cultivation.			Receipts.			Profit.			Remarks.
		Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.	
1940/41	3191	21	13	7	100	12	0	78	14	5	
1941/42	1714	42	9	6	90	8	6	47	15	0	Severe rat-attack at flowering stage.
1942/43	2697	43	9	0	123	2	6	79	9	6	
1943/44	3374	52	3	9	145	6	4	93	2	7	
1944/45	1856	55	11	3	108	12	10	53	1	7	Severe rat damage.
1945/46	2085	82	8	9	139	4	2	56	11	5	do.
1946/47	2175	80	0	1	175	10	0	55	9	11	Bad season: yet profits high, due to rise in price of paddy and straw; Rs. 4 per 60 lb. of grain and straw at 80 lb. per Re.

A. Kuruvai & Thaladi: Yield Figures

Season	Acre yield in lb.			Remarks.
	Kuruvai	Thaladi	Total	
1940/41	3239	2419	5658	
1941/42	3408	1698	5106	Severe rat-damage at flowering stage.
1942/43	3011	2388	5399	
1943/44	2704	2497	5201	
1944/45	2708	2014	4722	Severe rat-damage in Thaladi.
1945/46	2855	1555	4410	do.
1946/47	3073	1844	4917	Bad season: yet profit high due to rise in price of paddy at Rs. 3-8-0 per kalam of Kuruvai and Rs. 4/- per kalam of Samba grain.

B. Kuruvai & Thaladi: Receipts and Expenditure.

Season	Cost of cultivation per acre			Receipts per acre.			Profit			
	Kuruvai.		Thaladi.	Total.	Kuruvai.		Thaladi.	Total.	per acre	
	Rs.	A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	
1940/41	40	5 3	25 12 0	66 1 3	100 11 0	93 7 0	194 2 0	128 0 9		
1941/42	46	9 10	32 12 9	79 6 7	139 0 9	92 2 6	231 3 3	151 12 8		
1942/43	41	11 1	39 3 0	80 14 1	131 1 3	118 4 0	249 5 3	168 7 2		
1943/44	49	11 3	51 0 6	109 11 9	137 1 9	131 10 7	268 12 4	168 0 7		
1944/45	47	10 0	33 8 9	81 2 8	122 4 0	73 15 1	196 3 1	115 0 4		
1945/46	64	11 1	54 2 5	118 13 6	183 2 1	82 0 9	265 2 10	146 5 4		
1946/47	97	14 11	62 14 0	160 12 11	207 6 3	141 5 11	348 12 2	187 15 3		

The above yield figures show that yields obtained at Aduthurai farm can well be compared with those of other countries in the world; and the economics of cultivation given above must surely dispel the misconception of some of us, who think that Government farms are spending much more towards raising crops than can be justified by the yields obtained from them.

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