KIRINDI OYA IRRIGATION AND SETTLEMENT PROJECT

PRE PROJECT SOCIOECONOMIC CONDITIONS

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RESEARCH STUDY NO. 59

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ABSTRACT

This study was undertaken to establish the bench-mark conditions relating to the socioeconomic aspects of the Kirindi Oya Project area to enable future comparisons which will indicate the effects and impacts of the project. As a basis for this exercise a sample of 650 households stratified to capture the differing conditions in the irrigated and unirrigated areas was selected at random studies.

The household size is slightly larger than the national average possibly due to migration into the area in anticipation of land and other economic benefits of development. About a third of the households is overcrowded. Considerable difficulty is experienced by the people in obtaining water for domestic use. This situation is expected to improve with the project implementation.

Level of development in the area is similar to the rest of the country but most of the employed comprise younger age groups. There are indications that the problem of educated youths not finding suitable employment is beginning to appear. During the early stages of the project the employment situation should show marked improvement owing to employment generated by the project.

Agriculture is the major income generating source followed by salaried employment. The average annual household income of Rs. 7,300 masks the magnitude of poverty in the area. Nearly half the households in the sample reported incomes below Rs. 3,600 which place them below the poverty line. Even allowing for underreported incomes this indicates destitution of a high order. The income relief scheme of food stamps appeared to be misallocated.

The inequality in land distribution will be ameliorated to some extent with land distribution under the project. But the resulting inequalities in income are likely to continue as redistribution of private lands is not contemplated and the larger holdings will also benefit from the project activities.

There is a high incidence of tenancy in the area. The recent tenancy reform legislations appear to be more closely followed here than in some other parts of the country. Tenancy can be expected to continue even after land allocation because the tenants have the right to transfer tenancy and are likely to exercise this right in favour of their children or relatives.

Highland farming assumes a low profile on account of the present difficulties in cultivating the highlands due to lack of irrigation facilities and high weed infestation. Since irrigated highland farming is part of the project plan this situation will change. The extent of change will depend on the efficacy of the extension programmes to educate the farmers regarding this type of farming which is new to them. Expansion of animal husbandry will have to depend on more intensive methods of management.

Paddy cultivation is the major agricultural activity and yields 40 percent of all income. The reported average annual productivity of 2480 kg per ha is lower than the national average. Adoption of modern techniques is generally high. Productivity and cropping intensity are low in the unirrigated area but are likely to show great advance with the supply of irrigation water.

The status of nutrition among the children appeared to be poor. However, incidence of chronic malnutrition was low and to this extent there didn't seem to be excessive deprivation. Major improvements in this situation can be expected with increased incomes arising from project activities.

Service facilities especially medical, educational, transport and supply of essential commodities are poor. The project plans to improve these services are largely confined to the provision of buildings.

However, measures to raise the quality of the services are perhaps more important.

A study of this nature does not usually allow many policy implications to be drawn. However, in its course two areas where policy needs to be redefined have become evident. One pertains to the need and nature of non-formal educational programmes aimed towards reaping the greatest benefits from the project in the spheres of health, nutrition and agriculture. The other is to develop fresh policies under the project to enable substantial improvements in the quality of the infrastructural services as well as the services intended to raise agricultural production.

FOREWORD

Benefit Monitoring and Evaluation of the Kirindi Oya Irrigation and Settlement Project was entrusted to the Agrarian Research and Training Institute by the Ministry of Lands and Land Development at the suggestion of donor agencies; the Asian Development Bank and the International Fund for Agricultural Development. This study on the preproject socioeconomic conditions was undertaken as part of the monitoring and evaluation programme in order to establish some of the baseline conditions.

Examination of socioeconomic conditions in this exercise goes a little beyond mere inventorisation of the existing status. Where appropriate the authors have made attempts to analyse the data and gain greater insight into certain conditions in order to enable predictions and suggestions to assist project management. Thus, it has been pointed out that the increasing incomes and employment opportunities are likely to give rise to conflicting situations with regard to education. Lesser inequality in agricultural income with the implementation of the project has also been predicted. The need for a well formulated programme to educate and induce farmers to undertake irrigated highland farming has been shown. With regard to service facilities for settlers the authors point out that mere provision of physical infrastructure as currently planned will be quite inadequate to realise the full benefits of the investments. They show that it is essential to develop a policy frame work which will ensure an improvement of the qualitative aspects of the services in order to derive the maximum benefits from the project. These are some of the policy implications for the project which arise from this study.

The four authors made up the monitoring and evaluation team at the time of this study. They are all Research and Training Officers of this Institute. Mr. Ananda Wanasinghe, coordinator of the Kirindi Oya monitoring and evaluation programme, was responsible for the planning and supervision of field work and also prepared the final version of this report for publication. My thanks are due to them for their efforts.

T.B. Subasinghe
DIRECTOR

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We acknowledge with thanks the useful comments made by our colleague Mr. P.J. Gunawardane on the earlier drafts of this report. Mr. P.N.M. Fernando, Additional Secretary to the Ministry of Education examined the final draft and made suggestions that helped to bring greater clarity to some of the discussions in this report. We are grateful to him for these suggestions.

The help given by Mr. T.B. Subasinghe, Director, ARTI during all stages of this study is gratefully acknowledged.

Miss Manori Melagoda typed the drafts and Mrs. Soma Wijewardena typed the final version of this report. I acknowledge with thanks, their services which made this report possible.

Authors

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Chapter One

INTRODUCTION

The Kirindi Oya Irrigation and Settlement Project (KOISP), inaugurated in 1979, is a major development scheme in the south east quadrant of Sri Lanka. The Project with a total investment of Rs. 1,050 millions (in 1977 prices), over a period of seven years, is partly financed by the Asian Development Bank (ADB) and the International Fund for Agricultural Development (IFAD) through a loan agreement with the Government of Sri Lanka.

As spelled out in ARTI (1981) "Kirindi Oya Irrigation and Settlement Project : Monitoring and Evaluation Programme" one of the objectives of Monitoring and Evaluation is "to establish a baseline of the social and economic conditions of the beneficiaries prior to the commencement of the project activities". This is the requirement which this document, attempts to fulfil.

1.1 THE PROJECT AREA

The project area, about 260 km by the coastal highway from Colombo, is located within the Hambantota district and covers about 21,000 ha (including the reservoir area). For administrative purposes this region falls within the Assistant Government Agent divisions of Hambantota and Tissamaharama, both under the Government Agent, Hambantota. This area has a long historical and cultural record as part of an important principality of the ancient kingdom.

The development scheme falls entirely within the dry zone of Sri Lanka with mean temperature ranging from 26°C to 28°C and mean annual rainfall estimated to be less than 1270 mm of which about 75 percent falls in the wet seasons (October - March). The topography is flat to gently undulating, low ridges alternating with shallow, wide valleys. The soils in this area falls into three main types: reddish brown earths, low humic gleys and alluvial soils. The natural vegetation consists of the primary forests with large trees and secondary forests which are mostly the result of years of shifting cultivation and consisting of scrub jungle with many xerophytes along the coastal belt and the land adjacent to it.

The physical area of the Project is about 12,900 ha out of which 4,300 ha have been already provided with irrigation facilities fed by Tissa, Yodawewa, Weerawila, Debarawewa, Pannegamuwa and Badagiriya Major Irrigation Tanks. The balance 8,600 ha falls within the proposed new irrigation area where new settlements are planned. This area consists of seven tracts on the Right Bank covering 5,000 ha and five tracts on the Left Bank covering 3,600 ha.

Paddy is the most widely cultivated crop in the lowlands while the traditional shifting cultivation of subsidiary crops is practised in the uplands. The population of the Project area has been estimated to be 45,960 in 1980.

At present, it is sufficient to say that the social infrastructure in the area varies from somewhat acceptable standards close to Tissamaharama town to relatively low levels in most parts of the rural interior.

A distinctive feature of this area, as mentioned earlier is that it consists of an "Irrigated area" and an "area to be irrigated under the project". It is further clear that these two areas are in different stages of development in almost all relevant aspects. In view of this, it was decided to treat the two areas separately during the socioeconomic study. Henceforth, the two areas will be identified as the "Irrigated area" (IA) and the "Unirrigated area" (UIA)

respectively. This dichotomy has been maintained throughout data collection, analysis and reporting of the pre-project conditions of the KOISP area. Irrigated area refers to the region served by the five major irrigation works located around Tissamaharama and the area under the Badagiriya scheme. It must be noted that even in these areas there are considerable extents of land with disadvantage of water shortages for cultivation. This is discussed in greater detail in chapter five.

1.2 THE STUDY

To assess the socioeconomic conditions prior to the implementation of the project a survey of a sample of households was carried out. A single staged randomised design was adopted in the selection of the sample. The list of households for each *gramasevaka* division prepared by the Department of Census and Statistics for the national Census constituted the sampling frame. This frame was first stratified according to the irrigation status of the *gramasevaka* divisions ie. as irrigated area and unirrigated area. Then from each area households were selected at random with equal probability of selection. The detailed methodology of sampling is shown in table A 1.

1.3 SAMPLING AND NON-SAMPLING ERRORS

Sampling error, the error due to the use of particular sampling design is measured by the standard error of estimate. Using the established formulae the standard errors of several estimates of the "socioeconomic study" have been calculated as in table 1.1. Judging by the size of the coefficient of variations the standard errors are generally small except in a few cases. Therefore, as far as the sampling design is concerned, this can be considered as an indicator of the reliability of estimates and thus the representativeness of the data.

Table 1.1 - Estimates, Standard Errors and Coeffieicnt of Variation (C.V) of Selected Indicators of the Socioeconomic Study

Indicator	Irrigated Area			Unirrigated Area		
	Esti-mate	Std. Error	C.V. (%)	Esti-mate	Std. Error	C.V. (%)
Average household size	5.75	0.127	2.21	5.69	0.147	2.59
Percentage of households owning radios	46.13	2.44	5.29	48.09	2.21	6.05
Percentage of households owning bicycles	50.26	2.45	4.87	38.55	2.84	7.37
Percentage of households having own latrines	71.65	2.21	3.08	48.09	2.91	6.05
Percentage of households having access to potable water	83.76	1.81	2.16	74.81	2.53	3.38
Average annual household income	Rs 7851/-	Rs 408/-	5.20	Rs 6504/-	Rs 346/-	5.32

The non sampling errors in the survey for the socioeconomic study may have been primarily caused due to interviewer bias and response errors. The survey was conducted by employing two permanent investigators of the ARTI and casual investigators hired for the purpose. Although the entire team of investigators were trained for about ten days - first in the office and then in the field, the benefit from training may have varied according to the educational background and the experience in this type of field work. Their education varied from G C E (A/L) to degree level while experience they possessed varied from no previous familiarity to five years of field work. Thus, despite continuous and thorough supervision by the M & E team, the variation among the interviewers would have influenced the manner and mode of interviewing and

the data collected. The response errors could have resulted due to the inability of some of the respondents to answer certain questions intelligently and due to wilfully biased answers, especially, in the case of wealth and income data. The general awareness about the projects already prevailing in the area and the attempts taken by the Monitoring and Evaluation team to convey the importance and usefulness of the surveys in the project area - through the radio and by distributing among the sampled households a specially designed brochure, - have helped to secure good cooperation of the respondents to obtain accurate answers. However, factors such as recall lapses might have affected the responses on such items as crop production.

Chapter Two

GENERAL CHARACTERISTICS OF THE PROJECT BENEFICIARIES

The general characteristics of the project beneficiaries presented in this chapter will include the demographic characteristics, educational status, recreation, migration, housing, ownership of household items and farm equipment, accessibility to service centres, and health and sanitation. The health and nutritional status of a subsample of the project beneficiaries will be presented in chapter six.

2.1 DEMOGRAPHIC CHARACTERISTICS

The ethnic-religious composition of the population in the project area is highly homogeneous with about 97 percent being Sinhala Buddhist.

As seen from table A 1, the basic unit of investigation in the socioeconomic study was the "household". The average size of household in the project area is 5.7 which is marginally higher than the national average of 5.6 in 1973. The variation of the mean as well as the medium size of household between the irrigated and unirrigated areas is not appreciable.

The masculinity ratio[1] in the sample is 106.4, which is slightly higher than the ratio of 104.0 for Hambantota district in 1981. Because of the importance of information regarding the age structure,

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1 The number of males per 100 females

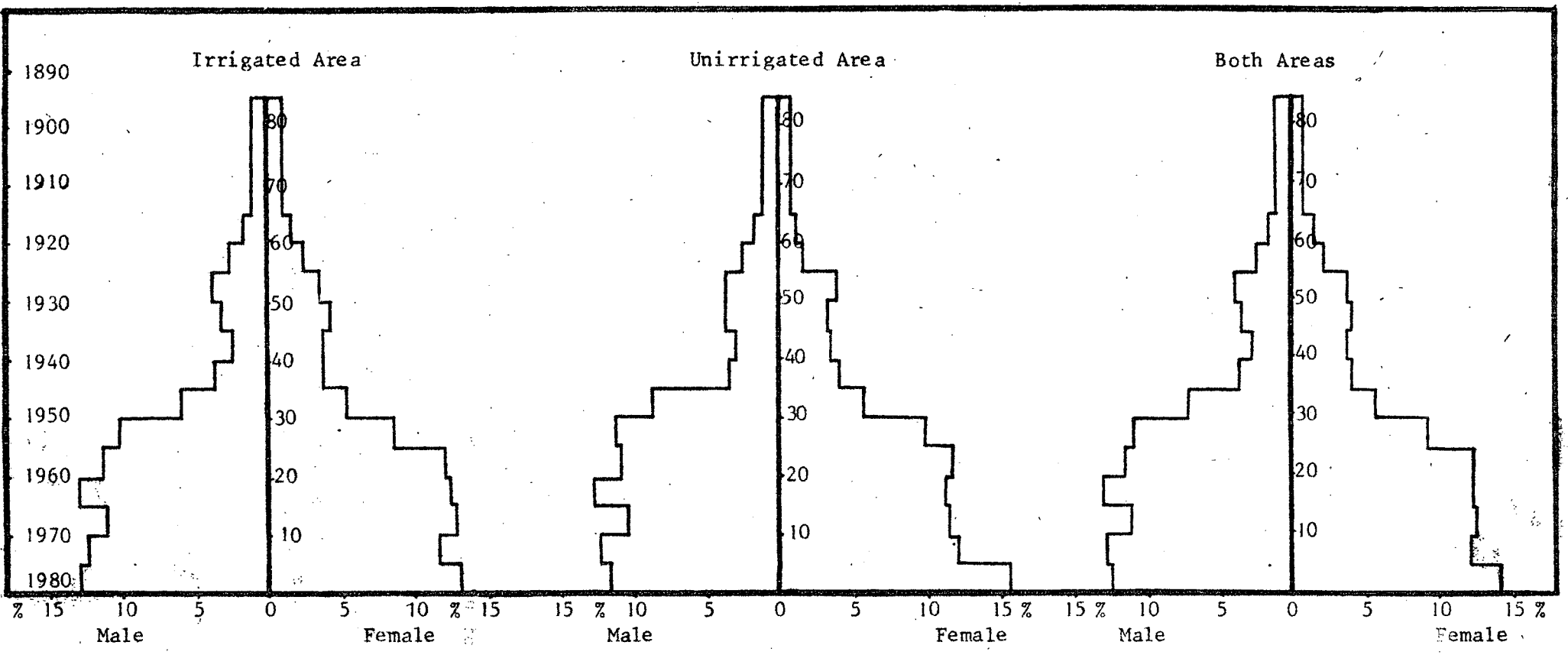

Figure 2.1

Age Structure of Members in the sampled Households

population pyramids representing the age composition of the sampled population have been drawn as in Figure 2.1. Although in a normal population - that is, one not disturbed by heavy migratory movements or rapid changes in birth or death rates - the age distribution tends to be a smooth curve, in Figure 2.1 we observe that in both irrigated and unirrigated areas the proportion of the population in certain age groups is more than that in the preceding age group. Considering that the masculinity ratio of the area is higher than the national average it is likely that these changes are more due to migration rather than due to sudden changes in birth and death rates. The age pyramids in Figure 2.1 also illustrates the similarity in the age composition of the household members between the two areas. This is further evident from the chart in Figure 2.2 which indicates the age dependency ratios as generally high but comparable with the figures for the other dry zone areas of Sri Lanka.

2.2 EDUCATIONAL STATUS

The high literacy rates generally observable in every part in Sri Lanka is also seen in the Project area (Table 2.1). As usual males have a higher literacy compared with that of females.

Table 2.1 - Literacy Rates by Sex

	Male	Female	Both Sexes
Irrigated area	92.2	79.1	85.9
Unirrigated area	88.7	79.4	84.3
Both areas	90.8	79.2	85.3

The age - specific school participation rates (that is, the number of school going children in particular age group per 100 in that group) by sex and by income of the household are in Table A 2. These data are presented graphically in figure 2.3. Care should be taken in interpreting some of these rates since the total number of children in the sample falling into some of the categories are extremely small. These participation rates are generally high. An important observation

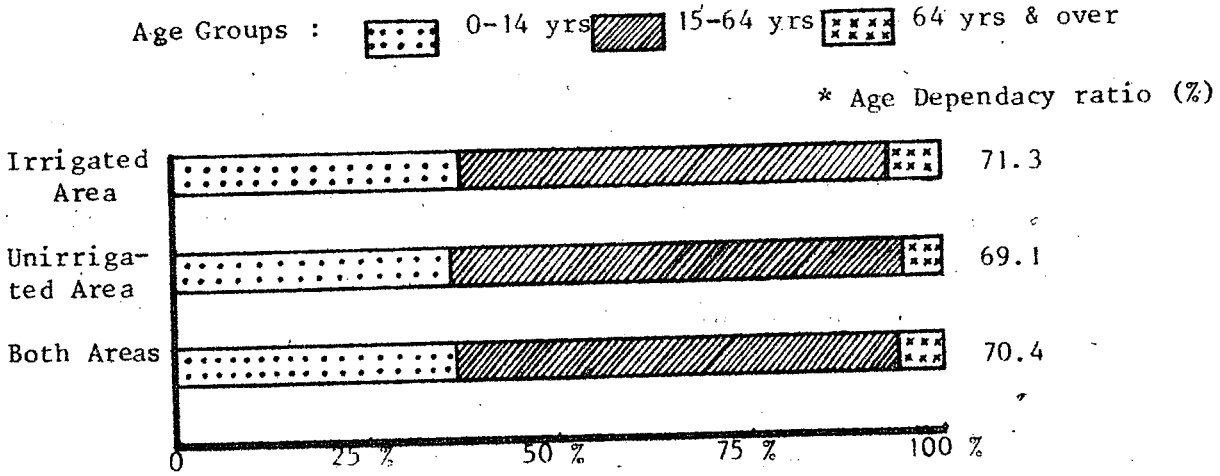

Figure 2.2

$$\text{* Age Dependency Ratio} = \frac{\text{Age Group (0-14) + Age Group 65 \& Over}}{\text{Age Group (15-64)}}$$

Percentage distribution of the household members by broad age groups and the age dependency ratio

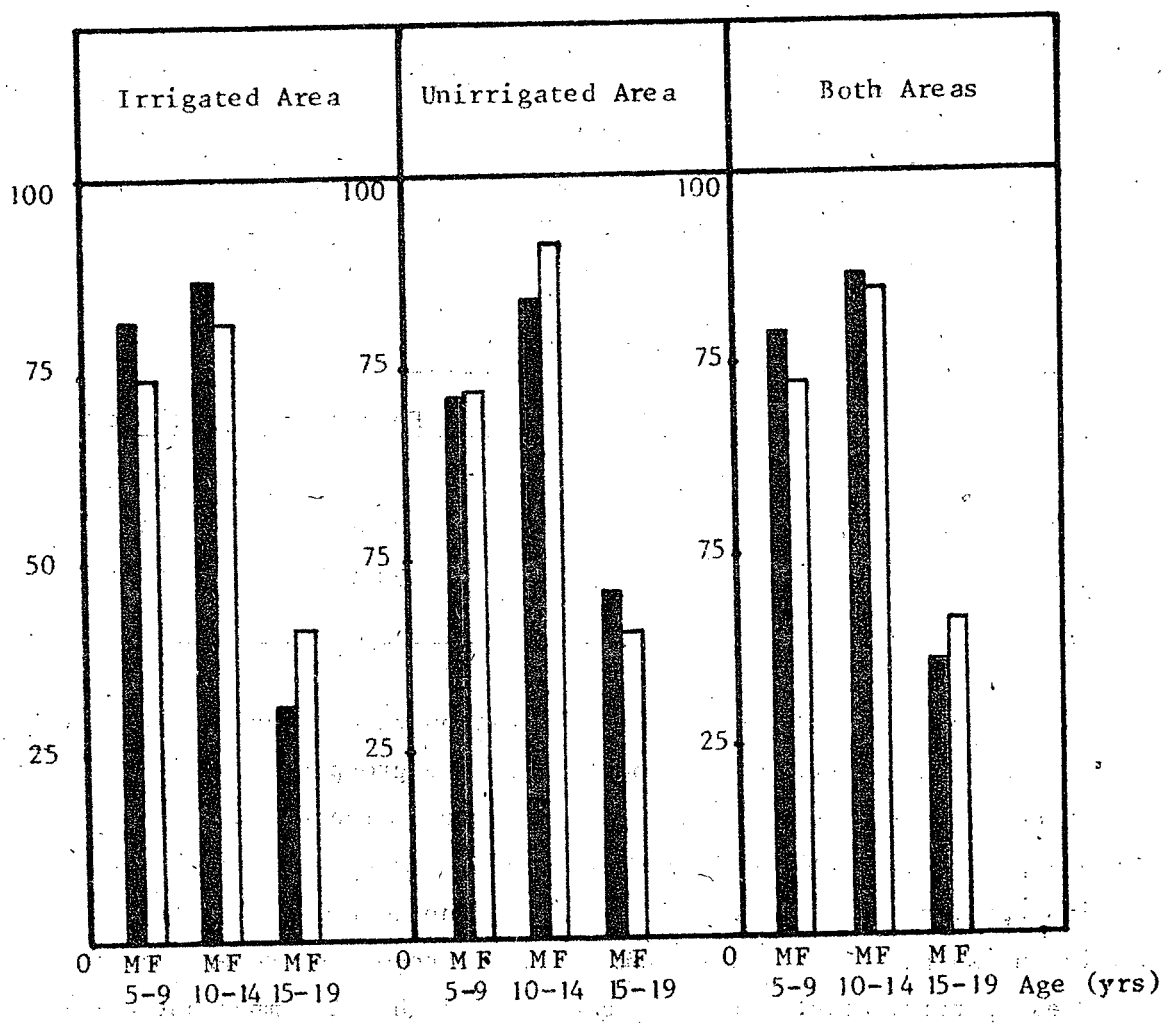

Figure 2.3

Age - specific school participation rates by sex and age

that can be made from these school participation rates (Table A 2 and figure 2.3) is that in a given age group there is no statistically significant difference between the participation rates for males and females. In addition, except for the age group 15-19 years, there is no significant variation in sex-wise school participation rates between the irrigated and unirrigated areas. For the age group 15-19 years, female participation rates are 31 percent and 46 percent in the irrigated and unirrigated areas respectively. The relatively low percentage in the irrigated area may be due to the greater participation of the older girls in economic activities in that area. Another interesting observation is the higher participation rate of children in the 10-14 years age group. This is contrary to the national trend. Explanation of this phenomenon requires further indepth study.

