AGRARIAN RESEARCH & TRAINING INSTITUTE

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COST OF PRODUCTION OF PADDY YALA 1972

A STUDY BASED ON RECORD KEEPING

FARMERS IN FIVE SELECTED DISTRICTS

by

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STUDY NO: 1

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SRI LANKA

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INTRODUCTION

There is a dearth of data on cost of production of most of the important food crops cultivated by the peasants. Lack of such data in the past was not considered as an impediment by extension workers as cultivation of food crops in the peasant sector was undertaken mainly for home consumption. However, with the recent restrictions placed on the import of foodstuffs, peasants no longer confine their farming activities only to producing their food requirements. Restrictions placed on the import of many foodstuffs have helped to activate the peasants to increase their output of many of the traditional food crops both by adopting more intensive cultivation practices as well as by extending the area under food crops. Consequently, the task of the extension workers in advising farmers has become more difficult in the absence of basic and detailed data of the actual production costs and returns. Besides, collection of cost of production data of paddy has become very essential as prices of farm inputs have risen sharply during the last few years, whilst the guaranteed price of paddy had remained unchanged until very recently.

Object of Study

1. To ascertain the extent of labour, animal/tractor power and other input applications in paddy production.

2. To ascertain the operationwise labour distribution in paddy production in order to find possibilities of more intensive utilization of family labour.

3. To ascertain the cost of cultivation per acre and cost of production per bushel of paddy in a number of districts that are located in different agro-climatic zones, so that the districtwise variations of the costs per acre and per bushel of paddy could be found.

4. To provide initial training to extension officers in farm record-keeping work and to supply them with basic input and output data that would be useful to them in economic farm planning which would include farm budgeting etc.

Method of Study

As a preliminary step to collect cost data, the Production Economics Unit of the Agrarian Research & Training Institute in association with the Extension Division of the Department of Agriculture, undertook a study of cost of production of paddy and a few other crops in 1972, Yala, season in the Districts of

Hambantota, Polonnaruwa, Kurunegala, Kandy and Colombo, using a farm record book prepared by the Production Economics Unit. Since the use of farm record books in cost of production studies in peasant farms is a new approach in Sri Lanka and as the Institute did not possess any Investigators at the time, this study was initiated more in the nature of a pilot project with the assistance of Agricultural Instructors in the above districts. Without using a record book, details of field operations conducted by farmers throughout a cultivation season cannot be ascertained accurately, as the 'recall' lapse among farmers is high. Thus a supervised farm record-keeping programme was conducted to collect detailed information. In view of the very nature of the record-keeping involved and lack of staff at the time, this project naturally had to be confined to a relatively smaller number of farms in each district selected on the following basis:

1. Proximity of farms to Agricultural Extension Centres so that the Extension Officer concerned could contact the selected farmers frequently without allowing his normal work to suffer. In this study each of the record-keeping farmers was visited by the Extension Officer of the area at least twice a week throughout the cultivation season, for entering the relevant record books regularly.

2. Willingness of the farmers to co-operate on a project of this nature by providing relevant information on paddy production right through the season to Extension Staff on their visits

In all the five districts, a series of training classes were conducted on farm record-keeping, primarily for the benefit of agricultural extension staff who were called upon to handle a programme of this nature for the first time. At these classes, the procedure with regard to costing of various input items was explained in detail. With a view to getting relevant entries recorded as accurately as possible, this work was entrusted only to Agricultural Instructors and accordingly Village level Extension Workers were not brought into this programme. During the cultivation season, the authors visited each of the districts regularly and supervised the progress of record-keeping work undertaken by the extension staff. On these visits, discussions were held both with the extension staff as well as with individual record-keeping farmers and necessary guidance was given.

Limitations of Study

As stated earlier, owing to the nature of record-keeping involved throughout the cultivation season, restrictions had to be placed in the initial selection of record-keeping farmers. Thus, the data obtained from these farm records would no doubt have some bias. Still such information could profitably be used as the preliminary data for farm budgeting and planning work and efficiency measurement studies in resource utilization in different sized holdings, particularly by Extension Officers in their advisory work. Such data would also be useful to them when dealing with problems of increasing family farm earnings.

This study was never intended to ascertain the average cost of production of a bushel of paddy on a country-wide basis, nor was it envisaged that it would provide adequate data for pricing policy decisions. It is our view that the data assembled in this study would prove primarily useful to extension staff, but at the same time, the information would prove useful even to policy makers, within certain limitations.

Costing procedure

In costing the various items, the following procedure was adopted:

I. LABOUR

(a) Hired - the actual hiring charges incurred by the farmers were used in compiling cost of hired labour. Besides the cost of food and drinks supplied to such labour was estimated in consultation with record-keeping farmers and added on to the actual money payments.

(b) Attan - In the case of Attan (exchange) labour used, the prevailing labour rates in the respective areas was used in estimating costs. In this instance too, the value of food supplied to such labour was estimated and added on to costs.

(c) Family - In costing family labour, the principle of opportunity cost was not used. In fact the opportunity cost of family labour in rural areas in Sri Lanka is almost zero. The family labour used was costed using the same wage rates paid to hired workers by the farmers concerned. However, the value of the food consumed by family labour was not accounted in costing, as expenses on food is incurred by family labour whether such labour was engaged on paddy cultivation or not.

II. BUFFALOES

In the case of buffaloes hired, the actual payment made in hiring buffaloes was used in computing costs. In instances where the farmers' own buffaloes have been used, the local rate for hiring buffaloes was used in costing.

III. TRACTORS

In instances where tractors were hired, the actual payments made were used as costs. Where the farmer's own tractor was used, the local hiring charges were used in arriving at costs of services provided by the tractor.

IV. MATERIALS USED

In the case of materials used such as seed paddy, fertilizer, chemicals and gunny bags, etc., the purchase price was used, whether the supplies were provided by the farmer or the land owner.

V. LAND RENT

Land rent was included as costs depending on the share-cropping pattern prevailing in the area, in the case of tenant farmers. Similarly where acreage taxes have been paid, such expenditure was included in costs.

VI. PAYMENTS IN KIND

Where payments were made in kind to labourers, tractor owners, land owners, etc., the cost was computed on the basis of the guaranteed price of paddy.

VII. TRANSPORT

The cost of transport of inputs to the farms as well as produce from the farms has been included in the computation.

Particulars of Farm Record Books Maintained and the Number of Records used for Tabulation are given below:

	No. of record books maintained by Extension Officers	No. of record books available for tabulation at ARTI
Hambantota	11	9
Polonnaruwa	16	16
Kurunegala	18	14
K a n d y	24	24
Colombo	22	22
	91	85

SUMMARY

Eighty five record books were maintained to collect data on Cost of Production of paddy during Yala, 1972, season, in five districts. In view of the restrictions placed in the initial selection of record-keeping farmers, it is not intended to draw general conclusions from the data assembled in this report.

The average area sown by record-keeping farmers was highest in Polonnaruwa and lowest in Kandy. Yields were also highest in Polonnaruwa. The amount of labour utilised per acre appears to have a relationship with yields obtained in the different districts. The number of tractor days used per acre in dry zone districts was substantially greater than in the wet zone. On the other hand, in wet zone districts more buffalo days had been used per acre. In dry zone districts, the use of buffalo power has decreased considerably during the last decade due to many reasons. In all the five districts the ratio of hired labour used was considerably high, and it has varied from 63 percent in Kandy to 85 percent in Polonnaruwa. Employment of Attan (exchange) labour was negligible in all districts.

The Cost of Production per acre has varied widely in the five districts. It was highest in Polonnaruwa (Rs.733.05) and the lowest in Hambantota, being only (Rs.532.19). Labour Costs constituted the largest single item of expenditure which varied from 51 percent in Hambantota to 69 percent in Kandy. The resource use patterns in different districts showed marked differences. In the two high yielding districts of Polonnaruwa and Kandy, the number of man-days used per acre had varied substantially. In Kandy, 25 more man-days had been used than in Polonnaruwa, primarily due to use of more family labour. In contrast, Polonnaruwa farmers had used exactly double the number of tractor days used in Kandy. Though the profit margins per acre obtained by farmers in these two districts were almost equivalent, in Kandy, family farm earnings per acre were higher than in Polonnaruwa, due to more intensive use of family labour.

