A STUDY ON THE EMPLOYMENT GENERATION IN KIRINDI OYA IRRIGATION AND SETTLEMENT AREA

Research Study No. 79

March 1987

AGRARIAN RESEARCH AND TRAINING INSTITUTE,
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SRI LANKA

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FOREWORD

Kirindi Oya Irrigation and Settlement Project (KOISP) inaugurated in 1979, is a major development project in the South-East quadrant of Sri Lanka. In its scope and magnitude it is second only to the massive Accelerated Mahaweli Project. The project with an estimated total investment of Rs.1,050 million (at 1977 prices) over a period of seven years, is jointly 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. The loan agreement stipulated that the Agrarian Research & Training Institute (ARTI) should be commissioned to undertake the benefit monitoring and evaluation of the project in accordance with the policies and the criteria of the funding agencies.

The ARTI commenced its benefit monitoring and evaluation assignment with a pre-project socio-economic survey in the project area. Subsequently, several other studies covering different components and management oriented problems in the project were carried out. This study on employment generation is one of them.

At appraisal, it was estimated that the project construction work would generate about 6.2 million man-days of additional direct employment over 7 years. This is equivalent to about 3500 jobs giving 250 days of employment per year. In view of this, the ARTI undertook this study with the objective of assessing the employment effects of the project during the construction period with particular reference to the type of jobs available, wage rates and places of residence of the workers. Another objective was to estimate the employment potential in rice cultivation based on the current volume and pattern of employment.

The KOISP introduced the public works approach to its construction phase as an immediate solution to the pressing unemployment and underemployment problems that existed in the area. The study shows that although the target of employment levels set by the project planners was achieved by the implementing agencies to a large extent, the implementation of the programme was beset with numerous problems. Such conditions as remoteness, poor on-site living facilities, seasonality and insecurity of employment rendered the recruitment of unskilled labour difficult even in an area where unemployment was rampant.

The study reveals that this project area has a high level of technology adoption in paddy cultivation. The package of technology adopted has features to increase yields and to displace labour. The main suggestion of the researchers is that the strategy adopted in the old irrigated area should ideally aim at promoting the efficient use of resources while in the new irrigated area much emphasis be placed on popularising the new technology.

Mr. L.D.I. Wijetunga, Research & Training Officer of the Institute was responsible for the co-ordination of this study under the guidance of Dr. R.D. Wanigaratne, Head of the Division of Agricultural Planning and Evaluation. Mr. P. Senanayake, Senior Lecturer in Economics of the University of Colombo participated in the study as consultant and was largely responsible for the preparation of the final draft. I wish to thank all of them and others who contributed to this study in various ways for making this study and the publication possible. I am sure this will be a valuable addition to the large number of project and study reports available on Kirindi Oya Project and Hambantota District. However, this study is only the first part of a long-term study to analyse the factors influencing the long-run dynamism of projects of this nature. In the second phase the labour absorption in agriculture and non-farm activities, and the project effect on economic growth, employment and income levels within and outside the project area would be studied.

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DIRECTOR.

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We thank Mr. S.B.K. Bandara, Information and Publication Officer and Mr. W. Ranasinghe, Librarian, A.R.T.I. for editing the first and final drafts respectively.

Miss Indra Balasuriya typed the first and final version of the report.

S.M.P.S.
L.D.I.W.

CONTENTS

LIST OF TABLES

PAGE

Chapter One

STUDY OBJECTIVES, METHODOLOGY AND LIMITATIONS

1.1 Rural Employment Strategies

In most developing countries, including Sri Lanka, employment creation has now become an explicit aim of development planning. The high rates of growth of population and labour force, and the inadequacies of economic growth policies towards generating employment opportunities to keep pace with increases in the potential labour force are the contributory factors towards this emphasis. Generally speaking, the economic growth policies followed in countries of the developing world including Sri Lanka have resulted in low profit and re-investment rates combined with a choice of technologies with high capital labour ratios[1], providing fewer employment opportunities.

Two major reasons have been advanced for depending on the rural sector for the provision of employment opportunities. The first relates to sectoral arithmetic. Almost 72% of the total population in Sri Lanka live in rural areas and agriculture provides the main occupation for 54% of the labour force. Thus it becomes necessary for the agricultural sector to absorb a higher proportion of the potential labour force during the foreseable future, because the rate of growth of employment in the industrial sector is dismally low.

The second is the potential capacity of agriculture to absorb more labour, given the present state of development in this sector in Sri Lanka. The introduction of new high-yielding and short duration varieties and the provision of irrigation facilities, can promote multiple-cropping and thereby provide more employment opportunities. Growing of non-food crops as well as livestock production too are capable of increasing employment opportunities

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1 Raj Krishna "Unemployment in India". Indian Journal of Agricultural Economics Vol. 18, No.1, 1973.

in the agricultural sector. The rapid diffusion of new technology would also enable the expansion of off-farm employment opportunities in this sector. Such opportunities would be greater in industries servicing agriculture as well as in those engaged in processing agricultural products. So far these potentials have not been tapped to an appreciable extent in Sri Lanka.

Approaches to employment creation (increasing agricultural productivity through technological and institutional messages, and promoting non-farm employment), however, would still leave out a fair number of people whose only means of income generation is unskilled labour. Rural Works Programmes (RWP) are often described as additive means for helping out this group of people who are employable but likely to remain unemployed. This approach aimed at using the surplus rural labour for building agricultural infrastructures, if adopted properly, can also spread the benefits of such projects to small and medium sized farms and increase farm employment through intensified farming made possible by means of irrigation and other improvements[1]. Here again, the past Sri Lankan experience has been not at all convincing.

1.2 Project Strategies[2]

The Kirindi-Oya Irrigation and Settlement Project (KOISP)[3], implemented by the Government of Sri Lanka (GSL) with assistance from the Asian Development Bank (ADB) and the International Fund for Agricultural Development(IFAD), is one such development project which has placed greater reliance on the line of thinking outlined in the preceding paragraph. The aim of the KOISP was to

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1 Vyas, V.S. Rural works in Indian Development. Development Digest Vol. 11, No. 4, October 1973.

2 The environment to the study describing the salient features of the project area is given in the Appendix A.

3 The estimated cost of the project was US $ 80 million, out of which 48% was provided by ADB, and IFAD on loan agreements. The project had been considered as technically sound, economically viable and socially desirable by the funding agencies. The economic internal rate of return (IRR) is estimated at 176 percent.

to construct a large reservoir to augment the water supply to six old major tanks for improving the irrigation facilities on 4,525 ha of paddy land cultivated at the time of appraisal and provide irrigation facilities for another 8,400 ha of new land. By doing this the project hoped to increase the cropping intensity of rice cultivation to 1.89 from the level of 0.85 that existed at the appraisal stage. Through the provision of improved irrigation facilities and the promotion of better water management and cultural practices, the average yield of the irrigated paddy crop is expected to increase from 2.4 mt/ha to 4 mt/ha per season after the completion of the project. The expected increases in yields were thought to be well within reach because such yields were already being obtained by the progressive farmers in the old irrigated areas of the project. The project also envisages to introduce the cultivation of non-food crops such as cotton, and upland crops like pulses on 5,506 ha under irrigated conditions. It is expected that cotton yield will increase to 2 mt/ha from the current yield of 1.3 mt/ha. This means that there would be a greater demand for purchased inputs and services required for the cultivation of these crops and for processing and marketing facilities that would be needed to dispose of the enhanced production.

The KOISP is one project of its kind, perhaps the only one, in Sri Lanka, which has explicitly declared the employment creation exercise as one of its main objectives during the construction phase. According to the Appraisal Report, the construction activities of the project are expected to create about 6.2 m man-days of employment over a period of seven years. If a man-year is taken to be 250 days, this is tantamount to regular employment for about 3,500 workers throughout this period. This implies an intention for providing employment opportunities to more than half of the unemployed labour force at the time of the appraisal. The project also has envisaged the provision of 800,000 man-days of employment per year, presumably in operation and maintenance activities of the project, upon completion. This would result in employment being provided for about 3,200 workers.

Phase I[1] of this project was inaugurated in 1979. The actual construction work of the headworks started in 1980 and lasted for about six years. The exercise of monitoring and evaluation of project benefits has been assigned to the Agrarian Research and Training Institute (ARTI) by the donor agencies and the GSL. The present study, which was originated to fulfil the requirements of the terms of reference (TOR) (agreed upon by the ARTI and the donor agencies) attempts to assess the employment impact of the project and, hence, was undertaken with the following specific objectives in mind.

1.3 Objectives of the Study

a) to assess the employment effects of the project during the construction phase with particular reference to the type of jobs made available, wage rates and places of residence of the workers, and

b) to estimate the employment potential in rice cultivation as paddy production gets underway in the project area, based on the current volume and pattern of employment.

The original intention was to study the employment potential in agriculture including all crops and livestock production. This idea was dropped subsequently due to the data limitations. Likewise, the prospective growth of the non-farm enterprises and their effect on employment cannot be assessed at this stage of project development. This is due to the difficulty in visualising the possible expansion of the markets in the project area and the pattern of future utilisation of financial surpluses made possible through the project[2].

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1 Phase I included the construction of the dam, work on the two main canals, and distributories and field canals of tracts 1 and 2 in LB and 1,2 and 5 in RB; 4200 new families will also be settled on 4191 ha of new land during Phase I. The rehabilitation of the existing irrigation system is also envisaged during this phase. The land area to be rehabilitated in phase I includes 850 ha in the Badagiriya scheme and 3734 ha in the previous Kirindi Oya Scheme.

2 It has now been proposed to undertake a study of this nature by the ARTI in the coming year.

1.4 Methodology of Data Collection

The information required for the present study was collected mainly from three different sources. The secondary data on employment creation through construction activity were obtained largely from the records of the principal agencies engaged in infrastructural construction, such as Irrigation Department (ID), River Valleys Development Board (RVDB), and the Land Commissioner's Department (LCD). A further set of secondary data relating to labour-force characteristics and employment situation in rice-cultivation was obtained from a number of previous research studies. The second source consisted of a series of unstructured interviews. Interviews were held with officials of the implementing agencies and their sub-contractors in order to collect data on the volume of employment generated by them during the construction phase. Another set of unstructured interviews was held with a number of new settlers, selected at random, to gather information on their employment, incomes, and other socio-economic conditions at the time of the survey. The third source was a sample survey of farm households which was undertaken with the help of a structured questionnaire.

The household survey was conducted in both the left and the right banks of the Kirindi Oya Irrigation System. The major tanks of Debarawewa, Tissawewa and Yodawewa come under the left bank while Pannegamuwa, Weerawila and Badagiriya come under the right bank. Altogether there were 4034 ha of paddy lands under these major tanks, prior to the inauguration of the KOISP. The land register maintained by the Agrarian Services Centre (ASC) contained names of a total of 2,000 farmers who apparently cultivated these lands. This register served as the sample frame for the household survey. A stratified random sample of 215 households was selected from this list and the stratification was based on the level of water supply and the land holding size. In addition, 85 new settlers were also selected randomly from a total of 370 settled at the time of commencement of the present study.

The questionnaire survey was carried out during a period of three months from June to September 1983.

The information sought through the structured questionnaire included items such as the volume and duration of employment, temporal fluctuations in the patterns of labour utilisation, wage structure, costs of production, cultivation practices and household incomes. In order to clarify as well as supplement the information collected during the field survey, another round of unstructured interviews was held with some of the respondents in November 1984 within a period of two weeks. It also became necessary at the writing stage to update the secondary data collected earlier. This was done in early 1986.

1.5 Limitations of the study

The shortcomings in the analysis presented in this study were caused mainly by the inadequacies of the data generated. Though a framework broader than what was required by the donor agencies was designed for the study, this interest has not been followed through due to the changes in the composition of the research team from time to time. This deficiency was compounded by two other factors as well :-

a) The nature and the coverage of the employment statistics provided by the implementing agencies differed from one another to a significant extent. The task of collecting information from private contractors was even more difficult because they employed seasonal workers on a piece rate basis involving longer than normal workdays.

b) The timing of the field survey for the study coincided with the construction phase of the KOISP, with consequent distruption of chena and upland farming. Some paddy lands were also not cultivated during this period due to insufficient water supply. A few farmers even suffered losses due to crop failure. Thus, the data collection process was adversely affected.

An attempt was, however, made to compensate for this deficiency in the data base by making use of data generated by the other studies conducted either within the project area or in Hambantota district, and by follow-up interviews with the implementing agencies.

It is the feeling of the authors that the new study which has been proposed by the ARTI should cover the deficiencies in the present study. The areas that need to be probed into further are: labour absorption capacity in agriculture observing the changes in cropping patterns, intensities and level of technological development and the nature of non-farm employment opportunities emerging within the project area and its environ through growth linkages.

