

TENDENCIES OF SOCIAL DIFFERENTIATION IN MAHAWELI H-AREA — THE IMPACT OF THE NEW RICE PRODUCTION TECHNOLOGY

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Introduction

Many Third World countries have considered land settlement schemes as a suitable solution to the political problems of increasing poverty, landlessness and unemployment in the rural sector. Wherever spare land is available, more radical programmes of land reform can be avoided or at least postponed by adopting such a strategy.¹ A further political reason is the stabilizing effect that most governments expect from increasing the class of independent land-owning peasants, particularly in politically unstable parts of the country.

Although the high costs of land clearing, site preparation, settlement and provision of irrigation infrastructure adversely affect the rate of returns, financing agencies are not difficult to be found. Land settlement programmes perfectly fit into the “redistribution-with-growth” — strategy of the World Bank and other donor agencies.² Apparently, these schemes (a) contribute to increase the total agricultural production of the country, and (b) give relief to the situation of at least part of the underemployed and landless rural labour force without harming the interests of landed capital.

This article puts forth the argument that an accelerated process of social differentiation, which is contrary to their philosophy, is inherent to this kind of peasant colonization. The spreading of capitalism in agriculture is favoured by the new (rice) production technology and finally leads to the proletarianization of many of the settlers while a few farmers grow and prosper. This phenomenon is demonstrated at the empirical example of early settlements in the Mahaweli scheme.

Peasant Colonization and Rice Production Technology

In Sri Lanka, land settlement has a long tradition, dating back to colonial times when the British rehabilitated the old Kalawewa in 1890. Since 1935, with

1 LIPTON, M., 1974 *Towards a Theory of Land Reform*: LEHMANN (ed.), *Agrarian Reform and Agrarian Reformism*, London: 278.

2 CHENERY, et al., 1974, *Redistribution with Growth. Policies to improve income distribution in developing countries in the context of economic growth — a joint study by the World Bank's Development Research Centre and the Institute of Development Studies*, London.

the introduction of the Land Development Ordinance (L.D.O.), land colonization has played an important role as a rural development strategy in Sri Lanka. This policy was based upon the principle of alienating small to medium-sized allotments to poor and landless people from rural areas of the Wet Zone. Any kind of disposition of lands alienated on a L.D.O. permit was prohibited. Selling, leasing as well as sub-dividing the holding among successors were strictly prohibited and led to a cancellation of the grant or permit. In case of credit default, mortgaging the holding was only allowed to a State Bank or to a Cooperative Society. With a few minor amendments these rules have continued to be valid in the Sri Lankan colonization schemes up to the present day.³

Since Independence in 1948, this policy of Dry Zone colonization was emphasized by every government. Owing to high costs and diminishing reserves of cultivable lands, incentives for the settlers were successively reduced. The plot sizes in the case of the Mahaweli scheme are thus only 2.5 acres (1 ha).

The Government's priority for irrigation settlement has only recently begun to show tangible results in increasing overall paddy production. Formerly, settlement schemes "often register(ed) disappointingly low output levels" and "average yields... proved to be considerably lower than the national average"⁴. But since irrigation was combined with the potential of the new rice production technology the expectations have been better met. As shown in Table 1, yields reported in the major irrigation schemes have been significantly higher than the national average. This holds true in particular for the two most important schemes recently implemented — Kalawewa (System H, Mahaweli Development Area) and Uda Walawe. Minor irrigation schemes, mainly village tank small-scale irrigation, and rainfed cultivation predominantly practised in the Wet Zone register below average yields, which are due to relatively high percentages of double cropped land. Much of the yield performance in these new schemes is explained by the fact that high yielding varieties of rice account for almost 100% of the area sown. The same source also reveals that tractor ploughing — at least in Mahaweli H-Area — by far outstrips other forms of field preparation that are still prevalent on national average.

3 GOVERNMENT OF CEYLON, 1935, Land Development Ordinance No. 19 of 1935, Chapter 464. Colombo, Reprint 1970; amended by the Land Grants (Special Provisions) Act No. 43 of 1979 and the Land Development (Amendment) Act No. 27 of 1981.

4 DUNHAM, 1982, Politics and Land Settlement Schemes in Sri Lanka. *Development and Change*, 13/1: 46.

TABLE 1
Production Characteristics of Irrigated Settlement in Sri Lanka (Maha 80/81)¹

Type of water supply	Total extent cultivated (hectares)	Area under new HYV's in % of total	Tractor-ploughed extent in % of total	Double-cropped extent in % of total	Yields	
					kg/ha	In % of nation. average
Kalawewa ('H) Uda Walawe	21,000	99.5	71.9	62.0	4,641	147.6
	9,200	99.5	43.5	94.4	4,383	139.4
Major Irrigation Minor Irrigation Rainfed	257,621	n.a.	n.a.	66.9	3,929	125.0
	178,103	n.a.	n.a.	38.6	3,101	98.6
	271,085	n.a.	n.a.	41.5	2,373	75.4
Sri Lanka Total	706,809	75.2	48.8	49.7	3,144	100 %

¹ Calculated after: MINISTRY of AGR. DEV. and RESEARCH, Agricultural Implementation Programme, 1981-82. pp. 4, 8, 12.

The difference in soil quality between the recently opened up lands and the old lands, which are cropped for long periods of time, does certainly not explain this productivity gap. It is rather the difference in the adoption rates of the new production technology. In theory, the new production inputs should be accessible everywhere in the country in the same way. Why have they been applied in the settlement schemes to a greater extent than elsewhere? Mainly, there are three possible answers to this question:

First, the complementary character of the technological package implies that the effectiveness of the new production technology highly depends on the reliability of the irrigation water supply to the paddy fields. Only where water is available in abundance can the modern varieties, supplemented with fertilizer application and pest control, be recommended for their high yield potential. This reliability of water supply is by far higher in the big irrigation schemes.

Second, in settlement schemes in general, special efforts are made regarding access to the required agricultural inputs as well as to credit schemes for purchasing these inputs in the quantities needed. Government agencies maintain a dense network of agricultural extension services, irrigation administration and management staff, bank branches and input supply kiosks.

Third, the alienation of small holdings to former tenants and landless people frees them from their feudal burden. But, at the same time, it provides the preconditions for a new social differentiation. The de facto peasant freehold allows an emerging class of progressive farmers to expand their operational holding sizes. This process is stimulated as the latter take full advantage of the new technology they employ. Furthermore, they usually have better access to technical know-how and to the necessary farm inputs and credits.

These points show that colonization schemes considerably ease the spreading of the new technology. The application of the complete technological package has to be made an integral part of the settlement policy in order to justify the immense capital investment with reasonable incremental benefits. A high-cost technology at the project level requires a high-yielding technology at the micro-level. But this technology also exerts an influence on the social stratification among those making use of it. There are those who can gainfully employ it, but also those who lose as they are obliged to use it without being able to bear the risk. The risk inherent to the new production technology is even more pronounced due to common design standards of irrigation schemes: the command area for irrigation schemes in Sri Lanka is calculated to be sufficiently served with irrigation water in only four out of five years.

