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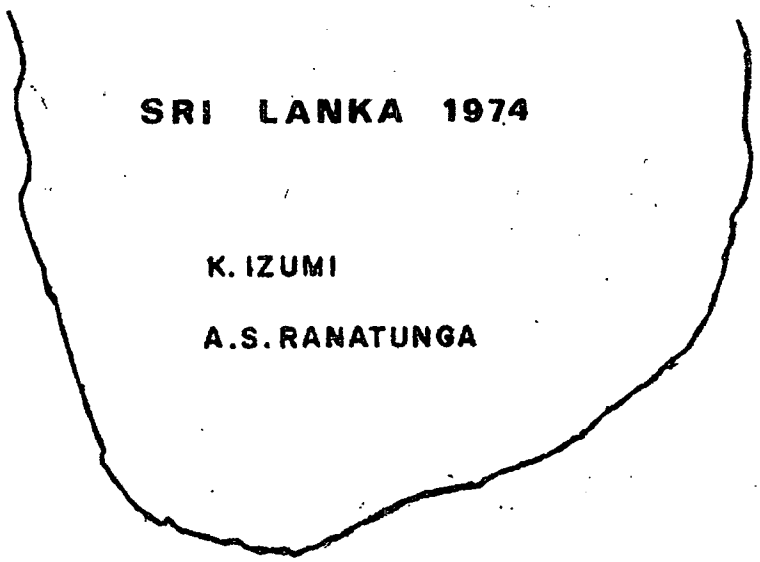
ENVIRONMENTAL AND SOCIAL CONSTRAINTS ON PADDY PRODUCTION UNDER EXISTING CONDITIONS

A CASE STUDY IN HAMBANTOTA DISTRICT



SRI LANKA 1974

K. IZUMI

A.S. RANATUNGA

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PREFACE

In 1973 FAO collected together a number of case studies representing various aspects of 'Contemporary Changes in the Agrarian Structure'.

Sri Lanka presented a series of six such case studies to the Asian Experts Consultation in Agrarian Reform at Bangkok in November. Responding to the suggestion of the FAO that the case studies should be made available to wider readership, the six Sri Lanka Studies have been reproduced in the 'Occasional Publication Series' of the Agrarian Research and Training Institute.

The tenurial situation in respect of paddy lands is of the utmost significance in most Asian countries. At a time when Sri Lanka is striving for self-sufficiency in paddy production, it is natural that the various factors which may affect production should be examined in order to identify any major constraints.

After conducting this case study in Hambantota district the authors concluded that the situation of the tenant-cultivators in this district at the time of the study was uneconomic due to the amount of rent paid. Attempts to enforce rent regulation under the Paddy Lands Act and its Amendments have generally proved unsatisfactory and effective measures for the transfer of ownership to the cultivator appeared to have better prospects than further attempts to control rent without incurring the problem of evictions. This study also provides data illustrating the disadvantageous position of the farmer dependent on rainfall compared to the cultivator with a more controlled supply of water from major and minor irrigation schemes.

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CASE STUDY: ENVIRONMENTAL AND SOCIAL CONSTRAINTS ON PADDY PRODUCTION UNDER EXISTING CONDITIONS IN SRI LANKA (HAMBANTOTA DISTRICT)

I. PROBLEMS

Throughout South and East Asian Countries the most severe constrains for expanding the diffusion of high yielding varieties are the lack of assured water supply and the anti-quated tenure systems. This study examines the influence from these environmental and social factors on Paddy Production.

The diffusion of high yielding varieties of paddy in this country has been very rapid, especially since 1971 with the appearance of the "new high yielding varieties" (NHYVs) such as BG 11-11, BG 34-8 and LD 66. The cultivation of improved varieties of paddy in this country started as early as the 1960s with the appearance of hybrid varieties. Although the productivity potential of hybrid varieties is much lower than that of NHYVs a maximum per acre yield of 101.7 bushels for Maha and 116.7 bushels for the Yala season (i.e. April - September) was obtained under experimental conditions. 1/ These yield figures for Maha (i.e. October-March) and Yala from H 4 are still more than double the latest national average.

1/ The following nitrogen fertilizer production functions from the experimental data for Maha 1961/62 and Yala 1962 at Ambalantota Rice Experiment Station, Hambantota District.

Maha 1961/62 : $Y = 68.497 + 0.610x - 0.0028x^2$

Yala 1962 : $Y = 82.810 + 0.831x - 0.0051x^2$

Where - Y is bushels of Paddy per acre and
X is nitrogen applied in lbs per acre.

Refer - K. Izumi: "Economics of Nitrogen Fertilizer Application to High Yielding Varieties of Paddy in Sri Lanka" July 1972.

Until 1970 the increase in both the yield per acre and the total national output of paddy came mainly from the diffusion of hybrid varieties and related agricultural extension work. For example, in 1950/60 Maha, the area under H 4 variety was only 1,100 acres, but in 1964/65 it increased to 455,100 acres, and in 1969/70 i reached 800,000 acres which constituted about 67 per cent of the total extent sown for Maha paddy. During the 1960s the yield of Maha paddy increased from 37.7 bushels in 1959/60 to 52.2 bushels in 1969/70. The rate of increase per unit area during the last decade was almost 40 per cent. The same tendency was found for Yala paddy.

Although the yield fluctuation of paddy in Sri Lanka since 1951 has been less than in most other countries of this region 1/ there were still two big upward and downward movements of yields during the 1960s. The yields of Maha paddy per acre in 1964/65 (34.11 bushels) and in 1969/70 (52.2 bushels) were the typical examples representing the worst and the best crop years respectively.