1.6 Organisation of the Report

This introduction which constitutes the first chapter deals with the objectives, methodology, and limitations of the study. In the second chapter a profile of the population and the labour force is presented. There emphasis is made on the size and the growth of the population, its age structure, size of the economically active population, size of households, type of main and secondary employment, and the levels of unemployment and under-employment. Chapter three deals with the employment effects of the construction phase of the KOISP. The type and volume of work opportunities that became available through the project, wage rates, and the places of residence of the beneficiaries are the subjects covered in chapter three. The institutional arrangements used as well as the problems encountered in mobilising such a large number of workers have also been considered therein.

Chapter four of the report examines the present and potential capacity of the rice-cultivation sector for creating employment. The level of technology adoption, the impact of mechanisation, the effects of irrigation etc. on cropping intensities and the use of labour would also be analysed in this chapter. The summary and conclusions of the study constitute chapter five.

Chapter Two

THE PROFILE OF THE POPULATION AND THE LABOUR FORCE

The supply of labour is directly related with the rates of growth of the population and the labour force. Thus this chapter analyses the population characteristics of the area as revealed by the average household size, level of education, occupational pattern, participation in the labour force, and employment and unemployment.

2.1 Population

A study undertaken by the Land Commissioner's Department (LCD)[1] has revealed that the entire area coming under the Kirindi Oya Project had a total population of about 42,304 in 1980. Of this number, about 13,352 lived in the command, catchment and tank-bed areas of the project, while the remaining 29,161 lived in the proposed irrigation rehabilitation area, mainly falling within the Tissamaharama AGA Division. The total population in the Hambantota district (including the project area) was 348,255 in the same year. No information is available to demonstrate the population growth within the project area, but the Hambantota district has experienced a high intercensal growth rate of 2.3 percent per annum which is significantly higher than the national average of 1.7 percent[2]. It is reasonable to assume that the population in the project area too had grown annually at the rate of 2.3 percent from 1980 to 1985 due to the natural increase.

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1 Land Commissioner's Department. Socio-Economic Survey of the Kirindi Oya Irrigation and Settlement Project. Colombo, November 1980 (mimeo).

2 Department of Census and Statistics. Census of Population and Housing, 1981.

Table 2.1 : Population Increase in the Project Area as a result of Natural Increase

Area	1980	1981	1982	1983	1984	1985
Total command area	11,388	11,650	11,918	12,192	12,472	12,757
Catchment area	653	668	683	699	715	732
Tank-bed area	1,312	1,342	1,373	1,405	1,437	1,470
Total	13,353	13,660	13,974	14,296	14,624	14,959
Rehabilitation area	29,161	29,832	30,518	31,220	31,938	32,673
Total project area	42,514	43,492	44,492	45,516	46,562	47,632
Total Hambantota District	348,255	356,265	364,459	372,842	381,417	390,189

Note : Totals do not include the persons who are seasonal visitors to the area coming for the purpose of chena cultivation.

It has been targeted to settle 4,200 new families at the end of the phase I of the project. Out of this number, 3601 have been settled by March 1986. Since 1592 of the new families came from the old inhabitants of the project area, the number of new families that came from outside works out to 2,009. This would mean an inflex of about 10,450 persons into the area under the assumption that the average family size is 5.2 persons[1].

The age-wise distribution of the 11,388 persons inhabiting the total command area of the KOISP in 1980 showed a typical triangular form reflecting the high rate of population growth, as can be seen from Table 2.2.

1 A further increase in the population has taken place due to squatting. However, no statistics are available on the number of squatters in the project area.

Table 2.2 : Age-wise Distribution of the Population in the Total Command Area of the KOISP

Age group (years) (a)	Population in the age group (b)	% of total population (c)
0 - 4	1630	14.3
5 - 14	2976	26.1
15 - 19	1301	11.4
20 - 59	4955	43.6
60 - 69	338	3
Over 70	188	1.6
All groups	11388	100

Source : Land Commissioners' Department. Socio Economic Survey of the Kirindi Oya Irrigation and Settlement Project. Colombo, November 1980 (mimeo).

The ARTI study on the pre-project socio-economic conditions of the KOISP has estimated that the proportions of the labour force in the age groups of 15-19 and 20-29 were as high as 21 percent and 37 percent respectively[1]. The data provided by these two studies clearly demonstrate that the size of the labour force which is about to retire constituted only a small proportion (about 3%), but the proportion of the potential entrants to the labour force was almost certainly large (24-26% in the group of 5-14 years).

These two studies differ from each other in their definitions of the labour force[2]. The LCD study has recorded that the labour force constituted 55 percent of the total population, while the ARTI study has estimated it to be around 59 percent.

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1 Wanasinghe, Ananda (et al). Kirindi Oya Irrigation and Settlement Project: Pre-project Socio-economic Conditions. ARTI Research Study No. 59. Colombo, 1984.

2 The LCD study has included persons in the age group of 15-59 years in defining the labour force, while the ARTI study included persons from 15-65 years of age.

Table 2.3 : Age Distribution of the Population in the Sample Households

Age group Years	Male No.	Male %	Female No.	Female %	Both groups No.	Both groups %
10 - 14	44 (55.7)	3.5	35 (44.3)	3.5	79 (100)	3.5
15 - 65	568 (56)	44.7	446 (41)	44	1014 (100)	44.4
Below 10 and over 65	659 (55.3)	51.8	533 (44.7)	52.5	1192 (100)	52.1
All groups	1271 (55.6)	100	1014 (44.3)	100	2285 (100)	100

However, the estimate of the labour force made in the present study is somewhat lower than the other studies mentioned, as can be seen from Table 2.3. This is attributable to the fact that the sample for the present study included 85 families selected from among the new families whose average household size was lower than those that lived in the project area for a long time. In contrast, the sample population of the present study included more younger persons than the other two studies. If it is assumed that the older generation of over 65 years consisted of about 5% of the sample population, the share of 0-10 year age group is about 47%. Thus the findings of the present study suggest that the number of potential entrants to the labour force is going to be even larger within next 5-10 years than those suggested by the earlier studies. Table 2.4 shows the activity status of the sample population covered in the present study.

Table 2.4 : Activity Status and Related Measures of the Sample Population[1]

Activity	Male		Female		Total	
	No.	%	No.	%	No.	%
A) Economically Active Population						
i) Employed	543	42.7	88	8.7	631	27.6
ii) Non-income earners and unemployed	95	7.5	427	42.1	522	22.8
B) Economically Non-Active						
i) Students	275	21.6	305	30	580	25.4
ii) Discouraged workers (not looking for employment)	23	1.8	28	2.8	51	2.2
iii) Others (retired, disabled, too young or too old to work)	335	26.4	166	16.4	501	21.9
Total	1271	100	1014	100	2285	100
Crude Activity Rate (%)	50.2		50.7		50.5	
Economic Dependency Ratio (%)	-		-		262.1	

1 The definitions used are those developed by the Census and Statics Department of GSL. The same definitions have been used in the study on the Pre-project socio-economic conditions by the ARTI. (See appendix C) However, some researchers (eg. Wanigaratne, 1984) have contested that the association of terms such as "non-income earners" and "economically non-active" with such groups like unpaid family helpers because they are normally engaged in a wide range of minor but productive activities. Nevertheless, the authors prefer to use the standard definitions particularly for the purpose of comparison of their findings with those of the pre-project situation study.

A noteworthy feature emerging from the data given in the first half of Table 2.4 is that only about 8 percent of the female population in the area is gainfully employed, while the corresponding figure for males is about 43 percent. The low proportion of females in the gainfully employed category is due to the fact that a larger proportion of women (42%) are engaged full-time as housewives or family helpers. The total labour force participation rate in the area as indicated by the economically active population is about 51 percent. This is slightly higher than what is reported for the rural sector as a whole in the survey of Sri Lanka Consumer Finances 1981/82[1]. The area is also characterised by a high economic dependency ratio, which works out to approximately 262 percent. This means that an average income earner should maintain about 2.6 persons with his income from employment, and therefore results in very low per-capita incomes. According to the LCD study already mentioned, about 66% of the families in the project area receive incomes below the poverty line. Therefore, such a high economic dependency ratio inplies a state of destitution of high order.

2.2 Size of Household

The average size of a household in the sample is 6.3 compared with the national average of 5.6[2]. The somewhat larger size of households in the project area is the result of the above average rate of Population growth. On account of both the population growth and the increase in the number of households in the project area, due to the influx of persons seeking benefits from the project, the man-land ratio has depressed.

As a consequence of this, the number of landless workers has increased in the project area. This in turn should increase the supply of casual labour for construction activities of the project as well as for cultivation purposes.

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1 Central Bank of Ceylon. Report on Consumer Finances and Socio-economic survey 1981/82, Sri Lanka, Part II. Colombo, May 1985.

2 Department of Census and Statistics. Census of Population and Housing in Sri Lanka, 1981.

The size of households and their labour-force capacities varied with the size of land holdings in the area. The family size was the greatest in the medium category of farmers (6.6 members) who owned 1-2 ha of irrigated land compared with the small (who operated less than 1 ha) and large (who operated more than 2 ha) farm households.

The average size of the households in these two categories was 5.7. There was no marked variation, however, in the availability of labour among these three categories. The average labour availability within a household was 3.7 adults made up of 2 males and 1.7 females.

2.3 Type of Employment

According to the ARTI study on the pre-project socio-economic conditions in the KOISP, more than half of the gainfully employed (56.6%) were engaged in agricultural activities, while only about 5 percent found employment in small industries. Thus the remaining 45% were engaged in household activities and also in miscellaneous services. This pattern of the occupational distribution stems from the predominantly agricultural base of the economy in the project area.

The findings of the present survey too confirm the above position. Table 2.5 shows the main occupations of the respondents in the survey. Here, it can be seen that about 33% is engaged in household work. In fact about 73% of the female labour force is engaged in such activity while being engaged part-time as unpaid farm-helpers.

2.4 Unemployment

A noteworthy difference can be observed with respect to the level of open unemployment between the pre-project situation survey and the present one, where the level of unemployment has declined by about 3%. The decline in the rate of unemployment is 5% in the right bank (unirrigated area) and only 0.7% in the left bank (irrigated area). This change can be mainly attributed to the employment opportunities made available in the construction phase of the KOISP.

Table 2.5 : Distribution of the Labour Force According to the Type of main Occupation

Occupation	Right Bank		Left Bank		Both Areas	
	No.	%	No.	%	No.	%
Cultivation	276	50	261	46.5	537	48.2
Hired Labour	19	3.4	10	1.8	29	2.6
Household Work	178	32.2	189	33.6	367	32.9
Trade	6	1.1	8	1.4	14	1.3
Teaching	1	0.2	5	0.9	6	0.5
Driving	2	0.3	-	-	2	0.2
Livestock-keeping	1	0.2	2	0.4	3	0.3
Other Employment	10	1.8	12	2.2	22	2
Schooling	40	7.2	23	4.1	63	5.7
Unemployed	19	3.4	51	9.1	70	6.3
Total labour force (10 - 65 years)	552	100	561	100	1113	100
Males	315	57.1	297	52.9	612	55
Females	237	42.9	264	47.1	501	45
No. of families	150	**	150	**	300	**
Household labour force	3.7		3.7		3.7	
Males	2.1		2		2	
Females	1.6		1.7		1.7	

2.5 Underemployment

In a predominantly agricultural area the main problem generally is not unemployment, but underemployment. The seasonal nature of crop production, the lack of integration of crop and livestock production, and the difficulties of practising multiple-cropping usually leave a sizeable proportion of the labour force unemployed during certain periods of the year. Moreover, the irregularities of the behaviour of environmental factors, such as rainfall, affect the crop production schedules thus causing uncertainities in the demand for labour. However, the level of underemployment is difficult to measure, compared with open unemployment. Theoretically, underemployment can be measured by ascertaining the number of people who work less than (daily, weekly, monthly or seasonally) they would like to work[1]. But, the concept of a normal work week does not fit too easily into the circumstances in the LDCs. The real problem of shortage of work opportunities occurs during seasonally slack periods as can be seen through the form of part-time work done by the persons in the labour force. This information is presented in Table 2.6.

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1 Taking those who work less than 20 hours a week as underemployed, the ILO had found that in rural Sri Lanka about 10.7% and 17.5% of the males and females respectively were underemployed in 1968. "Matching Employment Opportunities and Expectations", Geneva 1971. A higher estimate was made by N. K. Sarkar in 1957. His estimate was 28.42% of the labour force as underemployed.

See, N. K. Sarkar. Demography of Ceylon. Ceylon University Press Board, 1957.

Table 2.6 : Secondary Occupation of Persons Mainly Engaged in Farming

Secondary Occupation	Right Bank		Left Bank	
	No. of persons	%	No. of persons	%
No. secondary occupation	109	39.6	160	61.3
Agricultural Labour/ Hired Labour	156	56.5	92	35.2
Petty trading	3	1.1	1	0.4
Masonary/carpentry	2	0.7	2	0.8
Animal husbandry	4	1.4	5	1.9
Making bricks	2	0.7	1	0.4
TOTAL	276	100	261	100

When these estimates are compared with those presented in the pre-project situation study of the ARTI, it becomes clear that part-time employment as agricultural or non-agricultural labourers has increased during the construction phase. Of the 254 persons reporting secondary occupation, only 26.4% were engaged as agricultural labourers during the pre-project period.