The school participation rates for the compulsory school going age groups (5-9 and 10-14) according to the income of the households (Table A 2) indicate the generally expected trend of higher participation rates at higher levels of income.

Table 2.2 - Reasons for School Avoidance

Reason	Irrigated Area			Unirrigated Area		
	Male	Female	Both	Male	Female	Both
Economic reasons	3	8	11(31)	1	4	5(20)
Lack of interest	5	5	10(28)	7	3	10(43)
Physically/Mentally handicapped	4	3	7(19)	1	3	4(17)
Absence of school	-	-	-	1	4	5(20)
Other	3	5	8(22)	-	-	-
Total respondent within age group 5-14 years	15	21	36(100)	10	14	24(100)

In an attempt to understand the reasons for school avoidance at least by some of the children in the compulsory schoolgoing age, data presented in table 2.2 were obtained. In spite of the limitations

imposed by the smallness of the numbers, it can be concluded that economic reasons and lack of interest in furthering education are the predominant factors contributing to the school avoidance in the project area.

The levels of educational attainments of the household members are also an important measure of human development that needs attention. The proportion of the household members aged 15 years and over who have attained specific educational levels are given in table A 3. A graphical presentation of this data in figure 2.4 reveals interesting patterns. Although the levels of education of males and females in the age group of 15-34 years appear to be similar[1], there is marked difference in the higher age groups where the levels of attainment of females in education is consistently lower. The graphs for men and women become increasingly divergent with age. Figure 2.4 also illustrates the absence of any marked variation in the levels of education of household members in the irrigated and unirrigated areas.

2.3 RECREATION AND RELATED ACTIVITIES

The extents of participation of the project beneficiaries in recreational activities, such as listening to radio, reading newspapers, and sports are useful indicators relating to quality of life.

2.3.1 Listening to radio

Although it is customary to use different criteria in analysing the radio listening habits of a community, for the sake of simplicity, data were collected only to assess the frequency of listening categorised as 'frequently', 'moderately', 'occasionally', and 'never', to a selected set of eight programmes by majority of household members. For this purpose, the households were further grouped according to ownership of radios. News and religious programmes are frequently

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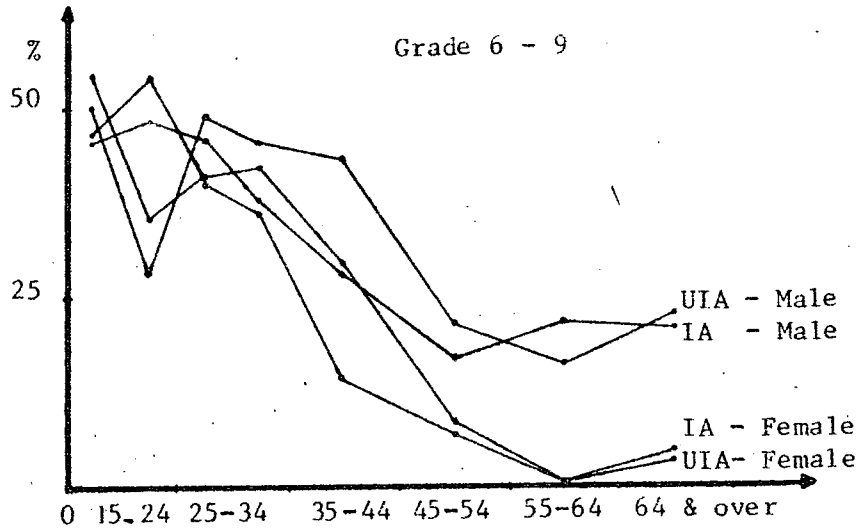
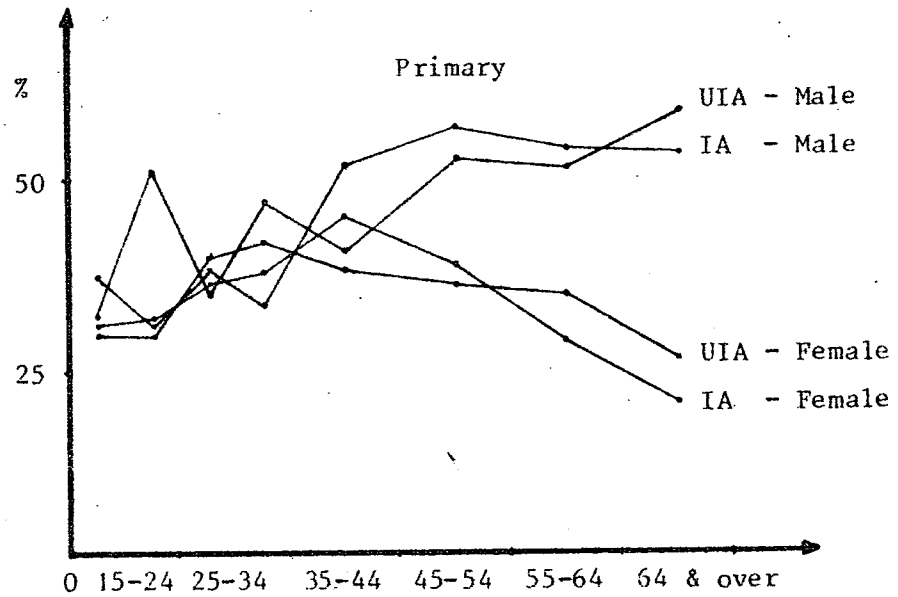
1 It is interesting to observe that the upper age limit of 34 years mentioned here nearly corresponds to those born after the introduction of universal free education in Sri Lanka in 1945, impact of which is clearly visible here.





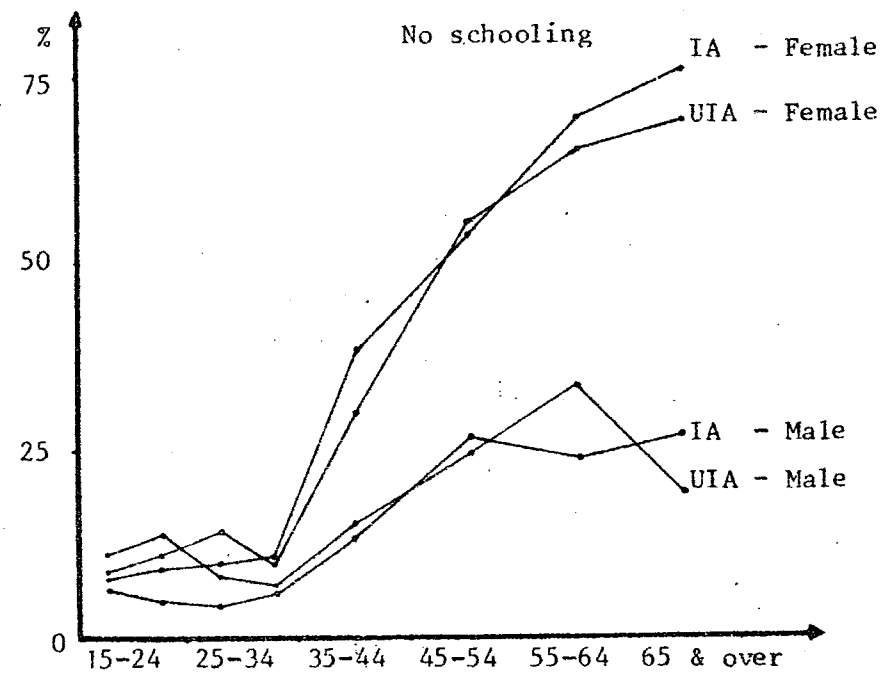


Figure 2.4

Proportion of household members having different levels of education by age and sex

listened to by about 80 percent of the households owning radios. The programme such as Development programmes, Young Farmers Club/Quiz programmes, Health and Nutrition programmes and radio plays are frequently listened to, by only about one-third of the households owning radios. Among the households not owning radios, news and religious programmes too remain among the programmes frequently listened to, but the proportions being slightly less than 20 percent. About 40 percent of the households that did not own radios never listened to any of the programmes under consideration. Evidence from table 1.2 suggests that more than one half of the households are without radios, we may surmise that about a quarter of the households never listened to radio programmes.

2.3.2 Reading newspapers

The frequency of reading daily and weekend newspapers by the household members of different age groups were also studied. Generally there appeared to be greater readership for the weekend newspapers than for the dailies. This is to be expected on account of the greater volume and variety of contents of the former. There was greater frequency of reading newspapers among the households in the irrigated area which is probably due to the greater economic opportunities that prevailed in the area. Finally, when compared with the rest of the age groups, those in the 15-34 age group tended to read newspapers more frequently.

2.3.3 Participation in sports

For the sake of simplicity this enquiry about participation in sports was limited to those members of the sampled households who were employed. As seen from table A 4 participation in sports is very low. Participation in outdoor sports is, slightly higher than in indoor sports.

2.4 INTERNAL MIGRATION

Although refined data are not available to study internal migration, data with respect to (a) the place of origin of the household along with the year of arrival to the present village, and

(b) the movements "to" and "from" the household according to reasons, are available.

The data with respect to the place of origin of the household and the year of arrival in the present village are in table A 5. It can be observed that one-half of the households in the sample belongs to those who have migrated from outside and the proportion varies marginally between the irrigated and unirrigated area of the project. On considering the year of arrival in the project area, it is evident that nearly one-half of the householders in the irrigated area had migrated before 1950 whereas 70 percent of the householders in the unirrigated area had migrated between 1961-1970.

The data related to the movements "to" and "from" the sampled households according to reasons for such movement, during the period of two years immediately prior to the survey are in table 2.3. It indicates that the majority (more than 80 percent) of movements are either due to marriage or to join relatives. The number of movements dictated only by the need for employment is small. However, it must be supposed that many of the movements to join relatives were also motivated by the prospect of the presence of economic opportunities as well.

Table 2.3 - Movement of Members of Households

Reason	Inward			Outward		
	IA	UIA	Both	IA	UIA	Both
Marriage	41(80)	27(69)	68(75)	19(50)	6(55)	25(51)
To join relatives	4(8)	2(5)	6(7)	12(32)	5(45)	17(35)
Employment (including transfers)	4(8)	3(8)	7(8)	2(5)	-	2(4)
Others	2(4)	7(18)	9(10)	5(13)	-	5(10)
Total	51(100)	39(100)	90(100)	38(100)	11(100)	49(100)

Note. Figures in parentheses are percentages.

2.5 HOUSING

The project area is characterised by the presence of a large proportion of small houses. The average number of rooms per house in the project area is 2.3 with irrigated and unirrigated areas averaging 2.5 and 2.2 respectively. Two-thirds of the houses in the project area are with one to two rooms (table A 6). The proportion of houses with floor area between 23-46 sq metres (250-500 sq ft) varies from 67 percent in the irrigated area to 73 percent in the unirrigated area (table A 7).

Only about one-fourth of the houses in the project area are permanent structures and about two-thirds of the houses have detached kitchens. The variation of these proportions between the two areas are marginal (table A 8).

Availability of electricity for the residents in the project area is very poor. Only about two percent of the households in the sample had electricity supply (table A 8). The proportion of houses that are accessible by vehicle is three-fourths (table A 8).

About 88 percent of the houses are owner occupied. The proportion varies only slightly between the two areas. However, the ownership patterns of the land on which houses have been built indicate that 37 percent of the houses in the irrigated area have been built on own land whereas the proportion in the unirrigated area is only 24 percent. As much as 66 percent of the houses in the unirrigated area have been built on crown land whereas the proportion of such houses in the irrigated area is about 42 percent (table A 8).

To estimate the extent of overcrowding the houses, the percentage of distribution of houses according to the number of occupants (assuming that all members of a household that have been reported are actually occupying the houses) was examined (table 2.4). It indicates that 34 percent of the houses in the project area are with seven or more occupants. The comparable figure for Sri Lanka according to Census of Housing (1971) is 36 percent.

Table 2.4 - Percentage Distribution of Houses According to the Number of Occupants

No. of occupants	Irrigated area(%)	Unirrigated area(%)	Both areas (%)
1 - 3	18.0	16.4	17.4
4 - 6	47.2	49.6	48.2
7 & over	34.8	34.0	34.4
Total	100.0	100.0	100.0

In an attempt to assess the degree of overcrowding in houses two measures were employed. The first was the proportion of overcrowded houses on the basis of three persons or more per room and second was the proportion of overcrowded houses on the basis of 'a minimum floor area per person'[1]. As evident from table 2.5 about 31 percent of the houses in the project area are overcrowded according to the former criterion while on the basis of 'a minimum floor area per person', about 35 percent of the households are overcrowded. With respect to the two areas it is observed that houses in the unirrigated area are more overcrowded than those in the irrigated area.

1 The following criterion has been used to measure overcrowding on the basis of 'a minimum floor area per person'.

Floor area (sq ft)	If no. of occupants exceed
100	2
100 - 250	4
250 - 500	6
500 -1000	8

Source : ESCAP Population of Ceylon p. 295

Table 2.5 - Incidence of Overcrowding

	Percentage of Households (Proportion of overcrowded houses)		
	Irrigated area	Unirrigated area	Both areas
1. Three or more persons per room	28.1	35.9	31.2
2. Minimum floor area per person	32.7	38.9	35.2

2.6 OWNERSHIP OF HOUSEHOLD ITEMS AND FARM EQUIPMENT

The frequency of ownership of selected household items such as radio, wrist watch, petromax lamp, sewing machine, etc. may be considered as a somewhat reasonable indicator of the economic status of households of project beneficiaries. For this reason the households owning these items were enumerated. The results are given in Table A 9. The results indicate that except for items,namely, electric torches, and radios, all other items under consideration are available in a relatively higher proportion of households in the irrigated area than in the unirrigated area. This indicates a slightly better economic status of households in the irrigated area than in the unirrigated area.

The density of ownership of farm equipment may also be considered here. It can be seen from the data in table A 10, that families possess only limited numbers of farm equipment.

2.7 WATER AND SANITATION

The details relating to the availability of water for domestic purposes and sanitary facilities are given in table A 11. Eighty percent of the households in the irrigated area obtained drinking water from wells or pipes. In the unirrigated area such sources provided 64 percent of the households with their drinking water. In

both areas main sources of water for bathing and washing were tanks and streams on which 80 to 95 percent of the households depended. The households in the irrigated area were significantly better off than the households in the unirrigated area regarding the availability of latrines.

The restricted availability of water combined with the absence of latrines for many households did not seem to reflect in the incidence of bowel diseases such as dysentery and diarrhoea even through such conditions are generally considered to promote the occurrence of these diseases. Only eight households in the irrigated area and six households in the unirrigated area reported the incidence of such diseases during the 12 months preceding the survey. It is observed that in these areas a large amount of time and effort are devoted by women and older children for fetching drinking water. The water obtained from wells and pipes should be considered generally safe for drinking. This probably explains the low incidence of bowel diseases even in the unirrigated area where only ten percent of the households had their own wells or access to pipe-borne water for drinking.

2.8 ACCESSIBILITY TO SERVICE CENTRES

The accessibility of households to basic service institutions/facilities is also useful in characterising a given area. The percentage of households within given distances from 17 types of service institutions/facilities considered to be important are as in table A 12. Table 2.6 derived from it indicates the service institutions in each of the irrigated and unirrigated areas that are within specified distance for the majority (defined to be more than 70 percent) of the households.

While table 2.6 illustrates the general variation in the ready accessibility to service institutions in each area, it also highlights the prevailing backwardness in the unirrigated area. Out of the 17 types of service institution/facilities, under consideration, as much as 16 are within 8 km (5 miles) for a majority of the households in the irrigated area, while there are only 8 within the same distance for a majority in the unirrigated area. For the

majority in the unirrigated area, the accessibility to service facilities such as the bazaar and the village fair (*pola*) which are important in purchasing the daily needs and marketing of produce and to institutions such as the government dispensary and the hospital is poor.

Table 2.6 - Basic Service Institutions/facilities Accessible to the Majority (more than 70 percent) of Households within Given Distances

Distance	Irrigated area	Unirrigated area
3 km (2 miles)	School-Primary School-Secondary Cooperatives Bus route Temple	School-Primary Bus route
5 km (3 miles)	School Science (O/L) Bazaar Post Office	School-Secondary Cooperatives Temple
8 km (5 miles)	School Science (A/L) Village Fair (*pola*) Health Centre Govt. Dispensary Hospital Bank, Police Station A G A Office	School Science (O/L) Bazaar Post Office
11 km (7 miles)	Agrarian Service Centre	
16 km (10 miles)		School Science (A/L) Village Fair (*pola*) Health Centre Govt. Dispensary Hospital Bank Ag. Service Centre

Chapter Three

LABOUR, EMPLOYMENT AND INCOME

In this chapter it is intended to explore the different characteristics of the labour force in order to identify the patterns of employment and unemployment and also to analyse the composition, levels and distribution of income from such employment.

3.1 CHARACTERISTICS OF THE LABOUR FORCE

Adopting the standard definition, the labour force is defined to include all those in the age group 15 to 64 years. As table 3.1 indicates 59 percent of the population in the project area is in the labour force and the variation in the proportion between the irrigated and unirrigated areas is negligible. The sex composition of the labour force reveals that 47 percent are females.

Table 3.1 - Characteristics of the Labour Force

	Irrigated Area	Unirrigated Area	Both Areas
1. Proportion of the labour force in the sample	58.4 %	59.2%	58.7%
2. Proportion of females in the labour force	47.8 %	46.9 %	47.4 %
3. Size of labour force in the sample	1309	879	2188

The majority in the labour force is relatively young. The proportions of the labour force in the age groups 15-19 and 20-29 are as high as 21 percent and 37 percent respectively. This also indicates that the size of the labour force that is about to retire constitutes only a small proportion. The fact that the age group 5-14 comprised of 24 percent of the population suggests that there is a large number of new and potential entrants to the labour force in the future.

The educational status of the labour force will not be outlined here since the educational attainment of the household members aged 15 years and over have been discussed in chapter two.

3.2 PATTERN OF EMPLOYMENT AND UNEMPLOYMENT

The key terms used in the present discussion are as explained and/or defined below:

Activity					
Economically Active		Economically Inactive			
(a)	(b)	(c)	(d)	(e)	(f)
Employed (including unpaid family workers)	Unemployed (including those without gainful employment in at least 15 days within three months prior to survey)	House-wives	Students	Discouraged workers (those not looking for employment)	Others (includes retired, disabled, those too young or too old to work)

$$\text{Crude Activity Rate (\%)} = \frac{(a) + (b)}{\text{Total in the sample}} \times 100$$

$$\text{Net Activity Rate (\%)} = \frac{(a) + (b)}{\text{15-64 years old in the sample}} \times 100$$

$$\text{Economic Dependency Ratio (\%)} = \frac{(b) + (c) + (d) + (e) + (f)}{\text{Total employed i.e. (a)}} \times 100$$

3.2.1 Activity Status

The composition of the sample in terms of activity is in table 3.2. It also presents the crude and the net activity rates and the economic dependency rates.

Tabel 3.2 - Activity and Related Measures

Activity	Irrigated Area		Unirrigated Area		Both Areas	
	No.	%	No.	%	No.	%
Employed	648	(28.9)	471	(31.7)	1119	(30.0)
Unemployed	128	(5.7)	74	(5.0)	202	(5.4)
Housewives	410	(18.3)	255	(17.2)	665	(17.8)
Students	579	(25.8)	362	(24.3)	941	(25.2)
Discouraged workers	36	(1.6)	11	(0.7)	47	(1.3)
Others	441	(20.0)	313	(21.1)	754	(20.2)
Total	2242	(100)	1486	(100)	3728	(100)
Crude Activity Rate (%)						
Male	54.1		58.7		55.9	
Female	14.4		18.3		16.0	
Both Sex	35.3		39.0		36.8	
Net Activity Rate (%)						
Male	91.0		82.2		87.2	
Female	25.5		32.0		28.1	
Both Sex	60.8		60.5		60.7	
Economic Dependency Ratio (%)	235.6		193.7		217.5	

The irrigated area is characterised by having a high economic dependency ratio of 236 percent compared to that of 194 percent in the unirrigated area.

The overall labour force participation rate in the project area as indicated by the crude activity rate is about 37 percent which may be compared with that of 32 percent for the rural sector reported

in the survey of Sri Lanka's Consumer Finances - 1973. The apparently low crude activity rate for females, which is 16 percent contrasts with 56 percent for males. This is basically due to the exclusion of housewives from the economically active segment of the population. However, a moderate labour force participation is indicated by the overall net activity rate of 61 percent. Here again the marked difference between the males and the females is repeated.

A more detail picture of the labour force participation is available from figure 3.1 which depicts the age-specific crude activity rates by sex. It highlights the very high participation by the males in the age group 25-54 years. It also demonstrates the similarity in participation in the irrigated and the unirrigated areas for both sexes.

3.2.2 Employment

From the overall picture of the extent of employment presented in table 3.3 it can be seen that 30 percent of the members of the households in the sample are employed. This amounts to 46 percent of the labour force or 85 percent of the economically active sector.

