

The Improvement of Paddy Yields in Ceylon

BY

D. RHIND

THE official estimates of the yields of paddy in Ceylon is only 13 bushels per acre (*vide* page 68 of this number). While there is doubt as to the reliance which can be placed on this very low figure there is no doubt that yields are generally much below what they need be. The standard of cultivation nearly everywhere is depressingly low. For many years before the war cheap imported rice from Burma and Siam so depressed the internal paddy market that there was scarcely any margin of profit in paddy growing at the low yields which traditional field practices entailed. There was no monetary incentive to do better and no urgency. Today prices are four to six times as high and there is also a guaranteed minimum price of Rs. 8 per bushel of paddy. The profit motive is therefore strong at present but amongst villagers there persists a notion that nothing can be done to increase yields; at least nothing which is within their reach and at the same time profitable to apply. Another deterrent in the form of malaria has also been very largely eliminated and is no longer a limiting factor. Feeling confident that much greater yields could be obtained by methods which enabled weed control to be effective and which decreased the risks inherent in broadcast crops, a series of village demonstration plots was initiated by the Agricultural Department in *Yala* 1948 and *Maha* 1948-49. These plots took the form of small practical demonstrations, on cultivators' own fields, of methods judged likely to be effective in raising yields and within the reach of small farmers. Particular stress was laid on transplanting. This paper records briefly the results obtained from these demonstration plots compared to the yields from neighbouring, untreated fields. The figures are sometimes actual weighings but in others are estimates made by eye. They cannot therefore be regarded as having a high degree of exactitude but they are considered sufficiently reliable to indicate the kind of response to improved cultural practices which can be expected in Ceylon.

RESULTS OF THE DEMONSTRATIONS

Yala 1948

Range officers were rather unfamiliar with the methods it was intended to demonstrate and particularly so regarding transplanting about which some fantastic ideas as to its cost and laboriousness were widely held. Nevertheless a number of demonstration plots were laid down, the most important practices being transplanting alone or combined with manuring. There were 35 demonstrations of transplanting alone (23 in South-Central Division). These gave an average yield of 41.3 bushels per acre on the demonstration plots compared to 19.5 bushels per acre on the neighbouring broadcast fields, an increase of 111.9 per cent. Because the South-Central plots were mostly in areas where the standard of cultivation was lower than elsewhere it is best to consider them separately. When this is done the South-Central

Division demonstrations showed an average yield of transplanted plots of 44.5 bushels per acre compared to 17.0 bushels from neighbouring plots, an increase of 161 per cent. The rest of the demonstrations of transplanting alone gave an average yield of 35.4 bushels compared to neighbouring fields sown broadcast of 24.4 bushels per acre, an increase of 46.1 per cent.

These are satisfactory gains particularly if it is remembered that those doing the demonstrations were largely unfamiliar with this kind of work and the labour which had to be employed was likewise inexperienced and unhardy. The season was also not a very favourable one. The average *increase* in the South-Central Division was 27.4 bushels per acre, to which an average saving of seed amounting to 4 bushels per acre must be added, a total increase in available paddy of 31.4 bushels per acre, worth Rs. 251.20 at the minimum controlled price of Rs. 8 per bushel, but worth Rs. 376.80 at the then prevailing price of Rs. 12 per bushel. For the other demonstrations the cash value of the gain was Rs. 174.40 per acre.

Demonstrations of transplanting combined with manuring (some green manure, some artificials) numbered only 12. They gave increases of from 34.7 to 51.7 bushels of paddy per acre, an average increase of 49 per cent. Comparing all demonstrations involving transplanting with all others not involving transplanting there was an average increase of 68.3 per cent. in favour of transplanting. Thus, while substantial improvements are possible by methods other than transplanting, such as harrowing the standing broadcast crop, manuring, weeding, selected seed, &c., the added advantage of transplanting was very large.

Since transplanting cannot be done everywhere the improvements to be had from other methods must not be neglected. There were 14 demonstrations of the use of improved mould-board ploughs followed by harrowing the standing crop when it was about three weeks old. The treated plots gave an average yield of 32.5 bushels per acre compared to the untreated plots at 19.8 bushels, a gain of 64.1 per cent. Fields ploughed and green manured gave an average increase of 5.5 bushels per acre, or 34.8 per cent., worth Rs. 44 at the minimum price. These practices are easily within the capacity of any farmer. Too much should not be deduced from these preliminary demonstrations but they serve to indicate the large improvements which are possible.

Maha 1948-49

A considerably larger number of village demonstration plots were laid down in the North-East monsoon season of 1948-49. The combinations of treatments varied so much that broad grouping has been necessary to derive the essential information on the principle treatments. These show quite clearly the improvements in yields which certain cultural methods confer, though it is not justifiable to deduce too much regarding the probable magnitude of the response from the arithmetic mean differences because of the widely varying conditions and levels of cultural efficiency in different localities. The purpose of this note is not so much to assess the probable degree of benefit from any particular practice which has been demonstrated as to emphasise the overall improvement which is possible in the general average of rice yields in Ceylon.

Table I gives the results of 534 demonstration plots after broadly grouping the treatments for ease of presentation.