The main occupations of the persons who hire out their labour are presented in Table 2.7. These data reveal that, except those who hired out their labour as their main occupation, the majority of the part-time labourers were either farmers or housewives. In addition, a small number of minor employees in the public and private sector and some school children have also found part-time employment as labourers. But, these cannot be considered as likely candidates who can be readily mobilised for part-time employment in organised activities such as public work programmes, on a regular basis.

Table 2.7 : Main Occupation of Persons Hiring out their Labour as a Secondary Occupation

Main Occupation	Right Bank			Left Bank			Both Banks		
	Total	No.not hiring out labour	No.hiring out labour	Total No.	No.not hiring out labour	No.hiring out labour	Total No.	No.not hiring out labour	No. hiring out labour
Cultivation	276 (100)	118 (22.8)	158 (57.2)	261 (100)	169 (64.8)	92 (35.2)	537 (100)	287 (53.4)	250 (46.6)
Hired Labour	19 (100)	0 (0)	19 (100)	10 (100)	0 (0)	10 (100)	29 (100)	0 (0)	29 (100)
Household Work	178 (100)	155 (17.1)	23 (12.9)	189 (100)	162 (85.9)	27 (14.3)	367 (100)	317 (86.4)	50 (13.6)
Trade	6 (100)	6 (0)	0 (0)	8 (100)	8 (100)	0 (0)	14 (100)	14 (100)	0 (0)
Teaching	1 (100)	1 (100)	0 (0)	5 (100)	5 (100)	0 (0)	6 (100)	6 (100)	0 (0)
Driving	2 (100)	2 (100)	0 (0)	-	-	-	2 (100)	2 (100)	0 (0)
Livestock Keeping	1 (100)	1 (100)	0 (0)	2 (100)	2 (100)	0 (0)	3 (100)	3 (100)	0 (0)
Other employment	10 (100)	8 (80)	2 (20)	12 (100)	12 (100)	0 (100)	22 (100)	20 (90.9)	2 (9.1)
Schooling	40 (100)	37 (92.5)	3 (7.5)	23 (100)	23 (100)	0 (0)	63 (100)	60 (95.2)	3 (4.8)
Unemployed	19 (100)	19 (100)	0 (0)	51 (100)	51 (100)	0 (0)	70 (100)	70 (100)	0 (0)
Total Labour Force	552 (100)	347 (62.9)	205 (37.1)	561 (100)	432 (77)	129 (33)	1113 (100)	779 (70)	334 (30)

The majority of the people who indulged in other occupations too have undertaken farming as their secondary occupation. This is clearly demonstrated by the data given in Table 2.8. The data imply that except for the 4.4% of hired labourers, there is very limited possibility of drawing labour from other categories of employees into a planned construction programme.

Table 2.8 : Main Occupation of Persons Reporting Farming as Secondary Occupation

Main Occupation	Right Bank		Left Bank		Both Banks	
	No.of persons	%	No.of persons	%	No.of persons	%
Hired Labour	10	4.98	7	3.7	17	4.4
Trading	3	1.49	5	2.6	8	2.1
Employment in the public sector	2	1	4	2.1	6	1.5
Driving	1	0.5	1	0.5	2	0.5
Other	1	0.5	1	0.5	2	0.5
Schooling	38	18.9	23	12.2	61	15.6
Household Work	146	72.64	148	78.3	294	75.4
Total	201	100	189	100	390	100

A few important implications emerge from the analysis presented in this chapter :-

a) The existence of an openly unemployed portion of the labour force does not guarantee the availability of those people for an organised labour-intensive public construction programme such as the KOISP. This is more so when the level of educational achievement is high among the individuals of this group, which appears to be the case in the KOISP area according to the pre-project situation study. The job aspirations of such individuals do not match with the employment opportunities provided by the public sector construction projects. Ofcourse there are other social, cultural, economic, and demographic factors that prevent such individuals from opting for manual work even when wages offered for such work are relatively

higher than in other occupations such as agriculture. Table 2.7 indicates that none of the 70 individuals who are unemployed has hired out labour.

b) Likewise, the prevalence of a high dependency ratio does not guarantee a regular supply of labour for such programmes because the underemployed will share the work on the farm or household as well as the food and other basic necessities under the system of extended families.

c) In the case of females, though they are underemployed may not be available for manual work, because such work is generally frowned upon as demeaning on social grounds. Females tend to opt for such jobs only when their household incomes are too small to support their families. While 75% of the females are engaged in farming activities as their secondary occupation, only 13% hire out labour.

d) It is difficult to physically identify the underemployed because much of the underemployment exists in disguised form. On the other hand, this problem is compounded by the social and cultural attitudes of the labour force relating to manual work.

e) The majority of the people who would make themselves available for public sector construction projects would therefore come from the categories of small farmers, tenants and agricultural labourers, whose incomes either fall below the officially determined poverty line or slightly above it. The supply of this type of labour too is highly seasonal. Therefore the majority of them would not be available on a regular basis. The contribution of labour from the families of better-off farmers for such activities tends to be minimal (eg. farmers who had an assured supply of water under previous Kirindi Oya system).

All these points contribute to the difficulty in mobilizing labour on a regular basis from the project area for the smooth execution of a massive scale public construction project such as the KOISP, which was expected to generate 6.2 million man days of work opportunities, within a period of six years.

Table 2.9 : Estimated Labour Force and the Number of Workers who would Hire out their Labour - 1980 to 1985[1]

	Year					
	1980	1981	1982	1983	1984	1985
A. Estimated Labour Force						
i) Command Area	5,929	5,932	6,204	6,347	6,493	6,642
ii) Rehabilitation Area	12,947	13,245	13,350	13,862	14,180	14,507
iii) Total Project Area	18,876	19,310	19,754	20,209	20,674	21,149
B. Estimated No. of Workers who would have hired out Labour						
i) Command Area	1,779	1,780	1,861	1,904	1,948	1,993
ii) Rehabilitation Area	3,884	3,974	4,065	4,159	4,254	4,352
iii) Total Project Area	5,663	5,793	5,926	6,063	6,202	6,345

Note : 1 Based on the data given in Tables 2.1, 2.3 and 2.7.

Some crude estimates made of the number of workers who would have hired out their labour either for construction work of the project or agricultural activities of the other farmers are presented in Table 2.9. These estimates are based on the data given in Tables 2.1, 2.3 and 2.7 of the present report. These show that the number of such workers increased from 5,663 in 1980 to 6,345 in 1985. As is evident from Tables 2.7 and 2.8, the majority of these persons were available only seasonally. Moreover, the ARTI study on pre-project situation of KOISP has shown that 26.4% of the persons reporting secondary occupation was hiring out labour for agriculture. Thus, during the cultivation season, the numbers available for construction activities should become even more scarce.

The next Chapter will examine how this project was actually implemented with emphasis on the attempts made to match the labour supply with the additional demand created through the construction activities.

Chapter Three

EMPLOYMENT GENERATION THROUGH THE CREATION OF ASSETS : CONSTRUCTION PHASE

3.1 The Rationale Behind Labour-Intensive Public Sector Construction Projects

Arthur Lewis[1] and Nurkse[2] about three decades ago argued that human labour can be utilised as a source of capital formation, and can be used in constructing roads, bridges, irrigation canals and buildings, with a very little amount of capital. This process is now widely known as "Public Works Programmes"(PWP). The prime objectives of such programmes are employment generation (or income distribution) and asset creation. Lewis[3] has said that millions of left-over people and millions of left-over jobs can be brought together if satisfactory financing arrangements and administrative measures could be adopted. In an ideal situation, such measures should be capable of mobilising mass participation of beneficiaries in the planning and execution of projects.

There are a number of advantages of PWP. First, the cost-effectiveness of the labour intensive work programmes has helped in alleviating rural poverty. Second, by creating an additional

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1. Lewis, W.A.(1954). Economic Development with unlimited supply of labour. The Manchester School.
2. Nurkse, Ragna (1955). Problems of Capital Formation in Developing Countries. Blackwell, Oxford.
3. Lewis, J.P.(1972). The Public Works Approach to Low End Poverty Problems: The New Potentialities of an Old Answer. Journal of Development Planning No.5.

demand on the rural labour market, the barganing position of agricultural labour can be enhanced. Third is they can impart new skills to a relatively untrained, unskilled labour force, thus enabling those workers to find alternative employment either in agricultural or non-agricultural sectors.

Past experiences from many developing countries[1] have shown that this approach, although impressive conceptually, does face countless problems in implementation. The main objective of the KOISP is to intensify the employment potential in agriculture by strengthening the agricultural base through the provision of irrigation and other infrastructural facilities. Further, the KOISP is also concerned with opening up of employment avenues to a large number of unemployed and underemployed during the construction phase (i.e. asset creation). The present chapter is devoted to examining whether the KOISP was successful in achieving the latter objective.

3.2 Type of Activities Envisaged

In the past, the labour-intensive public works in Sri Lanka were confined mainly to small scale jobs which were undertaken mostly as social welfare measures in response to crisis situations such as recurrent droughts and other calamitous occurrences. Hence the prime objective of such programmes was the amelioration of poverty and enhancement of incomes rather than the creation of productive assets. Works undertaken under these programmes included improving village roads, de-silting of small tanks and bunds. These programmes often suffered from technical hastiness. The quality of the output left much to be desired, and the labour productivity was surprisingly low. Leakages of the funds as well as the provisions distributed in kind were other

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1. Thomas J.W.Sahid Javed Burki, David G.Davies and Richard M.Hook (1976). Public Work Programmes: Goals, Results, and Administration. In Guy Hunter et al. Policy and Practices in Rural Development. Overseas Development Institute, London.

weaknesses of such programmes[2]. The KOISP differs significantly from past programmes in many respects.

The prime objective of the KOISP was asset creation and the objective of employment creation, particularly during the construction phase was secondary to it. Investigations, planning and designing of the project were undertaken systematically and carefully by well experienced and qualified technical personnel. The project was massive in scale, both in terms of funds and personnel required to complete the work envisaged. An exceptionally high quality was expected in all the works undertaken, and a strict time schedule was to be adhered to. Thus, it was necessary to economise on the scarce resources and to maintain labour productivity at the highest levels possible.

However, there have been no records of participation of project beneficiaries in the planning of the KOISP. This may be due to the fact that the project components demanded engineering and technical skills at the highest levels, which the project beneficiaries did not possess. Nevertheless the envisaged activities were aimed at fulfilling a long-felt need of the farmers in the project area.

The construction activities involved under the three main components of the KOISP and the agencies responsible for implementing them are given in Appendix B.

3.3 Institutional Framework for Implementing the Construction Programmes

The Department of Irrigation (ID) under the Ministry of Lands and Land Development (MLLD) was the principal executing agency for the KOISP. It held the overall responsibility for implementing the irrigation component of the project. This task was delegated to a chief Resident Engineer cum Project Manager and his deputies.

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2. Wickramasekara, Piyasiri (1977). Aspects of Hired Labour Situation in Rural Sri Lanka: Some Preliminary Findings. In S.Hirashima (ed). Hired Labour in Rural Asia. Institute of Developing Economies, Tokyo.

The ID established two offices close to the work site, one in the Right Bank (RB) and the other in the Left Bank (LB) of the Kirindi Oya Irrigation System. These two offices were manned by the Engineers, Technical Officers, supervisors and other skilled and unskilled employees, who carried out the rehabilitation and the consturction work of the two main canals. A large number of officials and other employees provided the support services such as administration, financial control, and miscellaneous activities for the staff resident at the work sites.