With regard to cultural practices adopted both in Polonnaruwa and Hambantota, all the record-keeping farmers had applied fertilizer, but the quantity applied even in a very high yielding district such as Polonnaruwa had been less than the recommended dosage. Kurunegala had the lowest fertilizer consumption. Direct sowing had been the common cultural practice adopted, except in Kandy where over 90 per cent of the record keeping farmers had transplanted their crops. In all the five districts, fertilizer had been the most expensive item of input used.

The Cost of Production of a bushel of paddy had varied from Rs.9.67 in Polonnaruwa to Rs.14.43 in Hambantota. As expected it had a direct relationship with yields per acre. An inter-district

cost function was derived using the Cost per bushel and the yield of paddy per acre in the five districts, as indicated below:

$$C = 17.929 - 0.112Y$$

$$(0.023) \quad (r^2 = 0.891)$$

This function was used to estimate the cost per bushel corresponding to a given yield and it was found that the difference between the estimated cost and the actual cost from record books in each of the five districts was quite small. In Yala, 1972, the Cost of Production of a bushel of paddy amounted to Rs.14.00 when the yield per acre was 35 bushels.

Family farm earnings were also estimated on the assumption that all record keeping farmers were tenants. Generally tenants pay 25 percent of the harvested crop as land rent to land owners in dry zone districts. In most of the wet zone districts, land rent is fifty percent of the harvested crop. On this basis, when land rent was added on to other farm expenses, it was found that family farm earnings were negative in all districts, except in Polonnaruwa. This tendency, pin-points the urgency of taking meaningful steps to regulate tenancy and rents.

Analysis of labour distribution, ~~as~~ operationwise revealed that the intensity of labour use was extremely high in two peak periods, viz: (a) land preparation and planting (b) harvesting and threshing. The aggregate of the two ratios of labour used for land preparation and harvesting to total labour used had varied from 76 percent in Kurunegala to 83 percent in Kandy. A superficial look at the labour distribution in paddy production shows a pattern similar to that of the developed countries. However, the yields per unit area in Sir Lanka is far below that of the developed countries. In Sri Lanka, the technology adopted in paddy production is based mostly on imported inputs, and consequently in a situation when import of inputs are restricted owing to non-availability of sufficient foreign exchange, the problem of sustaining the productivity of paddy lands at a reasonably high level arises. Thus, from the point of view of the individual farmer, the adoption of a system of paddy cultivation where family labour and other domestic inputs are used to the full, is of paramount importance to achieve increased family farm earnings. Such an attitude will also help to revitalise the paddy sector of this country.

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1. USE OF MANUAL LABOUR, BUFFALOES AND TRACTORS

Prior to the estimation of the number of days worked by manual labour, buffaloes and tractors per acre, the average size of Yala paddy holdings and the average yield of paddy per acre in bushels in respect of record-keeping farmers were calculated (Table I-1). The average acreage under 1972 Yala paddy of the record-keeping farmers was highest in Polonnaruwa and lowest in Kandy. Highest yields per acre were also found among the Polonnaruwa farmers whilst yields were lowest in Hambantota.

Table I-1 Farm size and yield per acre, 1972, Yala

	No.of record keeping farms used for tabulation	Average area sown per farm acres	Amount of Yala Paddy harvested per farm bushels	Average Yield per acre bushels
Hambantota	9	2.88	106.1	36.9
Polonnaruwa	16	4.09	310.0	75.8
Kurunegala	14	3.54	176.5	49.9
K a n d y	24	1.31	93.8	71.7
Colombo	22	1.44	66.4	46.1

Though the five districts selected for this study differ in terms of agro-climatic conditions, the following tendency was observed in all the districts irrespective of climatic variations (Table I-2). Generally the districts with higher yields per acre had also utilized more labour per acre, than the districts with lower acre yields. The amount of labour utilized per acre appears to show a relationship with yields obtained by record-keeping farmers.

Table I-2 No.of days worked - Manual Labour - Buffaloes and Tractors

	No. of days worked by manual labour per acre 1/				Buffalo days per acre 2/	Tractor days per acre 2/	Yield per acre of Paddy bushels
	Hired Labour	Attan Labour	Family Labour	Total			
Hambantota	30.7	1.0	8.9	40.6	0.6	2.0	36.9
Polonnaruwa	57.9	0.1	10.0	68.0	3.4	1.2	75.8
Kurunegala	54.4	1.8	8.2	64.4	2.7	0.9	49.9
K a n d y	58.8	6.1	28.2	93.1	5.9	0.6	71.7
Colombo	37.7	1.3	16.3	55.3	6.0	0.6	46.1

Note: 1/ Includes the number of days worked by both buffalo and tractor drivers, i.e. hired, attan or family labour.

Note: 2/ Includes the number of days spent for threshing of paddy and land preparation.

The number of tractor days used per acre by record-keeping farmers in Hambantota and Polonnaruwa was substantially greater than the number used in the other three districts. Hambantota farmers had utilized the highest number of tractor days which was almost double the number used in Polonnaruwa. This was partly due to the fact that in Hambantota two-wheel tractors were widely used by farmers, whilst in Polonnaruwa four-wheel tractors were more popular. The number of tractor days used per acre does not show any direct relationship with the average area sown per farmer in the dry zone districts. On the other hand the number of buffalo days used in Hambantota was the lowest among the five districts. It was only 0.6 days per acre, in comparison with 3.4 days in Polonnaruwa and 2.7 days in Kurunegala, where the average area sown per farm had also been greater than in Hambantota (Table 1-1). The above data (Table 1-2) also points to the fact that in Hambantota, most of the field preparation and threshing had been done with tractors, whereas in Polonnaruwa and Kurunegala both tractors and buffaloes appear to have been used for tillage and threshing operations. In the wet zone districts of Kandy and Colombo, the number of buffalo days used per acre had been twice as much as the number used in dry zone districts.

Generally, in many of the dry zone districts due to large scale encroachments on forests, scrub lands and channel reservations, the question of finding adequate grazing for animals particularly in Yala season when water too is scarce, has become an acute problem for paddy farmers. Consequently, the buffalo population in many of the dry zone districts had diminished over the years. Another factor that has aggravated this situation, was the subsidised tractor hiring services provided by the Department of Agriculture with a network of tractor units established in most parts of the dry zone, during the nineteen fiftees. Besides, policies adopted in the past in respect of import of tractors and ancilliary equipment at over-valued exchange rates also had given an opportunity to landlords and merchants to provide tractor services to farmers at very competitive rates, thus displacing the buffalo from many paddy fields in most parts of the dry zone. Hambantota is a case in point.

Table 1-3 Labour Ratio of hired and family labour to total labour

District	Hired labour % of total labour	Family and Attan labour % of total labour	Total
Hambantota	75.6	24.4	100.0
Polonnaruwa	85.1	14.9	100.0
Kurunegala	85.5	14.5	100.0
K a n d y	63.2	36.8	100.0
Colombo	68.2	31.8	100.0

The amount of hired labour employed was as high as 85 percent of the total labour inputs both in Polonnaruwa and Hambantota (Table 1-3). Even in Kandy, where small sized holdings are common, the ratio of hired labour used was more than 60 percent. Some of the important reasons for the high percentage of hired labour to total labour used, especially in the dry zone could be summarised as follows:

1. Heavy dependence by farmers on machinery for land preparation and threshing which is mostly owned by landlords and merchants. This in turn has increased the hired labour component in the total labour used per acre.

2. The rapid spread of the variety H-4 during the early 1960s throughout the dry zone was also a contributory factor for extensive use of hired labour. H-4 being highly resistant to shedding of grain, has made the farmers to switch on to tractor threshing on a large scale thus displacing the buffalo from many threshing floors. Besides, the tendency of this variety to lodge rather heavily even under moderate fertilizer dressings, necessitates quick harvesting of paddy crops. In the case of traditional varieties too, lodging of paddy crops is a major problem. Heavy lodging of crops too has contributed to employment of more hired labour for harvesting.

3. The traditional practice of using attan (exchange) labour in rural areas has gradually declined over the years. Even in wet zone districts such as Kandy, the amount of attan labour used was very small (Table I-2). In the dry zone districts the amount of attan labour used was negligible. Thus the assumptions made by some of the earlier research workers on the use of attan labour do not appear to be valid altogether at present.

4. Weeding and other inter-cultivation operations such as spraying had been practiced on a very limited scale by record-keeping farmers. Even where these operations had been practiced, most of the work had been done by hired workers and very little family labour had been used except in the case of cultivators with very small holdings.

5. The low density of population, relatively large sized holdings and limited time available for cultivation operations in the dry zone compells the farmer to engage migrant labour from other areas as family labour is unable to cope with peak season labour demands.