Table 3.3 - Indicators of the Extent of Employment

Indicator	Irrigated Area	Unirrigated Area	Both Areas
Proportion of the employed in the sample	28.9 %	31.7%	30.0 %
Proportion of the employed in the labour force	45.9 %	46.6 %	46.2 %
Proportion of the employed in the economically active sector	83.6 %	86.6 %	84.9 %

(a) Characteristics of employed

The sex composition of the employed in the project area indicates that 84 percent are males. The employed males constitute 49 percent of

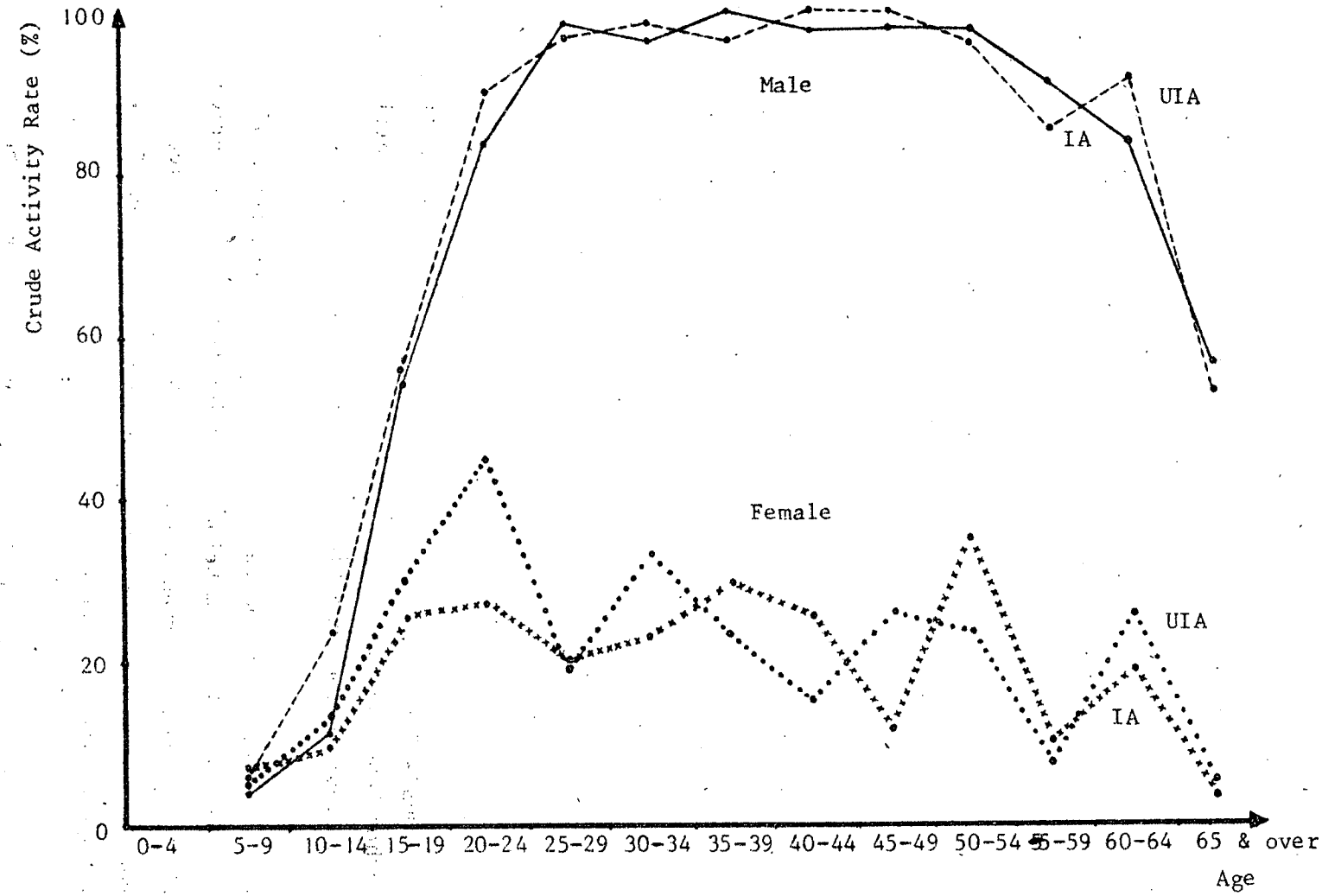


Figure 3.1

AGE-SPECIFIC CRUDE ACTIVITY RATES

the total males in the project area whereas the employed females account for only 10 percent of the total females.

The age structure of the employed in the project area reveals that the age group 20-29 and 30-54 constitute 36 percent and 43 percent respectively of the population while the age groups 15-19 and 55-64 constitute 11 percent and nine percent respectively.

The educational levels of the employed by types of occupation presented in table A 13 indicates that about 40 percent are with junior secondary or higher education while 15 percent are without any schooling. Out of those having G C E (O/L) or higher education only 28 percent were engaged in agriculture while 50 percent are in salaried occupation in medical, educational, clerical and banking services. Most of those with no schooling are either in agricultural occupation or working as labourers/domestic servants.

(b) Occupational pattern of employed

The occupational distribution of the employed, as one would expect, indicates bias towards agricultural activities. Two-thirds of the employed in the sample were engaged in that sector with no significant differences in the proportions between the irrigated and unirrigated areas (Table A 14).

Further, out of those employed in the agricultural sector 37 percent (or 25 percent of total employment) are owner cultivators and 25 percent are labourers. It is noteworthy that on one hand the proportion engaged in industries is less than five percent, while on the other hand the service sector (including the agricultural labourers) provides employment to 46 percent of the employed.

There is marked variation between the occupation patterns of males and females. The farm helpers, agricultural and non-agricultural labourers and domestic servants are the categories into which 78 percent of the employed females fall. Only 46 percent of the employed males fall into these categories.

Another characteristics of the occupational pattern of the

employed, is that about 23 percent of them are engaged in subsidiary occupations in addition to the main occupation. The occupations that are more common as subsidiary occupation are the cultivation of own land (26 percent) and labour (55 percent) (table A 14). As seen in table 3.4 there is a greater tendency for subsidiary employment among those employed in the unirrigated area. There is also a greater incidence of subsidiary employment among men than among women.

Table 3.4 - Proportion of Employed Engaged in Subsidiary Occupation

	Irrigated Area	Unirrigated Area	Both Areas
Male	17.8 %	35.1 %	24.9 %
Female	9.4 %	13.3 %	11.2 %
Both Sex	16.5 %	31.2 %	22.7 %

(c) Distance to the place of employment

The closeness of the place of employment or the distance that has to be travelled for the main occupation is also of relevance here. The data in table A 15 indicates that 62 percent of the work places in the project area are within 1.6 km (one mile) from the residences with no significant difference in the percentages between the irrigated and unirrigated area. It is interesting to observe that, among the broad occupational categories there is no significant variation in the proportion of the work places within 1.6 km (one mile).

3.2.3 Unemployment

From table 3.5, it is evident that 9.2 percent of the labour force in the sample or 15.3 percent of the economically active sector were unemployed during the survey period. The figures are generally low, possibly due to under-estimation of the actual level

of unemployment. This is due to the non-inclusion of seasonal unemployment which is common in predominantly agricultural communities such as this.

Table 3.5 - Indicators of the Extent of Unemployment

Indicator	Irrigated Area	Unirrigated Area	Both Areas
Proportion of the unemployed in the labour force	9.8 %	8.4 %	9.2 %
Proportion of the unemployed in the economically active sector	16.5 %	13.6 %	15.3 %

The unemployed, consisting of males and females in equal proportions, almost entirely belong to the age group 15-34 and the majority (74 percent) are in the younger age group 15-24.

The educational levels of the unemployed presented in table A 16 indicates 23 percent are with primary education, 50 percent are with junior secondary, and 22 percent with G C E (O/L) or higher. The above highlights that a majority of unemployed are youths with more than six years of schooling.

3.3 INCOME - THE DATA

The Agricultural income data collected during the survey refers to the 1979/80 crop year which includes the two seasons *maha* 1979/80 and *yala* 1980. The non-agricultural income data covers the period of 12 months ending in March 1980. It needs bearing in mind that the income data presented in this discussion are subject to some limitations. Although every attempt was made to capture income from all sources including cash values of government food stamps for the poor and income relief to the unemployed youth, items such as imputed value of rent free housing were not accounted for due to practical

difficulties. Further, the data tend to be under estimates of actual income since the method of collection was by "single" interviews.

3.4 COMPOSITION OF INCOME

The composition of income, which indicates the principal sources from which total household income is generated can be viewed from two angles; firstly, by observing the proportion of households deriving income from each source and secondly, by observing the proportion of income generated from each source.

The distribution of the households according to the source of income is in table 3.6. It can be seen that 37 percent of the households in the sample earn their income entirely from agriculture and 49 percent mainly from regular income sources such as salaries and wages. The proportion of households depending mainly on self-employment is very small and amounts to six percent only. Except for small variations in the proportions, this pattern is observable in both irrigated and unirrigated areas.

The composition of average annual household income presented in table 3.7 indicates that in the irrigated areas 54 percent of the income is from agriculture and 28 percent from salaried employment while in the unirrigated areas the proportions are 37 percent and 39 percent respectively. Not surprisingly, the income from paddy (amounting to 39 percent) is the dominant source of household income in the irrigated area whereas in the unirrigated area that place has been taken by the income from both animal husbandry and crops other than paddy. The latter enterprises generate 15 percent of the household income in both areas. Self-employment (in the agricultural sector), on the other hand, generates only a small proportion of the households income.

Table 3.6 - Distribution of Households According to Source of Income

Source of Income	Sub Group	Irrigated Area No.	%	Unirrigated Area No.	%	Both Areas No.	%
1. Entirely Agricultural	1.1 Paddy	123	32	57	22	180	28
	1.2 Non-paddy	32	8	28	10	60	9
	Sub total	155	40	85	32	240	37
2. Regular Income Receivers Wage earners	2.1 Salaried employment	94	24	57	22	151	23
	2.2 "+Paddy	17	4	13	5	30	5
	2.3 "+Non paddy	66	17	73	28	139	21
	Sub total	177	45	143	55	320	49
3. Self employment	3.1 Self employment	12	3	9	3	21	3
	3.2 "+Paddy	3	1	5	2	8	1
	3.3 "+Non paddy	7	2	5	2	12	2
		22	6	19	7	41	6
4. Others	4.1 Value of food stamps, hiring of equipment	34	9	15	6	49	8
	Grand total	388	100	262	100	650	100

Table 3.7 - Composition of Average Annual Household Income

Source of Income	Irrigated Area Amount (Rs.)	%		Unirrigated Area Amount (Rs.)	%	
Paddy	3033	39	)	1409	22	)
Other crops	828	11	) 54	799	12	) 37
Animal husbandry	342	4	)	196	3	)
Salaried employment	2197	28		2493	39	
Self employment	468	6		669	14	
Others	983	12		938	14	
All sources	7851	100		6504	100	

The variation of the composition of household income according to the income classes is presented in figure 3.2. It illustrates the percentage composition of income in different income classes by principal sources. It is evident that in the higher income classes income from paddy occupies a more predominant position in the irrigated area than in the unirrigated area. Salaried/wage employment is the dominant source of income in lower income classes in both areas. It also illustrates the minor place occupied by the income from the other crops and animal husbandry across the income classes in both irrigated and unirrigated areas.

3.5 LEVELS OF DISTRIBUTION OF INCOME

The levels of income may be viewed in three ways, namely, as; (i) household income, (ii) income per income receiver, and (iii) per capita income.

The average annual household income in the area is Rs. 7308/- and varies from Rs. 6504/- in unirrigated area to Rs. 7851/-, in the irrigated area (table A 17). The "midspread" or the interquartile range of the average annual household income presented in figure 3.3(a) indicates that household income in the irrigated area has large midspread than that of the unirrigated area.

The annual income per income receiver in the project area is Rs. 4272/- and varies from Rs. 3634/- in the unirrigated area to Rs. 4737/- in the irrigated area (table A 17). It is evident from figure 3.3(b) that the distribution of annual income per income receiver in the unirrigated area is more skewed to the right than that in the irrigated area.

The annual per capita income in the project area is Rs. 1286/- and varies from Rs. 1148/- in the unirrigated area to Rs. 1378/- in the irrigated area (table A 17). From figures 3.3(a) and 3.3(c) it is clear that per capita income distribution is more skewed to the right than household income distribution.

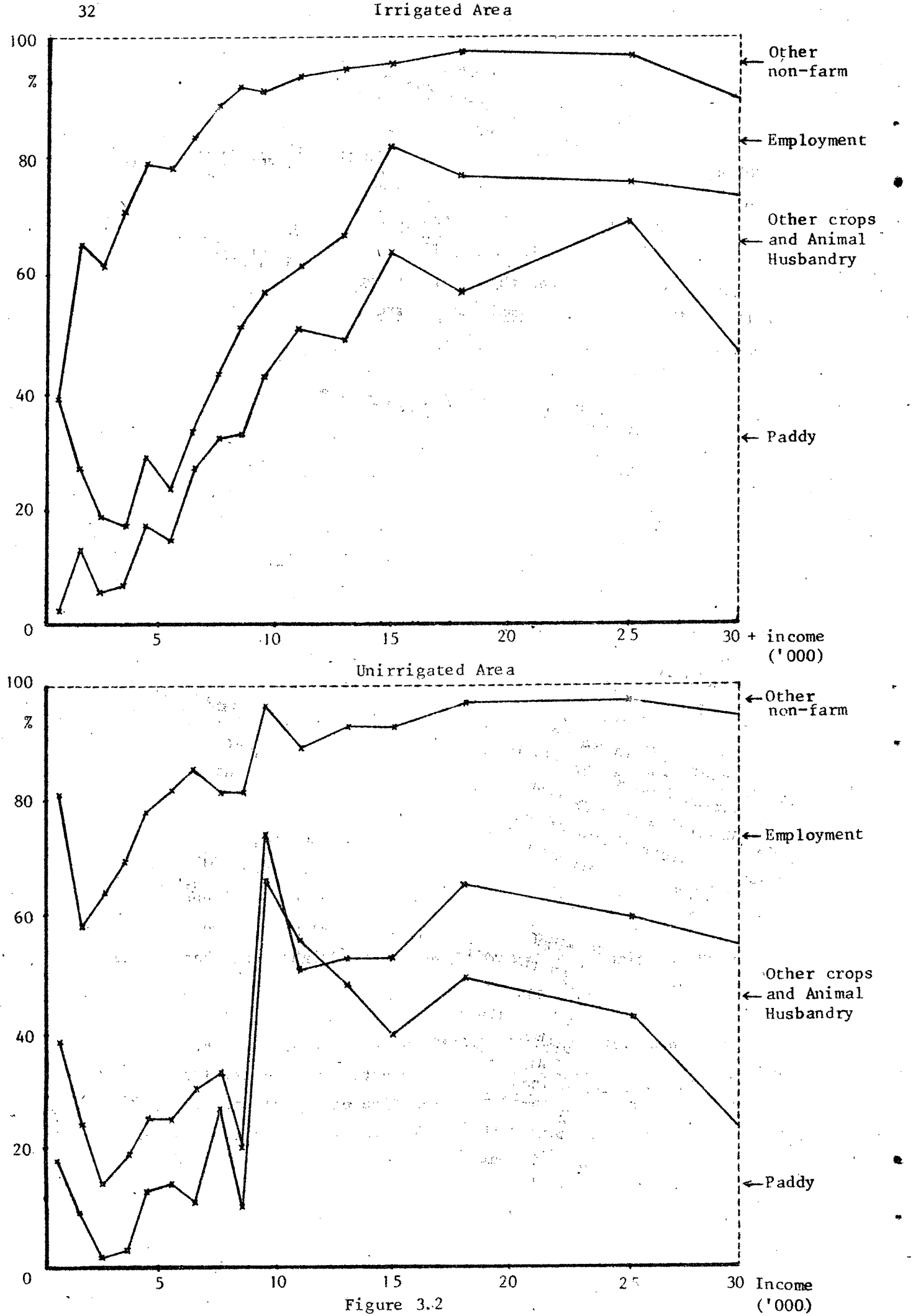


Figure 3.2
Variation of the composition of household income, according to income

The income levels of the irrigated and unirrigated areas can be further characterised by the level and the spread of the annual household income according to size group of operated land. Figure 3.4 which attempts to present it graphically indicates the absence of a marked difference between the levels of income of households with operated land size of 1.2 ha (three acres) or less in the irrigated and unirrigated areas.

The inequality in the distribution of the income between household can be seen from the Lorenz curves in figure 3.5. it indicates that the income is relatively more inequally distributed in the irrigated area than in the unirrigated area - the Gini Coefficients being 0.453 and 0.364 respectively.

By looking at the income from the two main sources, namely, agriculture and nonagriculture, it can be seen from figure 3.6 that in both areas the agricultural income is much inequally distributed between households than the nonagricultural income. The Gini coefficient of the Lorenz curves with respect to income from agriculture and nonagriculture are 0.578 and 0.273 for the irrigated area and 0.539 and 0.261 for the unirrigated area, respectively.

The effect of the size of operated land on the distribution of income between households can be seen from the Lorenz curves in figure 3.7 which carries the following Gini coefficients:

Size of operated land	Irrigated Area	Unirrigated Area
Less than 0.8 ha (2 acres)	0.370	0.362
0.8 ha (2 acres) or more	0.465	0.392

Thus, operated land of larger size has resulted in more inequality in the distribution of income between households in the irrigated area than in the unirrigated area.

The Lorenz curves in figure 3.8 having the following Gini coefficients illustrate the effect of the size of operated low land on the distribution of income between households:

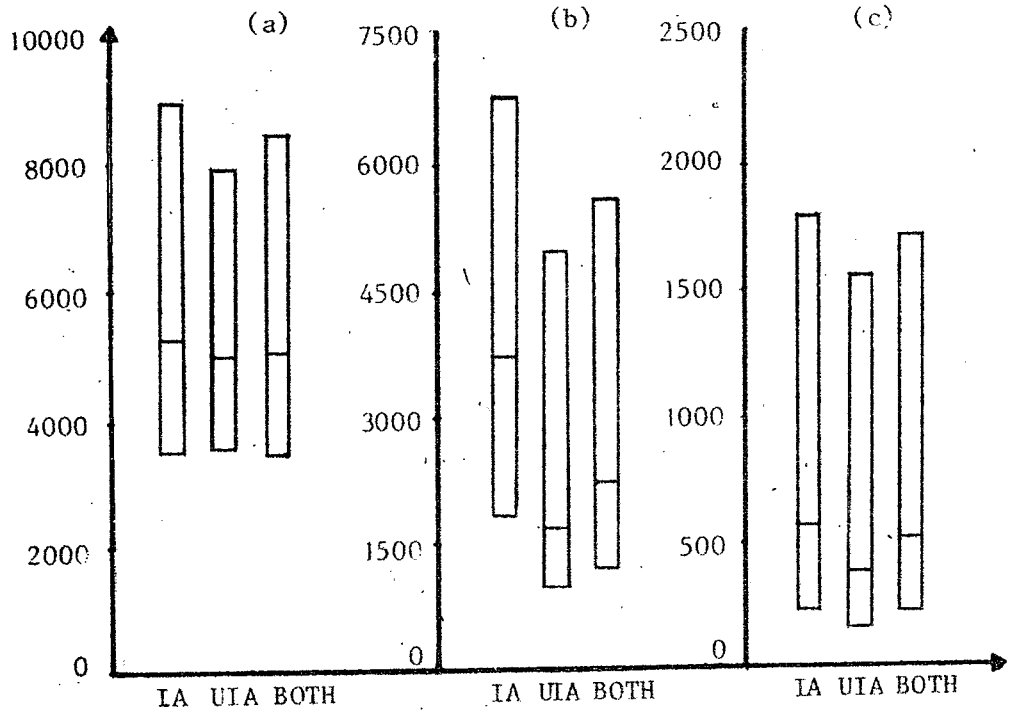


Figure 3.3

Lower quatiles, Medians and Upper quatiles of Income Distribution of (a) Households (b) Income Receivers and (c) Per Capita

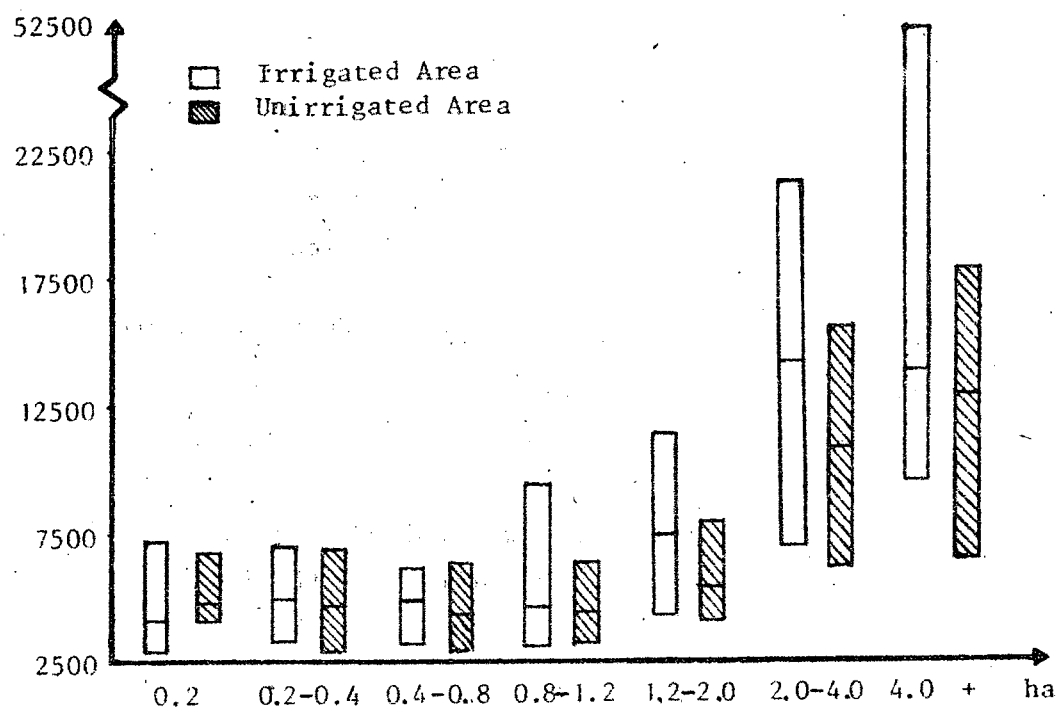


Figure 3.4

Lower quatiles, Medians and Upper quatiles of Income Distribution of households according to size group of operated land