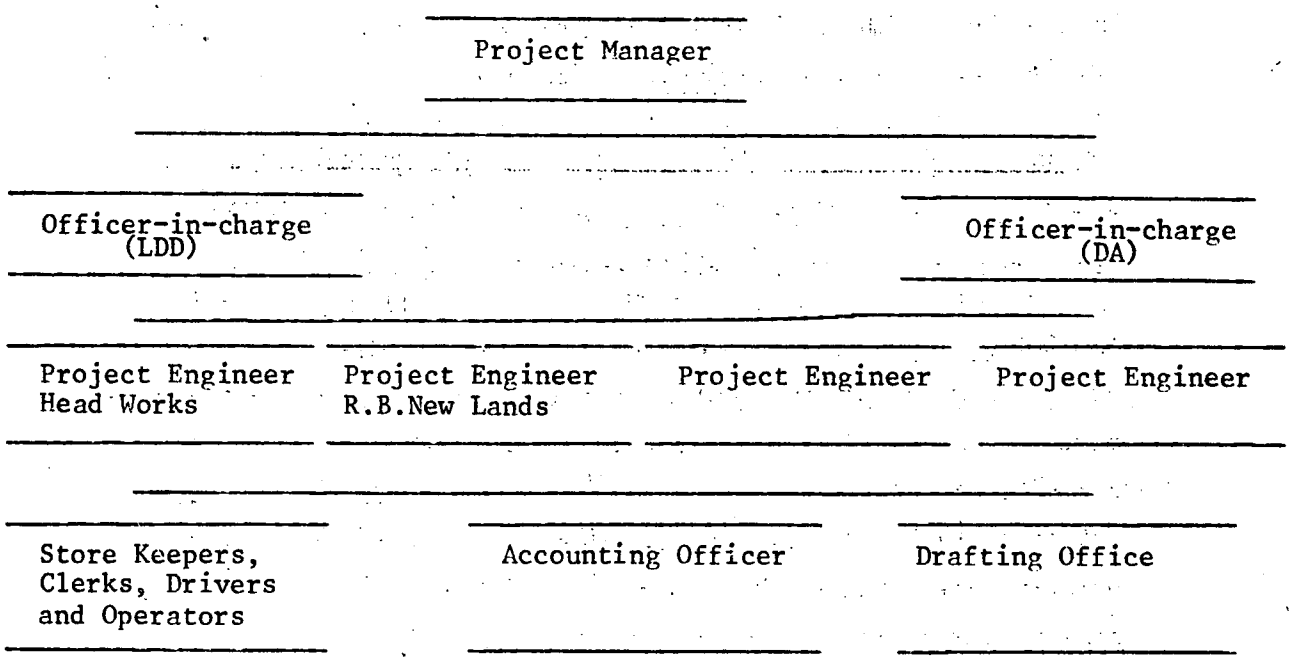
In 1980, the construction of the dam and the headworks of the project weee contracted out by the ID to a statutory corporation, namely the River Valleys Development Board (RVDB). The RVDB established a base camp adjecent to the dam site at Debarawewa. The engineering, technical and other supporting and field workers were housed in this camp. This arrangement enabled the implementation of the work on the dam and the rehabilitatinn activities of the two main canals simultaneously.

The responsibility of building the social infrastructure in the 28 villages and the three village centres was carried by the Land Development Department (LDD) with the support of Land Commissioner's Department (LCD). Both these departments came under the MLLD. The work load involved was distributed among 14 officers in-charge who were employees of these two departments. These departments, relying heavily on their own permanent skilled and unskilled labourers, recruited some casual workers from the project area in order to carry out the construction works assigned to them.

The Department of Agriculture (DA) held the overall responsibility for the implementation of the agricultural development component which comprised the Agricultural Training Centre Complex and the pilot projects. However, the construction work involved with this component, such as the provision of irrigation facilities and the building activities of the training centre, was assigned to the ID and LDD respectively.

The organizational chart of the project office established by the ID at Kirindi Oya is shown in Chart 1.

CHART 1



As can be seen from the foregoing chart, the management of the project has been based on a special kind of organization structure which is popularly known as the "Matrix Organization Structure". Under this pattern of organization, the Project Manager himself being an employee of a line department, is entrusted with the responsibility of the successful completion of the entire project, while the execution of some of the components becomes the responsibility of the officers in some line departments. This has become the most common organization structure adopted in the implementation of projects of the nature of the KOISP Sri Lanka and many other countries. The Chief Resident Engineer of the ID was the Project Manager and two officers-in-charge, one from the LDD and the other from the DA were the authorities at project level from the other line departments involved.

A Project Co-ordinating Committee(PCC) was also established in Hambantota district, and according to the project documents, this committee was expected to co-ordinate both the physical and institutional development aspects of project implementation. The Chief Resident Engineer / Project Manager was the de jure chairman of this committee and all senior staff at district level

of the executing and supporting agencies comprised its membership. In addition, the District Minister (DM) and the Government Agent (GA) were also members of this committee, and many of the meetings of the PCC were chaired de facto by the DM.

A Central Coordinating Committee (CCC) was set up under the chairmanship of the Secretary MLLD, to coordinate the activities of the project at national level. The membership of the CCC included senior staff at head office level of all the executing and supporting agencies. The Director of Irrigation served as the Secretary to this Committee.

The institutional framework designed by the project planners to undertake this massive labour intensive project, by and large, proved to be capable of performing the tasks entrusted to it. Only two modifications were introduced to the original (implementing procedure). The first was the need to contract out the work on the dam and the headworks to the RVDB. The second exception was the need for engaging private sub-contractors too in the construction activities connected with the distribution and field canals. Both these steps were necessary in order to adhere to the strict time schedule of the construction programme.

The success of the institutional framework in carrying out the activities assigned to it was largely dependent upon the decentralised structure of the authority and the responsibility for the implementation process. There was a clear division of responsibility with necessary authority delegated to the appropriate level of management in each implementing agency and this facilitated the contribution of individuals in the attainment of the objectives of the project. The assignment of a large army of supervisory personnel from all implementing agencies, enabled the allocation of subordinate employees among them in a manner consistent with sound management principles. The formation of two committees, one at the project level and another at the national level, facilitated the co-ordination among the institutions involved.

Naturally, in undertaking projects of this scale and magnitude, where a multiplicity of line departments and institutions are

involved, one has to face immense problems of co-ordination.[1] As can be seen from the organizational chart of the project office, the two officers in charge of the activities assigned to the LDD and the DA belonged to two seperate line departments and hence did not come under the direct supervision of the Project Manager. In such a situation the Project Manager does not have the authority to issue orders to any of the line departments. Thus his role becomes one of information gathering on the progress of the project and of reporting either to the PCC or to the CCC, depending on the seriousness of the individual situation. The dual command resulting from the particular organization structure adopted makes it difficult for the Project Manager to be aware of the persons responsible for any faults and where the difficulties really lie.[2]

In fact, such shortcomings did crop-up occasionally in the implementation of the KOISP as revealed by the minorities of the PCC and CCC. However, there was greater unanimity of project objectives and the assignment of the activities to each institution was done on the basis of intimate association with the tasks. Thus cases of friction, passing of fault to other agencies, and confusion were kept at a minimum in the implementation of the KOISP.

3.4 Mobilization of the Work Force

Though the engineering, technical and supervisory staff and employees such as mechanics, operators of heavy-duty machinery and equipment were selected from among the permanent employees of the implementing agencies, they (the agencies) did not have

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1. See for example, the ARTI study on Evaluation of Project Management of the Kurunegala Integrated Rural Development Project.

2. C.Resser. Human Problems of the Project Form of Organization. Academy of Management Journal December 1969.

an adequate number of employees in skilled, semi-skilled and unskilled categories in their permanent cardre. Thus, it became mandatory for the implementing agencies to recruit such workers on a casual basis from within the project area or its immediate environ. The level of recurrent expenditures allocated from the national budget to these agencies did not warrant the continuence of such a huge cadre on a permanent basis in their payrolls. On the other hand, the labour regulations in the country did not permit an employer to retain a particular employee continuously for more than three months on casual basis without making him permanent in the relevant post. Thus the agencies were compelled to discontinue the services of casual employees after a maximum period of three months, and to reinstate them after a certain time interval, which of course is not debarred by the law. These external constraints were applicable in equal force in recruiting casual employees by the implementing agencies of the KOISP. In adhering to these constraints, the implementing agencies had to pre-occupy themselves with a large amount of paper work and ensuing administrative problems in recruiting labourers. On the other hand, employees so recruited were confronted with insecurity of jobs, a factor which adversely affects the morale of the workers and their productivity. These discouraging factors were compensated however, at least by two motivating points. The first was the eligibility for a higher wage rate when working for a government institution than for a private contractor. Though the specified daily wage rate was low, these workers were entitled to perks such as overtime and cost of living allawances as payable to other public sector employees, so that their total emoluments were higher. Secondly, once employed their employment was regular until they were discontinued. In contrast, when working for a private contractor, a particular labourer is uncertain as to the duration of employment which, at times, is depended upon the whims and fancies of the contractor. The duration of employment of a self-employed too is uncertain and irregular which depends mainly upon the ability of the individual to find work opportunities. Therefore, the recruitment process of the implementation agencies was made somewhat easier because of the preference of the prospective employees to join a public sector institution.

The types of workers required by the implementing agencies from within the district on casual basis were in the main, masons, carpenters and unskilled labourers. The data on employment given in the previous ARTI studies on the KOISP[1] as well as the data presented in Chapter Two of the present study, show that there was an acute shortage of workers in such trades as masonry and carpentry within the project area. Even among the small number who lived there, some individuals had already taken to farming as a part-time activity. Some others were employed as masons and carpenters only during the slack season as their main occupation was farming (cf. Tables 2.7 to 2.8 in Chapter Two). In either of these occasions their labour was available for construction work only during the off season. Thus, the three main public sector agencies as well as the private contractors were compelled to bring in persons possessing such skills from other areas in the Hambantota district and even from beyond.

3.4.1 Formation of a Labour Cooperative

One of the measures adopted to overcome this difficulty was the formation of a cooperative society of the construction labourers and building material producers in 1978, sponsored by the ID. The society was also given legal status by registering it with the Department of Cooperative Development (DCD) under the business name of "Lunugamvehera Irrigation", Building Construction Labourers and Building Material Producers Cooperative Society Limited" (Labour Co-op.). The main objective of the labour cooperative society was to undertake work sub-contracted by the ID and to supply certain items of building materials such as bricks and sand to the worksites in the project. It was hoped that this society would mobilize the skilled and unskilled labour from among the project beneficiaries and those resident in the Hambantota district. The membership of the co-operative was opened to any individual who resided within the boundaries of the Hambantota district. The value of a share of the co-operative was fixed at Rs. 100/= payable in instalments of Rs. 5/=.

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1. Wanasinghe et.al op.cit and, ARTI. Dietary Intake and Nutrition Study of KOISP (to be published)

Arrangements were made to deduct the instalments from the wages payable to members for subscribing their labour to the work undertaken by the society. By November 1984 as much as 135 members had paid their share capital in full. Table 3.1 presents some statistics which speak of the progress of the cooperative society.

Table 3.1 : Statistics on the Progress of the Labour Cooperative Society

Year	No. of Members	Profit/Loss (Rs)
1978 - 1979	82	77.194
1980	120	72,324
1981	130	18,493
1982**	135	-12,036*
1983	135	n.a.
1984	135	n.a.
1985	135	n.a.

Source : Lunugamvehera Labour Cooperative Society

Notes : ** There was work only for 6 months

* This loss was a result of the depreciation of fixed assets and implements.

It can be seen from these figures that the membership had remained constant after 1982. In fact in 1985 only 135 members offered their services to the cooperative society and the rest of the membership did not come to work. However, in the initial years about 400 workers were on its payroll as the society also mobilized some non-members to work for it.

The society did not have any share capital or other funds during the initial years but that did not debar it from receiving preferential treatment from the ID in awarding sub-contracts. The ID also helped out the cooperative society by providing it with simple tools required in excavation and construction work on loan basis. The society also received the political support, as the District Minister for Hambantota was always ready to provide the leadership required for its proper functioning.

Ministry of Plan Implementation too lent it's support by releasing one of its Development Officers (DO) on secondment basis to work as the General Manager (GM) of this cooperative society.

However, it failed to mobilize the amount of labour needed to complete the work sub-contracted to the society on time. This was because (a) the attendence of the casual labourers was not regular. Absenteesm was highest during the Chena cultivation season; (b) the few labourers who did come for work wanted their wages paid at least at the end of the week. This raised difficulties for the society from the point of view of the working capital, (c) as all the members of the Board of Directors came from among the labourers themselves, there were difficulties in carrying out the administrative functions. Neither the members nor the GM had the technical competence to supervise the work done by the labourers.

3.4.2 Enlisting of the Cooperation of Private Contractors

These factors caused recurrent delays in the work schedules and also resulted in sub-standard work quality. Thus the ID was compelled to be guided more by work norms and speediness than the welfare considerations of the labourers. Therefore, in 1982 the ID awarded contracts to two private firms to undertake the excavation activities of the RB main canal. This resulted in the substitution of capital for labour, as the two private firms utilized more and more capital-intensive equipment and machinery in carrying out the work assigned to them. These firms also brought the necessary skilled labour such as masons and carpenters from outside the project area and provided temporary huts to house them while providing other facilities required to keep them in camps.

For work on the distribution canals and the field canals, the ID opted to entertain tenders from the cooperative society as well as private contractors. The preferential treatment given earlier to the society was now withdrawn and the tenders were awarded to the lowest bidder. Therefore, it became difficult for the cooperative society to successfully compete with private contractors, and after 1982 it succeeded in getting only two out of a total of

about 63 contracts. Under these circumstances the society failed to provide work opportunities even for its own membership, and consequently the loyality of the membership towards the society weakened. Its inability to provide adequate and regular employment for the membership has prompted certain members to work for private contractors despite the lower rates of wages paid by the latter.[1]

TABLE 3.2 : Concentration Ratio of Contracts

No. of Contractors	%	Cumulatives	No.of Contracts	%	Cumulatives
1	2.6	2.6	4	6.6	6.6
5	12.8	15.4	15	24.6	31.2
9	23.1	38.5	18	29.5	60.7
24	61.5	100	24	39.3	100

The data presented in Table 3.2 show the concentration ratios of the contracts awarded. It can be seen from these data that the top 15% of the contractors have got only 31% of the contracts, which implies a very low concentration ratio[2]. This means that there was no possibility for a single individual or a group of individuals to enjoy monopsony powers in receiving tenders.