Let us examine how the yield of paddy fluctuated during the last decade using the trend equation of the yield of Maha paddy for the period 1951/52 to 1969/70, measured for the first time. 2/

The trend equation of the yield of Maha Paddy was

$$q_t = 90.888 \ (10^{0.0124t})$$

where t: time in years which for 1951/52 is zero and

q_t : yield of Maha paddy for a given year.

1/ See, for example: The State of Food and Agriculture, 1970" FAO, Rome, Figure II-2, page 83.

2/ K. Izumi: "The Development Stage of Paddy Production in Ceylon" Mineograph 1972 p.8.

The following table indicates the difference between the actual yields harvested and the yields estimated from the trend equation for the best and worst crop years during the 1960s.

Table 1-1: Yield Fluctuation in Percent in Best and Worst Crop Years during 1960s - Sri Lanka

Year	Actual yield of Maha Paddy harvested per acre		Estimated yield of Maha Paddy per acre		Deviation of actual yield from trend curve in %
	Index (A)	Bushels	Index (B)	Bushels	(C)
13(1964/65) Worst Yr.	110.6	34.6	131.7	40.64	-16.0
18(1969/70) Best Yr.	169.2	52.21	152.0	46.88	+11.3

Note: 1. Index of the actual yield for 1951/52:100.00

2. $C = \frac{B - A}{B} \times 100\%$

It is clearly indicated in this table that the downward movement of the yield in the worst year was much bigger than the upward movement in the best year. If we apply this trend curve to the present food situation we could say that one of the reasons for the present difficulties created by the rice shortage came from the fact that the 1970s started with one of the best crop years since 1951, but just after one year the country had to face one of the worst crop years due to failure of monsoon rains.

Thus one of the crucial problems of paddy production in Sri Lanka is the weakness of the irrigation system. In spite of a relatively high percentage of irrigated land, the yield of paddy per unit area in this country is not high as compared to other countries in the region where ratios of irrigated areas are much less than in this country. One of the excellent indications of this characteristic of paddy production in this country can be found in the Figure 11 at page 518 in 'Asian Agricultural Survey'. 1/

1/ Published by the Asian Development Bank: University of Tokyo Press, 1969.

According to this graphic presentation, the yield of paddy per hectare in Sri Lanka should be 3.0 instead of 1.5 tons corresponding to the irrigation ratio of 60 per cent. We could therefore assume that this very big deviation of the yield from the regional trend curve was mainly the result of the weakness of irrigation facilities in this country.

Using actual data from one of the major paddy producing districts in this country, we could examine how the conditions of water supply influence paddy production.

In Table 1-2, 153 paddy cultivators randomly selected from Hambantota District are classified into the four groups on the basis of the yield of Maha paddy per acre at each farm. In this table, a very close relationship is found between the yield of paddy and the water conditions during the two crucial stages of production, i.e. the land preparation - sowing stage and the flowering stage of paddy. The water conditions during the latter stage in particular seems to have a much closer relationship to higher yields. For example, during this stage the water conditions of more than 50 percent of the cultivators who belong to the lowest yield group were poor while almost 80 percent of the cultivators in the highest yield group had good water conditions. In addition, these water conditions are also closely associated with the high ratio of the area under NHYVs and old high yielding varieties (OHYVs) in each yield group, making the size of operational holding of a higher yield group smaller than that of a lower yield group (see Table 1-3). Here we find one of the most important and interesting pictures of the production situation after the introduction of high yielding varieties.

The second problem of paddy production in Sri Lanka has to be reviewed from institutional aspects, especially with reference to the present tenure system.

At present the paddy sector in this country is outside the Land Reform Act except for a small number of landlords whose paddy holdings are above 25 acres, and it seems to be broadly acknowledged by policy makers and government officers that no acute tenurial problems seriously hamper the drive towards self-sufficiency in rice. Most of them still seems to think that the more important institutional arrangement for the paddy sector is the reconstruction of cooperatives and banking systems through which all required credit, loans, fertilizer and agro-chemicals could be made smoothly available to cultivators. There is no doubt that the institutional re-construction of these areas is indispensable, but we must pose the question:"without improvements to the present tenure system,is it really possible to encourage tenant cultivators who occupy quite a large part of the land to push paddy production?"

Table 1-2: Yield Per Acre of Maha Paddy and Water Conditions during the Season - Hambantota District - 1971-1972

Yield/ ac in bu Maha Paddy	No of farms	Av.Yield per acre of Maha Paddy	Number of Farms Classified According to Water Conditions							
			Land Prep.and Sowing Stage				Flowering Stage			
			Good	Fair	Poor	Total	Good	Fair	Poor	Total
- 20	47	8.39 bu	29	10	8	47	15	7	25	47
(%)	(30.7)		(61.7)	(21.3)	(17.0)	(100.0)	(31.9)	(14.9)	(53.2)	(100.0)
20-40	53	31.29	37	11	5	53	29	11	13	53
(%)	(34.6)		(69.8)	(20.8)	(9.4)	(100.0)	(54.7)	(20.8)	(24.5)	(100.0)
40-60	30	55.77	24	3	3	30	20	6	4	30
(%)	(19.6)		(80.0)	(10.0)	(10.0)	(100.0)	(66.7)	(20.0)	(13.3)	(100.0)
60 -	23	81.34	17	5	1	23	18	3	2	23
(%)	(15.1)		(73.9)	(21.7)	(4.4)	(100.0)	(78.3)	(13.0)	(8.7)	(100.0)
Av.	153	32.84	107	29	17	153	82	27	44	153
(%)	(100.0)		(69.9)	(19.0)	(11.1)	(100.0)	(53.6)	(17.6)	(28.8)	(100.0)

Table 1-3: Yield Per Acre of Maha Paddy and Average Area Sown under Different Varieties per Farm - Hambantota District - 1971-1972