6. The expansion of educational facilities in rural areas during the last two decades had induced many of the rural youth with secondary schooling to drift from farming pursuits to urban areas, thus compelling farmers to depend more and more on hired labour.

II. COST OF PRODUCTION PER ACRE

In estimating the cost of production per acre, we have assumed that all record keeping farmers as owner operators, since only a few tenant farmers had got included in the study. Accordingly, classification of cost of production on the basis of owner cultivators and tenants was not attempted, as it was considered that such an analysis would not have much significance.

Table II-1 Cost of Production per acre in Rupees

	Labour				Buffalo days	Tractor days	Materials used	Total cost per Acre
	Hired labour	Attan labour	Family labour	Total labour				
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
Hambantota	230.40	4.41	37.42	272.23	5.44	118.33	136.19	532.19
(%)	(43.3)	(0.8)	(7.0)	(51.1)	(1.0)	(22.2)	(25.7)	(100.0)
Polonnaruwa	352.03	0.86	50.16	403.05	34.32	150.07	145.61	733.05
(%)	(48.0)	(0.1)	(6.8)	(54.9)	(4.7)	(20.5)	(19.9)	(100.0)
Kurunegala	356.58	10.02	37.71	404.31	23.80	98.03	104.43	630.57
(%)	(56.5)	(1.6)	(6.0)	(64.1)	(3.8)	(15.5)	(16.6)	(100.0)
K a n d y	332.57	42.61	108.04	483.22	61.33	50.85	106.81	702.21
(%)	(47.4)	(6.1)	(15.4)	(68.9)	(8.7)	(7.2)	(15.2)	(100.0)
Colombo	242.89	11.67	67.60	322.16	40.21	58.49	115.00	535.86
(%)	(45.3)	(2.2)	(12.6)	(60.1)	(7.5)	(10.9)	(21.5)	(100.0)

The cost of production per acre was highest in Polonnaruwa, where per acre yields were also highest, whilst in Hambantota the cost of production as well as the yields per acre were lowest. The data given in Tables II-1 and 1-1 reveals that in all the five districts, the total cost per acre has moved in the same direction as the acre yields. Labour costs constituted the largest single item of expenditure, which varied from 51 percent in Hambantota to 69 percent in Kandy. Comparison of cost of production in the two high yielding districts of Polonnaruwa and Kandy, where the agro-climatic as well as the socio-economic conditions of farmers differ markedly, showed differences in the patterns of resource use among the record-keeping farmers.

In Kandy, as pointed out earlier (Table 1-2), total man-days used per acre was highest, being 25 days more than in Polonnaruwa. The higher total labour input in Kandy was primarily due to use of more family and'Attan'labour. However, the cost of labour used per acre in Kandy was only 14 percent more than in Polonnaruwa(Table II-1).

In contrast, the number of tractor days used per acre in Polonnaruwa was exactly double the number used in Kandy, but the cost of tractor days used was only 13 percent more than in Kandy. It is thought that due to variations in the wage rates as well as tractor

hire charges in the two districts, the cost of these input items used per acre have not varied to the same degree as the amounts of inputs have varied. The yield differences in the two districts was rather negligible; Polonnaruwa yields being only four bushels higher than in Kandy (Table I-1)

Table II-2 Profit Margin and Family Farm Earnings per acre (Rupees)

	Total Value of Paddy harvested per acre (A)	Total cost per acre (B)	Profit margin per acre (C)	Estimated Value of Attan and Family labour per acre (D)	Family Farm Earnings per acre (E)
Hambantota	516.60	532.19	- 15.59	41.83	26.24
Polonnaruwa	1,061.20	733.05	328.15	51.02	379.17
Kurunegala	698.60	630.57	68.03	47.73	115.76
K a n d y	1,003.80	702.21	301.59	150.65	452.24
Colombo	645.40	538.86	106.54	79.27	185.81

Note: 1. Profit margin per acre = (A) - (B)
2. Estimated Value of Attan and Family labour in this table was transferred from Table II-1.
3. Family farm earnings per acre (E) = (C) + (D)

The costs of seed paddy, fertilizer, agro-chemicals and other miscellaneous inputs per acre, were also calculated from the record-books.

The profit margins per acre obtained by record-keeping farmers in these two districts were almost equivalent (Table II-2). But in Kandy, since the farmers had used family labour more intensively, family farm earnings per acre obtained by them were relatively higher than those earned by Polonnaruwa farmers. In Hambantota profit margin per acre was negative, mainly due to the adverse weather conditions experienced during the season which resulted in very low yields. In Kurunegala and Colombo too, the proift margins were small, due to relatively low yields obtained.

Table II-3 Cultural practices adopted by Record-keeping farmers in the five districts

	No.of record-keeping farmers tabulated	No.of farmers who practiced		No.of farmers who did not apply	
		Direct Sowing	Trans-planting	Ferti-lizer	Agro-chemicals
Hambantota	9	8	1	-	-
Polonnaruwa	16	12	4	-	6
Kurunegala	14	10	4	4	3
K a n d y	24	2	22	2	5
Colombo	22	19	3	1	5

With regard to cultural practices adopted (Table II-3) it is seen that both in Polonnaruwa and Hambantota, all the record-keeping farmers had applied fertilizer. However, in both these districts the amount of fertilizer applied per acre had been less than the quantity recommended. Kurunegala had the lowest fertilizer consumption among record-keeping farmers, the quantities applied per acre were far below the recommended dosage, even if account is not taken of the fact that four out of the fourteen record-keeping farmers had not used any fertilizer. It is desirable for extension officers in this district to bear this fact in mind and to intensify efforts to raise the fertilizer consumption level gradually. Direct sowing had been the most common cultivation practice adopted in all districts, except in Kandy where over 90 percent of the record-keeping farmers had transplanted their crops.

Table II-4 Cost Components of Input Materials per acre in Rupees

	Seed Paddy	Fertilizer	Agro-chemicals	Miscellaneous	Total
Hambantota	40.97	53.61	30.11	11.50	136.19
Polonnaruwa	32.16	65.61	27.85	19.99	145.61
Kurunegala	28.77	37.14	15.56	22.96	104.43
K a n d y	21.26	51.04	16.04	18.47	106.81
Colombo	27.08	52.39	11.14	24.39	115.00

The average cost of input items used in the five districts had varied depending on the cultural practices adopted (Table II-4). In all the five districts, fertilizer had been the most expensive item of input used, followed by seed paddy. The average cost of the fertilizer applied per acre had been substantially less than the cost of the recommended dosage, except in Polonnaruwa. Even in this district the average cost of fertilizer applied per acre had been less than the cost of the recommended dosage. 1/

In respect of seed paddy too, the average costs per acre have varied greatly in the different districts depending on the method of planting adopted. In Kandy, where transplanting was widely adopted cost on seed was lowest. In Hambantota, the cost of seed paddy had been unusually high, as some of the record-keeping farmers had re-sown their fields due to severe drought that prevailed during the Yala season. With regard to use of agro-chemicals, the expenditure incurred by farmers in Hambantota and Polonnaruwa was considerably greater than those in the wet zone districts. Table II-4 indicates that the farmers in dry zone districts incur relatively more expenditure on input materials per acre than those in the wet zone.

1/ The cost of the recommended dosage of fertilizer for paddy in Polonnaruwa district is Rs.80.00 per acre.

III. COST OF PRODUCTION PER BUSHEL AND INTER-DISTRICT COST - YIELD RELATIONSHIP

Cost of Production of a bushel of paddy was calculated from the cost of production per acre given in Table II-1. As expected it also indicates a direct relationship with corresponding yields per acre.

Table III-1 Cost of Production per Bushel of Paddy, in Rupees, Yala, 1972

	Labour	Buffaloes	Tractors	Input Materials	Total cost per bushel	Yield per acre bushels
Hambantota	17.38	0.15	3.21	3.69	14.43	36.9
Polonnaruwa	5.32	0.45	1.98	1.92	9.67	75.8
Kurunegala	8.10	0.48	1.96	2.09	12.64	49.9
K a n d y	6.74	0.86	0.71	1.49	9.80	71.7
Colombo	6.99	0.87	1.27	2.50	11.68	46.1

Cost of Production of a bushel of paddy in respect of record-keeping farmers in each of the five districts is given in Table III-1. According to this table it was highest in Hambantota and lowest in Polonnaruwa.