Social Organization of Agricultural Production Before and After Resettlement

In order to understand these differences in the adoption pattern for the innovations it may be helpful to look at the social organization of agricultural production existing in traditional Sri Lankan villages as compared to the new settlements. The case material presented here is based on field studies of the relocation of Kotmale reservoir area evacuees in the years 1980 and 1981/82. Naturally, the empirical evidence produced then would need to be followed up by further studies. For the time being, we can only indicate the trends observed by then.

The Social Organization of Agricultural Production in the Traditional Village

Kotmale is one of the major dam and reservoir projects of the Accelerated Mahaweli Programme. When construction works started at the entrance of Kotmale valley in 1979, the village "Dorakadagama", directly located at the future dam site, had to be evacuated immediately.

Due to caste segregation all Dorakadagama villagers belonged to the *Govigama* or cultivator caste which ranks highest in the Sinhalese hierarchy of castes. But a stratification along caste barriers is not clearly distinguishable in the traditional villages of the Kandyan heartlands.⁵ It is landed property rather than caste status that determines village hierarchy. So, the high-ranking *Govigama* of Dorakadagama, as in other Sinhalese villages, were considerably unequal in terms of wealth, land-holdings and occupation; they included wealthy landlords as well as landless labourers and poor share-croppers, school teachers as well as small traders.

Already in 1840, the Waste Lands Ordinance had expropriated the Sinhalese peasantry in favour of the foreign plantation economy and reduced their sphere of independent production to the mere bottom of the valleys.⁶ Since then, the remaining village area had been characterized by petty commodity production in small peasant proprietorship. Trade and transport were monopolized by traders from outside the village who dominated the exchange relations.

5 GUNASINGHE, 1980, Politics and Primordial Relations. In: *Social Science Review* 2:201 ff; this is even so in Hinduist village society, cf. KANTOWSKY, 1971, Aspects of Social Mobility in India. In: *Internationales Asienforum*, 2/4: 177; or: BETELLE, A., 1965, Caste, Class and Power — Changing Patterns of Stratification in a Tanjore Village. Berkeley.

6 DAWOOD, 1980, Tea and Poverty — the Political Economy of Sri Lanka. Hongkong: 43ff.

The major source of income for most of the peasant households in Kotmale was the cultivation of uplands. The average plot size of own uplands in the Dorakadagama sample was 2.2 acres. On those, the Kotmale peasants pursued a highly diversified production pattern. The general agricultural pattern was characterized by a high degree of diversification that has recently, under the label of "mixed cropping", become fashionable in the development debate. The cash crops grown included tea, coffee, arecanut, cloves, cardamom, pepper and sugar palm. Apart from tea, coconut occupied the major share of the Dorakadagama uplands. Being the second most important item of the Sri Lankan diet, it was exclusively grown for home consumption.

The same holds true of paddy. The paddy fields that cling to the steep slopes consisted of plots too tiny to allow the use of animal draught power — not to think of tractors — without destroying the bunds and terraces. The fields were predominantly prepared by hoe; the use of animals was mainly restricted to threshing operations.

The average size of own paddy fields was 1.2 acres per family with a fairly uneven distribution. About one fourth of the sample households did not report any own paddy lands at all. Without considering the land of absentee landlords, 7% of the households held almost one third of the total paddy lands of Dorakadagama. Share-cropping or *ande* tenancy was a common feature of paddy cultivation in the old village. Absentee landlordism accounted for 31% of the total paddy area cultivated by the sample households in Dorakadagama. The Paddy Lands Act of 1958 had officially limited the landlord's share to 25% of the yield. Nevertheless, most of the Dorakadagama sharecroppers included in our sample reported the traditional half-share of the net-harvest.⁷ 16% of the sample households were pure share-croppers who can doubtlessly be classified as poor and bonded. A further 38% held one rented acre of paddy plus one additional acre of own land.

The cultivation of paddy in Kotmale revolved primarily on a traditional system of exchange labour known as *attam*. This traditional cultivation practice was pursued as mutual help for field preparation, sowing and harvesting among neighbours and relatives, and is reported to have extended even beyond caste barriers.⁸ This traditional system, however, was, during the 1960s and 70s, increasingly supplemented by the use of hired labour.

The degree of adoption of modern farming practices with regard to rice cultivation was still fairly low. Most of the rice terraces were under paddy only.

7 DIAS/GUNERATNE, 1975, Land Settlement and Tenure in Kandy district. ARTI Research Study Series No. 7: 38.

8 ROBINSON, 1973, Political Structure in a Changing Sinhalese Village. Cambridge: 64ff.

once a year, during the *Maha* season between September/October and February/March. Among the varieties grown, the old improved varieties such as H4 dominated. Old, indigenous varieties with a 5-7 months maturing period were still common, too. During the *Yala* or minor season the fields were most often left fallow or cultivated with vegetables that require far less water than paddy. Organic substances such as cow dung or leaves was used as the only manure.

Despite these general features, it has also to be seen that in the traditional up-country villages the high-input/high yielding rice production technology was at the threshold of general acceptance. It is only because of the structural conditions which we tried to outline above that the adoption rate is lower than in new settlements.

Summarizing the social relations in the old village it is to be noted that the majority of the Dorakadagama households were predominantly engaged in self-employed cultivation. The majority of the Kotmale peasants earned their livelihood from a mainly export-oriented petty commodity production — though along the lines of a low-input technology. Apart from this, basic subsistence was guaranteed by the traditional cultivation of paddy on steep terraces and coconuts and vegetables grown in the homesteads. Occasionally, they also had to accept additional work as hired labourers, often on one of the nearby tea estates. Among the villagers, feudal and semi-feudal forms of labour mobilization and surplus extraction were still prevailing. Although mechanisms favouring social differentiation were already in operation, those favouring demographic differentiation were still likely to dominate.⁹

The Social Organization of Agricultural Production After Resettlement

Changing Social Relations After Resettlement

In 1979, when Dorakadagama had to be evacuated, the villagers were offered the choice to be resettled either in Mahaweli H-Area or on a nearby tea estate as tea small holders on a plot of two acres. More than 80% opted for the Mahaweli colonies.¹⁰ The case material presented here is only related to the first 200 Kotmale families resettled in one irrigation unit in Mahaweli H-Area. Hereafter, we shall refer to this place as “Alutgama”, the “new village”. The empirical data was gathered during a six-months’ stay in the village in the Maha season 1981/82.