TABLE 3.3 : Size Distribution of Contracts According to the Numbers Employed

No. of Employees	No.of Contracts	%	Cumulatives
Less than 5	4	6.6	6.6
6-10	11	18	24.6
11-20	29	47.5	72.1
21-30	8	13.1	85.2
31-50	3	4.9	90.1
51-75	3	4.9	95
75-100	3	4.9	100

1 The Society pays Rs. 49/50 per cube of earth whereas the private contractors pay between Rs. 35 to 40.

2 These are based on official figures. The indepth interviews conducted with a few selected contractors revealed that some contractors had obtained contracts providing the names of their family members or close relations. This would mean a slightly higher concentration ratio, but it does not change the general conclusion.

The greater degree of competition among contractors for bidding for tenders is also evident from the data presented in Table 3.3, where it is shown that 85% of the contracts were small in scale and therefore required employment of 30 labourers or less. In fact the model contract awarded required between 11-20 labourers (48% of the contracts belonged to this size category). The breaking down of a large constructon programme into a large number of minor contracts facilitated the mobilization of 1358 labourers, each contractor mustering a small gang of labourers. The supervision also became effective as each contractor had to supervise a small number of men. At the same time it helped to bring about a fairer distribition of the benefits of such contracts.

The majority of these contractors were found to have residence outside the project area. Many came from Hambantota district, while some others were from the Southern province. Therefore, many skilled and unskilled workers were brought in by these contractors from outside the project area. After arrival at the work sites, these labourers took residence in temporary huts. The contractor provided them with an advance to cover their daily necessities. Payment being usually on a piece-rate basis, the labourers did not have to work according to set working hours. At times, they worked during the night as well. On completion of the work, the contractor paid them at the agreed rate after deducting the amounts of money advanced to them to buy their daily needs.

The average daily receipts based on a piece-rate system amounted to about Rs.45/- for a casual labourer and Rs.75/- for a mason. However, to earn this average wage they normally had to work long hours (on average about 11 hours a day). Thus the average wage per an eight-hour working day works out to Rs.32 for a casual labourer and Rs.55 for a mason. Even these average wage rates were higher than these offered by the public sector agencies. Table 3.4 presents data on employment opportunities provided by the private contractors.

TABLE 3.4 : Labour Used in 63 Subcontracts

Type of Labour	Within the Project Area		Outside the Project Area		Total	
	No.of Workers	%	No.of Workers	%	No.of Workers	%
Skilled labour (Masons and Carpenters)	169 (23.3)	42.1	232 (36.7)	57.9	401 (29.5)	100
Unskilled	556 (76.7)	58.1	401 (63.3)	41.9	957 (70.5)	100
Both types	725	53.4	633	46.6	1358	100

Source : compiled from data obtained from private contractors.

The data show that sub-contractors, including the labour cooperative, depended heavily upon sources outside the project area for meeting their requirements for skilled labourers such as masons and carpenters. About 58% of skilled labourers employed by these contractors came from areas outside the project. On the other hand, much of their requirements for unskilled labourers were fulfilled from within the project area. As much as 58% of the unskilled labourers used by the private contractors came from the project area itself.

3.5 Labour Use by Public Sector Agencies

Being a massive construction programme, the KOISP demanded the services of an array of employees ranging from highly qualified and well experienced engineers to unsiilled casual labourers. As there was a number of public agencies involved, they had established several offices and camps within the project area to facilitated the programme of work assigned to each agency. A large number of permanent employees attached to such agencies took up temporary residence in the camps established for that purpose. Four broad categories of employees came to the project area in this manner. They were (a) professional and technical, (b) clerical and allied grades, (c) skilled and semi-skilled and (d) unskilled workers[1]

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1 The types of workers included under each category are shown in Tables 3.5 and 3.7.

Column (b) of Table 3.5 presents data relating to the number of employees in each category as at October 1984 and the number of mandays worked by each category of employees, assuming that the number of workers in column (b) had worked for 288 days each in that year. Columns (d) and (e) show the distribution of workers and the mandays according to their original place of residence, within and outside the project area.

Data summerised in Table 3.5 reveal some important facts. The first refers to the ratios of various categories of workers who made a contribution to accomplish the tasks envisaged by the KOISP. The ratio of professionals to skilled and unskilled labourers works out to approximately 1:3:13, which implies a relatively narrow span of management than in an industrial concern. However, the adoption of such a narrow span of management may be reconciled in terms of the heterogeniety of work involved with the constructin of a large project like KOISP, and the type of technology used therefore. The ratio of supporting staff (i.e. workers in administration, clerical and allied grades) to all other categories involved in actual construction activities works out to 1:25. This would have been necessary as the employemnt of a large army of seasonal employees on casual basis placed heavy demands on the amount of paper work to be attended to.

The second fact relates to the geographical origin of these employees. It is clear that 100% of the workers in professional and clerical grades came from outside the project area. When this is compared with the percentages of other categories of workers that came from outside, the relevant figures read as 88% of skilled labourers and 73% of unskilled labourers. Thus, this situation speaks of the limited participation of the people who were residing within the project area in the construction activities of the project.

The third fact concerns the absolute number of mandays of employment generated by the construction activities. Going by the estimates given in Table 3.5, the four public sector agencies have provided 1.2 million mandays of work for the year 1984[1]. Using this figure

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1 The construction activities reached its peak in 1983.

TABLE 3.5 : Type of Employment and the Average Number of Mandays Worked by Each Category of Workers

Category	No.of Employees(b)	Mandays Per Year (c)	Within the Project Area (d)			Outside the Project Area (e)		
			No.of Persons	Mandays	%	No.of Persons	Mandays	%
Professional[1]	243(5.8)	69,984	-	-	-	243	69,984	100
Clerical and Allied grades[2]	164(3.9)	47,232	-	-	-	164	47,232	100
Skilled Labourers[3]	608(14.5)	1,75,104	76	21888	12.5	532	1,53,216	87.5
Unskilled Labourers[4]	3186(75.8)	9,17,568	872	2,51,136	27.3	2314	6,66,432	72.7

Notes :

1. Engineers, Technical Officers, Work Supervisors, Planning Technicians, Administrators, Accountants, Project Officers, Asst. Project Officers, and Unit Officers were included in this category.
2. Clerks, Shroffs, Store-keepers, Asst. Store-keepers, Typists, Office Assistants, and Staff Assistants were included in this group.
3. Drivers, Tractor Operators, Operators of Machinery and Equipment, Mechanics, Welders, Borers, Masons and Carpernters comprised group.3.
4. In addition to seasonal labourers, others included in this group were watchers, stores labourers, Office Labourers, Messengers, Maintenance Labourers, Assistants to Drivers and Sanitary Labourers.

Source : Compiled from Statistics collected from the Irrigation Department.

as the base, it is possible to set an upper limit of 7.2 million mandays of work during the period 1980-1985 which is higher by 1 million mandays estimated at the appraisal stage.

Table 3.6 presents the data on the labour contributed by masons, carpenters and unskilled labourers for the various components of the construction programme, undertaken by the public sector agencies in terms of mandays. The data on the number of mandays contributed by other types of skilled labourers (eg. mechanics, welders, machine operators and etc.), professional and clerical workers were available only from the RVDB. On the basis of this information it is possible to arrive at a pessimistic lower limit of 4.5 million mandays. The actual amount of work opportunities created could, however, be much greater than this figure on the following counts.

(a) The data given in Table 3.6 relate to the employment opportunities provided by the four public agencies only. The work opportunities provided by the private contractors should be added to this figure.

(b) Only the RVDB provided data on all categories of employees up to the end of December 1985 (see Table 3.7). The total number of mandays contributed by masons, carpenters and unskilled labourers in the accomplishment of the settlement activities too were made available up to that point of time. The data on labour used in the other components of the project refer to the period ending October 1984. A substantial amount of labour must have been used in these components during the intervening period.

On the basis of the preceding analysis it can be asserted that the implementing agencies have succeeded in generating the level of employment targetted at the appraisal stage, from construction activities. However, this was fraught with a number of obstacles.

(a) The completion of the construction programme had to be done according to the time schedules agreed upon by the donor agencies and the GSL. The delays in the initial stages, in procuring heavy equipment and machinery etc., and in selecting a contractor to undertake the work in the dam and headworks compounded the difficulties in

TABLE 3.6 : Labour Use in Construction Activities by the Public Sector Agencies

Operation	Carpenters and Masons	Unskilled Labourers	Other Workers	Total	%
Rehabilitation	165	3,865	n.a.	4030	0.1
Left Bank Main Canal	2345	58,358	n.a.	60,730	1.4
Right Bank Main Canal	40,458	166,801	n.a.	207,259	4.6
Field Canals	n.a.	n.a.	n.a.	71,510	1.6
Distribution Canals	n.a.	n.a.	n.a.	5,599	0.1
Right Bank Headworks (ID)	81,245	587,115	n.a.	668,360	14.9
Dam and Headworks (RVDB)**	93,888	1,282,022	1,067,328	2,443,238	54.4
Settlement Activities** (LDD)**	89,232	329,816	n.a.	419,048	9.3
Estimate of other workers (other skilled professional and clerical)	-	-	612,723	-	13.6
TOTAL	307,333	2,427,977	1,680,051	4,492,470	100

Source : Compiled from the data obtained from ID, RVDB, LDD, and LCD.

Notes : ** Figures up to the end of December 1985. All other figures are upto October 1984.
* Estimates are based on the proportion 1:3:13. Adjustments are made for the labour days put in by the masons and carpenters. Detailed estimates are given below :-

Category of Workers	Estimated Mandays
Skilled labourers (other than masons and carpenters)	2,52,969
Professionals	1,86,967
Clerical and allied grades	1,72,787
Total	6,12,723

meeting such a time schedule. Thus it became necessary for the implementing agencies to depart somewhat from labour-intensive techniques and to depend on capital-intensive techniques.

Machinery and Equipment

The accomplishment of this large civil engineering project required the co-ordinated mobilisation of a large fleet of earth-moving, drilling and blasting, mucking and transport equipment as summarised below :

Table 3.6.1 Important Machinery and Equipment Mobilised

Name of Machine	No. of Units	Name of Machine	No.of Units
Motorised scrapers	20	Crawler drills	3
Crawler tractors	20	Waggon drills	3
Motor graders	4	Jack hammers	32
Rear pumpers	18	Air compressors	9
Hydraulic excavators	6	Vibrators	49
Front end loaders	6	Stone crushers	2
Cranes	5	Concrete mixers	11
Sheep foot rollers	5		
Water bowsers	9		
Trucks	2	Lorries 3T, 5T, 10T	16
		low bed trailer	3
		Water pumps	39
		Welding sets	5

Source : R.V.D.B.

(b) Some of the work meant to be undertaken by employing labour-intensive techniques had to be carried out with machines due to the problems that cropped up in the actual implementation. Digging of main canals is a case in point which involved crushing and removing of large rocks, an activity unanticipated at the planning stage.

(c) The shortage of skilled workers such as masons and carpenters within the project area posed problems in recruiting such workers in required numbers. Though preference was to be given to unemployed and underemployed persons within the project area, in meeting the demand for unskilled labourers, the supply levels were gossly inadequate and were irregular. Therefore, the implementing agencies were compelled to depend on supply sources outside the project area, and consequently the

the level of participation of project beneficiaries in the construciton work fell much below the levels expected originally. Ultimately, the recruitment depended heavily on the recommendations made by the District Minister for Hambantota, and the Members of Parliament (MPs) in the district. Thus the employment benefits of the KOISP were distributed largely among the people in the Hambantota district.

3.5.1 Problems Associated With the Regular Availability of Labour

(a) Nature of the Programme Life Cycle and the Demand for Labour

The demand for labour in a construction programme of the composition and scale of the KOISP is dependent upon several factors. The first and foremost is the nature of the life cycle of the construction programme itself. Such a life cycle is composed of four stages such as introductory, growth, maturity and decline. When implementing agencies face problems, like those cited above, the programme naturally has a prolonged introductory stage. The result is the delay in reaching the maturity stage than that anticipated by the project planners. This may be evident from the employment data supplied by the RVDB (Table 3.7) regarding the level of deployment of its permanent work force in constructing the dam and headworks.

The maturity stage of the construction programme of the dam and headworks has been reached in 1983. At least part of this delay was due to time lags in finalising formal contract documents, and in purchasing heavy equipment. Such delays had to be recouped in the subsequent years and therefore, the demand for labour too had increased. As a result, it became difficult, if not impossible, to fit the seasonal variations in labour supply into its envisaged programme of work. Though data were not available in respect of the annual labour use by the other public sector agencies, it can be deduced that they too experienced the same difficulty.