The Cost per bushel produced by farmers in Kandy was almost the same as those in Polonnaruwa. The fact that the cost of labour for producing a bushel of paddy by farmers in Kandy was smaller than in the other districts except in Polonnaruwa, was note-worthy because (as indicated in Table II-1), the total cost of labour utilised per acre in Kandy was the highest. The low cost of labour used for production of a bushel of paddy was mainly due to higher yield obtained per acre, and relatively lower wage rates paid in Kandy district.

The following inter-district cost function was derived using the cost per bushel and the yield of paddy per acre as shown in this table.

$$C = 17.929 - 0.112\ Y;$$

$$(0.023) \qquad (r^2 = 0.891)$$

Where C is the cost of production per bushel in rupees and Y is the corresponding yield of paddy per acre in bushels. Since the coefficient of determination (r^2) is 0.891 and the sampling error of the regression coefficient is small (0.023), this derived inter-district cost function is statistically very significant.

III-2 ESTIMATED COST PER BUSHEL FROM DERIVED EQUATION, YALA, 1972

Yield		Estimated Cost bushel Rs	Actual Cost Rs	Price per bushel Rs	Profit Margin per bushel Estimated Rs	Profit Margin per bushel Actual Rs
30		14.57	N.A.	14.00	- 0.57	N.A.
35.0		14.01	N.A.	14.00	- 0.01	N.A.
36.9	Hambantota	13.80	14.43	14.00	0.20	- 0.43
40.6		13.45	N.A.	14.00	0.55	N.A.
45.0		12.89	N.A.	14.00	1.11	N.A.
46.1	Colombo	12.77	11.68	14.00	1.23	2.32
49.9	Kurunegala	12.43	12.65	14.00	1.57	1.35
50.0		12.33	N.A.	14.00	1.67	N.A.
55.0		11.77	N.A.	14.00	2.23	N.A.
60.0		11.21	N.A.	14.00	2.79	N.A.
65.0		10.65	N.A.	14.00	3.35	N.A.
70.0		10.09	N.A.	14.00	3.91	N.A.
71.7	Kandy	9.90	9.80	14.00	4.10	4.20
75.0		9.53	N.A.	14.00	4.47	N.A.
75.8	Polonnaruwa	9.44	9.67	14.00	4.56	4.33
80.0		8.97	N.A.	14.00	5.03	N.A.
85.0		8.41	N.A.	14.00	5.59	N.A.

Using this derived inter-district cost function, the cost per bushel corresponding to a given yield per acre, was estimated as shows in table III-2, above. The difference between the estimated cost and the actual cost obtained from the record books in each of the five districts was quite small. As seen in Table III-2, the cost of production per bushel of paddy in Yala 1972 worked out to Rs.14.00 when the yield per acre was 35 bushels. Using the above relationship between the cost per bushel and the yield per acre, the following tendency was observed:

The price of paddy under the guaranteed price scheme was increased from Rs.14.00 to Rs.18.00 in February 1973. According to official estimates the average price index had risen by about 25 percent at the time of increase of the price of paddy. If the above altered price situation is used in the cost function, a bushel of paddy would cost Rs.18.00 as shown below. This figure is equivalent to the present guaranteed price of paddy:

$$1.25\ (17.929 - 0.112\ Y) = 18.00$$

$$\text{then } Y = 31.49$$

It it is assumed that the average price index of input materials had increased by 30 percent then $Y = 36.35$

III(a) COST OF FERTILIZER AND OTHER INPUT MATERIALS PER BUSHEL

The district-wise cost of fertilizer and other input materials per bushel of paddy was also calculated from the record books.

Table III-3 Cost Component of Input Materials in Rupees per Bushel of Paddy

	Yield per acre bushel	Seed Paddy	Fertilizer	Agro-Chemicals	Miscellaneous	Total Cost of Input Materials
Hambantota	36.9	1.11	1.45	0.82	0.31	3.69
Polonnaruwa	75.8	0.42	0.87	0.37	0.26	1.92
Kurunegala	49.9	0.58	0.74	0.31	0.46	2.09
K a n d y	71.7	0.30	0.71	0.22	0.26	1.49
Colombo	46.1	0.59	1.14	0.24	0.53	2.50

When we compare Table III-3 with Table II-4, it is seen that the cost of each of the input items per bushel - seed paddy, fertilizer and agro-chemicals, does not have a direct relationship with the cost of each of the input materials used per acre. The lowest cost of seed paddy per bushel incurred by Kandy farmers is mainly due to the widespread adoption of transplanting, a practice very common in Kandy District, which also gave them the second highest yield among the five districts. Polonnaruwa farmers had applied the highest quantity of fertilizer per acre among the five districts (Table II-4), yet the cost of fertilizer to produce a bushel of paddy was less than the cost incurred in Colombo or in Hambantota. This was due to the higher yield obtained per acre, which was the highest in Polonnaruwa. In Hambantota, the cost of fertilizer per bushel of paddy produced was highest mainly due to very low yields recorded. Very low level of fertilizer consumption in Kurunegala was mainly responsible for low cost of fertilizer per bushel of paddy produced.

In Kandy and Colombo, though the total cost of fertilizer applied per acre had been almost equal, the cost of fertilizer to produce a bushel of paddy in the two districts have varied considerably due to wide differences in yields obtained per acre in the respective districts.

IV. PER ACRE FAMILY FARM EARNINGS OF TENANTS

Since land and labour are the most important resources for a peasant cultivator, estimation of family farm earnings is more significant than the profit margins from the point of view of tenants. In this section, family farm earnings to a tenant cultivator was estimated assuming that all the record-keeping farmers were tenants.

Family farm earnings to a tenant cultivator was calculated from Table II-2, on the basis of the following common tenurial arrangements as found in each of the five districts in our survey on Agrarian situation in relation to paddy cultivation conducted during Maha, 1972-1973.

1. Tenant cultivators in Hambantota and Polonnaruwa Districts generally pay 25 percent of harvested paddy to their landlords as land rent. The landlords do not offer them any collateral help.

2. Most tenant cultivators in Kurunegala, Kandy and Colombo districts pay fifty percent of the harvested paddy to their landlords as land rent, whilst the latter provides fifty percent of the required seed paddy, fertilizer and agro-chemicals to their tenants as collateral help.

Table IV-1 Per acre Family Farm Earnings of Tenants

	Total value of paddy production per acre Rs.	Farm Expenses per Acre: Expenses excluding land rent Rs	Land Rent Rs	TOTAL Rs		Family Farm Earnings per acre Rs.
Hambantota	516.60	532.19	129.15	661.34	-	144.74
Polonnaruwa	1,061.20	733.05	265.30	998.35	+	62.85
Kurunegala	698.60	579.05	349.30	928.35	-	229.75
K a n d y	1,003.80	648.80	501.90	1,150.70	-	146.90
Colombo	645.40	478.36	327.20	805.56	-	160.16

As indicated in Table IV-1 Family Farm earnings of a tenant cultivator were found to be negative except in Polonnaruwa.

Since a tenant cultivator does not own land and his capital investment in farming is usually negligible, family farm earnings to a tenant consists mainly of the returns to family labour (and management). In other words, family farm earnings to a tenant cultivator has to be equivalent to family labour earnings, as no returns are due on capital. The fact that family farm earnings to a tenant cultivator are negative in most cases as shown above suggests us to make the following observations:-

1. If a tenant cultivator adopts some of the common cultural practices widely adopted by owner cultivators, no family

labour earnings could be expected from paddy production after the payment of land rent.

2. In consequence a tenant cultivator has to reduce farm expenses both in cash and in kind to ensure returns of family labour and this in turn, forces him to make his size of paddy holding smaller than those of owner cultivators or tie him to a lower yield or paddy per unit area than those obtained by owner cultivators.

Based on the above observations, it is not intended to draw general conclusions with regard to existing temurial arrangements between tenants and landlords, primarily as this study was confined to a relatively small number of farmers most of whom were owner cultivators. However, these observations, pinpoint the urgency of improving temurial arrangements particularly with regard to payment of rent in these districts. It is thought, that some relief could be given to tenant cultivators immediately if necessary administrative arrangements could be made to pay legal land rent in cash, to landlords under the recently introduced scheme for monopoly purchase of paddy through Co-operative Societies.

V. LABOUR DISTRIBUTION IN PADDY PRODUCTION

An understanding of the operationwise labour distribution is important to both research and extension workers in their efforts to increase paddy production.