9 LEHMANN, 1977, *Agrarian Structures and Paths of Transformation*. In: *Journal of Contemporary Asia*, 7/1: 84.

10 BULANKULAME, 1979, *A Study on the Socio-Economic Conditions of the People and Area to be Submerged by the Kotmale Reservoir*. Mahaweli Development Board, Colombo: 5.

The abrupt environmental change and the compulsory character of the relocation of the reservoir evacuees is supposed to considerably prolong the "transitional period" of social and economic adaptation.¹¹ This transitional period is expected to be shorter in the case of voluntary settlers, and shortest in the case of the *purana* or old villagers who are incorporated in the settlement scheme without having to leave their known environment. For the latter, the settlement process is similar to a land consolidation or land reform programme. Only the agricultural and social organisation of production changed, but not the physical habitat. The traditional relation between landlord and tenant or between employer and labourer known to each other for a lifetime¹² were turned into relations between landowners of equal pieces of land within the same irrigation organization. At the same time, the traditional *Chena* cultivation (slash-and-burn cultivation) had to be given up in favour of an intensive irrigated paddy cultivation.

Our empirical findings suggest that settlers coming from outside, including the reservoir evacuees, had in general better chances of adapting to the new situation. In spite of the undoubted stress, the relocatees had even some sort of psychological advantage. To them, the change between their former habitat and the new environment was complete. They physically realized that their old community in Kotmale was gone and would soon be submerged. Many of them felt unhappy in the Mahaweli scheme, but had no choice but to make the best of it.

The *purana* villagers, on the other hand, were also compulsorily involved in the Mahaweli scheme, but were allowed to stay in their old villages. This is why most of them found it difficult to adapt to the new situation. Another factor may be that before resettlement they had hardly been integrated into the commercialized market economy at all.

Other factors favouring the good start of the Kotmale settlers in comparison to their fellow settlers include the due payment of compensation for lost property. Many of them invested this money in agricultural means of production such as hand-tractors, buffaloes, or water pumps. In addition, they were known as good paddy cultivators and proved this reputation to be true in the new environment.

11 SCUDDER, T., 1980, Mahaweli Development and Compulsory Relocation. SCUDDER, 1980, The Accelerated Mahaweli Development Programme: Some Issues of Settlement. Colombo.

12 For an example see BROW'S studies on Kukulewa, a *purana* village in the area: BROW, J., 1978, The Changing Structure of Appropriation in Veddah Agriculture. *American Ethnologist* 5/3: 448ff; and: BROW, J., 1980, The Ideology and Practice of Share Cropping Tenancy in Kukulewa and Pul Eliya. In: *Ethnology* 19/1: 47ff.

The New Pattern of Agricultural Production

The irrigation agriculture of the Mahaweli colonies is based upon a highly commercialized cultivation pattern. Paddy, which has become the dominant cash crop of the settlers, is cultivated exclusively by using the new HYVs.

According to the official Mahaweli cultivation time table for the Maha season 1981/82, water from Kalawewa was to be released to the irrigation canals by October 15, 1981. From then on, water should have been supplied daily to the fields for a period of one month. During this time, the farmers were expected to complete field preparation and to have established a nursery of paddy seedlings. But in many cases, the farmers' own cultivation schedule lagged considerably behind. Although Mahaweli officers pretended that water was released even ahead of schedule, it reached the fields of those at the tail-end of the main canal with substantial delay; for Alutgama, this time-lag was about one week. But the farmerstoo have to be blamed for the delay in cultivation. Even after the water had arrived, many did not start immediately. This was due to other problems farmers had to solve before they could start to cultivate. They had to look for draught power and hired labour, and had also to find the means to pay for the production costs.

It becomes evident that the time restrictions imposed by the irrigation system have a crucial impact on cultivation practices and farmers' performance. Those lacking finance most easily become too late and consequently undergo a much bigger risk than the early cultivators. Such a tight schedule, on the other hand, is required to optimize the overall functioning of the irrigation system and to achieve the high cultivation intensity aimed at. For the farmers, the strict cultivation schedule of the irrigation scheme forms a strong impetus for mechanized tilling. The use of draught animals is supposed to take up to ten times as long as ploughing by use of mechanized draught power.¹³

Relating the technique for field preparation to the average yields it becomes clear how the irrigation system and the new production technology are pushing for mechanization. Table 2 elucidates that farmers who used a tractor for field preparation achieved significantly higher yields than those using animals. Only in Yala 1981, when the farmers were restricted to cultivate only half of their plots with paddy while the other half had to remain fallow, this pattern was overlapped by the considerable difference between own and hired farm power. But in both Maha seasons considered here, even the ones who hired a tractor achieved better results than owners as well as mere users of buffaloes. In draught-affected Maha 1981/82, tractor-ploughed fields yielded on average

13 For one hectare ABEYRATNE/FARRINGTON/RYAN estimate 20 days if done with a pair of buffaloes, 20 hours for a hand-tractor, and 12 hours for a four-wheeled tractor. (ABEYRATNE/FARRINGTON/RYAN, 1981, *Animal Draught Power the Economics of Revival*. ARTI, Colombo).

155% of what was achieved on fields tilled with animal power. This is undoubtedly to be attributed to the superior timeliness of mechanized tilling.

TABLE 2

Types of Field Preparation and Yield Differentiation

Yields in t/ha	B U F F A L O E S			2 W — T R A C T O R		
	Own	Hired	Total	Own	Hired	Total
Maha 80/81	4.2	3.7	4.1	5.5	4.2	4.5
Yala 81	2.2	1.7	2.0	2.4	1.7	1.9
Maha 81/82	1.8	1.2	1.5	3.2	2.1	2.3

It has to be seen that the Kotmale resettlers were in a relatively favourable position as compared to their fellow settlers. Being liberally compensated as many as 47% disposed of their own farm power (7% had a two-wheeled tractor and 40% had a pair of buffaloes). Only the remaining half of the settlers had to depend on hiring draught power.¹⁴ In Yala, the majority of them preferred to hire a tractor. In Maha 1981/82, this proportion changed dramatically. Of 53 sample farmers, 13 hired buffaloes and 15 opted for a tractor. This reversal has to be seen in the light of the different forms of rent payments. After a successful Maha 1980/81 season, most farmers were able to afford direct cash payments for rented draught power. Yala 1981, however, was a poor season. Due to water shortages the area productivity was low, although only half of the plots was served with irrigation water at all. The resulting lack of working capital for the next season drove many farmers to look for hired animal draught power that could be paid for in kind after the harvest.¹⁵

14 In other Mahaweli villages the farmers' dependency on hired draught power is much greater; in Midellewa, a village studied by SIRIWARDHENE (1981, *Emerging Income Inequalities and Forms of Hidden Tenancy in the Mahaweli H-Area*, People's Bank Monograph, Colombo: 41), it is almost total, and in Thoranagama, studied by TILAKASIRI (1979, *Water Rights and Irrigation Practices: A Study of Thoranagama Hamlet in the Mahaweli Development Area*, Sri Lanka. People's Bank Study Papers, Colombo) only 7% had their own farm power (figures from Maha 1979/80).