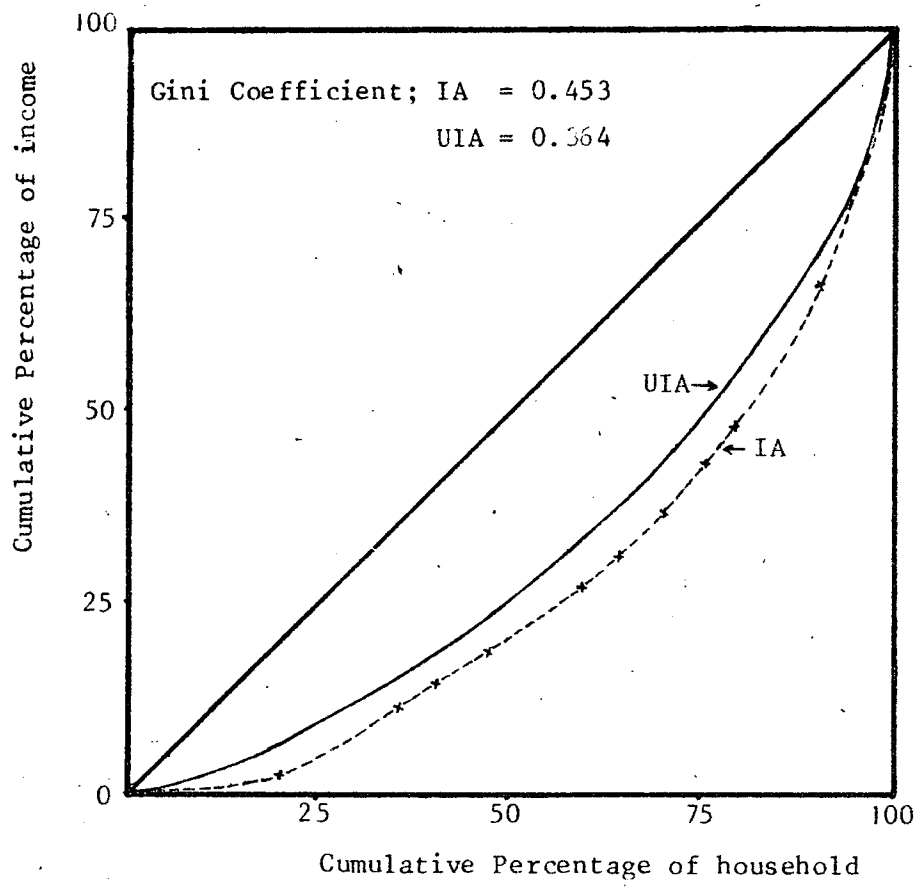


Figure 3.5

LORENZ CURVES FOR INCOME OF HOUSEHOLD

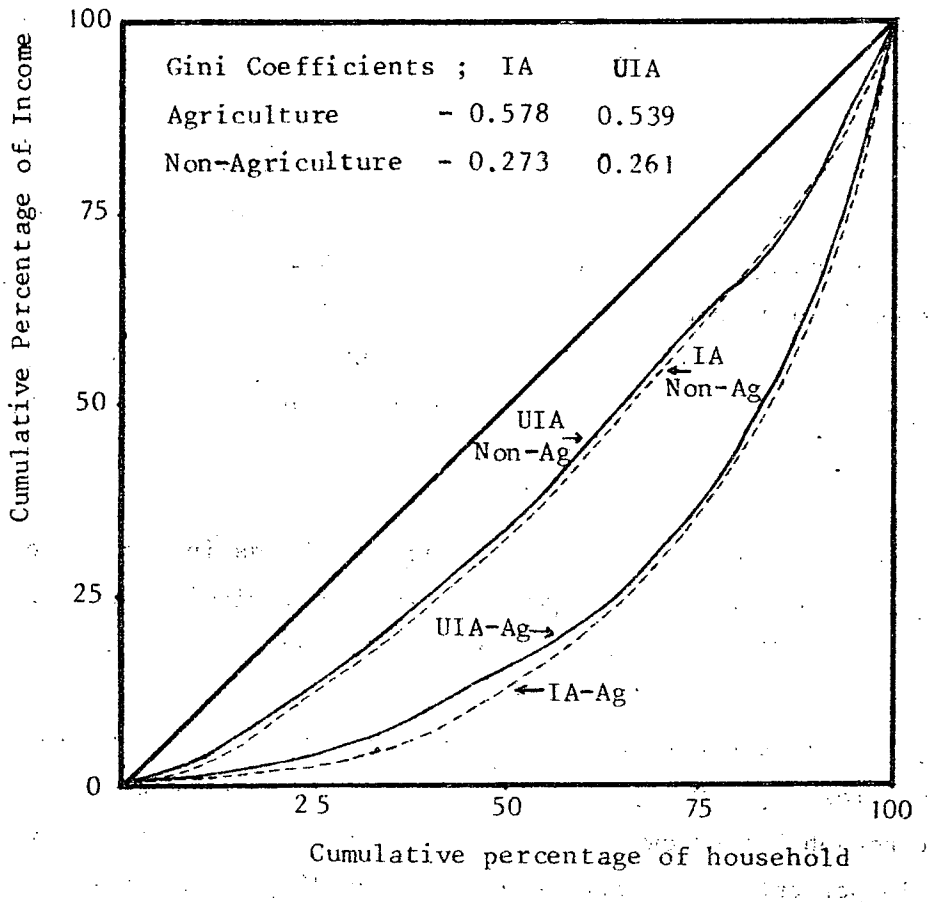


Figure 3.6

LORENZ CURVES FOR AGRICULTURAL AND NON-AGRICULTURAL INCOME OF HOUSEHOLDS

Size of operated Lowland	Irrigated Area	Unirrigated Area
Less than 0.8 ha (2 acres)	0.321	0.332
0.8 ha (2 acres) or more	0.363	0.323

The absence of marked differences between the corresponding Gini coefficients for the irrigated area and for the unirrigated area are suggestive of the lack of effect of the size of operated lowland on the inequality of distribution of income between households.

3.6 INCIDENCE OF POVERTY

The income data analysed in the previous sections of this chapter refers to income from all sources. It is, however, necessary for the present analysis on poverty to redefine household income to exclude the amount accountable for the cash value of government food stamps and the income relief (Rs. 50/- per month) received by unemployed youth.

After careful consideration of the prevailing average income levels and prices, in 1978, the government was of the view that a family that has an income less than Rs. 300/- per month was living below the poverty line. At the time of the present 'socio economic study', the families living below this poverty line were receiving government food stamps, the value of which has been computed for each family taking into account the family size and the income. The present analysis will, thus, be made by taking the poverty line of Rs. 300/- per month (ie Rs. 3600/- per annum). The related data is in table 3.8.

It is seen that about 43 percent of the households in the project area are below the poverty line, with hardly any variation between the proportion for the irrigated and unirrigated areas.

Although the government policy was to issue the food stamps to those households below the poverty line this has not been achieved. It is clear that households below the poverty line and not receiving food stamps is 16 percent in the irrigated area and 12 percent in the

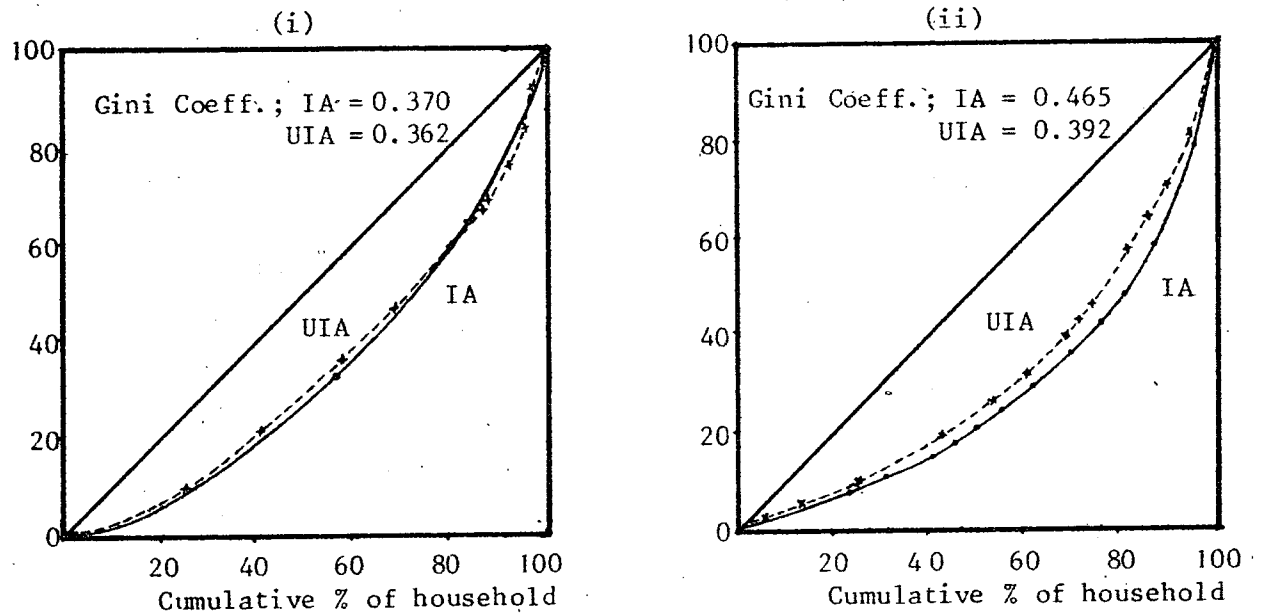


Figure 3.7

Lorenz curves for Income of households with operated land of size (i) less than 0.8 ha (2 acres) and (ii) 0.8 ha (2 acres) or more

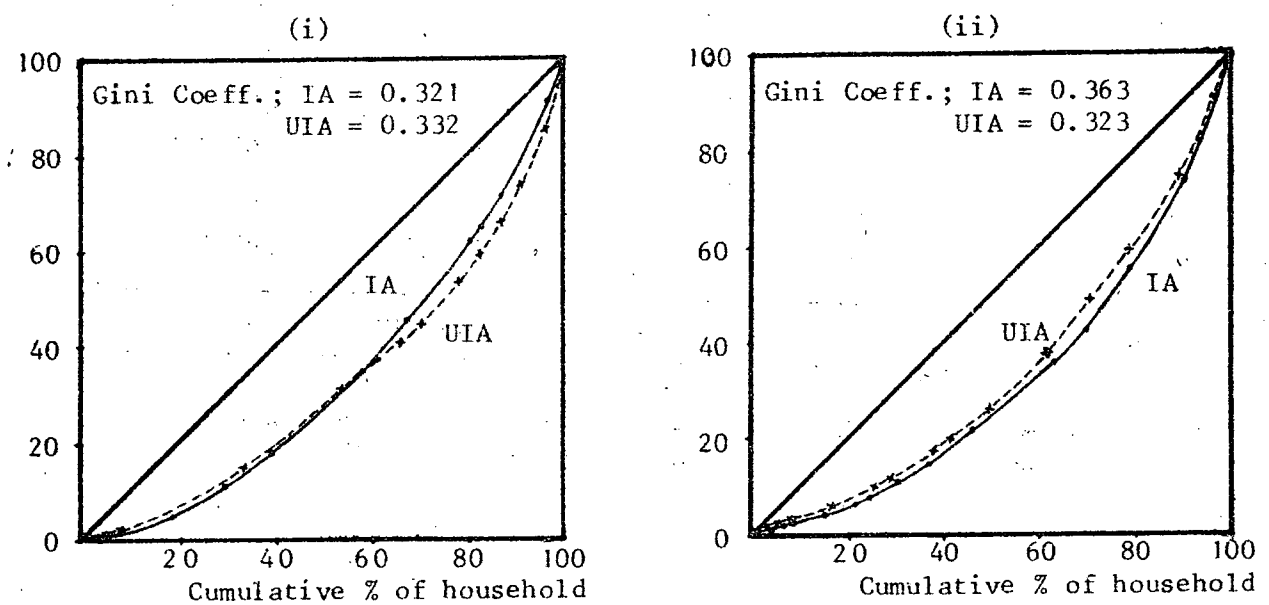


Figure 3.8

Lorenz curves for Income of households with operated lowland of size (i) less than 0.8 ha (2 acres) and (ii) 0.8 ha (2 acres) or more

unirrigated area. On the other hand, a substantial number of households above the poverty line were receiving the food stamps. The proportion of the households, with annual income more than Rs. 3600/- , that receive food stamps is as high as 43 percent in the irrigated area and 57 percent in the unirrigated area. The above may be summarised by observing that although only 43 percent of the households in the project area are below the poverty line, 61 percent of the households in the irrigated area and 71 percent in the unirrigated area were receiving food stamps. However, before one hastens to recommend the withdrawal of these measures from those above the poverty line, the validity of the poverty line itself must be examined. The Rs. 3600/- per year cut-off point was established in 1977 and no adjustments have been made for subsequent inflation.

Table 3.8 - Proportion of Households Receiving Food Stamps by Income Classes

Income class (Rs.)	Irrigated Area		Unirrigated Area	
	No. of house-holds	Proportion receiving food stamps	No. of house-holds	Proportion receiving food stamps
3600	166 (43)	84 %	155 (44)	88 %
3601 - 5000	48 (12)	65 %	41 (16)	59 %
5001 - 7000	50 (13)	52 %	47 (18)	64 %
7001 - 10000	48 (12)	46 %	26 (10)	62 %
10001	76 (20)	22 %	33 (12)	42 %
Overall	388(100)	61 %	302(100)	71 %

Note : Income, here refers to total income less value of food stamps and income relief to unemployed.

Chapter Four

LAND USE AND TENURE

A major economic resource available in the project area is land. Nearly one-half of the households in the sample derive a greater part of their income from farming, and the contribution from agriculture to the annual income of all households in the area is substantial. The general pattern of land utilisation, tenurial arrangements, land distribution and farm size, and landlessness affecting agricultural ventures in the study area are examined in this chapter.

4.1 GENERAL LAND USE

The traditional land utilisation pattern seen in the Kirindi Oya Irrigation and Settlement Project (KOISP) area is determined by the five major types of land listed below:

(a) Forest, forest reserves and uncultivated (waste) lands
(b) Water spread areas (irrigation) and paddy lands
(c) Home garden and highlands
(d) *Chena* plots on jungle patches
and (e) Land for residential, commercial and recreational purposes.

The percentage of extents under the above categories of land use are illustrated in figure 4.1.

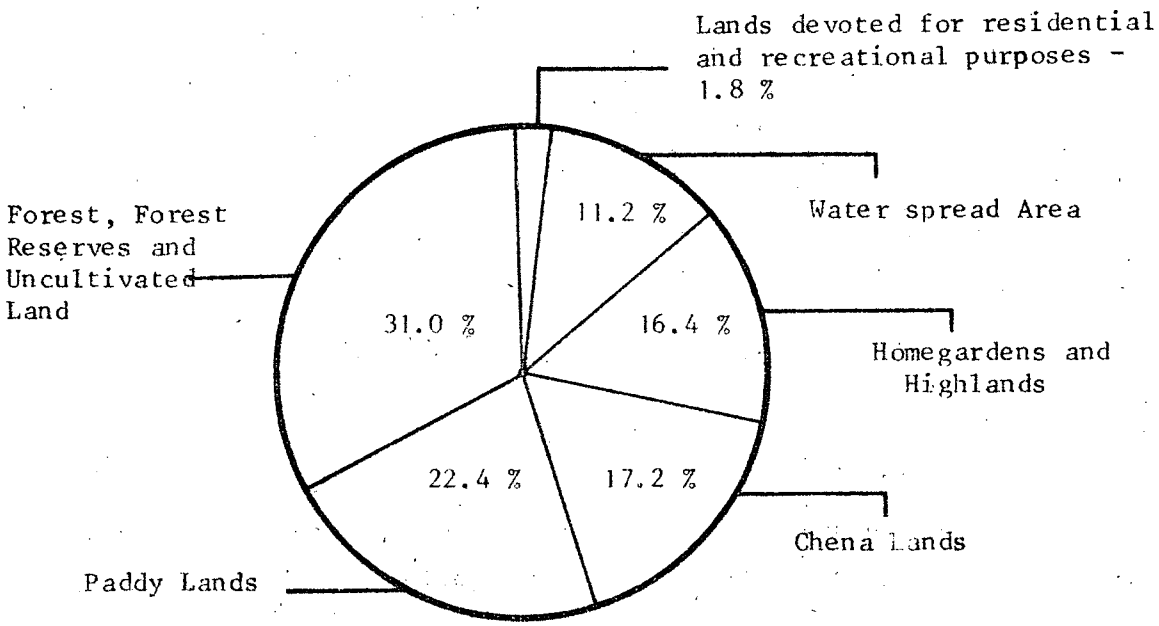


Figure 4.1

Land use in the Project Area

4.2 LAND USE PATTERNS IN AGRICULTURE

The land available in the project area is used in many ways. The general land use pattern (in the broad sense of land use) in the study area was described in the previous section. In this section an attempt is made to set forth the existing land use pattern. In this regard, it focuses attention on the composition of the farm land holdings, and availability of irrigation with respect to land utilisation. The pattern of land use in the area as shown in table 4.1 is not dissimilar to that in the rest of the dry zone in Sri Lanka.

Table 4.1 - Land Use in Agriculture in the Sample

Forms of Land Use	Irrigated Region		Unirrigated Region		Both Regions	
	Area(ha)	%	Area(ha)	%	Area(ha)	%
Lowland	205.6	49.10	113.9	36.70	319.5	43.8
Chena	68.5	16.30	51.6	16.6	120.1	16.5
Homesteads	67.1	16.00	35.5	11.5	102.6	14.1
Highlands (other than chena)	77.2	18.40	109.3	35.20	186.5	25.6

A majority of paddy lands in the study area is irrigated under major irrigation schemes, which account for approximately eight-tenths of the total paddy lands under cultivation (see table 4.2). The balance is cultivated mainly under minor irrigation and rainfed conditions. The latter is subject to greater risk of crop loss due to water stress. Most of the paddy farmers in the unirrigated region cultivate substantial portions of encroached lands. It was also observed, that many *chena* lands in proximity to old paddy fields have been converted to rainfed paddy lands.

Paddy was the exclusive crop on irrigated lowlands at the time of the survey and the extent under this crop amounted to approximately 4000 ha in *maha* 1979/80. Based on the pattern of rainfall and its frequency, two seasons of paddy cultivation are recognised. The

maha is the major season; which extends from October to March coinciding with the North East monsoon winds. During this season, almost all *asweddumised* paddy lands are brought under cultivation. The *yala* is the minor season which extends from April to September coinciding with the South West monsoon winds. Paddy cultivation during *yala* is mainly confined to lands under the major irrigation schemes in the area.

Shifting cultivation (*chena*) is based on slash and burn techniques of clearing the land and is seen on an extensive scale on the unirrigable uplands adjoining the rural settlements. In fact, *chena* farming forms a vital element in the farm economy as it brings a substantial proportion of income to many households in the project area.

Table 4.2 - Paddy Land Distribution According to Irrigation

Mode of Irrigation	Major Irrigation		Minor Irrigation & Rainfed		Total	
Region	Area ha	%	Area ha	%	Area ha	%
Project area	4250	80.7	1020	19.3	5270	100
Project area of Hambantota AGA Division	890	73.3	330	26.7	1220	100
Project area of Kirindi Oya Existing Irrigation system	3360	95.9	140	4.1	3500	100
Project area in Outer periphery of Irrigation region	-	-	550	100	550	100

Source : ADB (1977) :-Appraisal Report of Kirindi Oya Irrigation and Settlement Project

4.3 SYSTEMS OF CULTIVATION

The systems of cultivation adopted in each farm unit were also examined. These systems varied according to the types of land and the season. The classification of farms according to systems of cultivation is summarised in table 4.3.

Table 4.3 - Type, Size and Distribution of Farms (Maha 1979-80)

Type of farm	Average area per farm (ha)	Percentage of farms
Only lowland	1.23	5.76
Only highland	0.50	40.38
Only chena	1.19	16.07
Lowland + Highland	1.68	27.06
Lowland + Chena	2.0	3.21
Lowland + Highland + Chena	2.48	7.52

Due to erratic rainfall and unreliable supply of irrigation water for lowlands, diversification of farming activities is a common feature in the unirrigated region. In *maha* almost 38 percent of farms in both irrigated and unirrigated regions adopted more than one system of cultivation. The most common combination was paddy farming and highland cultivation.

Analysis of cultivation systems indicate that seasonal differences in availability of irrigation water for paddy cultivation and high pressure on paddy lands in the area are important reasons for the differences on the farming systems adopted during the two seasons. In the rainy season, farm production in the irrigated region is centred mostly on lowland paddy. In the unirrigated region farming in *maha* is centered on paddy while *chena* and highland cultivation are also undertaken. Nearly three-fourths of the *chena* farms in the project area is located in the unirrigated region. A reason for this concentration is the availability of crown lands.

4.4 LAND TENURE

Before the advent of British land policies in the dry zone peasant sector, all the land used by the peasantry were held in common and administered by the extended family and customary laws (Ranatunga *et al*: 1979). The issuing of title deeds to lands which provided for absolute private ownership of lands was introduced only at the turn of the last century. Thus, absolute ownership of land by individuals in the study area is a relatively recent development as in many other dry zone areas (Leach, 1961).

About 75 percent of the total irrigable extent of the paddy lands in this area are located in the settlements under the Ellegala Anicut (almost all paddy lands of this region are "Freeholds"). Nearly 17 percent is located in the unirrigated region. Detailed data relating to the distribution of land among the households in the sample are given in tables A 18 - A 23. These indicate an unevenness of distribution which is common in similar areas in the dry zone of Sri Lanka.

In considering the various characteristics relating to the distribution and tenure of land cultivated and used by the sample of households, it must be kept in mind that the sampling errors mentioned in chapter one are likely to yield underestimated figures relating to central tendency such as averages and medians. The full extent of the lands comprising *chenas*, highlands other than *chena*, homesteads and lowlands etc, operated by the sample of 650 households was 730 ha giving an average of 1.12 ha per household. The problem of landlessness is acute in the area, as it has progressively increased during the past three decades (ARTI : 1974). This situaion has also been highlighted by the Census of Agriculture in 1973.

4.4.1 Tenure of highlands

"Highlands" in this study refers to the homesteads and unirrigable lands which have already been used for farming purposes other than *chena* cultivation. Even with regard to highland, it was evident that in the irrigated regions farmers with the largest lowland

holdings also operated the largest highlands. In the unirrigated regions of the project there was no such relationship.

The distribution and tenure of highlands including homesteads is summarised in table 4.4. below.

Table 4.4 - The Distribution of Highlands According to the Tenurial Categories

Forms of tenure	Irrigated Region %	Unirrigated Region %	Project Area %
Singly owned	44.0	32.0	38.0
Jointly owned	8.6	4.0	6.2
Rented/Leased	2.8	1.4	1.6
L D O Allotments	18.6	26.2	22.2
Encroachments*	26.0	36.4	32.0

* Includes lands cultivated under temporary permits.

This data cleraly show a high occurrence of freehold lands as well as encroachments. Highlands in the project area, except fertile ones in the irrigated area, remain fallow for more than six months of the year. Since these lands are unirrigated, the crops, like vegetables, cowpea, gingelly and cereals depend entirely on the *maha* rains. *Yala* season is very dry and highland farming is often avoided.

4.4.2 Tenure of lowlands

Land tenural arrangements relating to lowland cultivation differ from those of highlands and *chenas* in the study area. A high incidence of "*ande*"(tenancy) is evident in paddy farming. Distribution of operated paddy lands according to tenurial categories is summarised in table 4.5 as follows:

Table 4.5 - Distribution of Operated Lowlands According to Tenurial Categories of the Sample Households

	Tenurial category	No. of operators	% of operators	Area ha	% of Area	Average farm size ha
I.	Owners	48	22.0	76	23.8	1.6
II.	Tenants	138	63.3	200	63.2	1.5
III.	Owners tenants	13	6.0	18	5.6	1.4
IV.	Tenant owners	19	8.7	23	7.4	1.2
	Total	218	100	317	100	1.5

This shows that tenancy predominates both in terms of operators and the land operated. In regard to the average size of farms, those of sole owners are marginally larger than farms of other categories. When we examine the distribution of the lowland holdings by the size of holding, operators of medium size holdings (0.8 - 2.02 ha) predominate (table 4.6). Additionally this data points towards uneven distribution of lowlands.