The following aspects are significant in this respect:

1. Knowledge of the pattern of labour utilization in the paddy sector
2. The stage of technological development that the country has reached in paddy production
3. Explore ways to more intensive use of family labour in order to increase family labour income/earnings of those engaged in paddy production

Operationwise labour distribution in each of the five districts given in Table V-1 and Table V-2, indicates the intensity of labour use in land preparation, planting, harvesting and threshing operations, in relation to total labour application. These two tables clearly indicate that the number of labour days utilized in paddy production was concentrated mainly in two major groups of field operations.

Table V-1 Per Acre Operationwise Labour Distribution, 1972, Yala

	Hambantota		Polonnaruwa		Kurunegala		K a n d y		Colombo	
	Days	%	Days	%	Days	%	Days	%	Days	%
1. Land preparation	11.4	27.8	17.3	24.9	14.6	23.3	23.4	25.0	15.1	25.6
2. Nursery 1/	1.0	2.4	0.3	-	1.0	1.6	3.9	4.1	0.6	1.0
3. Planting 2/	6.3	15.3	10.7	15.4	11.1	17.7	16.2	17.3	8.5	14.4
4. Irrigation	3.5	8.5	4.5	6.6	6.3	10.0	7.4	8.0	5.4	9.2
5. Top dressing, pests and weed control	5.1	12.6	7.6	10.9	7.0	11.1	8.3	8.9	6.7	11.4
6. Harvesting	8.9	21.8	14.7	21.6	15.3	23.9	19.5	20.8	13.7	23.2
7. Threshing 3/	3.8	9.4	12.6	18.1	6.3	10.1	13.3	14.3	7.8	13.2
8. Transport	0.9	2.2	1.7	2.5	1.5	2.3	1.5	1.6	1.2	2.0
TOTAL	40.9	100.0	69.4	100.0	63.1	100.0	93.5	100.0	59.0	100.0

Note: 1/ Includes preparation of seed paddy for nursery; sowing of seed in nursery; application of fertilizer for nursery; and irrigation of nursery.

Note: 2/ Includes broadcast-sowing and transplanting

Note: 3/ Includes clearing and repairing of threshing floors, breaking of paddy stacks, spreading of sheaves, threshing, winnowing, bagging, drying etc.

Table V-2 Ratio of Labour used in Major Field Operations to total Labour used Per Acre

	Hambantota	Polonnaruwa	Kurunegala	Kandy	Colombo
Total per acre	100.0% (40.9)	100.0% (69.4)	100.0% (63.4)	100.0% (92.0)	100.0% (59.0)
Land preparation mursery preparation and planting (A)	45.7 (18.7)	40.3 (28.3)	42.6 (26.7)	47.3 (43.5)	41.0 (24.2)
Harvesting and threshing(B)	31.1 (12.7)	39.4 (27.3)	34.0 (21.6)	35.7 (32.8)	36.4 (21.5)
(A) + (B)	76.8 (31.4)	79.7 (55.6)	76.6 (48.3)	83.0 (76.3	77.4 (45.7)

Note:
The numbers in parenthesis indicates the number of days applied per acre.

The ratio of labour used for land preparation and planting to total labour used per acre in Polonnaruwa was the smallest in the five districts, but yet, it was still more than 40 percent. The aggregate of the two ratios of labour used for land preparation and harvesting has ranged from 76.0 percent in Kurunegala and Hambantota to 83.0 percent in Kandy as shown in (Table V-2). Even though the greater proportion of ploughing and threshing operations in the dry zone districts is done by tractors, the technology of paddy production in the dry zone is basically similar to that prevailing in the wet zone districts. A superficial look at the labour distribution in paddy production in this country, indicates a pattern similar to that of the developed countries. However, in the use of technology, the developed countries and Sri Lanka show striking differences.

1. In Sri Lanka sufficient emphasis is not paid to inter-cultivation practices such as, weeding and spraying. Consequently heavy weed growth is found in many fields even in a district like Polonnaruwa where yields are high.

2. In spite of the apparent similarity in the patterns of labour use, the average yield per unit area in this country is far below that of the developed countries. In Sri Lanka the prevailing labour use patterns have not really arisen from an indigeneous paddy production technology, but suggests the adoption of foreign technology regardless of its financial implications and the need to maximise the use of human labour. Consequently, in a situation where the import of inputs like tractors, ancillary equipment, spare parts, fertilizer and agro-chemicals and so on is restricted, the problem of sustaining the productivity of paddy lands at a reasonably high level arises.

3. The widespread use of tractors owned by traders and landlords for ploughing and threshing has compelled the majority of paddy cultivators particularly in the dry zone to use more

hired labour thus reducing family farm earnings. Whilst in developed countries, where the land/man ratio is very high and also the cost of capital is relatively less than the cost of labour, mechanization has been geared to utilize extra family labour more efficiently in order to increase family farm income/earnings.

An important decision facing the paddy cultivators in this country is to adopt an indigeneous system of paddy production where family labour could be fully utilized to enhance family farm earnings.

Such an approach also would serve to revitalise the paddy sector of this country, while in the process, achieving the national goal of self-sufficiency in rice.

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AMOUNT OF LABOUR USED IN INDIVIDUAL RECORD-KEEPING FARMS

Tables A-1 to A-5, indicate the amount of labour used in Paddy Production and its related figures for each record-keeping farm in the five districts.

In this tabulation, field operations were classified into the following eight categories:

1. Land preparation
2. Nursery
3. Planting
4. Irrigation
5. Top Dressing of Fertilizer - Pests and Weed Control.
6. Harvesting
7. Processing
8. Transport

The details of operations in each category are given below:

1. Land Preparation including Nursery
   Land Preparation work includes clearing of channels, ploughing or mammoting, application of organic manure, irrigation for field preparation, harrowing, puddling, cleaning and repairing of lands, levelling, etc.

2. N u r s e r y
   Preparation of seed paddy, including cleaning and germination, sowing of seed in nursery, application of fertilizer for nursery, etc.

3. Planting
   Broadcast-Sowing or/and Transplanting

   Broadcast Sowing - the following operations are included under this item, i.e. final levelling of fields, basal application of fertilizers, sowing, etc.

   Transplanting - the following operations are included under transplanting, i.e. uprooting and transplanting of seedlings; draining and final levelling of fields, application of basal fertilizer, transplanting, etc.

4. Irrigation
   Irrigation operations in this page includes only labour used for the purpose, from planting until harvesting.

5. Top Dressing of fertilizers, Pests and Weed Control
   Top Dressing of fertilizers, hand-weeding, rotary weeding, spraying of weedicides, insecticides and/or fungicides, etc.

6. Harvesting
   Cutting, spreading, bundling of sheaves, transport of sheaves to, and stacking near threshing floors, etc.

7. Processing
Processing includes the following operations:

Cleaning and repairing of threshing floors, breaking of paddy stacks, spreading of sheaves, threshing, winnowing, bagging, drying, etc.

8. Transport
Transport here includes, transport of threshed paddy from a threshing floor to a homestead and/or a Cooperative Society.

Table A-1 Man-days of Manual Labour used in Paddy Production, Hambantota District, Yala, 1972

Farm No. 1/	1 (B)	2 (B)	3 (B)	4 (B)	5 (B)	6 (B)	7 (T)	8 (T)	9 (B)	10 (B.T)	11 (B)	Average Man/days per acre 2/ (%)
1. Land preparation	22.8	22.6	20.6	41.7	31.0	29.5	13.6	68.5	22.8	78.0	25.0	11.4 (27.9)
2. Nursery	-	-	-	-	-	-	6.2	18.0	-	9.5	-	1.0 (2.4)
3. Planting	13.0	17.0	10.0	27.6	22.0	23.5	14.1	56.0	10.0	24.7	14.5	6.3 (15.4)
4. Irrigation	1.0	2.0	19.4	14.0	22.5	7.8	4.0	3.8	3.8	16.0	4.0	3.5 (8.6)
5. Top Dressing of fertilizer and others	3.0	3.0	10.0	19.5	25.0	14.0	8.6	39.0	19.6	28.1	11.0	5.1 (12.5)
6. Harvesting	15.7	13.4	19.3	44.0	30.9	28.2	4.4	46.5	14.6	28.5	35.8	8.9 (21.8)
7. Processing	11.0	5.9	1.5	12.0	17.0	8.9	23.0	95.8	16.0	8.5	18.5	3.8 (9.3)
8. Transport	0.3	0.2	1.7	2.2	3.3	3.0	-	2.0	2.0	3.5	7.5	0.9 (2.2)
Total	66.8	64.1	82.5	161.0	151.7	114.9	73.9	329.6	88.8	196.8	116.3	40.9 (100.0)
Area grown in acres	2.25	2.00	2.50	4.0	2.75	2.50	4.50	5.0	1.88	5.0	3.0	2.88
Paddy harvested in bushels	60.0	60.0	125.0	152.0	120.0	66.0	NA	NA	66.0	105.0	201.0	106.1
Man-days per acre	29.7	32.1	34.3	40.3	55.2	46.0	19.7	65.9	47.2	40.2	38.8	40.9
Yield per acre in bushels	26.7	30.4	50.0	38.0	43.6	26.4	NA	NA	35.1	21.0	67.0	36.9

Note: 1/ T. Transplanting. B = Broadcasting or Direct Sowing

2/ Average excluding Farm, Nos.7 and 8.