15 This is the reason why 95% of the relatively poor Midellewa settlers preferred to hire buffaloes instead of tractors. (SIRIWARDHENE, 1981, *op.cit.*: 41).

But mechanization also began to encompass other fields of agricultural production in the new set-up.¹⁶ At the end of Yala 1981 the use of buffaloes for threshing was still a common practice. Six months later it had virtually vanished. Threshing operations after the dry Maha season 1981/82 were almost exclusively done by four-wheel tractors' hired from outside tractor-owners. Some farmers even used a (hired) two-wheel tractor for fanning in order to finish winnowing in times of calm. Within a few months an area with a notorious shortage of money had turned mechanized threshing and winnowing into high cash inputs of agricultural production.¹⁷

Due to the extreme scarcity of irrigation water during Yala 1981 and Maha 1981/82 a few Alutgama settlers already began to invest in kerosene water pumps and hosepipes for additional lift irrigation. Three farmers had already bought such implements, two more intended to do so after having received the last compensation instalment. These pumps after, having served their owners' fields wherever possible, were hired out during the final stages of the drought in Maha 1981/82. However, as the rent was due in cash and in advance, most farmers could not afford their crop to be saved by pumping water.

Systems of Labour Mobilization

The traditional paddy cultivation, relying exclusively on family labour and reciprocal help among the villagers, became virtually impossible in the Mahaweli colonies. Again, the major reason for this is the time constraint of irrigation organization and the cultivation time table. All the settlers have to pursue and complete the same kind of activities at about the same time and within a very short period. Therefore, it becomes impossible to jointly finish cultivation operations in successive fields as had been common in the old village. Work has now to be done simultaneously. Given the labour requirements of modern paddy farming with its distinct peaks, family labour proves to be completely insufficient. According to our observations, *attam* help only remained available for harvesting and, in times of crisis, for irrigation operations, but not for other operations during the cropping season. We even suspect that harvesting in Maha 1981/82 was an exceptional case, since yield prospects were rather low because of the drought.

16 For a general discussion of the interrelation between the new technology and mechanization, see: BYRES, T., 1979, *The New Technology, Class Formation and Class Action in the Indian countryside*. In: *Journal of Peasant Studies* 8/4: 411ff; or, from a different angle: AHMED, I., 1974, *Green Revolution with or without Tractors: the Case of Sri Lanka*. In: *Marga* 2/3: 64ff.

17 One reason for this might have been the urgent need for cash. Because of that many needed the job to be done as quickly as possible, no matter the cost, in order to be able to sell their produce.

In the Mahaweli scheme the labour requirements for 1 ha of paddy is supposed to amount to 175 person-days.¹⁸ The labour input naturally varies from farm to farm and depends on cultivation practices, the availability of family labour, and the size of the cultivated area. On an average the total labour input increased considerably when compared to the organization of paddy cultivation in Kotmale. The increase was especially noticeable for transplanting and crop care, less so for field preparation and for harvesting.¹⁹ This general increase had to be met predominantly by hired labour which is of special interest here.

In Maha 1981/82, the average hired labour input per hectare in our Alutgama sample was 83 person-days, with a standard deviation of 41 days. Only two farmers managed without any hired labour at all; four reported more than 150 days. Due to the limited area cultivated, the Yala 1981 figure was only 58 hired-labour-days per hectare. About 43% of the wage labourers employed were women, 57% were men. This is due to the specific division of labour: field preparation, fertilizer application and spraying are done by men, transplanting and weeding is women's work. Harvesting is performed by both. Since the proportion of land to be transplanted can be varied and weeding be done by using herbicides the labour demand for females is much more variable than for males.

The relatively high levels of labour input in the Mahaweli area cannot be met by the labour force available within the project area. The Alutgama settlers responded to this labour shortage mainly by recruiting male labourers from their places of origin, i.e. from the Kotmale valley. Female labour was sufficiently available, mainly from neighbouring villages. Transplanting was often performed by gangs of women labourers on a contract basis.

Tendencies of Social Differentiation in Mahaweli H-Area

Emerging Differentiations in Operational Holding Sizes

The size of agricultural holdings, or land as the primary means of production, can be taken as one of the most important indicators for social differentiation in a rural environment. Differentiations in operational holding

18 ABEYGUNAWARDANE, 1979, Employment and Output in the Mahaweli Settlements. Paper presented at the "National Seminar on Labour Employment, Resource Mobilization, and Basic Needs through Local Level Planning in Sri Lanka", Colombo: 105; and: WICKREMASEKERA, 1981. Aspects of Labour Use in Paddy Cultivation in Land Settlement Schemes. Paper presented at a "Seminar on Land Settlement Experiences", Colombo: 23ff.

19 See the comparison of labour requirements for paddy production in pre-HYV and post-HYV periods in: ABDUL HAMEED, 1977, Rice Revolution in Sri Lanka. UNRISD, Geneva: 102f.

sizes in peasant colonization schemes are even more remarkable than elsewhere since any disposition of land alienated under L.D.O. regulations is restricted by current legislation. For its supposed protection of the peasant freehold the L.D.O. is considered "one of the best conceived charters for family farm settlement policy".²⁰

Due to the delicate character of the question, only limited knowledge about transactions of L.D.O. lands in settlement schemes has been available to date. It was only through the comprehensive research undertaken by TILAKASIRI and SIRIWARDHENE in the Mahaweli area,²¹ that this problem was studied with satisfactory empirical depth. These two studies complement our own empirical findings from Alutgama that a serious process of differentiation in operational holding sizes is going on in the Mahaweli settlements.

The figures compiled in Table 3 do not only show how the differentiation is proceeding in time, but also hint at a different character of this process in the different villages. In Alutgama, the average operational holding size in Maha 1981/82 was 3.3 acres, i.e. considerably more than the 2.5 acres originally alienated. In Midellewa the average holdings which were cultivated by the original settlers themselves was extremely low. In Thoranegama the process of differentiation had apparently proceeded furthest while the average still remained constant at 2.1 and 2.2 acres respectively. Considering the fact that the Alutgama figures only refer to the settlers' fifth cultivation season it can be assumed that this trend was proceeding there at an even faster pace.

20 SCHICKELE, R., 1968, Protection of Cultivator-Ownership in Farm Settlement Schemes: Ceylon as a Case Study. In: Land Reform, Land Settlement and Cooperatives 1968, 2: 5.