Yield per ac. of Maha Paddy in bu.	No of farms	Av.size of paddy holding per farm	Av. Area Sown under Maha Paddy				Av. Yield of Maha Paddy in Bushels
			NHYVs	OHYVs	TRAD.	TOTAL	
- 20	47	5.19	0.88	2.74	0.27	4.32	8.39
%			(20.4)	(73.3)	(6.3)	(100.0)	
20-40	53	4.36	1.35	2.32	0.25	3.92	31.29
%			(34.4)	(59.2)	(6.4)	(100.0)	
4o-60	30	4.78	31.5	0.88	0.10	4.13	55.70
%			(76.3)	(21.3)	(2.4)	(100.0)	
60-	23	3.89	2.77	0.98	0.05	3.80	81.34
%			(72.9)	(25.8)	(1.3)	(100.0)	

Before analysing the tenurial situation of paddy cultivators, it could be assumed that a cultivator who possesses land has better chances of applying more inputs and of obtaining a higher yield than a tenant cultivator, because he requires no payments of land rent or a crop share. In Sri Lanka the main characteristic of the tenurial arrangements between landlord and tenant in the paddy sector may be summarised as "share-cropping with the rent ratios varying between 25 and 50 per cent of the produce". In most wet and intermediate zone districts where the size of operational holding is small but a yield from year to year is relatively more stable than in most dry zone districts, a tenant cultivator usually pays 50 per cent of harvested paddy to the landlord, while the latter supplies 50 per cent of required seed paddy, fertilizer and agro-chemicals to his tenant as collateral help. In most dry-zone districts, on the other hand, where the size of holding is bigger but yields fluctuate from year to year depending on rainfall, a tenant pays 25 per cent of the produce to the landlord, but the latter offers no collateral help to the farmer. From the above description, we could say that a tenant cultivator in the dry zone is less oppressed by the share-cropping system even without collateral help from his landlord. If so, we also could expect a high rate of progress from the former group. But if the difference in the ratios of crop shares in these two agro-climatic zones is in fact nominal and if 25 percent of the crop share exerts a heavy pressure to a tenant cultivator preventing him from intensive application of labour and inputs, this ratio has also to be considered in relation to possible 'rent regulation' and 'land to the tiller' policies.

Let us examine how the present sharecropping seriously affects the economic status of tenant cultivators in both dry and wet zone districts using our recently completed 'Cost of Production Study'.

Table 1-4 indicates gross returns, farm expenses and farm family earnings per acre of paddy under owner cultivators in Polonnaruwa and Kandy Districts. If we assume that all the cultivators in this table are tenant cultivators who produce the same amount of paddy per acre applying the same amount of labour inputs, we get a quite a different picture from that of the owner cultivators' in terms of farm expenses and earnings. The tenurial arrangements in these two districts were explained with reference to wet and dry zones. As indicated in Table 1-5 land rent figures are the biggest item of farm expenses, and as such restrict and reduce farm earnings to extremely low levels - only Rs. 63.00 in Polonnaruwa and minus Rs.145.00 in Kandy. This picture may suggest the following socio-economic situation of tenant cultivators in this country:

Table 1-4: Gross Returns, Expenses and Family Farm Earning per acre of Paddy under Owner-Cultivator - Yala 1972

	Agro-climatic Zone	No of farms	Average size of operational holding under paddy	Av.Yield per ac in bu.	Per Acre in Bu Gross Returns	Expenses	Family Farm Earnings
Polonnaruwa	Dry Zone	16	4.09 ac.	75.8	1,061.20	733.05	328.15
Kandy	Wet Zone	24	1.31	71.7	1,003.80	648.80	355.00

1. A tenant cultivator cannot adopt the common cultural practices widely found among owner cultivators, because even if he produces as much as owner cultivators in terms of yield per acre, his farm earnings after the deduction of land rent are negligible or negative as indicated in Table 1-5.

2. Therefore a tenant cultivator in the dry zone as well as in the wet zone and intermediate zones has to reduce farm expenses both in cash and in kind to ensure returns to family labour, and this unsatisfactory situation may force him to make his farming more extensive in terms of hired labour and input application than in an owner cultivator, thus dropping his yield per unit to a lower level. Alternatively the tenant may have to make his size of holding smaller than that of the owner-cultivator.

Table 1-5:Gross Returns,Expenses and Family Farm Earnings per Acre of Paddy under Tenant-Cultivator - Yala 1972

	Nof of farms	Per Acre in Bushels			
		Gross Returns	Farm Expenses		
			Expenses excluding land rent	Land Rent	Family Farm Earnings
Polonnaruwa	16	1,061.20	733.05	265.30	62.85
Kandy	24	1,003.80	648.80	501.90	-146.90

The above is a hypothetical framework formulated from the research findings of our 'Cost of Production Study - Yala 1972'. If this is accepted together with the first hypothesis (-the crucial role of water supply) uneven levels of productivity and incomes among cultivators as well as the relatively low level of living generally found in the paddy sector of this country are the result of agrarian conditions where a combination of these two environmental and social factors determines the resource use pattern of each individual peasant farm. When this type of socio-economic situation pre-dominates in a rural area, the classification of cultivators on the basis of the size of paddy holding could not give any definite picture of rural structure for the present analysis. For example, in Table 1-6 156 paddy cultivators are classified according to the size of holding, but this table indicates only that the ratio of tenant land in a larger size group is bigger than in a smaller size group; there is no relationship between the size of holding and the yield of paddy per acre.

The analysis in the next section, therefore, has been done with a different approach which clarifies the relationship between the size of holding and the tenurial status of cultivators.