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1. IFAD Report on Progress in Monitoring and Evaluation, Kirindi Oya Irrigation and Settlement Project - Sri Lanka, Rome, October 1980.

TABLE 3.7 Permanent Employees in Technical and Supervisory Grades and Other Skilled Employees in the Construction of the Headworks of KOISP River Valleys Development Board

Category of Employment	1980	1981	1982	1983	1984	1985	Total Man Years	Total Mandays
1. Qualified Engineers	8	12	6	9	10	7	52	19,000
2. Technicians / Engineers	5	12	2	7	9	5	30	11,000
3. Middle grade Technical Officers Including E.AA.	20	30	38	50	48	39	225	82,000
4. Supervisors	34	56	63	77	66	49	345	126,000
5. Operators	58	120	132	160	145	98	703	260,000
6. Mechanics	51	98	76	82	98	22	437	160,000
7. Masons	22	33	23	28	29	15	150	55,000
8. Carpenters	13	20	22	38	48	36	176	65,000
9. Skilled Employees (Lab)	-	-	29	93	35	34	191	-
10. Semi-skilled Employees	-	-	2	2	2	2	8	
11. Other skilled Employees	109	142	221	473	283	279	1507	700,000
12. Unskilled Employees (Lab)	49	93	22	19	16	9	208	1,600,000
13. Total No. of Employees	379	606	626	1038	789	594	4032	30,78,000

Source : RVDB Statistical Division

This situation is substantiated by the data given in Table 3.8 which presents information on the numbers of casual labourers (masons, carpenters and unskilled labourers) used monthly by the RVDB from February 1980 to December 1985.

According to Table 3.8, March, April and December were the months with low levels of labour use, while May, June, July and August were the high-use months. This finding is in close conformity with the inverse patterns of labour use in crop cultivation activities in the project area, which implies that the construction programme of the RVDB was affected by the seasonality of labour supply.

However, the seasonal index of labour use, calculated on the basis of those data, exhibits a reasonable level of stability, the amplitude of seasonal variation (i.e. the difference between the highest and lowest indices) being 13.7%. Such stability was in fact needed for recouping the delays explained earlier. Then what are the instruments used by the RVDB in keeping a reasonable number of employees regularly for the continuation of work assigned to it ? One method was of recruiting the family members of the permanent labourers of the RVDB on a casual basis. Another was to attract hired labour from agriculture by offering them more regular work opportunities, by re-employing them after a break of few days once their work is discontinued[1]. Last, but not the least, was by employing labourers from outside the project area, preferably from Hambantota district, to meet the shortages.

(b) Technology Prescribed and Used

The ratio of labour to capital used in the various components of the KOISP too affected the demand for labour. Basically, the activities connected with the construction of the irrigation infrastructure were more capital-intensive than the construction work involved in developing the social infrastructure such as roads, buildings etc.

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1 As was shown earlier in this chapter, this practice was adopted by the RVDB to keep its recruitments in congruence with the labour regulations.

TABLE 3.8 : Seasonal Pattern of Employment of Casual Labourers by the RVDB from February 1980 to December 1985

Year	Number of Labourers Employed in Each Month											
	Ja.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1980	-	150	150	150	150	150	150	150	-	-	-	-
1981	728	855	873	881	1334	1120	978	958	951	1030	1030	1030
1982	1030	897	897	899	968	967	1104	1139	1139	940	1071	979
1983	778	811	849	789	664	808	872	856	852	831	864	831
1984	808	795	553	548	603	677	685	814	685	931	946	894
1985	863	911	919	985	1014	912	907	876	566	566	317	321
Average	841	854	818	821	916	896	910	929	839	860	846	811
Seasonal Index	97.6	99.1	94.9	95.2	106.3	103.9	105.6	107.8	97.3	99.8	98.1	94.1

Source : Compiled from data obtained from the Statistics Division, RVDB.

Notes : 1. In working out the seasonal index, the aggregate method was used

2. Labour data for the year 1980 were ignored in calculating the average

TABLE 3.9 : The Ratio of Labour Costs to the Total Expenditure Allocated for Each Item of Work

(1)	Common excavation	:	17.03%
(2)	Rock excavation	:	17.97%
(3)	Concrete	:	11.4%
(4)	Clearing	:	16.95%
(5)	Placing and compacting	:	15.76%
(6)	Burrowing	:	15.76%
(7)	Filing	:	16.72%
(8)	Rip and Rap	:	12.11%
(9)	Stripping	:	17.01%
	Average	:	14.7%
	Total Cost		351,378,000
	Labour Cost		51,653,000

Source : Irrigation Department."Data for costing of civil works", third revision, Jan. 1980.

The ratio of labour costs to the total expenditure allocated for each component item of work within the construction programme of the ID is given in Table 3.9. The data suggest that, on average, only 15% of the funds allocated for the items mentioned has been spent as labour charges, implying a higher degree of capital intensity inherent in the types of work undertaken by them. Other items of costs included heavy expenditure categories such as building and construction materials, depreciation of capital equipment and machineries, fuel, maintenance charges, and cost of supervision. The works assigned to the RVDB too were of higher capital intensity if not the same. The demand for hired labour by such agencies was therefore large only because of their massive scale, and not due to the technology adopted. The scarcity of labour during certain months and the need to complete the work in time compelled these agencies to commit themselves to further capital-intensive techniques thus reducing the demand for labour even during periods when it was available in plenty.

On the other hand, construction of buildings, roads, field canals and other infrastructure did not require heavy equipment and machinery. Perhaps they could have followed a bimodal pattern of activity to suit the local labour supply trends, if the initial programme was planned by taking this aspect into consideration. Some of these works too were palmed over to private contractors, the majority of whom operated on a small scale and who also came from outside the project area. Usually such type of contractors preferred to keep a regular labour force with them consisting of skilled and unskilled labourers. Though this resulted in lost opportunities for the seasonally unemployed labourers from the project area, it opened up opportunities for others in the district.

(c) Supply of Labour : Transition of Unskilled Labour to Skilled Labour

From the point of view of supply, the high proportion of educated among the unemployed and the seasonality in employment in the agricultural sector curtailed the participation by them in the construction programme as was shown in Chapter 2. Since the shortages were acute in the case of carpenters and masons, it was thought fit to absorb the unskilled labourers, who learnt the skills while engaged as helpers. Though the productivity and the quality of the work performed by such labourers fell below the standard at the initial stages of their employment, they improved as time went on. Thus, the KOISP succeeded in imparting new skills to a relatively unskilled labour force, though the numbers involved were small. The skills imparted by the RVDB included service of machines and maintenance, bar-bending mechanical and electrical work, surveying and levelling carpentry and masonary.

(d) The Distance to the Worksite

The distance travelled daily by the labourers to reach the worksite generally influences the levels of adherence to a set of prescribed working hours. When the labourers have to travel long distances, they fail to report for work at the prescribed time for commencing the work, and tend to seek

permission to leve the work place early to get back to their places of residence before dark. This situation usually adversely affects the work norms and the productivity of labour.

Table 3.10 presents information on the place of residence of 1893 workers, and the distances they travelled daily for work, as revealed by the field survey of this study. The average distance travelled by the workers recruited from within the project area appears to be greater than those who came from outside the project area. This is evident from the fact that 57% of the workers recruited from the project area travelled more than 8 km daily, while the relevant percentage of the workers who came from outside the project area was 13%. This is because the latter category of workers lived in camps provided by their respective employers. Though these camps were originally located adjecent to the worksites, the distance from the camp to the worksite tends to get increased as the work proceeds. However, 87% of the workers who resided in camps travelled less than 3 km to the worksite.

The in-depth interviews held with private contractors revealed a distinct preference by them for the workers from outside the project area. This was, on the one hand, due to the willingness of those workers to take up residence in temporary huts adjecent to the worksites and, on the other, due to the irregular and late attendence of workers drawn from within the project area.

3.6 Wages Paid to Construction Labourers, Duration of Employment and the Contribution of Income from Construction Work to Total Household Income'

The construction labourers who worked for the public sector agencies belonged to two categories, namely permanent and casual. The permanent workers drew their wages monthly, according to their respective scales of wages, and the position of individuals on a given scale. The latter is based on the seniority of service in the same grade. They also enjoyed other benefits such as leave, holiday pay, overtime etc. The inter-agency and intra-trade as well as the grade differentials of wages paid to this category of employees are too numerous to mention and moreover, lie outside the scope of the present study.

TABLE 3.10 : Distance to the Worksite From the Place of Permanent/ Temporary Residence

Place of Residence	Distance Travelled(Km)									
	1.5		1.5-3.0		3.0-6.0		8			
	No.	%	No.	%	No.	%	No.	%	No.	%
1. Project Area (sub-total)	105	14.7	50	7	150	21	408	57.3	713	100
2. Outside the Project Area (sub-total)	500	42.4	370	31.4	300	25.4	10	0.8	1180	100
3. a) Temporary huts or camps	500	45.5	350	31.8	250	22.7	n.a.	-	1100	100
b) Travelling	n.a.	-	20	25	50	62.5	10	12.5	80	100
Both Areas	605	32	420	22.2	450	23.8	418	22	1893	100

However, differentials did exist in wages paid to skilled and unskilled labourers recruited temporarily by the various employers including the public sector agencies and the private contractors. On the whole, irrespective of their skills, the temporary cadre could be sub-divided into two groups :-

i. Those who were paid on a daily basis
ii. Those who were paid according to the piece-rate system.

Those employed by the public sector agencies belonged mainly to the first category. They were paid according to the number of days worked per month. The statutory allowances payable to other public sector employees were also paid to them, but in proportion to the number of days worked. On the average, a skilled labourer like a carpenter or a mason could earn Rs. 1800-2000 and an unskilled labourer Rs. 900-1000 if he worked for a whole month. This group of labourers were comparatively better off than the others, because once they have signed on, they were naturally expected to work till the job was over. Their risk of being discontinued was rather low. They also enjoyed the benefit of the 8-hour working day.

On the other hand, those who worked according to the piece-rate system, worked mostly for private contractors. When there is a hierarchical system of contracts, both the skilled and unskilled categories of labour operate under various sub-contractors and get unduly exploited in the process. As shown earlier, the private contractors paid around Rs.40/- for excavating a cube of earth and an average worker had to earn this amount by working for about 11 hours a day. In contrast, the cooperative society paid at the rate of Rs. 49.50 per cube. Usually the sub-contractor himself operates on a small margin of profit. In such a system it is the main contractor, having obtained the work contract from the official authority, who gets the major share of the profits.

The contribution of income from engaging in construction work to the total household income depends on three factors namely the average number of days per worker, the number of family members who found work opportunities in the construction activities, and the wages received. Based on the most recent data made available by the Mid-Project Evaluation Survey of the KOISP carried out by ARTI, the information on these aspects is presented in Table 3.11.

TABLE 3.11 : Duration of Employment and the Contribution from Labour Income to the Total Household Income During the Year 1985

Type of Labour	(1) No.of Workers	(2) No.of Households	(3) Average No. of Days Worked/ Year	(4) Average Wages Per Day(Rs)	(5) Average Income from (2)	(6) Average Total Household Income(Rs)	(7) (5) as a % of (6)
Skilled	13	13	129.46	50	6473	16604.15	39
Unskilled	19	17	76.10	37	2823.26	15701.59	18
Both	32	30	97.77	45	4404.81	16092.70	27.32

Source : Mid-Term Evaluation (on-going study) A.R.T.I., 1986.

The sub-set of 30 households selected on a purposive basis included 13 workers in the skilled category (carpenters and masons) and 19 workers in the unskilled category. It can be seen from the data that skilled workers on the average have worked about 130 days per year, while the unskilled workers have worked for a shorter duration, i.e. 76 days per year.

Since this information relates to 1985, which represents the declining stage of the life-cycle of the construction programme as discussed earlier, the duration of employment and the contribution of income thus received would have been greater in the three preceding years, viz. 1982, 1983 and 1984.

The average daily wage rate too was higher in the case of skilled workers (Rs.50/-) than the unskilled workers (Rs. 37/-). Consequently, households having skilled workers involved in construction activities of the project received an income of Rs. 6,473/- therefrom, while the households hiring out unskilled labour received less than half (44%) of that amount i.e. Rs. 2863/-.

The contribution of income earned from construction activities to the total household income was about 39% in the case of skilled worker-households, while it was 18% in the case of unskilled worker households. Earnings from construction activities, therefore, have raised the average incomes of these families by 2/5th and 1/5th respectively, and have helped them to elevate themselves above the officialy determined poverty line incomes.