21 TILAKASIRI, 1979, op. cit.; SIRIWARDHENE, 1981, op. cit.

TABLE 3

Distribution of Operational Holding Sizes in Three Villages

acres	<i>ALUTGAMA</i> 5th cultivation season, Maha 81/82		<i>THORANEGAMA</i> ¹				<i>MIDELLEWA</i> ² 6th cultivation season, Maha 78/79	
	No. of farmers	in %	No. of farmers	in %	No. of farmers	in %	No. of farmers	in %
0 — 1	2	3.6	5	12.5	5	12.2	2	4.8
1 — 2	2	3.6	9	22.5	10	24.2	19	45.2
2 — 2.5	1	1.8	5	12.5	8	19.5	13	30.9
2.5 — 3	29	52.7	15	37.5	10	24.4	5	11.9
3 — 4	10	18.2	3	7.5	2	4.9	3	7.1
4 — 5	2	3.6	—	—	1	2.4	—	—
5 — 6	5	9.1	2	5.0	2	4.9	—	—
6 and more	4	7.3	1	2.5	3	7.3	—	—
Total	55	100%	40	100%	41	100%	42	100%

1 Village of Bowatenna-settlers, after TILAKASIRI, 1979 and 1980, op.cit.

2 'purana' village, after SIRIWARDHENE, 1981, op.cit.

The Alutgama frequency distribution reveals three distinct peaks. More than half of the households were still to be found in the original class of 2.5 acres. In Maha 1980/81, this class had still encompassed 84% of the settlers. A second peak distinguishable in all three villages is the bottom group cultivating less than two acres. This peak indicates that settlers who give land away dispose of at least one acre or more of their original allotment. The third peak is the upper group of farmers cultivating five acres or more. In Alutgama, this group was already more numerous after the fifth season than it had been in Thoranagama after the eighth.

The rapid changes observable from the frequency distribution presented above let us assume that the unevenness of the operational holding sizes will further increase, and not decrease. It is difficult to assess the real extent to which these illegal dispositions of L.D.O. lands have jeopardized the principles of the family farm settlement policy of the Mahaweli scheme. But the empirical evidence available to date clearly suggests that renting of the allotments is not a rare phenomenon in particular villages, but is a common and widespread practice.

Tenureship Relations

A key element for the understanding of the new process of differentiation in the Mahaweli settlements are the tenureship relations which emerged for the illegal land transactions. With the resettlement tenureship has acquired a new character. In the old village, the prevailing share-cropping tenancy was an exploitative relationship between mostly absent landlords and poor tenants. Now, the tenants are the ones who appropriate and the formal "landlords" run the risk of becoming proletarianized. We see the emergence of a class of capitalist tenant farmers as already described by LENIN when discussing the development of capitalism in Russian agriculture.²²

This transition is characterized by a shift from produce-rent based tenureship to fixed rent agreements payable in cash. Fixed rent-payments, unlike share-cropping tenancy, are favouring the tenant and thereby comply with the postulates of agricultural economists for "progressive" land tenure systems. This is because fixed rents encourage farmers to invest in tenanted lands, since economic incentives can fully come into play.²³ The profit to be expected as well as the risk of agricultural production have become calculable.

22 LENIN, I.V., 1908, *The Agrarian Question in Russia towards the close of the Nineteenth Century*. Collected Works 15, Moscow 1963: 103ff.

23 BLANCKENBURG, 1979, *Social and Land Tenure Systems in Developing Countries*. *Zeitschrift für ausländische Landwirtschaft* 18/2: 126.

According to our findings, land transactions in the Mahaweli scheme involved three different forms of tenancy: "*nikang*" a kind of labour rent; *ande*, share cropping tenancy; and *badu*, fixed rent agreements. The least frequent form was *nikang*, where directly after the resettlement land was given to households with a surplus of male labour — "free" of charge. The actual rent paid is the labour invested in the initial land preparation. This form of tenancy only prevailed for the initial cultivation seasons, when there is a high labour input which, for many settlers, was difficult to be met by family or hired labour. *Ande* tenancy again dominated in importance in the first season when the practice of lease had just arisen in Alutgama, namely in the third cultivation season after resettlement. However, when this practice had become more common in Maha 1981/82, its relative importance considerably decreased in favour of *badu*, or fixed rent agreements. While during Maha 1980/81, *badu* accounted for only 35% of the total area tenanted, in Maha 1981/82 this percentage had already risen to 58%. The total area of tenanted lands almost quadrupled.

With share-cropping agreements, the landlord on an average can expect much higher rents than with a fixed rent. In money terms, the fifty-percent share in a "normal" season like Maha 1980/81 added up to a rent of Rs. 2,000 per acre. In Maha 1981/82, when *badu* had become dominant, the fixed rents ranged around Rs. 600 per acre. But the precondition for the latter form is working capital, for the money has to be paid in advance. Landlords who can afford to wait for the harvest certainly prefer to rent their plot on *ande*. But those who are short of money are compelled to let it on money-rent, sometimes even for years.

It was hypothesized above that the Kotmale resettlers could adapt much better to the new situation in the Mahaweli scheme than their fellow settlers from *purana* villages. It is therefore no surprise to note that the Alutgama settlers predominantly rented additional land in these surrounding villages. In one very poor neighbouring *purana* village, as few as 20% of the original settlers still cultivated their whole allotment by Maha 1981/82. Most villagers were compelled to find a livelihood as casual wage labourers. In another *purana* village, the market place of the area, an influential *mudelali* or merchant had started to take over the allotments of poor settlers on an even bigger scale. He was said to have accumulated as much as 100 acres of Mahaweli lands.

Social Differentiation in the Case Study Village

In order to be able to determine how the process of social differentiation is working in the Mahaweli settler communities, we tried to distinguish different classes among our 55 Alutgama sample farmers. A wide range of variables were reconsidered, describing the household's access to means of production, its

present and former wealth, as well as production data and endowment with family labour power. Out of these, one principal component measuring "peasant capitalism" was derived by applying a principal component analysis.²⁴ Comprehensive interpretation finally led to the distinction of five distinct groups of peasants living in the village: proletarianized peasants, poor peasants, typical middle peasants, entrepreneurial middle peasants, and capitalist farmers. For analytical purposes, these groups can be considered peasant classes as suggested by LENIN.²⁵ It is principally along the lines of these classes that social differentiation in the Mahaweli colonies is taking place.

The concentration of resources in Alutgama, most relevant for describing class affiliation, can clearly be seen in the Lorenz curve of Figure 1; the concentration of land and farm power is plotted against the percentage of total households. Almost half of the settler households, the ones labelled poor and proletarianized, dispose of only 17% of the farm power available, while the three most advanced farmers (5.5%) control more than 37% of the farm power.

The proletarianized peasants were not yet as numerous in Alutgama as they were in other Mahaweli settlements as, e.g. in the neighbouring *purana* villages mentioned above.²⁶ They were the ones who had already completely abandoned own cultivation. They disposed of their whole allotment and had to live from wage labour alone.