Table A-2 Man-days of Manual labour used in Paddy Production, Polonnaruwa District, Yala, 1972.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Avg. man-days ac.of all farms	Avg. man-days ac.of T farms	Avg man-days ac.of B farms
Farm No.	(B)	(B)	(B)	(T)	(B)	(B)	(B)	(T)	(T)	(B)	(B)	(T)	(B)	(B)	(B)	(B)	(%)	(%)	(%)
1.Land Preparation	50.5	60.0	37.0	60.0	42.5	51.5	22.5	32.0	37.0	45.3	111.0	28.5	54.0	44.0	308.0	149.0	17.3 (24.9)	19.7 (22.3)	17.0 (25.4)
2.Nursery	-	-	-	1.5	-	-	-	6.3	6.9	-	-	3.3	-	-	19.0	-	0.3 (-)	2.3 (2.6)	- (-)
3.Planting	19.0	16.0	15.5	26.8	21.9	14.8	5.2	15.0	64.8	11.8	33.0	88.0	19.5	16.7	292.5	42.0	10.7 (15.4)	24.3 (27.5)	8.8 (13.2)
4.Irrigation	12.0	13.0	13.0	14.0	16.0	9.0	15.0	13.0	23.5	15.0	34.0	6.0	16.0	10.0	55.0	33.5	4.5 (6.6)	7.1 (8.0)	4.2 (6.3)
5.Top Dressing & others	5.0	4.0	15.2	17.0	43.3	35.3	2.3	1.0	20.5	13.5	69.0	31.5	30.0	45.0	151.0	14.0	7.6 (10.9)	8.6 (9.9)	7.4 (11.1)
6. Harvesting	50.0	50.0	48.0	31.0	48.0	52.0	7.5	7.5	48.0	32.0	53.0	24.0	78.0	44.0	312.5	79.0	14.7 (21.6)	13.8 (15.6)	14.9 (22.2)
7. Processing	82.3	38.4	38.3	22.5	0.6	1.1	12.3	13.5	38.3	37.3	20.0	8.5	53.8	43.8	318.8	96.4	12.6 (18.1)	10.4 (11.7)	12.9 (19.3)
8.Transport	6.0	3.5	2.4	6.1	6.0	3.9	2.6	2.6	4.0	18.5	7.5	4.0	3.5	8.2	30.0	4.3	1.7 (2.5)	2.1 (2.4)	1.7 (2.5)
Total	224.8	184.9	169.4	178.9	178.3	167.6	67.4	90.9	243.0	173.4	327.5	193.8	254.8	211.7	1486.8	418.2	69.4 (100.0)	88.3 (100.0)	66.9 (100.0)
Area grown Paddy	5.0	3.0	3.50	2.0	4.5	2.50	1.0	1.0	2.50	4.50	5.0	2.50	6.0	3.0	15.0	4.0	4.09	2.0	4.79
Harvested	260.0	187.5	85.0	130.0	248.0	175.0	68.0	81.0	260.0	380.0	300.0	2.0	450.0	350.0	1512.0	275.0	301.0	118.20	375.33
Yield/ acre in bushels	52.0	62.5	24.3	75.0	55.1	70.0	68.0	81.0	104.0	84.0	60.0	0.8	75.0	116.7	100.8	68.8	75.8	59.1	74.6
Man-days per acre	45.0	61.6	48.4	89.5	39.6	67.0	67.4	90.9	97.2	38.5	65.0	77.5	42.5	70.6	99.1	104.6	69.4	88.3	66.9

Table A-3 Man-days of Manual Labour used in Paddy Production, Kurunegala District, Yala, 1972

Farm No.	1 (T)	2 (B)	3 (B)	4 (T)	5 (T)	6 (B.T.)	10 (B)	11 (B)	12 (B)	13 (T)	15 (B)	16 (B)	17 (B)	18 (T)	Average man-days acre of all farms %	Average man-days per acre of B farms 1/ %
1.Land Preparation	4.0	20.0	9.0	34.0	20.0	35.0	73.0	184.0	51.0	33.0	23.0	30.0	100.0	83.0	14.6 (23.3)	21.2 (28.8)
2.Nursery	9.4	-	-	3.0	4.5	3.5	-	-	-	5.0	-	-	-	24.5	1.1 (1.6)	- (-)
3.Planting/ Sowing	18.5	6.5	4.8	55.5	23.8	24.8	20.5	66.3	12.8	122.0	8.0	7.6	37.0	122.0	11.0 (17.7)	7.6 (10.4)
4.Irrigation	9.8	0.8	4.0	17.5	15.0	4.0	14.0	25.0	16.5	22.5	6.5	15.0	120.0	30.0	6.3 (10.0)	8.3 (11.3)
5.Top dressing of Fertilizer & others	13.6	25.5	3.0	19.4	7.0	4.0	7.0	12.8	8.0	28.0	17.4	2.5	144.0	41.0	7.0 (11.1)	9.1 (12.3)
6.Harvesting	14.6	40.0	6.9	50.0	40.3	47.2	52.0	82.0	50.0	106.0	11.0	23.8	82.0	129.0	15.2 (23.9)	15.6 (21.2)
7.Processing	19.8	14.3	6.3	16.7	1.0	23.0	42.3	83.5	12.4	82.0	0.5	15.4	38.0	20.0	6.3 (10.1)	9.5 (13.0)
8.Transport	3.0	3.0	1.0	3.5	4.0	6.5	14.0	12.0	0.3	2.0	1.0	2.3	15.0	2.0	1.5 (2.3)	2.0 (3.0)
Total	92.7	110.1	35.0	199.6	115.6	148.0	222.8	465.6	151.0	400.5	67.4	96.6	536.0	451.5	63.0 (100.0)	73.3 (100.0)
Area grown in acres	1.00	2.50	.50	2.0	2.0	1.25	3.0	7.0	3.0	8.0	1.0	1.50	5.0	10.0	3.41	2.75
Paddy harvested in bushels	82.3	47.0	50.0	102.0	180.0	141.0	200.0	450.0	60.0	320.0	40.0	60.0	400.0	300.0	159.6	138.9
Man-days per acre	92.7	44.0	70.0	99.8	57.8	118.4	74.3	66.5	50.3	50.1	67.4	64.4	107.2	45.2	63.3	73.5
Yield/acre in bushels	82.3	18.8	100.0	51.0	90.0	112.8	66.7	64.3	20.0	40.0	40.0	40.0	80.0	30.0	46.8	50.5

1/ Average per acre excluding farm No.1, 4, 5, 13 and 18

2/ Farm Nos. 7 - 9, were not tabulated here because of incorrect record-keeping.