Table 1-6: Size of Operational Paddy Holding, Ratio of Tenant Land and Yield of Paddy Per Acre, Hambantota District, 1971 - 1972 Maha

Size of operational paddy holding in acs.	No of farms	Av. size of paddy land under operation in acres				Av. area sown under Maha paddy in acs.				Yield per ac. in bushels
		Owned or allotted	Rented in	Others	Total	NHYVs	OHYvs	Trad.	Total	
-2.00	28	0.84	0.59	0.05	1.48	0.31	1.04	0.10	1.45	31.98
%		(56.8)	(39.9)	(3.3)	(100.0)	(21.4)	(71.7)	(6.9)	(100.0)	
2.00-4.00	52	1.00	1.92	0.06	2.98	1.26	1.19	0.19	2.64	30.28
%		(33.7)	(64.2)	(2.1)	(100.0)	(47.7)	(45.1)	(7.2)	(100.0)	
4.00-6.00	49	0.91	4.17	-	5.08	2.27	2.25	0.20	4.72	34.29
%		(17.9)	(82.1)	(-)	(100.0)	(48.1)	(47.7)	(4.2)	(100.0)	
6.00	27	2.53	6.81	0.30	9.64	3.35	4.01	1.01	8.37	33.25
%		(26.2)	(70.6)	(3.2)	(100.0)	(40.0)	(47.9)	(12.1)	(100.0)	
Av.	156	1.21	3.23	0.07	4.51	1.77	1.99	0.22	4.08	32.84
%		(26.8)	(71.6)	(1.6)	(100.0)	(43.4)	(48.8)	(7.8)	(100.0)	

II. THE SIZE OF FARM ECONOMY AND THE EFFICIENCY OF PRODUCTION AMONG CULTIVATORS WITH DIFFERENT TENURIAL STATUS:

Our approach to the analysis of the agrarian situation in the paddy sector begins by examining the relationship between the tenurial status, the size of economy and the efficiency of production among cultivators.

In Table 2-2, 144 cultivators in Hambantota District are classified on the basis of their tenurial status and the size of paddy holding. In this Table the following criteria were used to classify cultivators.

1. Tenant cultivator (T): A cultivator whose entire paddy land under operation is tenant land and who does not have any paddy land which is rented/ leased out.

2. Owner cultivator (O): A cultivator whose entire paddy land under operation belongs to him and who does not have any paddy land which is rented/; leased out.

3. Tenant-owner cultivator (TO): A cultivator in whose case more than 50 per cent of paddy land under operation is tenant land and who does not have any paddy land which is rented/leased out, and

4. Owner-tenant cultivator (OT): A cultivator in whose case more than 50 per cent of paddy land under operation belongs to his ownership and who does not have any paddy land which is rented/leased out.

According to this Table the size of operation paddy holding in acres of Group T is larger than that of Group O, while the yield per acre of both Maha and Yala paddy of the Group T is much less than that of the latter group. But no significant difference in the relative percentages of the areas under the three major groups of varieties were found between these tenurial groups. The ratio of the area under NHYVs in Yala 1972 in all four groups was larger than that in Maha 1971/72. In the absence of other reasons the difference appears mainly due to the additional five to six months between Maha 1971/72 and Yala 1972. All NHYVs except IR varieties became available to cultivators only from Yala 1971. Thus the high percentage of NHYVs in Yala 1972 may suggest that the rate of the diffusion of NHYVs in Sri Lanka during this one year period was particularly high.

Table 2-1: Tenurial Status of Farmers, Size of Operational Paddy Holding and Yield per Acre

Size of paddy holding in acs.	No of farms (1)	Size of Paddy holdings under operation acres			Area sown under Maha Paddy per farm in acres			
		Owned or allotted	Rented	Total	NHYVs	OHYVs	TRAD.	TOTAL
					%	%	%	%
I. TENANT CULTIVATORS								
- 2.00	7	-	1.43	1.43	0.55	0.61	0.21	1.37
%					(40.2)	(44.5)	(15.3)	(100.0)
2.00-4.00	26	-	3.01	3.01	1.68	1.21	0.01	2.89
%					(58.1)	(41.9)	(-)	(100.0)
4.00-6.00	32	-	5.25	5.25	2.10	2.63	0.14	4.87
%					(43.1)	(54.0)	(2.9)	(100.0)
6.00-	12	-	9.23	9.23	2.83	3.13	1.65	8.61
%					(32.9)	(36.4)	(30.7)	(100.0)
Av.		-	4.77	4.77	2.35	2.36	0.39	5.1o
%					(41.6)	(46.3)	(7.6)	(100.0)
II. OWNER CULTIVATORS								
- 2.00	12	1.35	-	1.35	0.21	1.06	-	1.27
%					(16.5)	(83.7)	-	(100.0)
2.00-6.00	13	3.04	-	3.04	1.46	0.88	0.35	2.69
%					(54.3)	(32.7)	(13.0)	(100.0)
4.00-6.00	7	5.71	-	5.71	2.07	2.71	-	4.78
%					(43.3)	(57.0)	(-)	(100.0)
Av.		2.99	-	2.9	1.20	1.44	0.15	2.79
%					(43.0)	(51.6)	(5.4)	(100.0)