The majority of our Alutgama sample households were included in the class of the poor peasants (46%). Most of them still managed to cultivate their original plot, even though their capital endowment did not provide room for much risk. In case of crop failure they would have to dispose of their allotments which is the only capital they possessed. Most of the households classified as poor were semi-proletarian in the sense that, in order to sustain themselves, they had to earn part of their livelihood as wage labourers.

24 In detail described in: KRIMMEL, 1982, Social Differentiation and Peasant Colonization — the Impact of the New Rice Production Technology under Conditions of Compulsory Relocation. Unpubl. Dipl. thesis, TU Munchen.

25 LENIN, I.V., 1908, op. cit.

26 figures compiled from official Mahaweli Authority (MASL) sources let us assume that in H1—Area this group encompassed at least 12% of the settler households in 1982.

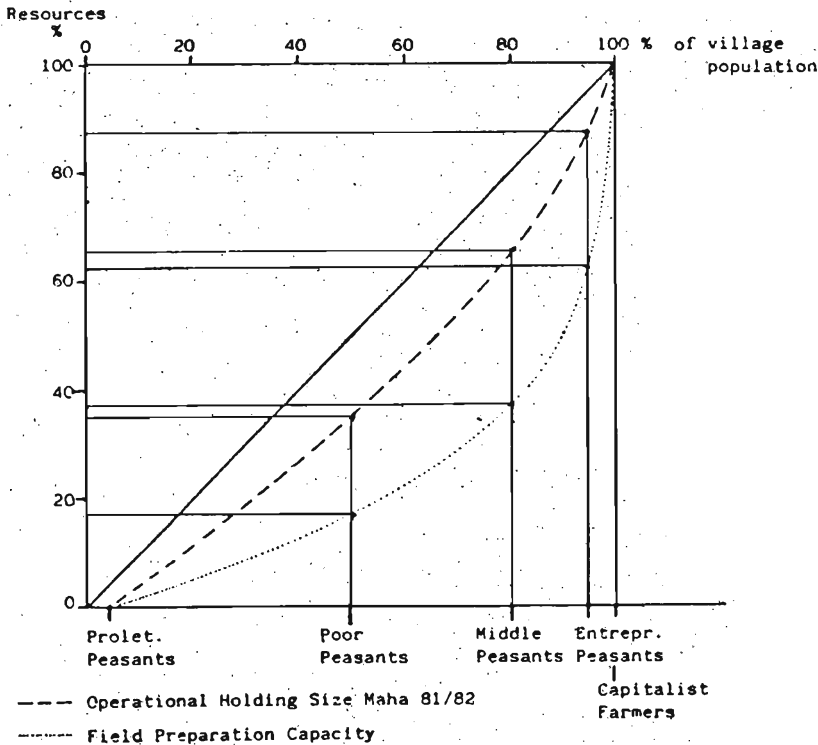


FIGURE 1 : The Concentration of Resources in Alutgama

The class termed "typical middle peasants" is probably the one which corresponds most distinctly to what planners expected the Mahaweli peasantry to become. In Alutgama it comprised about 31% of the settler households. Most of them were self-sufficient in draught power and, hence, were not as much subject to exploitation within the village as the groups mentioned so far were. Nevertheless, their economic weakness would not provide for more than one consecutive crop failure. On the other hand, after some good harvests, they may extend their scale of operation, especially if the family size exceeds the labour absorption capacity of the 2.5 acres plot.

Those middle peasants who showed "entrepreneurial" traits have a distinctly superior capacity to stand the risk of production. Very often, they are the ones who received substantial compensation payments for their lost property in Kotmale which they invested in means of production. They begin to apply these to cultivate along distinctly capitalist lines.

The capitalist tenant farmers, three of our sample of 55, cultivated between 5 and 10 acres each. All of them owned a two-wheel tractor, two had a water pump and the third was a well known trader. For their cultivation, they relied to a considerable extent on hired labour. Other examples of members of this class of "Mahaweli farmers" operate on regional rather than on a local scale, and were not included in the village sample. They comprise big merchants, contractors, Mahaweli officials and other Government employees who all cultivate lands rented from poor and proletarianized Mahaweli settlers. These capitalist tenant farmers are generally characterized by a substantial capital endowment and are attracted by paddy cultivation in the Mahaweli area because of its apparent profitability.

A small minority mentioned for completeness are the "absentee landlords" who were alienated a plot which they never started to cultivate themselves. They continued their business life elsewhere and received their *ande-rent* as an additional income without any personal efforts or costs.

Class Status and Agricultural Production

The explanation for the process of differentiation which has been empirically described in the previous sections has to be looked for in agricultural production itself. Social differentiation in the Mahaweli settlements is mainly a result of the new rice production technology. In order to prove this we have examined the average gross margins of rice production for the different peasant classes identified. (See Table 4)

Looking at the cost for field preparation, the unevenly distributed ownership of farm power clearly put the poor peasants at a disadvantage. They have to pay an average of Rs. 800 with a standard deviation of Rs. 528. Only about one third of them owned a pair of draught animals which allowed the costs of field preparation to be kept at only Rs. 155. The remaining two thirds depended on hired farm power. About 50% of the peasant middle classes could make use of own farm power. The use of animals helped to achieve a relatively low average, especially in the case of the "typical middle peasants". Since all capitalist farmers could rely on their own farm power, costs for field preparation proved to be lowest for them.

The cost for hired labour shows a more diverse pattern. If we take the total number of labour days hired, it is the middle peasants whose inputs of 92 days per hectare exceeded the average of 83 by the largest margin. The capitalist farmers had the lowest input with only 70 hired labour days per hectare, while the poor reported 75 days. But this general pattern is only understandable if male and female labour inputs are analyzed separately. The poor were most restricted

TABLE 4

Class Correlates of Costs of Production per Hectare, Maha 1981/82

Operation	poor Peasants		Typical Middle Peasants		Entrepreneur. Middle Peas.		Capitalist Farmers		Total Average	
	Rs.	%	Rs.	%	Rs.	%	Rs.	%	Rs.	%
Field preparation	800	20.5	633	14.8	792	16.8	510	13.4	729	17.6
Male labourers	821	21.1	1015	23.7	794	16.9	571	15.0	865	20.9
Female Labourers	453	11.6	604	14.1	719	15.3	722	18.9	557	13.5
Fertilizer	750	19.2	774	18.0	891	18.9	760	19.9	779	18.8
Pesticides	288	7.4	363	8.5	527	11.2	381	10.0	353	8.5
Lift irrigation	64	1.6	153	3.6	263	5.6	217	5.7	131	3.2
Seeds, threshing, transport	722	18.5	748	17.4	720	15.3	650	17.1	726	17.5
Total costs	3897	100%	4289	100%	4705	100%	3811	100%	4140	100%

(Source: own survey)

by a lack of working capital; they had to save on whatever costs possible. This could most easily be done by reducing female labour input for transplanting. Male labour was hardly to be replaced by them as it depends on the degree of mechanization. Therefore, the typical middle peasants who predominantly relied on animal draught power employed the highest number of male labourers per hectare, the capitalist farmers the lowest. The female hired labour input, however, clearly followed the pattern of who could afford the labour input of transplanting.