3.7 Increased Money Incomes, Prices of Wage Goods and Real Incomes

As most of the employment benefits were widely distributed both within the project area and Hambantota district, it is necessary to examine whether the resultant increases in incomes have had any impact on the prices of wage goods, and thereby on the level of real incomes. Though this phenomenon is theoretically plausible, there is no firm evidence to support the view. The movement of food prices within the project area as well as in Hambantota district was in congruence with the changes of food prices at national level. The high level of market integration in the country, and the non-existance of scarcities in the supply of basic food items at national level, would explain partially,

the relative stability of food prices. The other contributory factor was the availability of world food aid, which was distributed among the new settlers. An average settler received 60 Kg of rice, 1 Kg of lentil, 1 Kg of dryfish, 1 letre of Butter-oil, 6 tins of canned fish, and dates or plums monthly. Moreover, most of these new families too were eligible to receive food stamps. Thus, their dependence on the open market for requirements of food would have been minimal.

As there is no evidence on sharp increases in food prices, the income could have increased in real terms: the surplus generated was thus invested mainly on the improvement of dwelling houses, children's education and for the purchase of consumer durables such as bicycles. A few also have started tiny grocery shops.

The incomes accrued as profits also went largely into the hands of public sector agencies, because they were the main constractors of the construction activities of the KOISP. The private contractors too may have earned substantial amounts of profits, but information is not available on the manner in which such surpluses would have been utilised. Increased incomes within this group, however, may not have resulted in increases in the demand for basic food items.

3.8 Lessons to be Learnt From the KOISP Experiment

The KOISP experiment of employment generation through creation of assets has shown that this method can be used as an additive instrument of solving a part of the unemployment and underemployment problems if satisfactory financing arrangements and reasonably decentralised adminsitrative measures could be adopted. It also points to the need for preparing technically sound, economically viable and administratively feasible project proposals, in a broader regional development framework. In projects like the KOISP which involved, it is necessary to identify those components which are more suited for adopting a labour-intensive technology and those that require a capital-intensive technology, eg. the construction of the Headworks of the KOISP.

The experiment has also shown that even though the rates of unemployment and underemployment are high, mobilisation of labour on a regular basis becomes a difficult task particularly when the area covered by the project is small, predominently agircultural, and sparsely populated. In creating assets of exceptional quality and durability, the bringing in of unattended jobs and left-over people together, also requires a sufficient number of professional, technical and adminsitrative personnel, for undertaking supervisory, technical as well as facilitating functions, in addition to the capital and other resources. Thus these programmes are not so cost-effective as often thought. It is necessary therefore to maintain a balance between asset creation and employment generation objectives. There is so much to be learnt from the Chinese experience on this count[1]. Adequate measures should also be adopted for assuring a fair distribution of project benefits and keeping the food prices within reasonable limits, particularly when the funds invested are enormous.

If undertaken with due caution on these aspects, it is possible to increase employment opportunities, alleviate poverty, enhance incomes and create productive assets by replicating experiments of this nature. Otherwise,they will bring the whole notion of labour-intensive work to disrepute, and result in non-durable and poor quality assets and wasted resources. The latter has been the experience of many other countries, excepting a few. The KOISP was fortunate to have access to foreign funding through the ADB and the IFAD. The GSL's contribution to the project therefore did not pass an excessive burden on the national budget and so did not lend to an improper allocation of national resources. Without such assistance, however, it would have been difficult for the GSL to embark on projects of the scale and magnitude of the KOISP due to budgetary constraints. If the approach of employment generation through asset creation is to be taken as a serious policy instrument, it is necessary to give adequate thought to measures capable of mobilising internal funds for financing such projects.

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1 Moully J. and Costa,E.,"employment Policies in Developing Countries". Blackwell, Oxford, 1974.

One of the main drawback of similar schemes in other countries is that the assets created by this method are not being maintained properly, and therefore the structure does not last long. The planners of KOISP have given due consideration to this aspect, and have estimated that 800,000 mandays per year are required for maintaining the assets created. A suitable institutional mechanism has yet to be evolved for this purpose, preferably with the active participation of the beneficiaries of the project. Effective farmer oroganisations could play a significant role, for example in maintaining the distribution and field canals, if a suitable mechanism is worked out.

Another important lesson to be learnt from the KOISP experiment is that the major part of the construction programme (i.e. the dam and Sluice/spillway) was built by 100 percent Sri Lankan labour and engineering personnel. This showed on the one hand, that the Sri Lankans have the expertise required by such massive-scale projects and, on the other hand, that the profits remitted by the foreign contractors to their own countries could be retained in Sri Lanka by contracting out such projects to Sri Lankan Organizations. The surplus retained within the country could be re-invested in other activities which in turn would help in increasing employment opportunities in such spheres.

Chapter Four

LABOUR ABSORPTION IN RICE CULTIVATION : CURRENT LEVELS AND FUTURE PROSPECTS

4.0 Introduction

The other objective of the present study relates to the level of labour utilisation in rice cultivation. Ideally, this analysis should have included all agricultural pursuits including crop cultivation and livestock production, but the disruption of Chena[1] cultivation due to the construction activities of the project precluded such an attempt being made[2]. Nevertheless, rice has always been and will be the dominant agricultural crop in the project area. The labour absorption capacity in the cultivation of this crop would definitely exert influence on the volume of employment generated in agriculture.

The project has adopted a two-pronged strategy to increase the employment levels in rice cultivation :-

(a) increasing the cropping intensity from an existing level of .76 to almost 2.0 of lands devoted to rice cultivation,

(b) providing assured irrigation for new lands, for two rice crops a year.

On completion of Phase I of the KOISP, these strategies together would bring approximately 8775 hectares per season under the plough. If a cropping intensity of 1.75 is likely to be achieved,

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1 Shifting cultivation involving slash and burn

2 A detailed study is currently being undertaken by the ARTI on these lines. It also aims at investigating the non-farm employment opportunities within the project area.

this would mean the cultivation of 15,356 ha. in both seasons, and if double cropping becomes possible in all these lands (a cropping intensity of 2.0) the area cultivated with rice per year would amount to 17,550 ha.

4.1 Past Trends and Current Level of Labour Use

In general Sri Lanka's rice cultivation is characterised by high labour use and low productivity of labour. Labour productivity can be increased by raising the productivity per unit of land through irrigation and bio-chemical technology or by reducing labour use per hectare through mechanisation or other labour saving technology such as the use of herbicides for weeding[1].

In the context of Sri Lanka, it could perhaps be argued that the adoption of the latter method may lead to a premature release of labour from agriculture because of the slow rate of growth of industrial employment. The evidence from a number of micro-level studies[2] shows that the per hectare labour use is declining, particularly in major irrigation areas mostly due to the use of labour-substituting inputs. Hambantota district where the KOISP is located, is one district where such a decline is taking place.

The declining trend in labour use in rice cultivation in Hambantota district and in the project area could be seen from the evidence found in past studies. Such evidence is presented in summary form in Table 4.1.

The data presented in Table 4.1 show that from 1972/73 to 1980/81 the total mandays per hectare per season has dropped by 13. This represents a 11.3% decline over a period of 8 years. There has been a sharp drop in the use of hired labour - 34 mandays per hectare per season - which in percentage terms amounts to 34.3%.

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1 Randolph Barker et.al. "Employment and Technological Change in Philippine Agriculture" International Labour Review Vol. 106, 1974.

2 Perera, U.L.Jayantha and Gunawardena P.J. Hired Labour in Peasant Agriculture in Sri Lanka, ARTI, 1980.

TABLE 4.1 : Labour Input in Paddy Production Per Ha/Per Season

Hambantota District

Source	Crop Season and Year	Total Mandays per ha.	Family Labour Mandays/per ha.	Hired Labour Mandays/per ha.	Area Covered in the Study
Isumi & Ranatunga	1972/73 Maha	115	16	99	Hambantota District
Ranatunga & Abeysekera	1976/77 Maha	112	34	78	do
Wanasinghe	1980/81 Maha	102	37	65	Project Area
Present Study	1983/84 Maha				
a) With transplanting and hand weeding		146	37	109	
b) With transplanting and chemical weeding		128	37	91	
c) With broadcasting and hand weeding		102	37	65	
d) With broadcasting and chemical weeding		82	37	45	

Sources : 1. Izumi, K and Ranatunga, A.S."Cost of Production of Paddy - Maha 1972/73" ARTI Research Study No.12

2. Ranatunga,A.S. and Abeysekara, W.A.T. "Profitability and Productivity Characteristics of Paddy Farming". ARTI Research Study No.23

3. Wanasinghe, Ananda,"Input Use Efficiency and Productivity of Rice Production". ARTI Research Study No.65.

This drop has been recouped to some extent by increasing the use of family labour, by 21 mandays, which is equivalent to a 131% increase.

The findings of the present study show that the statistics relating to labour use presented in the study by Wanasinghe (1986) is exactly equal to the level of use of the farmers who adopted broadcast sowing and hand weeding. If for example, hand weeding is to be replaced by the use of herbicides, as has already happened in the case of some farmers, the per hectare per season labour use is bound to drop by about another 20 mandays. This amounts to a sharp drop of 14.6% over the levels used in 1980/81. Another important finding of the present study is that it is the drop in hired labour component which accounts for the entire decline in the total mandays used in the cultivation of rice. This implies that it is the management practices that require the services of hired labour which have been mostly given up by the farmers. Traditionally, land preparation, transplanting, weeding, and harvesting are done with the help of hired labour.

This analysis shows that the particular blend of the two technologies, bio-chemical and mechanical, used by the farmers greatly affect the level of labour use in rice cultivation while a number of economic and institutional factors influence the farmer. While factors affecting the level of technological adoption will be reserved for a latter part of this Chapter, the ensuing section will be devoted to an analysis of the trends in technological adoption by the farmers in Hambantota district in general and the current level of adoption in the project area in particular.

4.2 Trends in Technology Adoption and Current Levels

Hambantota is one of the pioneering districts in terms of the adoption of new technology in rice cultivation in Sri Lanka. Thus, it is no surprise that the current level of technology adoption among farmers is quite higher than the national average. However, there has been a change in the composition of the technology package which was introduced initially and is being adopted at present. Table 4.2 presents in summary form the trends discernible from the available evidence on the adoption of some technological components in rice cultivation, such as the use of improved seeds,

methods of crop establishment, method of weeding, the use of fertilizer and the use of farm power.

It is seen that from 1971/72 to 1983/84 the use of new high yielding varieties (NHYVs), herbicides and mechanical power (both 4-wheel and 2-wheel tractors) has increased to very high levels, while the use of fertilizer has always remained at high levels implying a relative stability. On the other hand, transplanting and raw sowing was gaining ground till 1976/77, but thereafter has been replaced by broadcast sowing. Thus, it can be observed that the farmers in this area have been adopting a technology which is capable of displacing labour and increasing yields.

The use of mechanical power for land preparation, broadcast sowing for crop establishment and herbicides for weed control results in the displacement of labour, while the use of NHYVs and chemical fertilizer has helped to increase yields. The sharp decrease in labour use has, however, been recouped by the harvesting and post-harvest methods used at present which accounts for 29 mandays per hectare per crop. These two operations together account for 28% of the total labour use in rice cultivation within the project area. The total labour use could further decline in the near future if the mechanical harvester and thresher being advertised in the mass media at the moment gain popularity among the farmers in the project area. In terms of the present productivity level of 3.8 tons per hectare in the project area and the level of labour use of 102 mandays, labour productivity works out to be 38 Kg/manday. This evidence leads to the conclusion that if this tendency continues, the farmers in the KOISP area, particularly those who come under the earlier Kirindi Oya system would move into a position of low labour use and high labour productivity situation in the near future. Thus, it might become necessary to intervene in factor markets, particularly those of labour substituting inputs such as tractor hire and herbicide markets, if a proper balance between growth and equity objectives is to be achieved.