Yield per ac. of Maha paddy in bu.	No of farms which sowed Yala Paddy (2)	% (2) is of (1)	Area sown under Yala paddy per farm in acres				Yield per Ac.of Yala Paddy in bu.
			NHYVs %	OHYVs %	TRAD. %	TOTAL %	
41.32	6	85.7	0.54 (41.2)	0.58 (44.3)	0.19 (14.5)	1.31 (100.0)	30.92
43.95	19	73.1	1.34 (46.7	0.82 (28.6)	0.71 (24.7)	2.87 (100.0)	19.95
34.97	21	65.6	3.30 (75.0	0 .94 (21.4)	0.16 (3.6)	4.40 (100.0)	16.67
29.62	11	91.4	2.41 (66.4)	1.22 (33.6)	- (-)	3.63 (100.0)	31.11
35.89	57	74.0	2.20 (64.0)	0.92 (26.7)	0.32 (9.3)	3.44 (100.0)	20.98
42.39	10	83.3	0.28 (24.8)	0.85 (75.2)	- (-)	1.13 (100.0)	25.13
47.78	11	84.6	2.14 (82.3)	0.39 (15.0)	0.7 (2.7)	2.60 (100.0)	48.52
32.70	6	85.7	3.08 (55.2)	2.50 (44.8)	- (-)	5.58 (100.0)	42.62
40.60	27	84.4	1.66 (61.0)	1.03 (37.9)	0.03 (1.1)	2.72 (100.0)	42.19

Table 2-1 Contd.

Size of paddy holding in acs.	No of farms (1)	Size of Paddy holding under operation acres			Area sown under Maha Paddy per farm in acres			
		Owned or all-	Rented	Total	NHYVs %	OHYVs %	TRAD. %	TOTAL %
III. TENANT-OWNER CULTIVATORS								
-4.00	11	0.55	1.80	2.35	0.43	1.29	0.14	1.84
%					(23.4)	(70.0)		(100.0)
4.00-	7	1.54	4.64	6.18	3.29	2.54	-	5.83
%					(56.4)	(43.6)	(-)	(100.0)
Av.		0.94	2.91	2.85	1.54	1.77	0.08	3.39
%					(45.4)	(52.2)	(2.4)	(100.0)
IV. OWNER-TENANT CULTIVATORS								
-4.00	8	1.17	0.82	1.99	0.09	1.07	0.57	1.73
%					(5.2)	(61.9)	(32.9)	(100.0)
4.00-	8	4.38	3.59	7.97	1.47	3.52	0.13	5.12
%					(28.7)	(68.8)	(2.5)	(100.0)
Av.		2.77	2.21	4.98	0.78	2.29	0.35	3.42
%					(22.8)	(67.0)	(10.2)	(100.0)

Yield per ac. of Maha paddy in bu.	No of farms which sowed Yala Paddy (2)	% (2) is of (1)	Area sown under Yala paddy per farm in acres				Yield per ac. of Yala Paddy in bu.
			NHYVs %	OHYVs %	TRAD. %	TOTAL %	
29.94	11	100.0	1.05	0.46	0.36	1.87	24.60
			(56.2)	(24.6)	(19.2)	(100.0)	
56.13	5	71.4	4.02	0.95	-	5.15	21.40
			(78.1)	(18.5)	(-)	(100.0)	
47.48	16	88.9	2.03	0.61	0.25	2.89	22.86
			(70.2)	(21.1)	(8.7)	(100.0)	
24.06	8	100.0	0.83	0.30	0.68	1.81	18.58
			(45.9)	(16.6)	(37.5)	(100.0)	
38.70	8	100.0	2.97	1.74	0.38	5.09	19.20
			(58.4)	(34.2)	(7.4)	(100.0)	
35.05	16	100.0	1.97	1.02	0.53	3.49	19.04
			(56.5)	(29.2)	(14.3)	(100.0)	

The ratio of the areas under three major groups of varieties among the four tenurial groups seems to be different depending on the size of holding in each group. The smaller farms below four acres in T, TO and OT groups had relatively bigger ratios of either OHYVs or traditional varieties (TVs) or both. Since a traditional variety usually has a stronger resistance to drought than any of NHYVs, these relatively high ratios of OHYVs and TVs on smaller farms in T, TO and OT groups is examined in the latter part of this study.

In Table 2-2 the relationship between the tenurial status of cultivators and size of farm economy[1/] of each group is found.

Although there are many ways to indicate the size of farm economy the following two measures were used in this Table:

1. the size of holding in acres under operation; (AUO) and

2. the annual amount of paddy produced in bushels (AAPP)

The size of economy of Group O in terms of both AUO and AAPP, was smaller than that of Group T. But after the deduction of 25 per cent of crop shares, paid to the landlords from the AAPP of T, TO and OT groups, the size of economy of Group O in terms of the annual amount of disposable paddy (AADP) becomes the biggest among the groups, and at the same time the difference of AADP among other three tenurial groups, i.e. T, TO and OT, becomes very small.

Since the cultivator who belongs to T, TO and OT groups usually feel that their actual size of economy is decided on the basis of AADP instead of either AUO or AAPP, the difference between AAPP and AADP at each group is very important. For example, the size of holding of Group T is about 38 per cent larger than Group O, but the difference of AAPP among these two groups becomes only 11 per cent because of a lower yield per acre of Group T and after the deduction of land rent AADP of this group becomes smaller than Group O.

1/ In considering 'peasant economy' the term 'farm business' is less appropriate.

Table 2-2: Tenurial Status of Cultivators and Size of Farm Economy

Tenurial status	No of farms	Av.size of paddy holdings in acres under operation (AUO)		Size of Farm Economy: Annual amt.of paddy produced in bu.per farm (AAPP)				Size of Farm Economy: Annual amt.of disposable paddy after deduction of land rent (AADP)	
		Acres	Index	Maha	Yala	Total	Index	Bushels	Index
T	27	4.77	100.0	183.04	53.41	236.45	100.0	177.34	100.0
O	32	2.99	62.6	113.27	96.85	210.12	89.0	210.12	118.5
TO	18	3.85	80.7	160.96	58.70	219.66	93.1	170.41	96.1
OT	16	4.98	104.4	119.87	66.65	186.52	79.1	167.68	94.6

III. THE RELATIONSHIP BETWEEN WATER SUPPLY AND PRODUCTIVITY OF LAND AMONG CULTIVATORS WITH DIFFERENT TENURIAL STATUS.

Generally, a paddy cultivator continues his production under a specific combination of the two factors of tenurial status and water conditions on his paddy field. The presence of these two factors determines the resource use patterns and the efficiency of production at each individual farm. From this point of view, Table 2-1 in Section II must be modified combining the tenurial status of a cultivator with the irrigation scheme in which his paddy land is located.