Table A-4 Man-days of Manual labour used in Paddy Production, Kandy District, Yala, 1972

Farm No.	1 (T)	2 (B)	3 (T)	4 (T)	5 (T)	6 (T)	7 (T)	8 (T)	9 (B)	10 (T)	11 (T)	12 (T)	13 (T)	14 (T)	15 (T)	16 (T)	17 (T)	18 (T)	19 (T)	20 (T)	21 (T)	22 (T)	23 (T)	24 (T)	AVERAGE PER ACRE: 1 - 24	1 -24 Excl. 2 & 9	1-19 Excl.* 2&9	20-24 /
1.Land Preparation	16.5	21.6	34.0	32.0	86.0	13.0	19.5	34.0	16.0	20.0	21.0	10.0	24.4	36.0	17.0	22.0	14.0	18.4	45.4	34.5	49.0	52.0	59.0	51.0	23.4 (22.6)	24.6 (24.4)	30.8 (25.7)	18.2 (22.5)
2.Nursery	-	-	2.8	3.9	16.0	8.0	8.9	10.2	-	1.9	0.8	3.7	2.1	1.2	5.1	12.1	1.5	4.8	2.3	3.4	5.5	3.3	7.8	11.8	3.9 (3.8)	4.3 (4.3)	6.1 (5.1)	2.4 (3.0)
3.Planting	14.3	4.4	38.0	34.3	47.3	11.1	21.7	9.5	3.4	9.0	13.3	30.5	10.9	15.0	12.0	27.1	8.0	18.1	11.8	52.6	25.8	10.5	44.8	19.5	16.2 (15.7)	17.7 (17.6)	23-9 (20.0)	11.3 (14.0)
4.Irrigation	2.0	-	2.0	3.0	1.0	4.0	4.3	8.0	2.0	11.0	2.5	6.3	3.0	6.0	3.1	3.5	2.0	7.5	10.0	53.1	35.0	21.0	19.0	17.0	17.4 (16.8)	8.2 (8.1)	5.7 (4.8)	10.7 (13.2)
5.Top dressing and others	4.0	0.5	10.0	9.3	16.6	11.0	7.4	4.8	3.8	4.5	5.8	14.8	5.0	11.0	5.5	8.0	3.6	17.0	6.5	22.3	16.5	27.5	21.1	15.5	8.3 (8.0)	9.0 (9.0)	10.4 (8.7)	7.6 (9.4)
6.Harvesting	5.7	11.8	31.5	22.5	35.0	8.3	15.8	10.0	5.7	10.5	14.5	22.0	7.5	33.1	8.8	19.0	5.0	31.5	18.1	57.0	27.8	43.5	78.3	71.0	19.5 (18.8)	21.1 (20.9)	21.5 (17.9)	20.6 (25.4)
7.Processing	7.8	10.6	37.5	22.5	11.6	6.8	12.8	12.3	6.3	13.0	14.9	20.8	15.3	40.0	10.5	22.0	5.0	22.0	-	38.3	21.3	20.5	28.0	6.0	13.3 (12.9)	14.2 (14.1)	19.8 (16.5)	8.5 (10.5)
8.Transport	1.0	2.0	1.0	2.0	2.5	3.9	0.5	1.0	1.0	1.0	1.0	2.5	0.2	-	0.2	3.0	1.0	-	-	3.0	6.0	6.5	4.5	2.5	1.5 (1.4)	1.9 (1.6)	1.5 (1.3)	1.7 (2.0)
Total	51.3	50.9	156.8	129.5	216.0	66.1	90.9	89.8	38.2	70.9	73.8	110.6	68.4	142.3	62.2	116.7	40.1	119.3	94.1	264.2	186.9	184.8	262.5	194.3	103.5 (100.0)	100.9 (100.0)	119.7 (100.0)	81.0 (100.0)
Area grown	0.50	1.0	1.50	1.00	2.25	0.5	1.0	1.0	0.65	0.50	1.0	1.25	1.25	1.50	0.50	0.50	0.50	1.00	0.50	3.50	4.00	2.00	2.00	2.00	1.27	1.25	0.82	2.70
Paddy Harvested	26.0	20.0*	150.0	120.0	82.0	35.0	56.0	72.0	35.0	52.0	100.0	191.0	45.0	120.0	21.0	50.0	55.0	42.0	24.0	265.0	241.5	148.0	150.0	150.0	95.9	101.8	74.2	190.9
Yield/acre in bushels	52.0	20.0	100.0	120.0	36.4	70.0	56.0	72.0	53.8	104.0	100.0	152.8	36.0	80.0	42.0	100.0	110.0	42.0	48.0	75.7	60.4	74.0	75.0	75.0	75.5	81.4	90.5	70.7
Man-days per acre	102.6	50.9	104.5	129.5	96.0	132.2	90.9	89.8	58.8	141.8	73.8	88.5	54.7	94.9	124.4	233.4	80.2	119.3	188.2	75.5	46.7	92.4	131.3	97.2	93.5	100.9	119.7	79.3

* Crop has failed.

* Excluding Minipe Special project

/ Refers to Minipe Special project

Table A-5 Man-days of Manual labour used in Paddy Production Colombo District, Yala, 1972

Farm No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	Avg. man-days per ac. of all farms	Avg Man-days per a. of all B farms
	(B)	(B)	(B)	(B)	(B)	(B)	(B)	(B)	(B)	(B)	(B)	(B)	(T)	(B)	(B)	(B)	(B)	(B)	(T)	(B)	(T)	(B)	(%)	(%)
1.Land preparation	14.0	114.0	24.0	19.0	8.3	4.0	6.0	14.0	25.5	12.0	13.0	13.0	26.5	72.0	24.0	7.0	12.5	21.5	14.0	5.0	18.0	13.0	15.1 (25.6)	16.4 (27.1)
2. Nursery	-	-	-	-	-	-	-	-	-	-	-	-	14.0	-	-	-	-	-	3.5	-	1.0	-	0.6 (1.0)	- (-)
3.Planting	9.0	39.0	14.6	9.8	5.0	2.5	7.4	4.5	15.0	4.7	5.0	10.0	20.0	21.8	7.8	10.8	9.0	9.5	24.5	2.0	26.3	10.3	8.5 (14.4)	7.7 (12.7)
4.Irrigation	7.0	26.0	10.0	5.3	1.0	2.0	9.0	2.0	4.3	4.8	4.0	6.0	30.3	19.0	4.4	2.0	10.0	5.0	5.0	6.5	4.5	4.5	5.4 (9.2)	5.2 (8.6)
5.Top Dressing & others	15.0	28.0	10.0	4.0	1.0	2.5	25.8	8.0	24.8	2.5	7.0	2.5	4.5	18.0	7.0	8.5	16.0	3.8	4.0	7.5	6.0	7.0	6.7 (11.4)	7.7 (12.7)
6.Harvesting	47.0	47.0	16.2	6.0	1.0	11.3	13.4	5.0	17.0	11.0	18.8	11.9	55.3	48.5	14.0	8.8	16.8	20.8	15.0	24.5	10.1	16.3	13.7 (23.2)	13.8 (22.8)
7.Process	13.0	45.3	19.0	1.0	1.0	10.3	8.5	5.3	8.0	1.9	2.5	2.0	4.4	30.2	13.8	2.3	11.4	9.8	10.8	15.3	13.5	16.8	7.8 (13.2)	8.5 (14.1)
8.Transport	2.0	2.0	1.0	0.2	0.3	1.4	2.0	0.5	2.0	2.0	0.8	0.1	2.0	6.0	3.0	0.5	2.0	2.5	3.0	1.0	1.6	2.0	1.2 (2.0)	1.2 (2.0)
Total	107.0	301.3	94.8	45.3	17.6	34.0	72.1	39.3	96.6	38.9	51.1	45.5	157.0	215.5	74.0	39.9	77.7	72.9	79.8	61.8	81.0	69.9	59.0 (100.0)	60.5 (100.0)
Area grown Paddy	3.50	4.00	0.80	1.25	0.67	0.50	1.00	0.50	1.25	0.50	1.00	.50	2.50	3.00	1.00	0.25	1.00	1.50	2.50*	2.50	1.00	1.00	1.44	1.39
Harvested	242.0	60.0	16.0	6.0	15.0	48.0	50.0	20.0	81.0	16.0	50.0	3.0	24.0	165.0	52.0	20.0	108.0	117.0	78.0	150.0	60.0	80.0	66.4	65.0
Yield/ Acre bushel	69.1	15.0	20.0	4.8	22.4	96.0	50.0	40.0	64.8	32.0	50.0	6.0	9.6	55.0	52.0	80.0	108.0	78.0	31.2	60.0	60.0	80.0	46.0	50.5
Man-days per acre	30.6	75.3	118.5	36.2	26.3	68.0	72.1	78.6	77.3	77.8	51.1	91.0	62.8	71.8	74.0	159.6	77.7	48.6	31.9	24.7	81.0	69.9	59.0	60.5

* Incorrect recording, accordingly averages for transplanted farms were not calculated.