Table 4.6 - Paddy Farm Distribution by Size in the Project Area

Size range ha	No. of farmers	% of farmers	Area ha	% of Area
Less than 0.4	14	5.4	2.63	0.8
0.4 - 0.8	42	16.4	19.22	6.0
0.8 - 2.02	161	62.6	175.29	54.8
2.02- 4.04	35	13.6	82.65	25.9
Above 4.04	5	2.0	39.90	12.5
Total	257	100	320	100

The Paddy Land Act of 1958 and the subsequent Land Reform Legislations have had an impact on land tenure throughout the country.

In the study area the provisions of these legislations in respect of the paddy lands have had a substantial influence on the security of tenure, land rent and so on. At present, the incidence of private ownership of large land tracts of paddy land has diminished. However, *"ande"* tenancy continues to exist. Further, the high incidence of small farms indicate pressure on cultivable land. An examination of the relationship between the landlords who give their lands on *"ande"* indicate that they are often related in one way or another to the tenants. The general picture on this situation is presented in table 4.7.

Table 4.7 - Relationship of Tenant and Landlord

Form of relationship of landlord to tenants	No. of tenants	Percentage
a. Friend	80	47.0
b. Neighbour	28	16.5
c. Relative	43	25.3
d. Others	19	11.2
Total	170	100

Ranatunga *et al* (1979) contends that landlords in this area do not contribute much towards the cost of cultivation which is almost entirely borne by the tenants. The evidence of this study also favours this view as very few landlords in the sample offered collatoral help to their tenants. Tenurial reforms and rental legislations have constantly influenced these changes in tenant landlord relationships. A small proportion of tenants who pay one-half or one-thirds of the harvest received such help from the landlords only at certain stages of cultivation ie. land preparation, transplanting, and harvesting.

The land rent paid by tenants has got gradually adjusted to confirm with the provisions of current legislation in this area, than in most other parts of the country. In fact, a large majority of the tenants now pay only a quarter of the harvest to the landlords as rent. See table 4.8 below.

Table 4.8 - Land Rent Paid by Tenants

Crop share	No. of tenants	Percentage
1/4 share	156	91.7
1/3 share	4	2.4
1/2 share	2	1.2
620 kg per 1 ha	8	4.7
Total	170	100

4.5 LANDLESSNESS

Table 4.9 below shows the extent of landlessness in the sample studied.

Table 4.9 - Distribution of Households According to Land Ownership

Region	Households enumerated	Land Owning households	Landless households	% of landless households
Project area	650	260	390	60.0
Irrigated region	388	177	211	54.4
Unirrigated region	262	83	179	68.3

Of the total number of families around 53 percent in the irrigated region and about 51 percent in the unirrigated region had no paddy lands. Of the total paddy cultivators, around 63.3 percent were tenants who did not own lowland.

Since a majority of the households did not own land, land distribution under the project is bound to have a major impact on these households. Many of the landless are currently employed as casual labourers.

A high rate of migration during the past three decades had resulted in high pressure on paddy lands in the irrigated area. The difficulty in irrigating suitable lands in the unirrigated region for paddy farming with the existing facilities has also contributed to a high incidence of landlessness in the project area. Migrants to this region acquire the highlands at first; and theafter the *chenas*. They not only depend on shifting cultivation, but also involve themselves in certain temporary occupations such as labour, trading, construction and so on. Almost all of them will have access to agricultural lands under the project.

Chapter Five

AGRICULTURE

Agriculture constitutes the most important economic sector in the project area. Sixty six percent of all employment in the sample is generated by agricultural activity yielding 50 percent of the total income. Agriculture directly benefits 66 percent of the households in the sample by contributing to the income of these households. The Kirindi Oya Project itself is almost entirely directed towards the development of agriculture as the chief economic activity of the area. Hence it is likely that in the future agriculture in the area will become even more important than it does now.[1]

5.1 CROPPING SYSTEMS

In general the cropping systems in the area are determined by the types of land and water availability. On the highlands with good soil types but without irrigation facilities, rainfed farming and animal husbandry are practised. Rainfed farming falls into two categories. One is shifting "*chena*" cultivation in which only annual crops are grown on a given plot of land for up to three seasons. The other is the cultivation of both annuals and perennials on permanently established highland farms and home gardens year after year.

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1 A detailed study of agricultural production, particularly of lowland production has been undertaken. This will be the contents of a seperate forthcoming report.

Where irrigation facilities are available flooded monocropping of rice is practised. As often happens in the dry zone, lowlands under minor irrigation works are cultivated only during the *yala* season. Most rice lands under the major irrigation schemes are double cropped.

The total agricultural land in the sample is 729 ha. This is operated by 429 households. Hence the crude mean holding size is 1.7 ha. Forty three percent of all holdings fall in the size category of 0.8 to 2.0 ha. The cropping intensity for the sample is 93 percent and indicates underutilisation of land. The details pertaining to land use categories of agricultural lands and the size distribution of holdings are given in chapter four.

5.2 CHENA CULTIVATION

Chena cultivation is concentrated mainly in the north and north eastern regions of the project area. It is only in these regions that jungle lands suitable for such cultivations still exist. As in the rest of the dry zone, *chena* cultivation in Kirindi Oya is restricted chiefly to the *maha* season. The related agronomic practices in this area do not defer in any significant detail to those describe by Gooneratne *et al* (1980 : 18-21).

Within the sample studied there were 145 *chenas* cultivated by 34 percent of the farm households. Silva (1977 : 85-91) has concluded that *chena* cultivation and rice cultivation are complementary and not competitive. If this were so one would expect a higher percentage of farmers from the unirrigated areas to undertake *chena* cultivation because of the relatively restricted opportunities for successful rice cultivation. Among the farm households in the sample 32 percent in the irrigated area and 36 percent in the unirrigated area cultivated *chenas*. This difference is not statistically significant. Hence, the data do not indicate any preference for *chena* cultivation among farmers with limited opportunities for successful rice cultivation.

More than half (56 percent) the *chena* cultivators in the sample admitted to being encroachers on their *chenas*. These encroached *chenas* comprised 51 percent of the area of all *chenas*. A majority of these

operators (74 percent) had other sources of income too. Various types of employment including agricultural labour were reported by 37 percent of these farmers. Another 37 percent of them claimed to be cultivating rice elsewhere in the area. Some information pertaining to the rice farms of these *chena* cultivations is given in table A 24. This shows that a high incidence of various forms of tenancy in their rice lands occur among those who come from the irrigated area. The average *chena* farming household had almost three units (2.98) of additional family labour apart from the operator. This is higher than the average for the sample which is 2.4. Thus we might surmise that availability of more family labour predisposes towards undertaking *chena* cultivation. Table A 25 gives the details of the distribution of the *chenas* according to their sizes. Table 5.1 below sumarises this data.

Table 5.1 - Size Distribution of Chenas

Size group (ha)	Number	Percentage	Area (ha)	Percentage
Less than 0.40	9	6	1.62	1
0.40 to 1.22	104	72	69.15	58
1.22 to 2.03	27	19	36.55	30
Over 2.03	5	3	12.96	11
Total	145	100	120.29	100

This indicates that the average size of a *chena* is 0.83 ha and that the majority of cultivators and cultivated land occur in the size category containing the average sized holding.

A variety of crops are cultivated on the *chenas*. The most important among these are gingelly, vegetables and chillies. Other crops commonly grown are the pulses, *kurakkan* and ground nut. The extents of various crops cultivated and their yields are detailed in table A 26. These details are summarised in table 5.2.

Table 5.2 - Production on Chenas

Crop	Percentage area	Productivity (kg/ha)
Gingelly	26	369
Chillies	19	514
Pulses	10	577
Vegetables & mixed crops	45	-

Except for vegetables, other *chena* crops carry relatively high prices. They are also not perishable unlike vegetables and the farmers may withhold them from immediate sale to get higher prices later. This happens often when farmers are not desperate for cash. The situation is quite the opposite in the case of vegetables and there is a glut in the market at harvest time. Farmers are often compelled to dispose of their harvests at ridiculously low prices. Not infrequently farmers claimed that it is unprofitable even to harvest the crops and transport it and therefore they are left to perish in the field. Vegetables are usually grown mixed, several varieties on the same patch of land. Commonly grown vegetables are pumpkins and other gourds, tomatoes, okra and brinjals. Different units are used in the sale of vegetables and this combined with the other problems mentioned made it impossible to quantamise their production on the *chenas* in the sample.

5.3 OTHER HIGHLAND CULTIVATION

Here we consider the cultivation activities on the permanently established highlands. These consist of the home gardens on which the houses are situated and plots of land elsewhere. It is not uncommon for one household to operate more than one of these units. The size distribution of these holdings is given in table A 27. This data are summarised in table 5.3 to give an idea of the general distribution.

Table 5.3 - Size Distribution of Other Highlands

Size group (ha)	Number	Percentage	Area(ha)	Percentage
Less than 0.40	205	36	32.54	11
0.40 to 1.22	325	58	198.75	69
1.22 to 2.03	24	4	31.08	11
Over 2.03	10	2	26.93	9

The average size of these holdings is 0.51 ha and a large proportion of them are small.

Agriculturally, the highlands are often poor in productivity under the current management conditions. With better management practices they have a high potential as they largely consist of reddish-brown soils which are well drained. Apart from the absence of irrigation water the chief problem is the high incidence of weed infestation. After years of cultivation and exposure of the surface without soil conservation measures these lands are generally denuded and poor in fertility. The only cultivation that is practised on highlands with any success is the cultivation of coconuts, mostly in the southern central region of the project area. There are also many forest gardens incorporating fruit trees such as Jak and Mango in this region. They take advantage of the high water tables due to irrigation of the surrounding rice fields under the major irrigation schemes. The other common permanent crop on these lands is *Murunga* which grows almost wild in the area, it requires no care and is harvested for sale only if the prevailing prices are attractive enough, which often is not the case. The crops and their extents during *maha* 1980/81 are given in table 5.4.

Table 5.4 - Highland Crops and Their Extents in Maha 80/81

Crop	No. of households	Percentage	Area (ha)	Percentage
Coconut	50	26	29.16	20
Murunga	20	10	14.78	10
Gingelly	24	13	18.43	13
Chillies	18	9	13.57	10
Pulses	2	1	5.67	4
Mixed crops	78	41	61.86	43
Total	192	100	143.47	100

The total cultivated highland area of 143.47 ha is almost exactly 50 percent of the highland area available for cultivation. This represents a gross underutilisation of land due mainly to the factors described earlier. We must also consider the productivity of the cultivation practised. Due to the poor soil fertility, weed competition and low soil moisture regimens the yields, especially those of the seasonal crops, are often low.

These are mainly meant for home consumption. Only in a few instances were the farmers able to recall the actual quantities harvested. Therefore, it was not possible to record the production of these lands. However, 35 farmers reported producing a surplus of coconut for sale. Twenty seven of them (77 percent) claimed to have produced more than twice their home requirements and sold the excess. Due to reasons mentioned earlier most of the coconut cultivation and production of surplus occurs in the irrigated area of the sample.

5.4 LIVESTOCK PRODUCTION

In the sample of households 93 practised livestock production. A majority of these were in the irrigated area where 59 households comprising 24 percent of the farm households kept animals for

production. The balance 34 households in the unirrigated area comprised 19 percent of the farm households in that area. The details regarding the types and number of animals and their distribution among the households are given in table A 28.

Neat cattle are the preferred animals for livestock production in the area. This is not surprising since this area has a national reputation for production of quality curd. The animals are usually grazed in the open and stall feeding is practised only rarely. Of the households keeping neat cattle 65 percent had less than five heads each. Only one household had more than 25 heads of cattle. Compared to neat cattle, buffaloes are managed in larger herds, often comprising of 10 to 25 animals. Poultry keeping was essentially for the production of eggs for home consumption.

In the irrigated area 75 percent of the households keeping livestock reported that their animals were not in production. In the unirrigated area the figure was 21 percent. To simplify the quantification of production the estimated value of produce during the 12 months prior to enumeration was used as the measure. The details of production are given in table 5.5.

Table 5.5 - Production From Livestock

(a) Irrigated Area:

Value product	Households		Annual Value Product		
Group (Rs.)	No.	Percent	Total Rs.	Percent	Average Rs.
Less than 1000	23	52	9931	7	432
1000 to 3000	11	25	19077	14	1734
More than 3000	10	23	106397	79	10640
Total	44	100	135405	100	3077

Table 5.5 contd.

(b) Unirrigated Area :

Value product Groups (Rs.)	Households		Annual Value Product		
	No.	Percent	Total (Rs.)	Percent	Average (Rs.)
Less than 1000	18	67	6526	13	363
1000 to 3000	5	18	8526	16	1705
More than 3000	4	15	36846	71	9212
Total	27	100	51890	100	1922

In both areas small scale producers comprise the majority in numbers. However, it is the large scale producers who share most of the production. In comparing the two regions, these figures suggest that there is a tendency towards greater production among all groups in the irrigated area. This however, is statistically inconclusive.

5.5 LOWLAND CULTIVATION

This is the major agricultural activity in the Kirindi Oya Project area. Of all the operated agricultural holdings in the sample, lowlands comprised 44 percent and constituted the largest in area. The income from lowland cultivation accounts for 67 percent of all agricultural income in the sample (table 3.7). The lowland cropping intensity for the sample is 121 percent. The cropping intensities for the irrigated and unirrigated areas are 152 percent and 65 percent respectively. During the *maha* most of the operated lowlands are cultivated whereas in the *yala* a considerable area is left fallow. Even in the irrigated area only 68 percent of the lands cultivated in *maha* were cultivated in *yala*. This indicates the potential for increasing production with better distribution of irrigation water. Some relevant information relating to lowland cultivation are given in table 5.6. Almost two-thirds of all lowlands in the sample are in the irrigated area. Hence, most of the rice production occurs in this area. It is the unirrigated area that is likely to benefit most from the Kirindi Oya Project.

Table 5.6 - Lowland Cultivation

	Irrigated Area		Unirrigated Area		Entire Sample	
	Maha	Yala	Maha	Yala	Maha	Yala
Operated Area (ha)	206	206	114	114	320	320
Cultivated Area (ha)	203	144	93	445	296	189
Percent of operated area cultivated	98	64	82	39	92	59
Area harvested (ha)	203	144	86	41	289	185
Percent of cultivated area harvest	100	100	92	91	98	98
Area under major irrigation (ha)	181	143	70	40	251	183
Percent of cultivated area under major irrigation	89	99	75	89	85	97
Number of households operating	157	157	100	100	257	257
Number of households cultivating	151	96	86	44	237	140
Percent of households cultivating	96	59	86	44	92	55
Total production (kg)	536227.16	374124.10	191181.90	101296.16	727409.06	475420.26
Productivity of cultivated land (kg/ha)	2641.51	2598.08	2055.72	2263.60	2457.46	2515.45

The differences between the productivities of land in the irrigated and unirrigated areas during *maha* is statistically significant at a probability level of 0.5 whereas the other differences are not statistically significant. This seem to suggest that water availability in the irrigated area during *maha* is more conducive to better cultivation than in the unirrigated area. In addition both areas appear to suffer from water shortages during *yala*. Any further conclusions pertaining to the two areas in relation to the two seasons are not warranted due to the cross-sectional nature of data. However, the above observations indicate that the unirrigated area is likely to benefit more from the project than the irrigated area.

The productivity of land of the entire sample is lower than the estimates of productivities for both the Hambantota District and Sri Lanka for the same season.[1] This is probably due to non-sampling errors such as recall lapse and under-reporting by the respondents.

The state of lowland cultivation can be assessed by the level of adoption of the various management practices like the use of improved varieties, application of fertiliser, adoption of crop protection etc. Table 5.7 provides this data to enable a comparison of the two areas.

The data indicate that the rates of adoption of the practices are consistently higher in the irrigated area than in the unirrigated area. However, these differences are not statistically significant. An interesting observation here is that the rates of adoption are higher in *yala* than in *maha* for both areas. This is contrary to usual expectations. Normally the rates are high in *maha* because of the better availability of water and the consequent reduction of risk. This difference cannot be explained in terms of costs of these practices as there were no significant changes

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1 Ministry of Plan Implementation estimates.
Maha 79/80 ; Hambantota 3673 kg/ha Sri Lanka kg/ha
Yala 80 ; Hambantota 3722 kg/ha Sri Lanka kg/ha

Table 5.7 - Adoption of Improved Practices among Cultivating Households

Improved Practices	Irrigated Area		Unirrigated Area		Entire Sample	
	Maha	Yala	Maha	Yala	Maha	Yala
Use of high-yielding varieties	91	93	56	93	78	93
Land preparation by tractors	89	96	80	86	86	93
Transplanting (random)	22	11	05	02	16	09
Transplanting and sowing (in rows)	01	01	00	00	01	01
Application of fertiliser	97	96	88	93	94	95
Application of three doses of fertiliser	54	66	47	61	51	64
Chemical weed control	84	92	78	82	82	89
Manual weed control	13	04	12	02	12	04
Pest control	85	93	81	89	84	91

between the two seasons. Neither were there any changes in agricultural credit policy between these two seasons which might have favoured greater adoption levels in *yala*. It is not known whether this is the normal pattern in this area.

It can be noted that transplanting is less common than the adoption of other practices. This in itself cannot be considered as a poor adoption rate as the major benefit from transplanting is better control of weeds. Consequently adoption of chemical weed control is relatively high owing to the widespread practice of broadcasting. Transplanting and sowing in rows facilitate the use of mechanical weeders and hence reduce the need for use of expensive imported weedicides which in turn helps conservation of the environment. The rate of adoption of transplanting and sowing in rows is very poor. Hence, a strong research and extension effort to promote wider adoption of these practices deserve urgent consideration.

5.6 CONCLUSION

Agriculture is the mainstay of the economy of the project area. Though there is considerable involvement of the farming population in the sample in *chena* and other highland cultivation and in animal husbandry their partial productivities in terms of returns to both land and labour appear to be low. Rice cultivation on the other hand is the chief income earning activity and provides greater productivity from land. The major impediment to rice cultivation appears to be the shortage of an assured supply of irrigation water. Cropping intensity of cultivable land is also low. This is especially so among the highlands. This too stems essentially from the dearth of irrigation water. Hence, the potential for the development of agriculture in the area seem to be very large with the Kirindi Oya Project which promises better and wider irrigation facilities.

Chapter Six

NUTRITIONAL STATUS

Kirindi Oya development programme envisages improving rural incomes in the project area by increasing agricultural productivity and employment. It is well known that, at early stages of development, increases of income will lead to higher consumption of food. This in turn will result in the improvement of nutritional well-being of the people in the area. Therefore, nutritional status can be considered as a useful indicator of the level of development. Hence, the establishment of the levels of nutrition among the different beneficiary groups of the project will enable future comparisons and measurement of progress.

Considerable evidence suggest that in many developing countries infants and young children suffer the worst effects of malnutrition. Manifestations of undernutrition are also most easily detected among this group. Protein-energy malnutrition in early childhood is considered as a serious problem in Sri Lanka and is generally regarded as an important cause of ill health and high mortality among them. Consequent to these considerations households with children between the ages of one and six years were selected as the target group for this study.[1]

According to Jelliffe (1966) anthropometric measurements and selected clinical data are acceptable key indicators of nutritional

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1 A detailed study of Dietary Intake and Status of Nutrition has been undertaken. This will be the contents of a separate forthcoming report.

status in pre-school children. Nutritional anthropometry is concerned with the measurement of the variations of the physical dimensions and the gross composition of the human body at different age levels and degrees of nutrition. It permits assessment of protein energy malnutrition by using simple body measurements.

6.1 THE SAMPLE

In the main sample of 650 households for the socioeconomic survey there were 346 households falling within the target group. It would have been impractical to collect the detailed measurements and observations needed for nutritional assessment from all these households. Hence, a subsample of 100 households was selected at random for this study.

From the 100 households 138 children between the ages of 12 and 59 months were measured. The distribution of the sample by sex and age is given in table A 29.

6.2 DATA COLLECTION AND EVALUATION

Ten investigators were given an intensive one-week training prior to the commencement of field work. Training of investigators and supervision of data collection were carried out with the collaboration of the Department of Nutrition of the Medical Research Institute of Sri Lanka.

The height or length of each child was measured in centimeters using a portable wooden board which could be read to the nearest 0.1 cm. Children less than 80 cm in length were measured in a horizontal position, while those more than 80 cm were measured standing. Weight was recorded in kilograms (kg) using a "Salter" hanging scale, which could be read to the nearest 0.1 kg.

The National Academy of Sciences (1974) reference population for anthropometry was used as the reference standard for comparison and evaluation of data.

6.3 ASSESSMENT OF THE NUTRITIONAL STATUS AND NUTRITIONAL CHARACTERISTICS OF THE SUB-SAMPLE

Anthopometric method is one of the most direct measures of nutritional impariment or improvement. Of the many measures of growth, two forms of physical growth influenced by protein energy malnutrition in children are:

(i) The decrease of body mass - measured by its weight
(ii) Growth in length or height

The decrease of body mass or a gradual slowing of weight gain will be visible within a short period of nutritional deficiency, while slowing of linear growth is visible only after prolonged nutritional deficiency. Seone *et al* (1971) state that, with accurate height, weight and age determinations and an acceptable reference population available, it is possible to estimate the phenomena of stunting (ie a deficit in height for age) and wasting (ie a deficit in weight for height). "Stunting" is a manifestation of chronic undernutrition, while "Wasting", is a sign of acute under-nutrition.

6.3.1 Chronic undernutrition (Stunting)

This refers to significantly substandard height of children, and is attributed to a long-term inadequacy of food intake, ie the observed height of the child is less than 90 percent of the reference median height for its age, provided its weight is not less than 80 percent of the reference median weight for its height. This will estimate the past malnutrition status.

In the sample, height for age determinations reveal that the percentage of children suffering from chronic undernutrition increases gradually from 12 months to the pre-school age. This relationship is evident from the data in table 6.1.

Table 6.1 - Incidence of Chronic Undernutrition* (Stunting)

Age (months)	% chronic undernourished
12 - 23	7.4
24 - 35	15.9
36 - 47	25.6
48 - 59	25
Average Kirindi Oya area	18.8

* Height-for-age 90% of reference median

However, the prevalence of chronic undernutrition in the area at 18.8 percent is low in comparison to the National average of 34.7 percent (Ministry of Health/CARE 1976) and the district average of 23.8 percent (Ministry of Plan Implementation 1979).

Incidence of acute and chronic undernutrition between the irrigated and unirrigated areas is given in the table A 30. It failed to show any significant difference between the two areas.

6.3.2 Acute undernutrition (Wasting)

Wasting refers to the deficient weight of a child in comparison to the ideal weight for its height, and is attributed to a short term inadequacy of food intake - ie the observed weight of the child is less than 80 percent of the reference median height for its age.