In Table 3-1 all cultivators of T and O groups are classified into three sub-groups on the basis of irrigation schemes. The following are important findings from this table.

1. For both T and O farmers, the average size of holding among the three sub-groups is larger in the major irrigation scheme; it is twice as large as the rainfed.

2. The yield of Maha Paddy per acre in both T and O groups is the highest in the major schemes, less in the minor schemes, and lowest in the rainfed areas.

3. The yield of Yala Paddy per acre in different irrigation schemes has a similar performance to that of Maha paddy, but its yield difference among group T is not as large as in group O.

4. The following features exist among the size of holdings, yields per acre, and the size of economies in terms of AADP, between T and O groups which are located in the same irrigation scheme, whether major, minor, or rainfed.

	Size of holding in acres	Yield/acre		Size of Economy in AADP
		Maha	Yala	
Major Scheme	T > 0	T < 0	T < 0	T < 0
Minor Scheme	T > 0	T < 0	T < 0	T < 0
Rainfed Area	T > 0	T < 0	T < 0	T < 0

Since no big difference of the ratios of the areas under NHYVs were found in Table 3-1 among the three irrigation schemes of groupt T, the cultivators of this tenurial group were re-classified into the two sub-groups on the basis of a yield of Maha Paddy per acre (see Table 3-2).

In this Table the following two features are found in both the major and minor schemes.

1. The average size of holding in acres under operation (AUO) of the group of cultivators who have a higher yield, is smaller than that of the group of cultivators whose yield is lower.

2. The ratio of the area under NHYVs in a higher yield group is much bigger than that of a lower yield group.

If the characteristics described in the foregoing paragraphs are widely found in both major and minor irrigation schemes, water supply to each farm must be under different conditions either from field to field or from cultivator to cultivator depending on the distance from an irrigation channel or the topography of an area. Indeed water conditions in the group of owner cultivators during the flowering stage of 1971/72 Maha paddy in the Hambantota District were not only different even within the same irrigation scheme, but also varied in the different schemes (see Table 3-3). For example 50 per cent of the owner cultivators in the major schemes had their field well irrigated during this stage, while 33.3 per cent had fair conditions and the rest had poor conditions.

Table 3-1: Classification of Cultivators according to Tenurial Status and Irrigation Scheme, and related Productivity of Paddy Land.

Tenurial status of cultivator	Irrigation Scheme to which cultivator belongs	No of farms (1)	Operational holding per farm in acres	Area sown under Maha Paddy per farm in acres			
				NHYVs	OHYVs	TRAD.	TOTAL
T	Major	43	5.16	2.37	2.10	0.52	4.99
%				(47.5)	(42.1)	(10.4)	(100.0)
-do-	Minor	22	4.59	1.68	2.11	0.16	3.95
%				(42.5)	(53.4)	(4.1)	(100.0)
-do-	Rainfed	5	2.33	0.90	1.33	-	2.23
%				(40.4)	(59.6)	(-)	(100.0)
O	Major	12	3.83	1.13	2.44	0.25	3.82
%				(29.6)	(63.9)	(6.5)	(100.0)
-do-	Minor	15	2.06	0.80	1.06	-	1.86
%				(47.0)	(57.0)	(-)	(100.0)
-do-	Rainfed	5	1.90	-	0.78	0.90	1.68
%				(-)	(46.4)	(53.6)	(100.0)

Yield per acre of Maha Paddy in bu.	No of farms which grow Yala Paddy (2)	% (2) is of (1)	Average area sown under Yala Paddy in acres	Yield per acre of of Yala Paddy in bushels	Annual amount of Paddy produced per farm in bushels	Annual amount of Paddy Produced after deduction of land rent in bushels
41.80	31	72.1	4.22	24.50	283.12	212.34
32.42	14	63.6	2.09	23.19	158.89	119.17
17.96	4	80.0	2.35	6.17	53.45	40.09
53.67	12	100.0	3.90	50.26	401.03	401.03
41.51	9	60.0	1.88	26.92	100.58	100.58
19.82	4	80.0	1.66	18.83	65.36	65.36

Table 3-2: Classification of Tenant-Cultivators According to Yield per Acre of Maha Paddy

Yield per acre of Maha Paddy in bushels	No of farms	Average Size of operational paddy holdings in ac.	Average area sown under Maha Paddy per farm in ac.			
			NHYVs	OHYVS	TRAD.	TOTAL
Major Irrigation Scheme						
-40.0	19	5.39	1.00	3.05	1.24	5.29
%			(18.9)	(57.7)	(23.4)	(100.0)
40.0-	24	4.98	3.46	1.35	-	4.81
%			(71.9)	(18.1)	(-)	(100.0)
Average	43	5.16	2.37	2.10	0.52	4.99
%			(47.5)	(42.1)	(10.4)	(100.0)
Minor Irrigation Scheme						
-40.0	7	4.70	1.11	2.63	0.23	3.97
%			(28.0)	(66.3)	(5.7)	(100.0)
40.0-	15	4.35	2.89	1.00	-	3.89
%			(74.3)	(25.7)	(-)	(100.0)
Average	22	4.59	1.68	2.11	0.16	3.95
%			(42.5)	(53.4)	(4.1)	(100.0)