With regard to fertilizer input, few farmers reached the quantities recommended by the Agricultural Department. The application of the basal fertilizer mixture seemed to be least popular. Only the capitalist farmers put at least 50% of the quantities recommended, all the others applied 30% and less. Apparently, the nitrogen fertilizer Urea was most popular. Throughout the village hierarchy, Urea was applied more or less in the recommended quantities, i.e. 125 kg/ha, amounting to Rs. 367.50. The Top Dressing Mixture (TDM), applied for its potassium content, was recommended again at a rate of 125 kg/ha, which only few farmers realized. We found no distinct evidence that overall fertilizer input increased with status. It only inclined from the poor, with a total average fertilizer input of Rs. 750, via the middle (Rs. 774) to the entrepreneurial middle peasants (Rs. 891), but did not include the capitalist farmers who reported Rs. 760 of fertilizer input.

The other agrochemical inputs, namely **herbicides** and **pesticides**, were found to vary according to a similar pattern. The entrepreneurial peasants again spent most for these inputs. At a considerably lower level, the capitalist farmers follow in second place. By far the lowest input was reported by the poor.

The input of agrochemicals did not reveal any major impact on yields. Only the TDM-input showed a positive correlation exceeding a mere 0.1. This observation could lead one to assume that saving on fertilizer did not necessarily lead to lower yields. The three capitalist farmers of our sample therefore proved to be right in cutting down the costs of agrochemicals and hired male labour.

Lift irrigation is assumed to have been an exceptional case in Maha 1981/82 season. Because of a severe drought the supply of irrigation water was stopped by the beginning of February 1982, although water was originally promised up to the end of the month. Consequently, in most cases three to four rotational turns of canal water were lacking for the crop to fully ripen. But the water in the drainage canals and in some smaller storage tanks could still be made available to some of the fields by lift irrigation with water pumps.²⁷ It was not only a question

27 A detailed description of the break-down of the irrigation system and the uncoordinated self-help actions of desperate farmers is given in: MASSLER, 1983, Planung und Implementierung eines bewässerungslandwirtschaftlichen Siedlungsprojektes in Sri Lanka — Versuch einer Beurteilung aus der Dorfperspektive. Unpubl. Dipl. thesis, TU Munchen.

of location of the field, but also one of cash availability, whether a pump could be put to use. It is not surprising to note that only 8% of the farmers classified as poor, but 29% of the middle, 38% of the entrepreneurial middle peasants, and all three of the capitalist farmers were able to organize lift irrigation for their fields. The costs for this lift irrigation varied, depending on whether own, privately hired, or Mahaweli Authority pumps were used. It is most interesting to note that the cost for lift irrigation accounted for almost 6% of the total cost in the case of the capitalist and entrepreneurial farmers, but was not even 2% in the case of the poor. Additional lift irrigation in Maha 1981/82 had become the most decisive factor determining the success of the crop. At least this holds true of the vast majority who neither started very early, nor, by mere chance, grew a three months variety or were favoured by location within the system.

The other costs of production listed in Table 4 include the cost of **threshing** (Rs. 250 per ha), **seeds** (5 bushels per ha at a rate of Rs. 80 per bushel), as well as the cost of **transport** of the produce from the threshing floor to the farmers' houses. The common charges were Rs. 3 for a bag of three bushels of paddy. Expenditure on transport was assumed to be negligible for those who had their own means of transport.

In total, with only about Rs. 3,800 per hectare the capitalist farmers displayed by far the lowest cost of production; the entrepreneurial farmers spent some Rs. 900 more. Although the poor peasants reported the second lowest production cost (Rs. 3,900), their average produced the highest variance with a standard deviation of more than Rs. 1,100

A systematic variation in the shares of the different components in total cost appears. The poor were obviously driven to emphasize the expenditure for field preparation and male labour which is indispensable for the initial preparation of the paddy fields. The relative weight given to these two components significantly decreased on the higher levels of the peasant hierarchy. The opposite pattern appeared for lift irrigation, female labour and chemicals. These components typically serve to increase yields, or to save the crop as in the case of lift irrigation.

The yields distinctly increased with class status. The actual yields reported were 1.4 t/ha for the poor, 2.0 t/ha for the middle, 2.4 t/ha for the entrepreneurial middle peasants, and 2.8 t/ha for the capitalist farmers. As can be distinguished in Figure 2, this difference was further accentuated if converted into money with the average sales prices obtained. The different farmers marketing power is clearly reflected there.