The percentage of children who showed signs of acute undernutrition (wasting) in the different age groups and the percentage for the project area is given in table 6.2.

Table 6.2 - Incidence of Acute Undernutrition* (Wasting)

Age (months)	% acutely undernourished
12 - 23	14.8
24 - 35	4.5
36 - 47	15.3
48 - 59	3.5
Average for Kirindi Oya area	9.4

*Weight for-height 80% of reference median

The weight-for-height parameter reveals that in the project area about 9.4 percent of the pre-school children are below 80 percent of the reference median. This figure is higher than the average for both Sri Lanka and the Hambantota District.[1]

As seen in many former studies acute undernutrition seem to be age dependent. A relatively high prevalence(14.8%) is seen in children between 12-23 months age group and also in the 36-47 months age group (15.3%). This high prevalence of "acute undernutrition" in the former age group of children could be mainly due to improper weaning practices or a severe shortage of food or disease. More detailed study would be needed to identify the reason for the high incidence of this condition in the latter age group.

6.3.3 Concurrent chronic and acute undernutrition (Concurrent Stunting & Wasting)

This is an effect of long-term protein calorie undernutrition - a retardation in linear growth and the effect of an acute deficit in nutrients. A weight loss creating a disproportionately low body weight-for-height situation occurs when the observed height of the child is less than 90 percent of the reference median height for its

1 The percentage for Sri Lanka is 6.6 (Ministry of Health/CARE 1976) and the average for Hambantota District is 6.3 (Food & Nutrition Policy Planning Division 1979).

age and the observed weight of the child is less than 80 percent of the reference median for its height.

The percentage of children in the subsample who had evidence of concurrent chronic and acute undernutrition is shown in table 6.3.

Table 6.3 - Incidence of Concurrent Chronic and Acute Undernutrition*

Age (months)	Percentage affected
12 - 23	3.7
24 - 35	2.2
36 - 47	5.1
48 - 59	3.5
Average Kirindi Oya area	3.6

* Weight-for-age 90% of reference median
Weight-for-height 80% of reference median

The above data indicate a comparatively higher prevalence of both chronic and acute undernutrition in the 36-47 months age group. The percentage prevalence for the subsample is the same as the National figure but is higher than the percentage of 1.4 for the Hambantota district.

6.3.4 Gomez classification

Gomez classified the early, moderate and severe stages of malnutrition into three degrees called the first, second and third degree Protein Calorie Malnutrition (P C M).

(i) First degree P C M - Early malnutrition
The actual body weight is between 75 to 90 percent of the standard which indicates a 10 to 25 percent deficit in weight.

(ii) Second degree P C M - Moderate malnutrition
The actual body weight is between 60 to 75 percent of the standard which indicates a 25 to 40 percent deficit in weight.

(iii) Third degree P C M - Severe malnutrition
The actual body weight is less than 60 percent of the standard which indicates a 40 percent weight deficit.

According to Gomez classification of the weight-for-age index, the percentage of children in the second and third degree malnutrition by age, for the sample is 19.8 percent. This is less than half the national average of 42 percent. The figures for the different age groups are given in table 6.4.

Table 6.4 - Gomez Classification of Malnutrition*
(Weight-for age NAS Reference)

Age (months)	% Second & Third degree
12 - 23	11.1
24 - 35	11.4
36 - 47	38.5
48 - 59	14.3
Average Kirindi Oya area	19.8

*Weight-for-age NAS Reference 75%

Here too the highest prevalence is seen between the age groups of 36 - 47 months. Only about 20 percent of the children 12 - 59 months of age fall into the second and third degree Gomez classification. More than 60 percent of the children identified as having weight-for age measurement less than 75 percent also fall into the disadvantaged category according to the measurement for chronic undernutrition.

6.4 CLINICAL SIGNS AND SYMPTOMS

Some of the more important clinical signs and symptoms that assist in the identification and evaluation of malnutrition are discussed below.

6.4.1 Bilateral pedal oedema

It is diagnostic of Kwashiokor a nutritional imbalance in early childhood, due to low protein intake.

In the sample no children were found with bilateral pedal oedema.

6.4.2 Angular stomatitis

These are lessions associated with fissuring at the angles of the mouth. It is a sign suggestive of Vitamin B (Riboflavin) deficiency.

Only nine children (6.5%) of those surveyed showed bilateral angular stomatitis. Two-thirds of these children were in the 36-47 month age group.

6.4.3 Goitre

This is a deficiency of iodine producing an enlargement of the thyroid.

There were no children showing any signs and symptoms of goitre among those examined.

6.4.4 Avitaminosis A

There are several signs caused by very low intake of Vitamin A, both as a vitamin itself and in the form of the orange-pigmented foods containing carotene, the precursor of vitamin A. Avitaminosis A is occasionally seen in young children but precipitated conditions would be seen in older children and adults. The more common signs of vitamin A deficiency are as follows:

(a) Bitot's spots

These occur in both eyes or sometimes only on one eye, and are seen on the temporal (lateral) side of the cornea. They appear to be triangular shaped, raised white plaques. When examined closely they look like a fine foam. This foamy material is soft and can be wiped away.

(b) Night Blindness

This is a lower than average diminution of the ability to see in dim light.

(c) Keratomalasia

This is a symptom that is associated with softening of the cornea, and in the later stages leads to ulceration of the cornea.

(d) If Keratomalasia is not treated, ulceration of the cornea will finally lead to a corneal scar making the person completely blind. This is a latter stage of Keratomalasia.

Only one child in the subsample showed vitamin A deficiency signs.[1] This is an incidence rate of less than one percent. World Health Organisation (1976) takes two percent as the level above which vitaminosis A should be treated as significant. Though the 19/5/76 National Survey indicated that the prevalence rate in the Matara area (which included the project area) is higher than two percent, the Hambantota district study of 1979 failed to show significant levels of prevalence. The latter substantiates the current observation. This leads to the conclusion that vitamin A deficiency is not a problem in the area.

6.5 SOCIOECONOMIC INDICATORS

As several social and economic factors contribute towards strengthening or weakening the nutritional status, some key socioeconomic indicators were also used to establish relationships that would shed light on some aspects of malnutrition.

The socioeconomic characteristics like household size, household income and the levels of education of the parents were examined to derermine any relationships with the incidence of malnutrition among

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1 This child showed vitamin A deficiency in the form of Bitot's spots and was also deficient in terms of height-for-age and weight-for-age.

the households. The relevant data are given in table A 31, A 32 and A 33. There was no strong evidence of malnutrition in the subsample. But to the extent that it appeared, the levels of education of the mothers seemed to be inversely related to the presence of malnutrition among children. Current trends of thought contend that formal education of the parents is not an essential factor in providing proper nutrition for the family. More important are the general understanding about different types of food and properties traditionally associated with those.

6.6 IMMUNISATION

Diseases against which immunisation is routinely carried out are small pox, tuberculosis, diptheria, poliomyelitis, tetanus and whooping cough. Table 6.5 shows the percent of children in different categories of undernutrition in relation to their status of immunisation.

Table 6.5 - Malnutrition and Immunisation

Nutrition Indicator		Immunisation Complete	Immunisation Incomplete
Weight/Age	75%	17.5	20.9
Height/Age	90%	15.7	20.9
Weight/Height	80%	8.7	9.8

In the subsample surveyed, the immunisation status of the child does not seem to have any relation to the nutritional status of the child. It is generally held that children who are not immunised have a tendency to show greater incidence of signs of malnutrition. This is probably because children do not fall prey to these diseases even though they are not immunised against them because such diseases are rare in the area. In fact, not even a single case of such diseases was reported from the sample households during the reference period of this study.

Chapter Seven

RURAL INSTITUTIONS, FACILITIES AND SERVICES

For the purpose of this review, rural institutions can be broadly defined as organisations that specifically cater to certain social and economic needs of people living in the area. These institutions fall into two major categories: Formal state controlled or sponsored institutions and informal voluntary associations. In the following discussion both the institutions themselves and the facilities and services they provide are examined for the entire project area mostly without reference to the sample. Only the facilities for credit are discussed in relation to the sample.

7.1 FORMAL INSTITUTIONS

The larger formal institutions in the area comprise the district and divisional units of the various government departments. These are the departments of Health, Education, Agriculture, Agrarian Services, Cooperative Development, Rural Development, Postal Services and Police.

Table 7.1 gives an overview of the facilities provided by these departments and the banking services in the area.

Table 7.1 - State Sector Facilities

Facilities	Number
Hospitals and dispensaries	07
Schools	28
Agrarian Service Centres	03
Veterinary service units	01
Cooperatives	26
Post offices	13
Police Stations	02
Banks	10

The services rendered by these institutions are well known and need no further description. However, for the purpose of further comparisons the extents to which these facilities are equipped to deliver the specific services intended of them will be described. Wherever possible assessments of the efficiency of the functions performed by these agencies will also be made subject to the limitations of the study.

7.1.1 Health facilities

There are two District hospitals at Hambantota and Debarawewa. On the average they respectively serve 250 and 300 out-patients daily. The staffing details of these hospitals are given in table A 34. The two hospitals are rather limited in the facilities available for surgical treatment. In addition to these there are one dispensary and two mobile units dispensing western medical treatment. There is one *ayurvedic* dispensary providing indigenous treatment. Four midwives serve the area and five Public Clinics with prenatal, postnatal, and immunisation services are managed under the aegis of the Medical Officer of Health based at Hambantota.

A large majority (94 percent) of the households in the sample preferred western treatment to *ayurvedic* treatment. This is due to the free issue of drugs, the relative convenience of the methods of

treatment and their efficacy. More people from the project area used the hospital at Debarawewa. The doctors claimed that the number of beds and other facilities in the hospitals were inadequate to cater to the needs of the large number of patients coming to it. The lack of surgical facilities and specialised clinics compel the patients in need of such treatment to travel some 110 km to Matara. Public Health Clinics were held at specific places in the area on a particular day of the week at each location. The regularity of these clinics was often affected by problems of transport for personnel and equipment. The two mobile dispensaries rarely functioned according to schedule. This results in large numbers of people in the area having to travel to Debarawewa or Hambantota to obtain treatment. These difficulties are compounded by the poor roads and transport facilities in the area.

7.1.2 Educational facilities

The area has a relatively large number of schools as detailed in table 7.2 below.

Table 7.2 - Schools in the Project Area

Category	Number
Primary	04
Secondary	17
Maha Vidyalayas	06
Madya Maha Vidyalayas	01
Total	28

The last two categories of schools have classes up to the GCE Advanced Level. The *Madya Maha Vidyalaya* at Debarawewa even provides for the teaching of science subjects up to the same level.

Practically all schools in the area suffered from a dearth of adequately qualified and trained teachers. This was especially so in the case of two subjects : Science and English.

7.1.3 Agricultural facilities

There are two Agricultural Instructors serving the area with 16 agricultural extension workers under them. Their main function is agricultural extension. They provide farmers with advice and carry out demonstrations of new techniques. In addition they collaborate with the Agrarian Service Centres in providing planting materials, agrochemicals etc. A veterinary service centre at Weerawila carries out artificial insemination and makes provision for animal health care.

Two Divisional Officers of the Agrarian Services Department man the Agrarian Service Centres at Weerawila and Yodakandiya. They have under them 18 Cultivation Officers and 80 *yaya nayakas* (tract leaders). The functions of the latter are mainly confined to water management.

Among the agricultural households in the sample ,87 percent availed themselves of the services offered by the above institutions. The frequency of such use is given in the table A 35. Only 12 to 14 percent of the users claimed that they had frequent recourse to these services. An assessment by the users of the pertinance of the services offered in relation to their needs is given in table A 36. Eighty seven percent of the respondents categorised the services as average or good.

7.1.4 Cooperatives and marketing

There are two Multipurpose Cooperative Societies serving the area. They are at Hambantota and Tissamaharama. Within the project area there are 26 branches with retailing facilities under the two parent societies. The Paddy Marketing Board operates seven purchasing centres in the area. There is one village fair at Pannegamuwa.

Sixtythree percent of households in the sample claimed membership in the cooperatives. Incidence of membership among agricultural and nonagricultural households was 68 and 51 percent

respectively. The higher incidence among agricultural households is presumably due to the availability of credit facilities and other benefits to farmers that existed in the recent past. Although the need for agricultural services is felt only by farmers, all households make use of the cooperatives. This seem to indicate a lack of awareness of the services that should be provided by these cooperatives, since the latter have ceased to issue credit and have not been efficient in supplying fertiliser and agrochemicals.

7.1.5 Other government organisations

Various administrative functions in the area fall upon the two Assistant Government Agents at Hambantota and Debarawewa. Their jurisdictions exceed the boundaries of the Project area. Fourteen *grama sevakas* (village headmen) function under them within the Project area. There are also 59 Rural Development Societies under the Rural Development Department.

The first steps towards restructuring the administration under the new District Development Councils have already been taken in the area. Under this programme of restructuring seven Special Service Officers have been appointed each covering two *grama sevaka* divisions. Their duties currently include the collection of socioeconomic data needed for administrative purposes, assisting in the implementation of development works, promoting rural savings, correcting anomalies in the distribution of food stamps, the preparation of electoral lists and the prevention of encroachments. Under the same programme *Gramodaya Mandalayas* (village awakening movements) have been established in each *grama sevaka* division.

7.1.6 Rural credit

Credit for various purposes is provided mainly by money lenders, state sponsored institutions, and friends and relatives. State lending institutions comprise two branches each of the Bank of Ceylon and the People's Bank as well as six Rural Banks, which are also managed by the People's Bank. During the period of the survey lending through cooperatives had been discontinued.

Table A 37 gives the distribution of loans taken according to the purpose and the size of the holding operated by borrowers. As can be expected the largest number of loans (83 percent) were taken for cultivation purposes. Further, 65 percent of all loans were obtained by borrowers who farm between 0.4 and 2.02 hectares of land. Most farms fall into this size group. After a detailed study of agricultural credit in the area Carr and Wanasinghe (1982) have concluded that agricultural production is constrained by the poor availability of credit. They draw particular attention to the low level of institutional credit used by farmers.

Distress loans in instances of death and sickness have been obtained only by borrowers who operate less than one hectare. Such loans have been obtained from money lenders and other noninstitutional sources. The distribution of the amounts of individual loans according to the land sizes farmed by borrowers is shown in table A 38. Here too we notice that the larger amounts have been borrowed by those who operate the same size class of lands as before, which indicates that the demand for credit is greater in this category. People borrow money from many sources. These sources and the frequency of their utilisation are given in table 7.3 below.

Table 7.3 - Sources of Loans

Source	Frequency Percent
Institutions	40
Money lender	45
Employer	06
Friends and relatives*	07
Others	02

* These loans are free of interest.

The interest rates charged by institutions for cultivation loans are between 9 and 12 percent. For consumption loans the

rate is 18 percent. Money lenders usually charge very high interest rates. They often run as high as 120 percent per year. People claim that they go to the money lenders because of their easy accessibility and the absence of formalities in obtaining loans from them. The more important reason is perhaps that the institutions do not consider them credit worthy owing to previous defaulting.

7.2 NON-GOVERNMENT INSTITUTIONS AND ORGANISATIONS

An important non-government service is the provision of health facilities. There are five private practitioners practising western medicine and eleven practising *ayurvedic* mecidine.

The most important voluntary organisations are the Death Donation Societies, of which 25 are found in the area. The main function of these societies is to assist in the funeral arrangements of member families. Most families in the village subscribe to these societies. The Death Donation Societies have a relatively long tradition and their success indicates the usefulness of the function performed and the high level of participation of the member families.

In the project area there are 35 places of worship. Excepting the mosque at Kirinda all the rest are Buddhist temples.

7.3 CONCLUSIONS

The area covered by the Kirindi Oya Project is generally considered to be a "difficult area". This is largely on account of the dearth of services and facilities. The institutions discussed above are not sufficient both in qualitative and quantitative terms to render adequate services to the area. Further, apart from the schools and rural banks all other facilities are concentrated along the main Hambantota - Tissamaharama road. A large number of people in Mattala, Bundala, Badagiriya and Kirinda thus have to travel long distances to obtain even elementary medical treatment, to purchase essential goods and to transact business such as obtaining loans agricultural advice etc. This aspect of accessibility was discussed at greater length in chapter two.

The other important consideration pertaining to the institutions and organisations in the qualitative aspects of the service provided by them. In health care, the unavailability of specialised services and surgical facilities has been mentioned. The schools are mostly without adequately qualified and trained staff. The response regarding cooperative and agricultural services indicate general satisfaction among the users. However, general observations suggest otherwise. Therefore, it is possible that the current users of these services are unaware of how well these functions can in reality be organised.

Chapter Eight

CONCLUSIONS

This study was intended as a means of establishing the preproject conditions in the Kirindi Oya area to enable future comparisons which would indicate the effects and impacts of the project. In this sense it is essentially an inventorisation of the current social and economic characteristics. However, the establishment of these indicators allow some conclusions to be drawn as regards the present conditions and how they are likely to be affected by the project. In this exercise certain caution is necessary due to the difficulty of dissociating project effects and impacts from those due to the effects of national level changes in development policies and processes and specific changes of a localised nature implemented from time to time in the project area. From the conclusions of this study a few policy implications have also been drawn.

8.1 DEMOGRAPHIC ASPECTS

The average household size in Kirindi Oya is higher than the national average. This is probably a result of migration during the last few years in anticipation of economic opportunities under the project. With land settlement under the project more houses will be built by the settlers and the household size is likely to diminish. A clear and definite policy of nonallocation of land under the project to recent arrivals is likely to deter rapid population growth from migration. However, further migration of people to satisfy the rising demand for various services which occur in the wake of development would continue for sometime.

About one-third of the 650 households in the sample appeared to be overcrowded. With more land made available under the project this situation will probably be eased. In this regard the current situation is better in the irrigated area than in the unirrigated area. Therefore, it is likely that the unirrigated area will benefit most from the supply of irrigation water and other facilities.

The water available for household use is limited and often difficult to obtain. This is especially so in the unirrigated area. The supply of irrigation water to these areas is also bound to have a significant effect in alleviating this situation. No major additional benefits in terms of increased health through the improvement of water supply can be expected as the incidence of diseases relating to poor availability of water is not high in the area. However, improved supply of water is likely to have a major effect in raising the physical quality of life in the area.

Keeping with the national trend, the literacy rate in Kirindi Oya is high. Literacy rate refers to the simple ability to read and write and reflects little on the levels of educational achievement. In this regard an important observation is the limited level of education received by the younger generation. This is mainly due to the inability of the parents to bear the costs associated with schooling and lack of interest among both parents and children in furthering education. Because of the poor economic opportunities available to the parents the older children are compelled to discontinue their education in order to help in the sustenance of the family. The enhanced opportunities for employment and the consequent increase in income that is likely to follow project implementation would alter this situation. With better incomes for the parents, children can be expected to stay longer in school and their educational levels may improve. But the apathy of parents regarding the education of children is not likely to change much as a result of project activity. Above all, interest in education depends on the availability of employment opportunities to the educated. Since the current situation of unemployment among those with only a general education is likely

to continue for some time, changes in the attitudes towards education cannot be expected in the near future.

We may thus witness a conflicting situation regarding education due to project activities. On the one hand, increased incomes would enable the schooling of children for longer periods. On the other hand increased employment opportunities may induce older children to leave school early. The net result of this situation is difficult to predict at present.

The exposure of a reasonably large segment of the population to the media of mass communication such as radio and newspapers is probably due in part to the good levels of literacy of the population. In the circumstances these media can be useful instruments of disseminating valuable information and know-how to the people of the area.This will be successful only with proper management of educational programmes and good coordination among the implementing agencies in the formulation of these media campaigns. It must be pointed out that a special broadcasting service to cater to the specific needs of the region is already functioning . This can be utilised for educational purposes in the fields of health, nutrition and agriculture in relation to the project.

8.2 EMPLOYMENT AND INCOME

Most of the employment in the area is generated through agricultural activities. There will be an initial rapid increase of agricultural employment both in the irrigated and unirrigated areas due to rehabilitation and augmentation of the existing irrigation system and associated land development. However, the growth in employment opportunities in the unirrigated area is likely to be greater as the entire potential of this area is still to be developed under the project.

Employment and the level of education are related in many ways. This has resulted in the problem of unemployment among the educated youth which is one of the more important issues of

development in the country today. The proportion of the uneducated among the employed in the sample was higher than their proportion among the unemployed. In other words there were more educated young people among the unemployed. This may be the beginning of an "educated unemployed" problem in the area. The employment generated by the project will only partly alleviate this problem because not all the educated youth will be willing to take to agricultural employment.

Eightyfive percent of the economically active population in the sample was employed. This figure compares well with the national unemployment situation. However, the possibility of hidden unemployment cannot be entirely discounted due to the seasonal nature of agricultural employment. Since employment opportunities will increase, the unemployment rate in the area should come down further when the project is completed.

The data indicate the presence of a large proportion of younger age groups among the employed. The proportion which is about to retire in the near future is small. Therefore, most of the employment opportunities needed to satisfy the demands of the unemployed and those about to enter the labour force will have to be generated by the project.

Agriculture and salaried employment are the main sources of income in Kirindi Oya. The average annual income is Rs. 7,300 per household. This varies from Rs. 6,500 in the unirrigated area to Rs. 7,750 in the irrigated area. Agricultural income is more unequally distributed than other income. An important predisposing reason for this is the unequal distribution of land. Greater equality in land distribution and hence, a trend towards better income distribution, can be expected from land settlement under the project if factors leading to differentiation will not come into play.

Paddy cultivation yields almost 40 percent of all income. This should increase further when paddy cultivation increases in both the area and intensity.

Income from highland farming, ie animal husbandry and cultivation of crops other than paddy, amount to only 15 percent of all income. The considerable potential for greater income from these activities can be harnessed by project programmes for developing these enterprises if they are carefully planned and executed.

Average incomes hide the magnitude of poverty in the area. Nearly 50 percent of the households in the sample reported incomes below Rs. 3,600 per year according to which they fall below the poverty line. Even allowing for underreported incomes this indicates a considerable extent of destitution in the area. This agrees with general observations and shows the capacity of the project, if properly implemented, to reduce poverty. The food stamps schemes which is an income relief measure does not reach all the poor households. However, some households claiming higher incomes receive food stamps. This misallocation of relief measures is probably due to the inadequacy of procedures for selecting the beneficiaries and points to the need for better methods in the selection of project beneficiaries.

8.3 LAND USE, DISTRIBUTION AND TENURE

Land categories in Kirindi Oya are the same as in other dry zone areas of Sri Lanka. A majority of the paddy lands are in the south central regions under the existing major irrigation works. Most of the *chena* lands are in the north of the project area. Farmers usually tend to undertake more than one type of cultivation. Paddy and *chena* cultivation are the most commonly practised combinations. The largely uniform systems of land allocation under the project will preclude such combinations in the future. Further, the development of highlands for irrigated agriculture will reduce the possibilities for *chena* cultivation.