Yield per acre of Maha Paddy in bushels	No of farms which grow Yala Paddy	Average area sown under Yala Paddy in acres	Yield per acre of Yala Paddy in bushels
22.15	13	4.38	20.40
58.61	18	4.10	27.66
41.80	31	4.22	24.50
21.44	7	3.02	19.54
56.52	6	3.65	27.03
32.42	13	2.09	23.19

Table 3-3: Difference of Water Supply among Owner Cultivators - 1971/72 Maha

Irrigation Scheme	No of farms	Yield of Maha paddy per ac. in bu.	Water supply during flowering stage				No of farms which grew Yala Paddy	Yield of Yala Paddy per acre in bu.
			Good	Fair	Poor	Total		
Major Scheme	12	53.67	6	4	2	12	12	50.26
Minor Scheme	10	41.51	2	5	3	10	9	26.92
Rainfed Area	5	19.82	-	2	3	5	4	18.83

Thus, the difference of productiviy of land among cultivators who have the same tenurial status in the same irrigation scheme has been mainly caused by irregularity of the condition of water supply. This is also true of the difference of productivity of land in T group.

IV. THE DIFFERENCE IN RESOURCE USE PATTERNS AND INCOMES AMONG CULTIVATORS WITH DIFFERENT TENURIAL STATUS.

The Yala 1972 was one of the worst crop season in the Hambantota District for the last ten years. In spite of a general crop failure throughout the district, there was still a very wide difference in yields per acre of Yala Paddy between T and O groups even in the same irrigation scheme. According to Table 4-1 owner cultivators in all three sub-groups had a higher yield than that of tenant cultivators. The most interesting and important feature of the above difference could be found by a comparison of T and O groups located in the major irrigation schemes. The following are the findings of this aspect from Table 4-1.

1. The average yield of Yala Paddy per acre in group O was more than twice as big as group T corresponding to (1-i) and (1-ii) described below.

   (1-i) Per acre application of hired labour and fertilizer in group O was much bigger than that of group T. A very big difference was found especially in per acre fertilizer application.

   (1-ii) The cash share of farm expenses in group O was much bigger than that of group T, but per acre total expenses of the latter was much bigger than that of the former group.

2. The above mentioned difference of the yield and related farm expenses caused a big difference in the family farm earnings between these two tenurial groups, i.e. family farm earnings per acre in group O were Rs. 315/- against - Rs.164/- in group T.

There are several possible reasons why the cultivators in group T usually have to bear more expenses in kind than those in group O. Among them the following might be considered the most important.

Table 4-1: Classification of Cultivators According to Tenurial Status and Irrigation Scheme, Yala 1972, Hambantota District.

Tenurial status and irrigation scheme	No of farms	Av.size of paddy holding in ac.	Av.Area sown under Yala Paddy in bu.	Av.Yield per acre of Yala Paddy in bu.	No of days of H.L.per acre of Yala paddy 1/
Tenant Cultivators:					
Major scheme	31	4.77	4.18	27.74	19.2
Minor scheme	13	3.96	3.15	26.00	14.1
Rainfed	4	2.47	2.35	6.17	17.0
Av.of T.C.	48	4.00	3.74	24.10	18.0
Owner Cultivator:					
Major scheme	10	4.00	3.70	52.97	25.6
Minor scheme	7	2.38	2.13	30.56	15.6
Rainfed	4	2.06	1.66	18.86	9.4
Av.of O.C.	21	3.09	2.80	43.21	21.2

Note: 1/ H.L. - Hired Labour

Note: 2/ Family farm earnings = The value of Yala Paddy Produced - Farm Expenses

Fertilizer applied per acre of Yala Paddy in Rs.	Farm Expenses per acre of Yala Paddy in Rupees			Family Farm earnings per acre of Yala paddy in Rupees 2/
	In Cash	In Kind	Total	
34.42	230.28	322.42	552.70	- 164.34
13.83	248.04	133.14	381.18	- 17.18
11.23	188.84	19.48	207.32	- 120.94
24.23	232.16	139.80	371.96	- 34.56
53.00	392.16	34.72	426.88	314.70
32.70	219.02	23.28	247.30	180.54
10.69	160.11	24.78	184.89	79.15
41.64	304.44	31.92	336.36	268.58

Table 4-2: Tenurial Status of Cultivators, Composition of Household Members and Incomes from Other Crops and Outside Employment 1971 - 1972

Tenurial status	No of farms	Total household members per farm	Household Members Over 14 Years Old				
			Members engaged only in their own farms	Members engaged in their own farm work as well as outside employment	Members engaged only in outside employment	Others 1/	Total
T	77	7.7	3.2	0.8	0.2	0.2	4.4
O	32	6.3	2.9	0.7	0.2	0.3	4.1
TO	18	7.7	3.5	0.6	0.2	0.2	4.5
OT	16	7.4	3.0	0.7	0.4	0.2	4.3

Note: 1/ Include unemployed and students

Incomes per Farm in Rupees From:			
Other Crops than Paddy	Livestock	Outside Employment	Total
113.18	12.86	123.18	249.22
437.30	33.93	496.03	967.26
231.78	1.44	366.67	599.89
214.88	32.19	608.75	855.82

Table 4-3: Yield/ac. of Maha Paddy and Major Source of Power for Land Preparation, Hambantota District, 1972

Yield/ -ac Maha Paddy in Bu.	No of farms	Number of farms which used 2W,4W and Buffaloes for land preparation					Average size of Paddy Holding
		Two wheel tractor	Four wheel tractor	Buffa-loes	Manual labour	Total	
-20.0	47	22	10	12	3	47	5.19
(%)		(46.8)	(21.3)	(25.5)	(6.4)	(100.0)	
20.0- 40.0	53	21	16	10	6	53	4.36
(%)		(39.6)	(30.2)	(18.9)	(11.3)	(100.0)	
40.0- 60.0	30	17.5	7.5	5	-	30	4.78
(%)		(14.5)	(25.0)	(16.7)	(-)	(100.0)	
60.0-	23	14.5	6.5	1	1	23	3.78
(%)		(62.9)	(28.3)	(4.4)	(4.4)	(100.0)	
Total	153	75	40	28	10	153	4.51
(%)		(49.0)	(26.1)	(18.1)	(6.5)	(100.0)	

Table 4-4: Tenurial Status of Cultivators with Two/Four Wheel Tractos and Buffaloes, 1972 - Hambantota.