DISTRIBUTION OF RECORD KEEPING FARMERS
SELECTED FOR THE STUDY

HAMBANTOTA

Farm No.	Village	Agricultural Instructor's Range		
1	Kivula	Hungama		
2	Kivula	Hungama		
3.	Polgahawelena	Kirindi Oya	(Right Bank)	Tissamaharama
4	Walagampattuwa	Kirindi Oya	(l e f t ")	"
5	Debara Wewa	Kirindi Oya	(" ")	"
6.	Bedigama	Giruwa Pattu	(North)	Walasmulla
7	Godakumbura	Giruwa Pattu	(South)	Beliatte
8	Kudaheella	Giruwa Pattu	(South)	Beliatte
9	Walasmulla	Giruwa Pattu	(North)	Walasmulla
10	Polgahawelena	Kirindi Oya	(Right Bank)	Tissamaharama
11	Thawaluwila	Walawe	(Right Bank)	Ambalantota

POLONNARUWA

1	Minneriya Special Project (Tract 7)	Minneriya Special Project	(Stage I)
2	Kotalawela Junction Hingurakgoda	Minneriya Special Project	(Stage I)
3	Diwulankadawala	Minneriya Special Project	(Divulankadawela)
4	Kusumpokuna	" " "	"
5	Yoda Ela 'A'	" " "	(Stage II&III
6	Yatiyalpatana South	" " "	"
7	Wijayapura	Medirigiriya	
8	Medirigiriya	Medirigiriya	
9	Kaduruwela (Tract 4)	Kaduruwela	
10	Giritale No.26	Giritale	
11	B.O.P. 317/156	Talpotha, Pulasthigama	
12	Talpotha	Pulasthigama	
13	Sewagama	Pulasthigama	
14	Palugasdamana	Pulasthigama	
15	Kaduruwela	Kaduruwela	
16	Palugasdamana	Kalinga Ela	
17	Wijayaraja Pura	Kalinga Ela	

KURUNEGALA

1	Damunugolla	Ibbagamuwa
2	Puwakwellagama	Ibbagamuwa
3	Watareka	Mawatagama
4	Welagedera	Mawatagama
5	Ganegoda	Narammala
6	Panaliya	Polgahawela
7	Bewilgamuwa	Polgahawela

KURUNEGALA - continued

Farm No.	Village	Agricultural Instructor's Range
8	Wariyapola	Wariyapola
9	Malagane	Wariyapola
10	Usgala	Pahala Giribewa
11	Usgala	Pahala Giribewa
12	Kurunegala	Kurunegala
13	Kurunegala	Kurunegala
14	Ambakolawewa	M a h o
15	Kadurupolayagama	Polpitiyagama
16	Weerakodiyana	Bingiriya
17	Nikaweretiya	Nikawaretiya
18	Nikaweretiya	Nikawetetiya

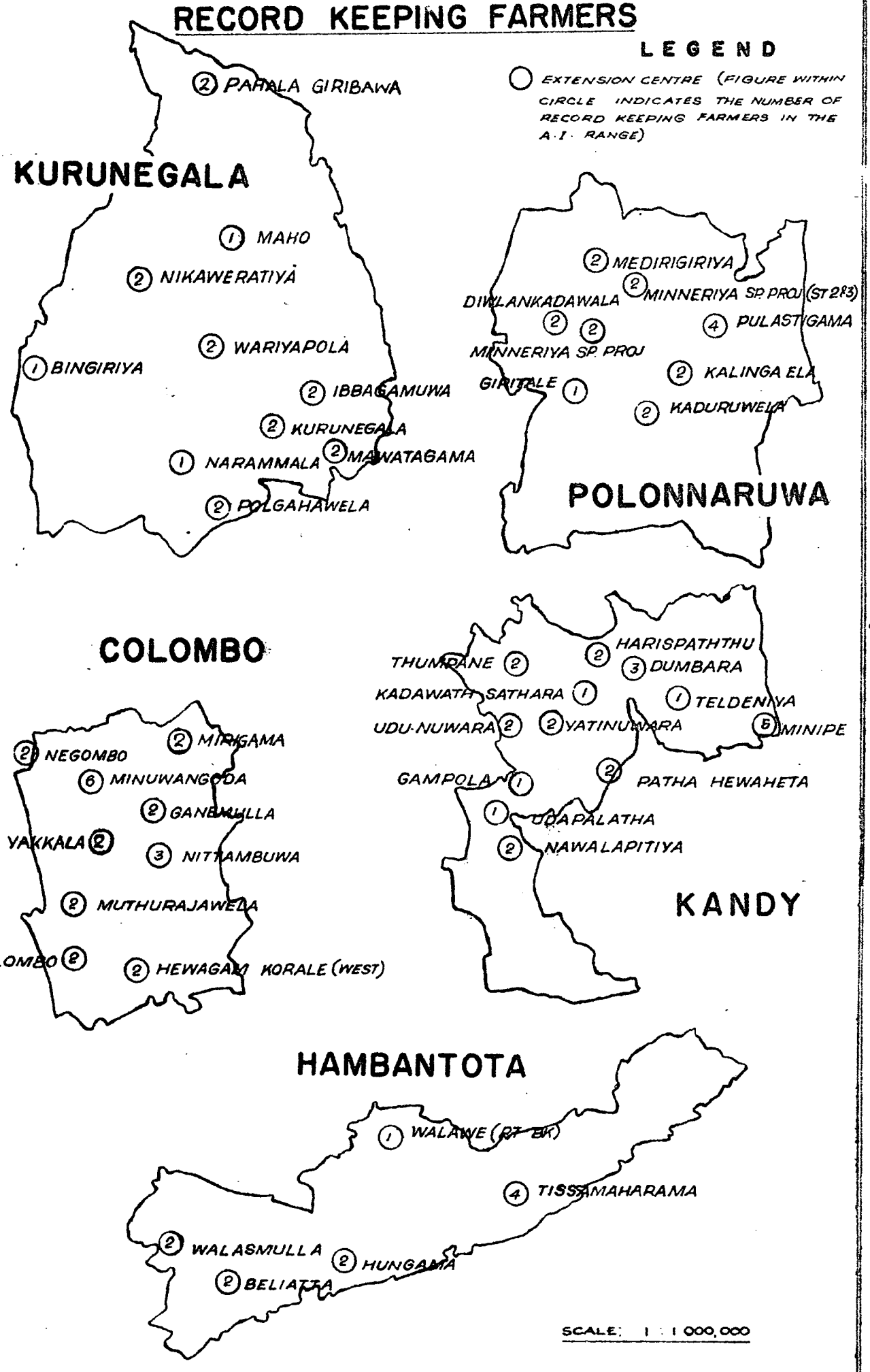
K A N D Y

1	Wattegama	Pahatha dumbara
2	Thalawathura	Udunuwara
3	Bokalawela	Harispattu
4	Pallegederawatte	Harispattu
5	Meepitiya	Nawalapitiya
6	Weligampola	Nawalapitiya
7	Kahatapitiya	Gampola
8	Pethiagoda	Udunuwara
9	Huraikanduwa	Uda dumbara
10	Ampitiya	Pahatha hewaheta
11	Alutwela	Meda dumbara
12	Thembiligala	Uda Palatha
13	Henagehuwela	Teldeniya
14	Weldambala	Pahatha hewaheta
15	Walgampaya	Yatinuwara
16	Bulmulla	Yatinuwara
17	Uda Peradeniya	Kandy
18	Narampala	Thumpane
19	Ilpemada	Thumpane
20	Handaganawa	Ambagahapelessa (Minipe Special Project)
21	Handagannawa	" -"-
22	Channel 28/1151	Udawela -"-
23	Channel 366/7	Ulpathagama -"-
24	Channel 7/1 Kingsdale Farm	Ulpathagama -"-

C O L O M B O

Farm No.	Village	Agricultural Instructor's Range
1	Kosinna	Yakkala
2	Maththumaggala	Muthurajawela
3	Mugape	Muthurajawela
4	Watayawatte	Colombo Mudliyar's Division, Mugegoda
5	Madiwela	Colombo Mudliyar's Division, Mugegoda
6	Thawalampitiya	Mirigama
7	Mirigama	Mirigama
8	Hambutiyawa	Nittambuwa
9	Hambutiyawa	Nittambuwa
10	Galahitiyawa	Ganemulla
11	Batagama North	Ganemulla
12	Kurana	Negombo
13	Katuwapitiya	Negombo
14	Pitipana (North)	Hewagama Korale (West)
15	Godagama	Hewagama Korale (West)
16	Karithatha	Yakkala
17	Meegalla	Nittambuwa
18	Matammana	Minuwangoda
19	Govigama	Minuwangoda
20	Sabidiawatte	Minuwangoda
21	Aluthapala	Minuwangoda
22	Polhena	Minuwangoda

MAPS SHOWING DISTRIBUTION OF RECORD KEEPING FARMERS



MAPS SHOWING DISTRIBUTION OF RECORD KEEPING FARMERS