Farmers who operate large paddy lands also operate large highlands. This is a result of the uneven distribution of land. Since the project does not contemplate redistribution of private

lands this situation will remain unchanged. Further, because these large holdings will also benefit from the provision of irrigation facilities inequalities in income are likely to remain, if not, to increase. This will be a counter process to the income equalising trends of land allocation mentioned in the earlier section.

There is high population pressure on paddy lands. This however, will disappear, at least during the initial stages of project implementation, because large tracts of new land will be brought under irrigation and farmers settled on those. However, the problem of pressure, not only on paddy lands but on other types of lands as well, will arise in the not too distant future as no provision is made for expansion to accommodate the second and subsequent generation.

There is a high incidence of *ande* and other forms of tenancy especially among the operators of paddy lands. Tenants of small paddy holdings seemed to have a greater predisposition to undertake *chena* cultivation, presumably to supplement their incomes. This may be counter productive as it compells them to divide their resources and energies unprofitably. The conditions of tenancy stipulated by the recent tenancy reform legislations are more closely followed in this area than in some other parts of the country. Owners rarely assist tenants with supply of inputs. Similarly, rents do not exceed what is payable in statutory terms. Most of the tenants who do not themselves own land are likely to be settled on new lands. This should alleviate the problems associated with tenancy. However, since tenants have the right to transfer tenancy to others of their choice it is more likely that they will transfer these rights to their children, or even to others under various transactions.

8.4 AGRICULTURE

Agriculture, particularly paddy cultivation, plays the dominant economic role in the area today. However, at present, the scope for expanding agricultural production and generation of employment in this sector is seriously constrained by the poor availability of

irrigation facilities to much of the cultivable lands. Consequently the cropping intensity among the sample is as low as 93 percent. The project envisages raising this to about 200 percent. Hence, if the project achieves its objectives there will be a more than two-fold increase in agricultural production and generation of employment.

The highlands are particularly poor in productivity. High incidence of weed infestation and poor rainfall patterns are the chief contributory factors. The only successful cultivation on the highlands is that of coconut in the irrigated area. Because of the difficulty of growing other crops such as pulses and vegetables on the highlands farmers pay scant attention to highland agriculture. Irrigated highland cultivation is an important component of the Kirindi Oya Project but farmers in the area are not used to this type of activity. In this context the importance of a well formulated programme to educate and induce farmers to undertake highland farming cannot be overemphasised.

There is a tradition of livestock keeping in the area, mainly for the production of curd. However, only about a fifth of the farm households practised animal husbandry. Free range grazing is almost the only form of management currently practised. Farmers who reared poultry and other animals were comparatively few in number. Therefore, this is another activity that has potential for development. The land distribution system envisaged, leave little room for continuation of animal husbandry as currently practised. Not much area is available for grazing lands. Hence, more intensive practices such as stall feeding will have to be promoted among the farmers.

Paddy cultivation is characterised by a rather low average annual cropping intensity of 121 percent. This varies from a very low 65 percent in the unirrigated area to 152 percent in the irrigated area. There is also a significant difference between the productivities of lands in the two areas (see table 5.6). The chief reason for these low intensities and poor productivities

is the general lack of an assured supply of water. This is indicative of the potential contribution that can be made by the supply of irrigation facilities. Even in this regard the unirrigated region will benefit most from the provision of irrigation water. The rates of adoption of modern practices are generally high. This is especially so in the irrigated area, and is probably due to the reduction of risks of crop loss arising from the more assured availability of water. However, there is a good case for encouraging greater adoption of row sowing and row transplanting to facilitate manual weed control. This will contribute towards reduced costs of cultivation by obviating excessive use of weedicides and also help in better water management as water is currently used in excess to facilitate weed control.

8.5 NUTRITION AMONG CHILDREN

Protein energy undernutrition is a general problem among the rural children in Sri Lanka. The type and extent of this condition differs from area to area. A high prevalence of acute undernutrition was observed in Kirindi Oya. However, the incidence of chronic undernutrition - appeared to be low. To the extent that the incidence of this condition is low it might be concluded that the food situation among these children is not entirely unsatisfactory. The wiry body contours which are characteristic of these children may be an adaptation to the poor dietary intake conditions.

There was a high prevalence of acute malnutrition as well as first and second degree protein calorie malnutrition among the children aged 12 to 23 months. The latter condition was as high as 74 percent. This is probably due to the nonintroduction of weaning foods to the children and their continued dependancy on breast milk alone into the second year. Very often only little attention is given to the feeding of children over three years of age as the next sibling has already arrived. This results in a consistantly high degree of malnutrition among the children in their fourth year.

Vitamin A deficiency is a common problem among children of Sri Lanka. However, in the sample studied the incidence of this condition was less than two percent. Thus Vitamin A deficiency does not seem to be a serious problem in the area.

The improvement of nutrition is an important impact expected from the project. It is not difficult to envisage that a fair portion of the increased incomes from employment and production will be utilised for more and better foods. However, to obtain the best results an effective programme of health and nutrition education will be needed. Such a programme would have to be aimed at the housewives and school children and will require trained and adequate staff.

8.6 INSTITUTIONAL AND SERVICE FACILITIES

Kirindi Oya area is generally referred to as a "difficult area". This is mainly due to the shortage of essential infrastructural services and facilities. The services that show the greatest need for improvement are medical, educational, transport and supply of essential commodities. The adequate provision of these services is important to the successful execution of rural development projects and the Kirindi Oya project plans contain some basic measures to improve these. Improvements are most required in the quality of the services. This entails the supply of essential technical facilities and making available qualified staff in adequate members to man these services in addition to the provision of buildings. Project policies need to be more explicit on these aspects as they now plan only for the buildings. If the services are inadequate during the early stages of the project the inconvenience caused are likely to divert the efforts of the settlers away from their cultivation activities. This was one of the major draw-backs of the advanced alienation schemes practised in the past. The improvement of these facilities will make a major contribution towards better physical quality of life.

Services such as agricultural extension, provision of credit, input supply and marketing facilities are important for the promotion of agricultural production. These services currently leave much to be desired. The success of the entire project will depend on the expansion and streamling of these functions. Perhaps the most important requirement during the reorganisation of these functions would be the development of a mechanism, to coordinate and integrate these services in a meaningful manner. Continuation of the present diversity of these service agencies in their approach to the farmers will only serve to negate any individual improvements made to these services.

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Table A 1

Important characteristics of the surveys for the socioeconomic study and the health and nutritional status study

Characteristics	Socioeconomic study	Health and nutritional status study
1. Period of the survey	April - May 1980	Mid-June to July 1980
2. Reference period	1979 calendar year/ 1979/80 crop year	As above
3. Basic unit of surveys	Household	Household with preschool children
4. Sampling frame of basic units	List of households prepared by the Dept. of Census & Statistics for the 1981 Census of Population and Housing	List of households with preschool children obtained from the list of sample of 65 households of the socioeconomic survey.
5. Level of stratification	Two geographical areas: irrigated area (IA) and unirrigated area (UIA)	None
6. Sampling design	Stratified single stage random design, with household as the primary sampling unit (PSUU)	Simple random design
7. Size of sample	7 percent PSUU from IA and 10 percent PSUU from UIA amounting to 388 and 262 PSUU respectively (for details, see table A1)	104 households with preschool children, resulting overall sampling fraction of 1.3 percent (for details see table A1)
8. Method of data collection	By single interview using structured questionnaire	Recording of anthropometric measurements, clinical signs and symptoms
9. Type of data collected	General household particulars Health & Sanitary conditions. Land use and tenure, Agricultural production, livestock, farming, employment & income. Indebtedness,credit utilisation & savings. Communication & leisure. Institutions & services. Availability of social amenities.	Height and weight following clinical signs and symptoms: Bitot's spots night blindness Keratomalacia Angular atomatitis Corneal scars Bilateral pedal oedema.

Note: On completion of the project activities with the settlement of farm families the different parts of the project area are to be identified by Irrigation Tracts partitioned on the basis of water shed boundaries. As a result the existing village boundaries will cease to exist. It was therefore conceived that a second stage stratification on the basis of Tracts will be a good criterian to follow. However, due to the fact that the time of the survey the Tracts have not been demarcated on the land for practical purposes, the identification of households by Tracts was not possible. Further stratification on the basis of Tracts was, therefore, abandoned.

Appendix Table A 2

Age - Specific school participation rates by sex and income of household

(Figures in parenthesis indicate the total number of children in the sample falling into the respective category)

Sex or monthly income(Rs.)		Irrigated area			Unirrigated area			Both areas		
		5 - 9	10-14	15-19	5 - 9	10-14	15-19	5 - 9	10-14	15-19
Male		82.8 (145)	86.3 (131)	30.8 (143)	71.1 (97)	84.4 (77)	45.9 (98)	78.1 (242)	85.6 (208)	37.0 (241)
Female		74.0 (127)	81.2 (138)	41.7 (144)	71.8 (85)	91.5 (82)	40.3 (72)	73.1 (212)	85.0 (220)	41.2 (216)
Both sex		78.7 (272)	83.6 (269)	36.2 (287)	71.4 (182)	88.1 (159)	43.5 (170)	75.8 (454)	85.5 (428)	39.0 (451)
Less than 100	M	83.3 (6)	75.0 (4)	20.0 (5)	-	-	-	87.5 (8)	88.9 (9)	14.3 (7)
	F	100.0 (2)	00.0 (4)	0.0 (1)	-	100.0 (1)	0.0 (1)			
100 - 199	M	83.3 (6)	87.5 (8)	75.0 (4)	100.0 (7)	75.0 (4)	37.5 (8)	78.3 (23)	77.8 (10)	35.0 (20)
	F	42.9 (7)	50.0 (4)	0.0 (6)	100.0 (3)	100.0 (2)	50.0 (2)			
200 - 399	M	75.0 (48)	87.5 (32)	27.8 (36)	70.7 (41)	100.0 (16)	68.8 (16)	70.9 (172)	87.7 (106)	37.6 (101)
	F	68.1 (47)	82.4 (34)	24.2 (29)	69.4 (36)	87.5 (24)	50.0 (20)			
400 - 599	M	84. (33)	83.3 (30)	21.2 (33)	75.9 (29)	84.6 (26)	45.5 (22)	79.7 (118)	81.4 (102)	36.0 (114)
	F	83.9 (31)	77.5 (31)	42.5 (40)	72.0 (25)	80.0 (15)	36.8 (19)			
600 - 799	M	79.2 (24)	81. (22)	25.0 (20)	50.0 (10)	92.3 (13)	.0 (27)	71.9 (57)	86.4 (81)	34.3 (73)
	F	66.7 (12)	76.2 (21)	35.3 (17)	81.8 (11)	6.0 (25)	44.4 (9)			
800 - 999	M	100.0 (8)	77.8 (9)	42.9 (14)	50.0 (4)	50.0 (6)	57.1 (7)	73.9 (23)	84.4 (32)	48.9 (47)
	F	70.0 (10)	100.0 (12)	50.0 (2?)	0.0 (2)	100.0 (5)	50.0 (6)			
1000 over	M	95.0 (20)	96.2 (26)	58.7 (31)	66. (3)	75.0 (12)	38.9 (18)	93.9 (43)	81.1 (40)	45.3 (53)
	F	88.9 (23)	81.3 (16)	64.5 (22)	(3)	50.0 (10)	36.7 (15)			

Appendix Table A 3

Percentage distribution of household members aged 15 years and over by level of education, age and sex

Age & sex		No schooling		Primary		Grade VI-IX		GCE(O.L) pass		GCE(A.L)pass or higher	
		IA	UIA	IA	UIA	IA	UIA	IA	UIA	IA	UIA
15-19	M	6.5	10.4	37.2	31.3	45.1	49.0	10.5	8.3	0.7	1.0
	F	6.6	7.3	30.6	29.3	46.0	54.9	16.1	7.3	0.7	1.2
20-24	M	4.5	13.3	30.3	50.6	48.5	27.7	14.4	6.0	2.3	2.4
	F	8.4	11.5	31.3	29.9	53.4	35.6	5.3	18.4	1.5	4.6
25-29	M	3.4	8.2	38.7	35.3	46.2	49.4	9.2	7.0	2.5	0
	F	9.5	13.4	35.8	39.0	40.0	40.2	10.5	3.7	4.2	3.7
30-34	M	5.6	6.0	41.7	47.0	37.5	45.5	12.5	1.5	2.8	0
	F	10.3	9.5	37.9	42.9	36.2	42.9	15.5	4.8	0	0
35-44	M	13.2	14.3	51.3	40.8	28.9	42.9	3.9	2.0	2.6	0
	F	37.5	29.8	45.0	38.6	13.8	28.1	3.8	1.8	0	1.8
45-54	M	25.9	24.6	56.8	52.6	16.0	21.1	1.2	0	0	1.8
	F	53.6	53.8	38.1	36.5	7.1	7.7	1.2	1.9	0	0
55-64	M	24.0	32.3	54.0	51.6	22.0	16.1	0	0	0	0
	F	70.7	65.0	29.3	35.0	0	0	0	0	0	0
65 & over	M	26.5	18.4	53.1	57.9	20.4	23.7	0	0	0	0
	F	75.5	69.6	20.5	26.1	4.5	4.3	0	0	0	0
Over all	M	10.9	13.9	42.5	43.8	37.0	37.4	8.1	4.2	1.5	0.8
	F	25.7	24.1	34.0	33.1	31.5	34.0	7.8	6.7	1.0	2.1

Note : IA = Irrigated area UIA = Unirrigated area

Appendix Table A 4

Percentage of employed by broad occupational groups and by participation in indoor and outdoor sports (The base figures are within parenthesis)

Main occupation	Indoor		Outdoor	
	IA	UIA	IA	UIA
Agriculture	1.9 (6:317)	3.8 (9:236)	6.0 (19:317)	6.4 (15:236)
Industries	4.3 (1:23)	0 (0)	4.3 (1:23)	25.0 (6:24)
Services	3.3 (10:304)	3.4 (7:205)	7.6 (23:304)	6.8 (14:205)

Appendix Table A 5

Distribution of households according to place of origin and year of arrival to present village

Year of arrival	Irrigated area				Unirrigated area				Both areas			
	1	2	3	4	1	2	3	4	1	2	3	4
Before 1950	-	8(14)	27(49)	57(45)	-	2(4)	3(4)	10(13)	-	10(9)	30(25)	67(33)
1951 - 1960	-	9(15)	11(20)	25(20)	-	19(34)	32(48)	24(32)	-	28(24)	43(35)	49(24)
1961 - 1970	-	16(27)	11(20)	23(18)	-	22(39)	22(33)	23(30)	-	38(33)	33(27)	46(23)
1971 - 1975	-	11(19)	3(6)	12(9)	-	7(12)	3(5)	15(20)	-	18(16)	6(5)	27(13)
1976 - 1980	-	15(25)	3(5)	10(8)	-	6(11)	7(10)	4(5)	-	21(18)	10(8)	14(7)
Total	47	59(100)	55(100)	127(100)	63	56(100)	67(100)	76(100)	210	115(100)	122(100)	203(100)
%	38	15	14	33	24	21	26	29	32	18	19	31

Note: 1 = Present village from birth
2 = Village within project area
3 = Village outside project area, but within Hambantota district
4 = Village outside Hambantota district

Appendix Table A 6

Distribution of houses according to number of rooms

	No. of Rooms							Total	Average No. of Rooms
	1	2	3	4	5	6	7		
Irrigated area	70	167	88	40	14	05	04	388	2.46
Unirrigated area	66	112	65	16	02	01	-	262	2.16
Both areas	136	279	153	56	16	06	04	650	2.34

Appendix Table A 7

Numerical and percentage distributions of houses by floor area

Floor area (Sq. feet)	Irrigated area			Unirrigated area			Both areas		
	No.	%	Cum %	No.	%	Cum %	No.	%	Cum %
Less than 250	66	17.0	17.0	44	16.8	16.8	110	16.9	16.9
250 - 499	259	66.7	83.8	191	72.9	89.7	450	69.2	86.2
500 - 999	41	10.6	94.3	23	8.8	98.5	64	9.9	96.0
1000 - 1999	20	5.2	99.5	4	1.5	100.0	24	3.7	99.7
2000 & over	2	0.5	100.0	-	-	-	2	0.3	100.0
Total	388	100.0	-	262	100.0	-	650	100.0	-

Appendix Table A 8

Distribution of houses according to various characteristics

Characteristic	Sub-groups	Irrigated area	Unirrigated area	Both areas
Ownership of house	Owner occupied	334 (86.1)	236 (90.0)	570 (87.7)
	Rented/Leased	10 (2.6)	1 (0.38)	11 (1.7)
	without rent/others	44 (11.3)	25 (9.6)	69 (10.6)
Ownership of land	Own	144 (37.1)	64 (24.4)	208 (32.0)
	Crown	162 (41.8)	172 (65.6)	334 (59.6)
	Private	67 (17.2)	17 (6.5)	84 (15.0)
	Other	15 (3.9)	9 (3.4)	24 (4.3)
Type of floor	Cement	107 (27.6)	78 (29.8)	185 (28.5)
	Mud	281 (72.4)	184 (70.2)	465 (71.5)
Type of walls	Brick	110 (28.4)	62 (23.7)	172 (26.5)
	Clay/others	278 (71.6)	200 (76.3)	478 (73.5)
Type of roof	Tiles/Asbestos/Metal sheets	66 (17.0)	57 (21.8)	123 (18.9)
	Cadjan/others	322 (83.0)	205 (78.2)	627 (81.1)
Type of kitchens	Detatched	268 (69.1)	170 (64.9)	438 (67.4)
	Undetatched	120 (30.9)	92 (35.1)	212 (32.6)
Availability of electricity	Yes	7 (1.8)	5 (1.9)	12 (1.8)
	No	381 (98.2)	257 (38.1)	638 (98.2)
Accessibility by vehicle	Yes	281 (72.4)	192 (73.3)	473 (72.8)
	No	107 (27.6)	70 (26.7)	177 (27.2)
Total		388 (100)	262 (100)	650 (100)

Appendix Table A 9

Number and percentage of households having selected household items/ transport facilities (Figures in parenthesis indicate percentages)

Item/Transport facility	Irrigated area	Unirrigated area	Both areas
1. Wrist Watch	171 (44.1)	97 (37.0)	267 (40.3)
2. Other Clocks	73 (18.8)	19 (7.2)	92 (14.1)
3. Torch	310 (79.9)	225 (85.9)	535 (82.3)
4. Patromax Lamp	135 (34.8)	69 (26.3)	204 (31.4)
5. Radio	179 (46.1)	126 (48.1)	305 (46.9)
6. Cassette Recorder	9 (2.3)	3 (1.1)	12 (1.8)
7. Sewing Machine	106 (27.3)	60 (22.9)	166 (25.5)
8. Kerosene Cooker	10 (2.6)	3 (1.1)	13 (2.0)
9. Wardrobe	105 (27.1)	42 (16.0)	147 (22.6)
10. Set of Furniture	76 (19.6)	33 (12.6)	109 (16.8)
11. Carts	18 (4.6)	10 (3.8)	28 (4.3)
12. Bicycles	195 (50.2)	101 (38.5)	296 (45.5)
13. Motor Cycles	1 (0.2)	0 -	1 (0.1)
14. Cars	7 (1.8)	2 (0.8)	9 (1.4)
15. Lorries	2 (0.5)	0 -	2 (0.3)

Appendix Table A 10

Number of different types of farm equipment owned by all households and per 100 households

Farm equipment	No. owned by all households		No. owned per 100 households	
	Irrigated area	Unirrigated area	Irrigated area	Unirrigated area
1. Mammoty	607	438	156	167
2. Plough (Wooden)	6	0	2	0
3. Plough (Iron)	14	0	4	0
4. Sprayers	13	5	3	2
5. Duster	1	1	*	*
6. Tractor 2-wheel	16	3	4	1
7. Tractor 4-wheel	3	0	1	0

* = Negligible

Appendix Table A 11

Sources of water and availability of lavatories

Source of water/availability of toilet		Irrigated area		Unirrigated area		Project area	
own well or pipe	Drinking	155	39.95	25	9.54	180	27.69
	Bathing	44	11.34	5	1.91	49	7.54
Nearby well	Drinking	154	39.69	143	54.58	297	45.69
	Bathing	26	6.70	8	3.05	34	5.23
Tank or river	Drinking	79	20.36	94	35.88	173	26.62
	Bathing	318	81.96	249	95.04	567	87.23
Availability of lavatories	Yes	292	75.26	129	49.24	421	64.77
	No	96	24.74	133	50.76	229	35.23
Total		388		262		650	

Appendix Table A 12

Closeness of households to various basis service institutions/facilities

Service Institution facility		1.5 km (1 mile)	3 km (2 miles)	5 km (3 miles)	8 km (5 miles)	11 km (7 miles)	16 km (10 miles)
School	IA	56	84	96	100	100	-
Primary	UIA	47	74	97	98	99	100
School	IA	50	78	92	98	100	-
Secondary	UIA	42	68	90	96	97	99
School	IA	34	58	77	92	97	99
Science (O.L)	UIA	29	45	60	75	84	95
School	IA	12	33	53	85	94	99
Science (A.L)	UIA	6	7	10	23	41	75
Bazaar	IA	24	51	70	88	97	100
	UIA	24	39	53	74	79	88
Co-operative	IA	49	76	89	97	100	-
	UIA	37	62	83	94	96	99
Village fair	IA	16	34	52	76	92	98
	UIA	6	6	12	30	40	70
Bus route	IA	61	81	91	97	100	-
	UIA	80	85	93	94	96	97
Health centre	IA	14	36	51	81	91	97
	UIA	12	20	26	36	49	80
Dispensary	IA	15	40	59	84	92	98
	UIA	16	30	39	47	60	86
Hospital	IA	6	24	42	78	91	98
	UIA	4	5	8	14	34	71
Post office	IA	15	45	69	94	99	100
	UIA	34	66	85	92	92	96
Police Station	IA	4	15	41	71	92	100
	UIA	7	10	13	23	29	66
Bank	IA	5	20	44	75	93	100
	UIA	1	3	11	28	37	69
Ag. Service	IA	5	13	27	66	90	99
Centre	UIA	0	0	2	16	46	79
A.G.A. Office	IA	4	18	34	74	89	98
	UIA	0	0	0	8	28	62
Temple	IA	50	81	93	98	99	100
	UIA	44	65	83	93	97	99