Tenurial status of cultivators	No of farms	No of farms which have			Total No of 2W, 4W and Buffaloes, which belong to each tenurial group		
		2W Trac-tors	4W Trac-tors	Buffaloes	2W	4W	Buffaloes
T	77	2.5	-	6	3.5	-	38
O	32	3	1	2	5	1	23
TO	18	2	-	1	2	-	24
OT	16	1	-	2	1	-	33
TOTAL	143	8.5	1	10	11.5	1	118

One reason is, needless to mention, due to the practice of crop share, and the other should be due to poor economic conditions of this group. As already examined, the yield of both Maha and Yala Paddy of this group is usually much lower than that of Group O, and their income from other crops and livestock as well as outside employment are the smallest among the four tenurial groups (see Table 4-2). Smaller incomes of group T from highland crops and outside employment result mainly for their social status by virtue of the fact that their size of holdings under highland is smaller than other groups (see Table 4-2) and most of their outside jobs are non-professional.

If this is a general characteristic of group T in comparison to other tenurial groups, the economic status of this group among paddy cultivators is at the bottom of this scale of rural poverty, and if this status is accepted, it could be safely assumed that the household economy of most cultivators in this group is under the vicious circle. Many of them are defaulters of loans and credit, and most of them cannot receive any cultivation loans for the next crop season from a Co-operative or Rural Bank. Thus, when they want to hire labourers for field operations or get fertilizer and agro-chemicals, they cannot pay in cash at the required time. Hence payment for labourers and traders, from whom the necessary requirements are obtained, are in paddy with interests after harvest.

In addition we have also to mention that the present pattern of distribution of tractors and buffaloes among cultivators makes payment in kind more popular by a poor group. According to Table 4-3, ploughing operations of 75 percent of Hambantota Paddy cultivators are done by two-wheel or four-wheel tractors, 18 percent by buffaloes, and the rest by mammoties. But very few cultivators own tractors and buffaloes (see Table 4-4). This suggests that tractor owners are non-cultivators, i.e. traders and relatively bigger landlords, and buffaloes are owned by a small number of cultivators who are in a position to use land and water for grazing. For example, among 77 tenant cultivators in Table 4-4, only six have buffaloes, but the total number of buffaloes belonging to them is 38. The same feature of buffalo ownership is found among other tenurial groups. This pattern of buffalo distribution means that the majority of cultivators cannot keep or are not interested in keeping buffaloes, on the other hand at ploughing and threshing times they must hire tractors or at least buffaloes for payment in kind. This is especially true of the cultivators in Group T.

Therefore the difference in resource use patterns and earnings among cultivators with different tenurial statis is a matter beyond their abilities and aptitudes. It is a social fact that cultivators are governed by their position in rural society.

CONCLUSION

The aim of this paper was to find the difference in productivity of land among Paddy cultivators in relation to their tenurial status and environmental conditions, particularly irrigation.

It was found by analysis of the Hambantota District that there is a very big difference in yield per acre farm expenses and related family farm earnings between T and O groups, even in the same irrigation scheme. In fact in the major irrigation scheme's yields per acre of 1971/72 Maha and 1972 Yala paddy of group T were 12 and 24 bushels less than those of group O respectively (see Table 3-1). As far as Hambantota paddy cultivators are concerned, their yield of paddy per acre has been mainly determined by their tenurial status in each irrigation scheme, and it appears that there is little room for tenant cultivators to apply themselves for increasing the efficiency of production. Further, the fact that the holding size of this tenurial group is usually bigger and that the ratio of tenants to owner cultivators is 3.5 to 1.0 (see also Table 3-1), one could easily imagine the potential increased contribution to national output by this group in the major irrigation schemes under effective rent regulation or a transfer of ownership to the cultivator.

Two immediate possibilities suggest themselves as alternatives for improving productivity in the paddy sector where peasant farming is dominant. The first is a strict enforcement of rent regulation, with rents fixed at a level which motivates the tenant farmer to apply the requisite inputs to increase paddy production to a level at least comparable with the average owner cultivator. The implementation of the Paddy Lands Act and its Amendments would appear to have largely failed in this respect, and prospects for future rent regulation of a land-to-the-tiller policy appears to offer brighter prospects, although here again the problems of implementation must not be under-estimated. In cases of large paddyland ownership, which is relatively rare in Sri Lanka, the establishment of cultivator status is easier than in the many small landlordships - often shared between co-owners, subject to family obligations or collectively involved in complex traditional tenurial rights. It is not the place of this study, covering as it does only a relatively small sample of farmers in one of Sri Lanka's several agro-climatic zones, to suggest the course of national policy making. (We believe our analysis could, however, be applied to many dry zone districts except perhaps those dominated by large settlement schemes).

We establish by the analysis of Hambantota Paddy cultivators, that the present tenurial arrangements act as fundamental obstacles to an increase in production efficiency in this area. Land is the basic resource of agricultural production and its ownership pattern could be the most crucial factor affecting existing land utilisation and national output.