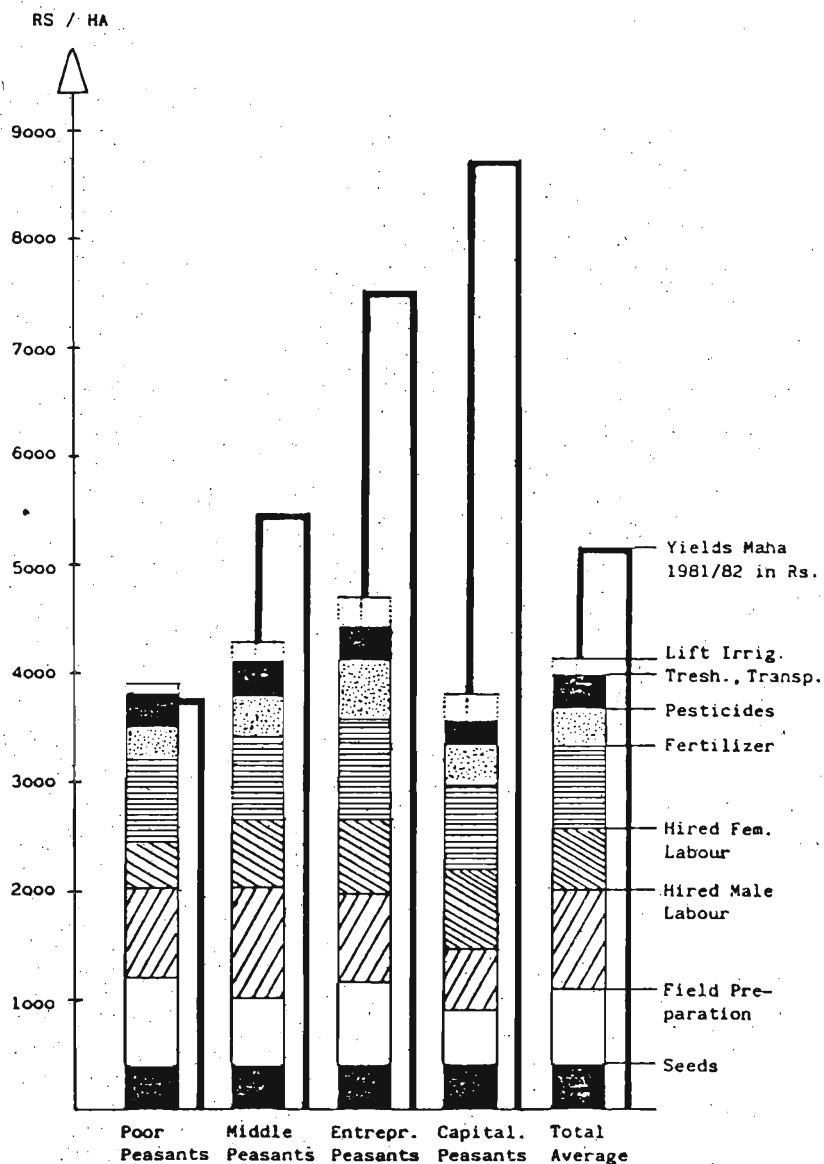


FIGURE 2: Yield Differentiation and Costs of Production

The picture is even more distinct regarding the average profits, i.e. the difference between production cost and benefits. Even if only the official one-hectare plot is considered, the capitalist farmers reaped by far more than what the others obtained. While the former received an average net benefit of Rs. 4,900 per hectare, the poor on average suffered a loss of Rs. 110. They could not even cover their cash expenses, not to speak of a recompensation for the family labour invested.

This pattern aggravates further if the total extent which was actually cultivated by the different farmers is taken into consideration. Table 5 reveals that income differentiation not only occurred as a result of the devastating drought, but was already distinguishable in Maha 1980/81. The forces that drive the poor peasants into proletarianization are illustrated by the fact that over 18 months they had a calculated income of only Rs. 214 per month. This was even lower than the line of absolute poverty that was fixed by the Government at Rs. 300 for a family of four in 1979.

TABLE 5

Profit and Risk of Production in Mahaweli H-Area

<i>Income from Total Extent Cult. (Rs.)</i>	<i>Tot. Inc. Maha 81</i>	<i>Tot. Inc. Maha 82</i>	<i>Monthly Inc. 03/81-08/82</i>
Poor Peasants	7,217	-46	214
Middle Peasants	8,330	1,447	414
Entrepren. Peas.	13,139	4,263	768
Capitalist Farmers	14,960	10,667	1,323
Total Average	8,906	1,689	424

Prospects for Further Development

The empirical evidence presented above strongly suggests that the supposed equality of the settlers in the Mahaweli colonies is of a rather transitory nature — if indeed it ever existed. The mechanisms of illegal leases rapidly jeopardize the originally even distribution of holding sizes. As one of the more successful villages in Mahaweli H-Area, Alutgama as a whole was found to be expanding towards adjoining villages rather than letting own fields to outsiders.

But looking at the individual farms, this village did not show a homogeneous picture either. Apparently, the middle peasants of Alutgama in their majority were still operating additional rented fields. Hitherto, they were able to largely avoid the strong social erosion that the middle peasants in other Mahaweli villages already suffered.

The development of inequalities with regard to operational holding sizes in Alutgama is illustrated in Figure 3. As a consequence of the drought this process of differentiation can be assumed to have accelerated considerably since the cultivation seasons considered here.

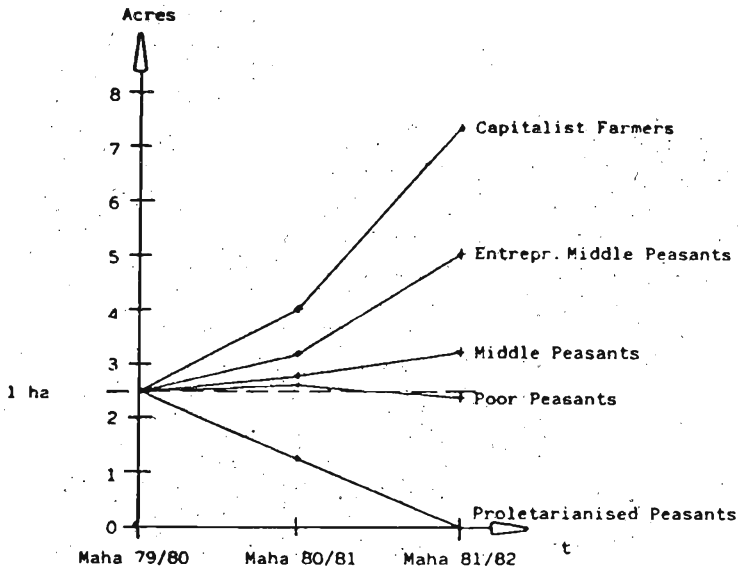


FIGURE 3: Trends of Differentiation in Operational Holding Sizes

The reason is that for the capitalist and entrepreneurial farmers such a drought — taking it to be the natural hazard statistically occurring once in five years — reduces the average profit by a mere 20%, if they suffer at all. These big operators, if they do not own powerful pumps themselves, can easily hire one to save their crop in times of such a drought. They have easy access to bureaucracy as well as political influence to make water reach their fields when it is no longer available to others. With their strong wage labour force they can urge farmers and officers to get done whatever needed, even if this implies to destroy irrigation structures for diverting water to their fields. At the same time the drought makes the fields of impoverished farmers more readily available for lease at even lower rates than before.

This process of an emerging social differentiation is a direct consequence of the design of the colonization schemes. Typically, these schemes are based on the principles of modern farming relying on the new rice production technology, an 80% — probability of water availability of the irrigation system, and on small

peasant freehold. The former two factors are apparently indispensable because of the high project costs involved. The third factor corresponds to the political commitment of most Third World governments to encourage small producers to become modern agricultural entrepreneurs.

Agricultural production in these schemes, when the new production technology is supplemented with relatively reliable irrigation water, has in fact become highly profitable. However, this applies only to those who can afford to participate in this kind of agricultural production. The majority of the producers can hardly bear the risk involved in the high-input/high-yielding technology that has to be employed in order to comply with the requirements of costly irrigation schemes. The risk of production is further emphasized by the reliability design of the irrigation scheme. It is evident that a theoretical 80% — reliability does not imply equally high profits for all settlers in four out of five years. The disaggregated analysis disclosed that at the very time of a drought there are a few who continuously manage to reap a considerable profit. At the same time, many others suffer heavy losses. This evolution of poverty paralleling the capitalist development of a few progressive farmers must, to a large extent, be attributed to the impact of the new technology. The fundamental fallacy in current project design is to assume that the biochemical components of the new rice production technology can be applied independently from mechanization and, hence, can benefit all settlers equally. But as a result of the settlers' differing resource endowment, social differentiation rapidly generated out of the initially equal land allocation.

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