Note IA = Irrigated area UIA = Unirrigated area

Appendix Table A-13

Percentage distribution of employed by level of education and type of occupation

Type of occupation	Irrigated Area						Unirrigated Area					
	No schooling	Primary	Grade VI-IX	GCE (O.L) pass	GCE (A.L) pass or higher	Total (no. employed in paran)	No schooling	Primary	Grade VI-IX	GCE (O.L) pass	GCE (A.L) pass or higher	Total (no. of paren.)
Agricultural	13.5	48.6	33.1	4.2	0.6	100(320)	14.2	54.5	30.0	0.9	0.4	100(237)
Industrial	12.5	45.8	33.4	8.3	-	100(23)	14.3	46.4	39.3	-	-	100(27)
Medical/Educational	-	-	33.3	44.5	22.2	100(27)	-	-	25.0	62.5	12.5	100(16)
Clerical/Banking												
Transport	-	38.1	52.4	9.5	-	100(21)	-	33.3	66.7	-	-	100(6)
Trading	-	42.1	52.6	5.3	-	100(19)	11.1	16.7	72.2	-	-	100(18)
Others (labourers/ domestic servants etc.)	19.5	49.4	28.2	2.9	-	100(238)	19.9	45.2	32.5	2.4	-	100(167)
Overall	14.3	46.2	32.5	5.8	1.2	100(648)	15.4	47.1	33.4	3.4	0.6	100(471)

Appendix Table A 14

Percentage distribution of employed in main and subsidiary occupation by type of occupation and sex

Type of occupation	Main occupation							Subsidiary occupation						
	IA		UIA		Both areas			IA		UIA		Both areas		
	M	F	M	F	M	F	Both sex	M	F	M	F	M	F	Both sex
Agricultural :														
Owner cultivators	21.9	13.5	35.8	3.6	27.7	9.0	24.7	24.5	0	31.6	0	28.6	0	26.4
Share cultivators	15.8	4.2	3.6	0	10.7	2.2	9.4	1.0	0	3.7	0	2.6	0	2.4
Farm helpers	13.8	13.5	13.9	32.6	13.8	22.4	15.2	2.0	0	5.2	27.2	3.8	15.0	4.7
Animal husbandry	0.9	1.0	0	0	0.5	0.6	0.5	1.0	0	0.7	9.1	0.9	5.0	1.2
Sub total	52.4	32.2	53.3	36.2	52.7	34.6	49.8	28.5	0	41.2	36.3	35.9	20.0	34.7
Industrial :														
All Industries	3.8	2.1	6.9	0	5.1	1.1	4.5	5.1	0	5.1	9.1	5.1	5.0	5.1
Services :														
Medical/Educational	0.9	5.2	0.6	2.4	0.9	4.0	1.3	0	0	0	0	0	0	0
Clerical/Banking	2.5	3.1	1.8	4.8	2.2	4.0	2.5	0	0	0	0	0	0	0
Transport	3.6	1.0	1.6	0	2.8	0.6	2.4	1.0	0	0.7	0	0.9	0	0.8
Trading	3.1	2.1	4.4	1.2	3.6	1.7	3.3	5.1	11.1	4.4	0	4.7	5.0	4.7
Agricultural labourers	16.1	33.4	11.9	25.3	14.4	30.0	16.8	26.0	22.2	26.5	36.4	26.0	30.0	26.4
Others (labourers/ domestic servants etc.)	17.6	20.8	19.3	30.1	18.3	25.1	19.4	34.7	66.7	22.1	18.2	27.4	40.0	28.3
Sub total	43.8	65.5	39.8	63.8	42.2	65.4	45.7	66.8	100	53.7	54.6	59.0	75.0	60.2
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100
No. of persons reporting	552	96	389	83	940	179	1119	98	9	136	11	234	20	254

Appendix Table A 15

Percentage distribution of employed in broad occupational categories according to the distance to the place of main occupation

Broad occupational category	Less than 1km(1mil)	1.6-3 km (1-2mil)	3-8 km (2-5mil)	More than 8km(5mil)	Total (No. in parenthesis)
Agricultural; IA	64	15	14	7	100(320)
UIA	64	12	17	7	100(237)
Both areas	64	14	15	7	100(557)
Industrial; IA	52	4	17	27	100(23)
UIA	67	15	15	3	100(27)
Both areas	60	10	16	14	100(50)
Services; IA	55	11	18	16	100(305)
UIA	63	7	16	15	100(207)
Both areas	58	10	17	15	100(512)
All categories; IA	60	30	15	12	100(648)
UIA	64	10	16	10	100(471)
Both areas	62	12	15	11	100(1119)

Appendix Table A 16

Percentage distribution of unemployed by level of education

	Irrigated area	Unirrigated area	Both areas
No schooling	1.6	9.4	4.5
Primary	25.8	17.6	22.8
Grades III - IX	52.3	47.3	50.5
G.C.E. (O.L) pass	16.4	17.6	16.8
G.C.E. (A.L) pass or higher	3.9	8.1	5.4
Total	100.0	100.0	100.0
	(128)	(74)	(202)

Appendix Table A 17

Average annual household income, annual income per income receiver and annual per capita income classes

Income class	Irrigated Area					Unirrigated Area					Both Areas				
	Average annual income (Rs.)	No. of income receivers (Rs.)	Income per income receiver	No. of individuals	Per capita income (Rs.)	Average annual income (Rs.)	No. of income receivers (Rs.)	Income per income receivers	No. of individuals	Per capita income (Rs.)	Average annual income (Rs.)	No. of income receivers (Rs.)	Income per income receivers	No. of individuals	Per capita income (Rs.)
Under - 1000	462	12	539	41	158	662	3	883	8	331	507	15	608	49	186
1001 - 2000	1526	23	1327	778	391	1625	23	1272	63	464	1573	46	1300	141	424
2001 - 3000	2552	58	1848	199	539	2528	28	2167	107	567	2543	86	1952	306	549
3001 - 4000	3525	75	2726	287	712	3491	49	2565	183	687	3512	124	2662	470	702
4001 - 5000	4546	63	3463	269	811	4445	63	3528	259	858	4494	126	3496	528	834
5001 - 6000	5468	77	3196	279	882	5480	49	3020	161	919	5473	126	3127	440	896
6001 - 7000	6555	35	3558	110	1132	6480	147	3033	129	1105	6515	82	3257	239	1118
7001 - 8000	7415	41	4341	135	1318	7543	44	3086	127	1069	7470	85	3691	262	1197
8001 - 9000	8553	47	3639	140	1222	8448	30	3661	104	1056	8551	77	3648	244	1151
9001 - 10000	9491	30	5062	102	1489	9308	23	3238	58	1284	9430	53	4270	160	1415
10001 - 12000	11140	45	4951	135	1650	10784	36	3595	86	1505	11007	81	4348	221	1594
12001 - 14000	12766	28	6383	94	1901	13157	27	4386	72	1645	12919	55	5402	166	1790
14001 - 16000	15078	30	6031	95	1905	15110	22	5494	50	2418	15091	52	5804	145	2082
16001 - 20000	18548	21	10599	73	3049	18340	9	10189	39	2351	18487	30	10476	112	2806
20001 - 30000	23644	25	10403	79	3292	21860	12	9108	25	4372	23087	37	9983	104	3552
30001 & over	41743	33	16444	95	5712	41677	4	20838	13	6412	41734	37	16919	108	5796
Overall	7851	-	4737	-	1378	6504	-	3634	-	1148	7308	-	4272	-	1286

Appendix Table A 18

Distribution of households and total area of operated land according to size groups of operated land

Size group of operated land (ha)	Irrigated Area						Unirrigated Area					
	No. of house-holds	Percen-tage of house-holds	Cumula-tive percen-tage of house-holds	Area of opera-ted land (ha)	Percen-tage of opera-ted land	Cumula-tive percen-tage of opera-ted land	No. of house-holds	Percen-tage of house-holds	Cumula-tive percen-tage of house-holds	Area of opera-ted land (ha)	Percen-tage of opera-ted land	Cumula-tive percen-tage of opera-ted land
<0.20	41	11.7	11.7	3.8	1.0	1.0	15	6.2	6.2	1.4	0.5	0.5
0.20-0.41	35	9.9	21.6	7.5	2.0	3.0	15	6.2	12.4	3.3	1.1	1.6
0.41-0.81	80	22.7	44.3	36.4	9.6	12.6	43	17.7	30.1	21.3	7.2	8.8
0.81-1.21	54	15.3	59.6	47.5	12.5	25.1	59	24.3	54.4	50.9	17.1	25.9
1.21-2.02	85	24.2	83.8	120.5	31.8	56.9	60	24.7	79.1	88.6	29.8	55.7
2.02-4.04	46	13.1	96.9	114.9	30.3	87.2	46	18.9	98.0	107.1	36.0	91.7
4.04 & above	11	3.1	100.0	48.4	12.8	100.0	5	2.0	100.0	24.8	8.3	100.0
Total	352	100.0	-	379.2	100.0	-	243	100.0	-	297.4	100.0	-

Appendix table A 19

Distribution of households and total area of owned land* according to size groups of owned land

Size group of owned land (ha)	Irrigated Area						Unirrigated Area					
	No. of house-holds	Percen-tage of house-holds	Cumula-tive percen-tage of house-holds	Area of owned land (ha)	Percen-tage of owned land	Cumula-tive percen-tage of owned land	No. of house-holds	Percen-tage of house-holds	Cumula-tive percen-tage of house-holds	Area of owned land (ha)	Percen-tage of owned land	Cumula-tive percen-tage of owned land
<0.20	29	16.4	16.4	2.8	2.2	2.2	10	12.0	12	0.9	1.0	1.0
0.20-0.41	33	18.6	35.0	7.3	5.8	8.0	10	12.0	24	2.1	2.4	3.4
0.41-0.81	62	35.0	70.0	28.1	22.5	30.5	16	19.3	43.3	7.1	8.1	11.5
0.81-1.21	24	13.6	83.6	20.6	16.5	47.0	18	21.7	65.0	15.9	18.2	29.7
1.21-2.02	17	9.6	93.2	22.9	18.3	65.3	16	19.3	84.3	23.5	26.7	56.4
2.02-4.04	8	4.5	97.7	18.3	14.6	79.9	10	12.0	96.3	24.6	27.9	84.3
4.04 & above	4	2.3	100.0	25.1	20.1	100.0	3	3.6	99.9	13.9	15.7	100.0
Total	177	100.0	-	125.1	100.0	-	83	100.0	-	88.1	100.0	-

* Includes lowland, highland and home garden only.

Appendix Table A 20

Distribution of households and total area of operated paddy land according to size groups of operated paddy land

Size group of land (ha)	Irrigated Area						Unirrigated Area					
	No. of households	Percentage of households	Cumulative percentage of households	Area of low-land (ha)	Percentage of low-land	Cumulative percentage of low-land	No. of households	Percentage of households	Cumulative percentage of households	Area of low-land (ha)	Percentage of low-land	Cumulative percentage of low-land
<0.20	2	1.3	1.3	0.2	0.1	0.1	2	2	2	0.2	0.2	0.2
0.20-0.41	7	4.5	5.8	1.5	0.7	0.8	3	3	5	0.7	0.6	0.8
0.41-0.81	23	14.6	20.4	11.1	5.4	6.2	19	19	24	9.9	8.7	9.5
0.81-1.21	63	40.1	60.5	3.7	26.1	32.3	19	19	43	15.8	13.9	23.4
1.21-2.02	31	19.8	80.3	44.7	21.8	54.1	48	48	91	60.9	53.5	76.9
2.02-4.04	28	17.8	98.1	66.1	32.1	86.2	7	7	98	16.6	14.6	91.5
4.04 & above	3	1.9	100.0	28.3	13.8	100.0	2	2	100.0	9.7	8.5	100.0
Total	157	100.0	-	205.6	100.0	-	100	100	-	113.9	100.0	-

Appendix Table A 21

Distribution of Households and total area of operated Highland according to size groups of operated Highland

Size group of land (ha)	Irrigated Area						Unirrigated Area					
	No. of household	Percentage of households	Cumulative percentage of households	Area of highland (ha)	Percentage of highland	Cumulative percentage of high land	No. of household	Percentage of households	Cumulative percentage of households	Area of highland (ha)	Percentage of highland	Cumulative percentage of highland
≤0.20	11	9.6	9.6	1.1	1.4	1.4	2	1.4	1.4	0.2	0.1	0.1
0.20-0.41	9	7.8	17.4	2.2	2.9	4.3	6	4.2	5.6	1.2	1.1	1.2
0.41-0.81	54	47.0	64.4	23.6	30.5	34.8	40	28.0	33.6	18.3	16.8	18.0
0.81-1.21	30	26.1	90.5	24.7	32.0	66.8	76	53.1	86.7	62.1	56.8	74.8
1.21-2.02	4	3.5	94.0	5.4	7.0	73.8	16	11.2	97.9	20.8	19.1	93.9
2.02-4.04	5	4.3	98.3	12.1	15.7	89.5	3	2.1	100.0	6.7	6.1	100.0
4.04 & over	2	1.7	100.0	8.1	10.5	100.0	0	0	100.0	0	0	100.0
Total	115	100.0	-	77.2	100.0	-	143	100.0	-	109.3	100.0	-

Appendix Table A 22

Distribution of Households and total area of chena according to size group of chena

	Irrigated Area						Unirrigated Area					
	No. of house-holds	Percen-tage of house-holds	Cumula-tive percen-tage of house-holds	Area of chena (ha)	Percen-tage area of chena	Cumula-tive percen-tage of chena	No. of house-holds	Percen-tage of house-hold	Cumula-tive percen-tage of house-holds	Area of chena (ha)	Percen-tage area of chena	Cumula-tive percen-tage of chena
<0.20	1	1.3	1.3	0.1	0.1	0.1	1	1.5	1.5	0.1	0.2	0.2
0.20-0.41	2	2.5	3.8	0.4	0.6	0.7	5	7.6	9.1	1.1	2.0	2.2
0.41-0.81	25	31.6	35.4	11.1	16.1	16.8	19	28.8	37.9	8.5	16.5	18.7
0.81-1.21	32	40.5	75.9	26.3	33.4	55.2	28	42.4	80.3	23.3	45.1	63.8
1.21-2.02	16	20.3	96.2	22.6	33.0	88.2	11	16.7	97.0	13.9	26.8	90.6
2.02-4.04	2	2.5	98.7	4.1	5.9	94.1	2	3.0	100.0	4.9	9.4	100.0
4.04 & above	1	1.3	100.0	4.1	5.9	100.0	0	0.0	100.0	0.0	0.0	100.0
Total	79	100.0	-	68.7	100.0	-	66	100.0	-	51.8	100.0	-

Appendix Table 23

Gini Coefficient of Land Distribution

Gini coefficient by regions Nature of Tenure & Types of Land	Gini coefficient	
	Irrigated Area	Unirrigated Area
A. Nature of tenure		
(a) Operated Land	$\frac{30.2}{62.5} = 0.4832$	$\frac{25.0}{62.5} = 0.4000$
(b) Owned Land	$\frac{33.6}{62.5} = 0.5376$	$\frac{30.0}{62.5} = 0.4800$
B. Types of operated land		
(a) Lowland	$\frac{25.6}{62.5} = 0.4096$	$\frac{19.8}{62.5} = 0.3168$
(b) Highland	$\frac{26.7}{62.5} = 0.4272$	$\frac{17.7}{62.5} = 0.2832$
(c) Chena	$\frac{26.7}{62.5} = 0.4272$	$\frac{17.7}{62.5} = 0.2832$

Source : Appendix tables 4.1 - 4.5

Appendix Table A 24

Tenure of Paddy Lands Operated by Chena Cultivators

Tenure	Irrigated Area				Unirrigated Area			
	Area ha	Number			Area ha	Number		
		Major	Minor	Total		Major	Minor	Total
Land owner	6.28	9	4	13	5.27	2	2	4
Ande farmer	25.11	14	1	15	1.01	1	-	1
Encroached	1.62	-	2	2	3.34	1	4	5
L.D.O	0.81	1	-	1	8.40	6	2	8
Joint ownership	0.41	1	-	1	1.22	1	-	1
Rented	-	-	-	-	2.03	2	-	2
Total	34.23	25	7	32	21.27	13	8	21

Appendix Table A 25

Distribution of Chenas

Size group of land	Irrigated Area				Unirrigated Area			
	No. of chena		Area of chena		No. of chena		Area of chena	
	No.	%	ha	%	No.	%	ha	%
0.203	1	1.3	0.101	0.2	1	1.5	0.101	0.2
0.203-0.405	2	2.5	0.405	0.6	5	7.6	1.013	2.0
0.405-0.810	25	31.6	11.036	16.1	19	28.8	8.505	16.5
0.810-1.215	32	40.5	26.325	38.3	28	42.4	23.288	45.1
1.215-2.025	16	20.3	22.680	33.0	11	16.7	13.871	26.8
2.025-4.050	2	2.5	4.050	5.9	2	3.0	4.860	9.4
4.050	1	1.3	4.050	5.9	0	0.0	0.00	0.0
Total	79	100.0	68.647	100.0	66	100.0	51.638	100.0

Appendix Table A 26

Chena crops

Crops	Irrigated Area			Unirrigated Area		
	Area	%	Yield kg/ha	Area	%	Yield kg/ha
Gingelly	17.62	25.7	142.24	13.37	25.9	226.24
Chillies	17.11	24.9	282.24	5.47	10.6	231.84
Green gram	7.70	11.2	187.04	1.62	3.1	64.96
Cowpea	1.72	2.5	134.40	1.22	2.4	190.40
Gingelly + Chillies Kurukkan + Cowpea & others	24.50	35.7	-	29.97	5.0	-
Total	68.65	100.0	-	51.65	100.0	-

Appendix Table A 27

Distribution of Highland Farms

Size Group of land (ha)	Irrigated Area				Unirrigated Area			
	Number		Area		Number		Area	
	No.	%	ha.	%	No.	%	ha.	%
≤ 0.203	69	21	6.52	4.52	31	13	2.93	2.02
0.203 - 0.405	69	21	15.39	10.66	36	15	7.70	5.31
0.405 - 0.810	131	40	58.12	40.27	55	23	25.52	17.60
0.810 - 1.215	43	13	36.25	25.12	96	40	78.87	54.40
1.215 - 2.025	06	02	7.80	5.40	18	08	23.29	16.06
2.025 - 4.050	05	02	12.15	8.42	03	01	6.68	4.61
≥ 4.050	02	01	8.10	5.61	00	00	0.00	0.00
Total	325	100	144.33	100	239	100	144.99	100

Appendix Table A 28

Distribution of Livestock among Households

(a) Irrigated Area;

Number in herd	No. of households					No. of animals				
	Neat cattle	Buffa-loes	Poul-try	Others	Total	Neat cattle	Buffa-loes	Poul-try	Others	Total
Less than 5	21	-	12	3	36	40	-	43	9	92
5 - 10	4	2	6	-	12	36	18	55	-	109
10 - 25	5	3	4	-	12	95	47	73	-	215
Over 25	1	-	3	-	3	40	-	232	-	272
Total	31	5	25	3	64	211	65	403	9	688

(b) Unirrigated Area;

Number in herd	No. of households					No. of animals				
	Neat cattle	Buffa-loes	Poul-try	Others	Total	Neat cattle	Buffa-loes	Poul-try	Others	Total
Less than 5	10	-	7	1	18	28	-	30	4	62
5 - 10	4	-	7	1	12	32	-	56	8	96
10 - 25	3	2	-	-	5	55	35	-	-	90
Over 25	-	-	-	-	-	-	-	-	-	-
Total	17	2	14	2	35	115	35	86	12	248

Appendix Table A 29

Distribution of Sample by Age and Sex

Age (months)	Male %	Female %	Both %
12 - 23	20.3	18.9	19.6
24 - 35	34.4	29.7	31.9
36 - 47	23.4	32.4	28.3
48 - 59	21.9	18.9	20.3

Appendix Table A 30

Acute and Chronic Undernutrition in the Irrigated and Unirrigated Areas

Age (months)	Irrigated Area		Unirrigated Area	
	Chronic undernut.	Acute Undernut.	Chronic Undernut.	Acute Undernut.
12 - 23	7.1	14.2	7.6	15.3
24 - 35	14.8	3.7	17.6	5.8
36 - 47	26.3	15.7	25	15
48 - 59	23.8	4.7	28.5	0
Overall percentage	18.4	8.6	19.9	10.3

Appendix Table A 31

Status of Nutrition and Household Size

Nutrition Status	Average household size
Normal	6.3
Stunted	6.7
Wasted	4.8
Concurrent stunting & wasting	5.8
Second and third degree malnutrition (Gomez classification)	5.7

Appendix Table A 32

Status of Nutrition and Income

Income (Rs.) (annual)	Weight/Age 75%
< 2000	17.6
2000 - 4000	20.3
4000 - 6000	27.0
6000 - 8000	14.2
> 8000	5.5

Appendix Table A 33

Malnutrition and Parents' Level of Education

Level of education	Father's education % 75 W/A	Mother's education % 75 W/A
Primary education	19.0	21.7
Above Grade 6 but below O.L	17.5	14.7
O.L qualified	66.6	0
A.L qualified	0	0
No schooling but can read and write	0	0
No schooling and cannot read and write	28.6	41.7

Appendix Table A 34

Facilities at the two Hospitals Serving the Project Area

Personnel & Facilities	Debarawewa	Hambantota
Number of beds	110	138
Doctors	04	03
Dental surgeons	01	01
Registered medical practitioners	–	01
Asst. medical practitioners	01	–
Nurses	06	14
Attendants (female)	04	04
Attendants (male)	04	04
Out patients per day	300	250

Appendix Table A 35

Frequency of Untilisation of Services

Service	Utilisation (percent)		
	Frequency	Occasionally	Rarely
Cooperatives	51	27	22
Agricultural extension	14	35	51
Agrarian services	12	30	58

Appendix Table A 36

Assessment of Service by Users

	Assessment (percent)				
	Very poor	Poor	Average	Good	Very good
Cooperatives	1	6	55	36	2
Agricultural extension	3	8	58	29	2
Agrarian services	5	6	59	28	2

Table A 37 - Farm Sizes and Purposes of Loans

Size of operated land (ha)	No. of loans				
	Cultivation	Ag. Equipment	Housing	Distress	Total
≤ 0.20	6	1	-	6	13
0.20 - 0.40	-	-	-	3	3
0.40 - 0.81	23	-	-	1	24
0.81 - 1.21	23	2	-	-	25
1.21 - 2.02	52	5	-	-	57
2.02 - 4.05	29	2	-	-	31
4.05 ≥	3	3	5	-	11
Total	136	13	5	10	164

Table A 38 - Farm Sizes and Amounts of Loans

Size of operated land (ha)	Total amount borrowed (Rs) 500	500-1000	1000-2000	2000-5000	5000	Total Number of loans
< 0.20	4	-	1	1	1	7
0.20 - 0.40	-	-	-	-	-	-
0.40 - 0.81	6	10	3	1	3	23
0.81 - 1.21	8	7	6	3	1	25
1.21 - 2.02	5	17	20	12	4	58
2.02 - 4.05	-	10	6	12	3	31
4.05 >	-	-	1	2	4	7
Total	23	44	37	31	16	151