TABLE 1

Results of Village Demonstration Plots in Maha 1948-49

Division	No. of Demon- strations	Control		Transplanting		Other Cultural Methods		Manuring		Transplanting and Other Cultural Methods		Transplanting and Manuring		Other Cultural Methods and Manuring		Transplanting and Other Cultural Methods and Manuring	
		Bushels per acre	Per cent. increase	Bushels per acre	Per cent. increase	Bushels per acre	Per cent. increase	Bushels per acre	Per cent. increase	Bushels per acre	Per cent. increase	Bushels per acre	Per cent. increase	Bushels per acre	Per cent. increase	Bushels per acre	Per cent. increase
South-Central	234	27.75	52.5	89.2													
Central	102	12	14.8	20.5	38.5	25.7	60.6	28.1	37.7	42.6	59.0	31.9	75.3	35.8	55.7	46.8	66.0
		19	16.0														
		15	20.4														
		9	26.8														
		8	18.2														
		13	23.0														
South-Eastern	86	27	28.2														
		26	17.0	28.0	65.3	42.2	71.6	33.0	106.2	23.8	37.6			37.1	81.0	71.5	142.4
		3	24.6														
		1	16.0														
		32	17.3														
		22	20.4														
South-Western	62	2	29.5														
		37	31.5	50.1	59.0	24.6	14.4										
North-Western	36	25	21.5														
		9	30.6	55.1	80.0	48.7	20.2			34.0	74.4					40.5	46.7
		3	37.7														
		2	19.5														
Vavuniya	9	22	27.6														
		2	21.2	60.5	185.4					59.5	78.7						
		4	33.3														
		2	28.7														
Eastern	4	1	20.0											28.0	40.0		
		3	23.7	52.0	85.7	29.3	23.6										

There were actually many more demonstration plots laid down than the 534 here reported but owing to long delay in threshing, following the common practice of stacking for a considerable period after reaping, not all results have been reported. It is, however, necessary to present a general picture of the possibilities in order to plan future demonstration programmes.

Transplanting alone and in combination with other cultural treatments provides the greatest volume of data, particularly from the South-Central Division where a concentrated drive to introduce this practice has been launched. The weighted mean yield of the transplanted plots in the South-Central Division is 52.5 bushels per acre against an estimated average yield of neighbouring plots of 27.75 bushels, an increase of 89.2 per cent. without counting the amount of seed saved by transplanting. This increase of 24.75 bushels of paddy represents a value of Rs. 297 at the current local price of Rs. 12 per bushel. To this the saving of about 4 bushels of seed must be added, a gross gain of Rs. 345 per acre. Allowing for as many as 10 women-days for the work of transplanting and 2 man-days for accessory work, the extra cost would be unlikely to exceed Rs. 20 per acre. Large responses were also recorded to transplanting in all other Divisions, the increases varying from 38.5 to 185.4 per cent. Failures were very few and were all due to understandable causes such as the use of seedlings which were too old, floods or drought.

The benefits from other cultural practices were also marked. These practices included harrowing the standing broadcast crop when about three weeks old, the use of improved ploughs and harrows, clean weeding, &c. The increases ranged from 14.4 to 71.6 per cent. over the controls. Manuring alone was adequately tested only in the Central Division where it gave an average increase of 37.7 per cent. This corresponds with the results previously obtained on many test plots in Ceylon. When transplanting was combined with other improved cultural practices and the use of manures the results were roughly cumulative in the Central and South-Eastern Divisions, the highest recorded average yields of 46.8 and 71.5 bushels per acre being from these treatments.

The overall picture of this series of small demonstration plots shows that very substantial improvements in yields are possible by methods which require no elaborate or expensive appliances and which are within reach of the small farmer. The need is to induce the small farmer to adopt such changes in his traditional practices as are necessary. With the slight data available it would be wrong to attempt to reach any extrapolated estimate of the possible average yield of Ceylon, but it may be noted that the crude average yield of the untreated plots in this series was 24 bushels per acre and of the treated plots (all treatments) 40 bushels per acre.

ACKNOWLEDGEMENTS

My acknowledgement are due to many members of the Agricultural Department who have carried out the demonstrations and whose data I have utilized. For the summarizing of the data I am indebted to Dr. Chandraratna, Botanist and Senior Agricultural Research Officer.

Ceylon Paddy Statistics

(Furnished by the Director of Census and Statistics, Colombo)

Season Year	Extents sown (Acres)	Yields—Paddy			Rice available for consumption Metric Tons*
		Bushels	Long Tons	Metric Tons	
Maha, 1943-44	680,919	9,119,013	182,380	185,275	107,088
Yala, 1944	349,313	4,447,192	88,944	90,356	52,226
Total 1944	1,030,232	13,566,205	271,324	275,631	159,314
Maha, 1944-45	633,563	7,900,411	158,008	160,516	92,778
Yala, 1945	262,097	2,900,059	58,001	58,922	34,057
Total 1945	895,660	10,800,470	216,009	219,438	126,835
Maha, 1945-46	610,070	7,847,668	156,953	159,444	92,159
Yala, 1946	317,008	3,502,851	70,057	71,169	41,135
Total 1946	927,078	11,350,519	227,010	230,613	133,294
Maha, 1946-47	616,507	8,013,348	160,267	162,811	94,105
Yala, 1947	310,176	3,506,982	70,140	71,253	41,184
Total 1947	926,683	11,520,330	230,407	234,064	135,289
Maha, 1947-48†	616,507	8,013,348	160,267	162,811	94,105
Yala, 1948†	343,055	4,344,562	86,891	88,270	51,020
Total 1948	959,562	12,357,910	247,158	251,081	145,125
Maha, 1948-49‡	624,745	8,321,427	166,429	169,071	97,724
Yala, 1949†	342,842	4,323,826	86,476	87,849	50,776
Total 1949	967,587	12,645,253	252,905	256,920	148,500

* Total production of paddy (less 15 per cent. seed allowance) converted into rice. Extraction rate 68 per cent.

† Estimates.

‡ Provincial.

EXPLANATORY

The figures for 1943 to 1947 were collected under the Internal Purchase Scheme. The figures from 1948 onwards are based on returns furnished by the D. R. OO to the Director of Census and Statistics. During the operation of the Internal Purchase Scheme, there has been a tendency to under-assess extents sown and yields. This tendency still appears to continue.