TABLE 4.2 : Trends in Adoption of Improved Practices in Rice Cultivation

	(a) Maha 71/72		(b) Yala 72		(c) Maha 76/77	(d) Maha 1979/80		(e) Yala 1980		(f) Maha 1983/84	
						Major Irri.	Minor Irri.	Major Irri.	Minor Irri.		
No. of farms	145		116		89	75	60	75	60	97	
Average size of the farm (ha)	2.0		1.6		1.6	1.2	1.0	1.2	1.0	0.8	
Survey area	Ham. District		Ham. District		Ham.District	KOISP		KOISP		KOISP	
	% Farmers	% Extent	% Farmers	% Extent	% Farmers	% Farmers	% Farmers	% Farmers	% Farmers	% Farmers	% Extent
1. Use of Improved Seeds %											
a) NHYVs	34	43	53	63	63	90	84.0	94.7	100	90	92
b) OHYVs	42	48	25	26	25	-	-	-	-	7	5
c) NHYVs and OHYVs	13	na.	6	na.	na.	-	-	-	-	-	-
d) Traditional	7	9	8	11	12	-	-	-	-	3	3
e) Other	4	na.	8	na.	na.	-	-	-	-	-	-
2. Method of Crop Establishment											
a) Broadcasting	70	78	84	87	62	83	-	88	-	91	91
b) Transplanting, sowing in rows	20	22	11	13	38	17	-	12	-	9	9
c) Combinations	10	na.	5	na.	na.	-	+	+	-	-	-
3. Method of Weeding											
a) Hand weeding	8	5	na.	na.	na.	na.	na.	na.	na.	14	17
b) Use of herbicides	43	47	na.	na.	83	na.	na.	na.	na.	84	81
c) (a) and (b)	39	40	na.	na.	na.	na.	na.	na.	na.	-	-
d) Others	10	8	na.	na.	na.	na.	na.	na.	na.	2	2
e) No weeding	-	-	na.	na.	na.	na.	na.	na.	na.		
4. Use of Chemical Fertilizer											
a) Used	95	na.	90	na.	96	na.	na.	na.	na.	94	91
b) Not used	5	na.	10	na.	4	na.	na.	na.	na.	6	9
5. Use of Farm Power											
a) 4-wheel tractor	16	20	na.	na.)	87 37.0	48.3	57.3	48.5		56	55
b) 2-wheel tractor	38	39	na.	na.)	58	48	36.4	36.9	37	37	38
c) Buffaloes	16	14	na.	na.	na.	50	3.7	6.3	4.6	8	7
d) Mamoty	7	2	na.	na.	na.	-	-	-	-	-	-
e) Combinations	23	25	na.	na.	13	-	-	-	-	-	-

Sources:
1. ARTI. Agrarian Situation Relating to Paddy Cultivation in Hambantota District.
2. Ranatunga, A.S. and Abeysekera, W.A.T. "Profitability and Resource Characteristics of Paddy Farming. Research Study No. 23. ARTI, Colombo, 1977.
3. Wanasinghe, Ananda "Input use efficiency and productivity of rice production". Research Study No. 65. ARTI, Colombo 1986.
4. Field survey undertaken for the present study.

Notes :
1. Columns a,b,c are for Hambantota district and d,e,f for the KOISP area.
2. Percentage given in column c in respect of chemical weeding is the percentage of farmers who have used agro-chemicals and therefore include the farmers who used pesticides as well. The report, however, emphasises that chemical weeding was wide spread in the area.

The study by Wanasinghe (1986)[1] has found inefficiencies in resource allocation in rice cultivation in the present major irrigation schemes in the project area. According to this study, labour, machinery, fertilizer, seeds and agro-chemicals are over-utilized by the farmers while the land is under-utilized, in terms of the marginal productivity analysis. On the other hand, the research team involved in the mid-project evaluation study of KOISP has observed that the majority of new settlers lack experience in rice cultivation under major irrigation schemes, and the experience of some others is limited to Chena cultivation. Therefore the study has suggested that such new settlers be given adequate and appropriate extension advice[2]. These two contrasting siutations therefore demand two different appraoches to extension education in the project area.

4.3 Projected Labour Use in Rice Cultivation at Full Development of Phase I of KOISP

According to the interim report of the ARTI of its mid-term evaluation[2], some of the irrigated lands which have been allocated to beneficiaries may not be cultivated immediately due to deficiencies in land development and the lack of development of field canals. It was therefore assumed that the entire 8775 hectares of irrigated land will be cultivated in Maha 1986/87 season. An alternative cropping intensity of 1.75 was also assumed to make provisions for random disturbances.

In making the projections, it was assumed that the present labour use levels will be continued in the immediate years ahead, and no more labour substituting inputs would be used by the farmers in the project area, as relative prices of labour and other inputs were assumed to be constant. A further assumption is that the beneficiaries of the new land allotments would also use the same level of labour.

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1 Wanasinghe, Ananda op.ct.

2 ARTI. Interim Report, KOISP Mid-term Evaluation, Maha 1985/86

TABLE 4.3 : Labour Use in Rice Cultivation After Full Development Of Phase I of KOISP

Activity	Mandays	Total Mandays (CI=0.88)	Total Mandays (CI=1.00)	Total Mandays (CI=1.75)	Total Mandays (CI=2.00)
Land Preparation	21.9	192,173	336,303	384,346	168,152
Sowing and aftercare	51.4	162,338	284,092	324,676	142,046
Harvesting	17.1	150,053	262,593	300,106	131,297
Post-harvest Operations	11.4	100,035	175,061	200,070	87,531
All Operations	101.8	604,599	1,058,049	1,209,198	529,025

(CI) Cropping Intensity = $\frac{\text{Area harvested in a particular season / both seasons}}{\text{Total area of paddy land}}$

Source : Compiled on the basis of mandays given by Wanasinghe (1986) assuming the extent of lands to be developed in Phase I were taken as 8775 hectares.

Some of these assumptions may become unrealistic, as has been mentioned earlier in this chapter. Perhaps, relative input and product prices as well as wages could change due to macro-economic policies and the changes in the consumer price index. These in turn would affect the current levels of labour use in the old irrigated area. Likewise, the allottees of new lands may not adopt the same technology package and the level of labour use could differ from what was obtaining in the old irrigated area. If they adopt the technology package now used by the farmers who cultivate under minor irrigation schemes, the per hectare per season labour use could be around 92 mandays. On the other hand, activities related to land preparation and harvesting and post-harvest operations might require more labour on new lands because of the following reasons :-

(a) the hard soil of the new lands would be more difficult to prepare and also plastering of contour bunds would require more labour than the lands in the old irrigated area

(b) even if the fertilizer use on new lands in the initial years would be low, the farmers could expect a bumper harvest by cultivating on virgin soil.

Therefore, it is difficult at the present stage to make precise assumptions regarding the per hectare per season use on these lands. These projections could perhaps be improved, when the data are available from the study on employment now being conducted. Meanwhile, the data presented in columns 3 and 5 of Table 4.3 under the assumption of cropping intensities of 0.88 and 1.75 could be taken to represent the possible volume of labour use in the immediate future, whereas the data given in columns 4 and 6 under the assumption of cropping intensities of 1.0 and 2.0 would reflect the situation in 3-4 years hence.

Table 4.4 gives the estimated break-down of the total labour use in rice cultivation at full development of the KOISP according to the sources and the sex of the workers, based again on the ratios in each category, at the time of the field survey of the present study.

Here again the estimates provided in the table indicate the possible range within which the potential labour use figure would fit in. The range of the labour requirements per season is given in columns 3 and 4 and the range for the crop year is given in columns 5 and 6.

Though the data given in the table are self-explanatory, two points are worth mentioning. The first refers to the requirements of hired labour. The data show that the hired labour requirement per season would be in the range of 0.34-0.39 million mandays, while the requirements per crop year range between 0.68 and 0.78 million mandays. The latter estimate tallies with the estimate of hired labour made at the appraisal stage which stood at 0.72 million mandays.

The family labour availability is estimated at 3.0 units per family by Wanasinghe (1986). Of this amount, the male labour component amounts to 1.6 units. This works out to 13,280 male labour units in 8,300 farm families. If one unit of family male labour works for 46 mandays per season, the entire labour requirement for that season can be easily met. However, such a perfet substitution of family labour for hired labour is not practicable in the cultivation of rice, unless the traditional system of labour exchange known as "attan' 'attan' is reintroduced. This is because certain tasks in rice cultivation, such as the preparation of the seed-bed, harvesting and post-harvest work have to be completed within a very short period. These are the activities for which even child labour is drawn because of the urgency demanded by such tasks. The 'attan' system of labour exchange is fast disappearing even in the old irrigated area. On the other hand, persons who have been working previously as agricultural labourers in the area (Chena cultivators and landless labourers) become the beneficiaries of new land and they also will become employers of hired labour. This could lead to serious labour shortages during the peak labour demand periods. This shortage would have to be met mostly from seasonal migrant labour from outside the project area.

TABLE 4.4 The Source of Labour at Full Development of Phase I of KOISP

Source	Ratio Used %	Per Season C.I.=.88	Per Season C.I. = 1.00	Per Year C.I. = 1.75	Per Year C.I. = 2.00
Family Labour (mandays)	36	217656	380,898	435,311	190,449
Hired labour (mandays)	64	386,943	677,151	773,887	338,576
Male labour (mandays)	68	411,127	719,473	822,254	359,737
Female labour (mandays)*	32	193,472	338,576	386,943	169,288
Male labour (mandays)	52	411,127	719,473	822,254	359,737
Female labour** (womandays)	48	386,943	677,151	773,887	338,576

Note : * The conversion factor used was .5 in converting female labour days into mandays
** An alternative estimate was prepared without converting the female labour into mandays, so that the actual contribution made by the women in rice cultivation can be seen.

Source : Estimated on the basis of the findings of the field survey, Maha 1983/84

The second point which deserves attention according to the data presented in Table 5.4 is the involvement of female labour in rice cultivation. In terms of manday equivalents, the female labour contribution to rice cultivation in the project area works out to 32% of the total labour requirements. However, in terms of actual days worked, the ratio of male to female labour days become 100:92. As there are certain tasks which can only be performed more efficiently by female labour, than male labour, this ratio seems to reflect more of the women's involvement. Transplanting, weeding, and some post-harvest operations are almost exclusively and traditionally performed by the female labour. Further, these tasks cannot be undertaken entirely by the female labour available within the family and therefore carried out mostly with the help of hired females. When these tasks are mechanised or replaced by other non-labour intensive methods (eg. broadcast sowing and chemical weeding), the use of hired female labour tends to be drastically reduced.

4.4 Labour Market Consideration

The actual utilisation levels of labour in rice cultivation in the KOISP area would ultimately depend on labour market conditions are reflected by the demand for and supply of labour.

The technological factors affecting the labour demand have already been discussed in the previous sections. The other two sets of factors affecting the demand for labour refer to economic conditions and institutional factors. The most important among the economic factors is the price ratio between labour and labour-substituting inputs. Thus, the changes in wage rates, prices of herbicides, and hire charges of tractors etc. could change this ratio. When the price of labour-substituting inputs become cheaper, more of such inputs would be added by the farmers at the expence of labour.

The other ratio which is important in economic terms is the ratio between wages and price of paddy in real terms. When the real price of paddy is increasing faster than the real wages, farmers tend to invest more on cultivation, and therefore the demand for labour will also be increased. When the opposite happens, investments are discouraged and the demand for labour is reduced.

From the point of view of economics, the supply of labour into agriculture is closely associated with the changes of the ratio of agricultural wage to non-agricultural wage. As was discussed in Chapter 3, the work opportunities made available through the construction activities of KOISP, at higher wage rates, would have curtailed the supply of hired labour in agriculture, thus forcing the the agricultural wages to follow suit.

The trends in wage rates from 1978 to 1983 are presented in Table 4.5, both in normal and real terms. The data specific to the project area per se are unavailable, but the general picture emerging from the table is that wage rates in agriculture have increased sharply in nominal terms and moderately in real terms. The data also show that the wage rates prevailing in the project area, are by and large, comparable with those of the macro-situation in the country. The information given in Table 4.5 also reveals that wage differentials exist among tasks, and between males and females performing the same task. Tasks such as ploughing, sowing and spraying of agro-chemicals carry higher wage rates than the rest of the tasks. This could be attributed to the special skills required in ploughing and sowing and the occupational hazards involved in spraying chemicals. There could also be a shortage of such skilled labour in a given area.

Some of the institutional factors affecting labour demand such as the complex tenurial problems, would not loom large in the project area in the immediate future. Nevertheless, experiences from other settlement schemes have clearly established that such problems are inevitable in the medium and long term as a result of numerous economic and social problems[1]. Thus there

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1 R.D.Wanigaratne."Subsistence Maintenance and Agricultural Transformation on the Frontier in Sri Lanka: The Kaltota Irrigation Settlement Project". Unpublished PH.D.thesis University of Wisconsin, (1984); and Wickramasekara, Piyasiri. The Mahaweli Development Programme, Agrarian Change and the Peasantry in Abeysekera, Charles(ed). Capital and Peasant Production. Social Scientists Association, Colombo (1985).

TABLE 4.5 : Trends in Wage Rates in Rice Cultivation

Task	Labour Type	1978/a[1]		1979 b[2]		1982 c[3]		1983 c[4]		1983/84[5]d	
		Nominal	Real**	Nominal	Real**	Nominal	Real**	Nominal	Real**	Nominal	Real**
Ploughing	Male	10.0	9.0	15.4	13.9	35.5	19.4	41.7	20.0	49.0	23.5
Sowing	Male	10.0	9.0	16.8	15.2	31.2	17.1	36.0	17.3	35.0	16.8
Transplanting	Male	-	-	12.0	10.8	27.3	14.9	34.4	16.5	-	-
	Female	-	-	10.0	9.0	21.9	12.0	25.7	12.3	-	-
Manuring	Male	10.0	9.0	19.9	18.0	28.9	15.8	35.3	17.0	-	-
Spraying	Male	10.0	9.0	25.8	23.3	29.3	16.1	38.5	18.5	39.0	18.7
Weeding	Male	7.0	6.3	10.0	9.0	-	-	-	-	30.9	14.8
	Female	7.0	6.3	9.3	8.4	21.0	11.5	25.1	12.0	23.5	11.3
Harvesting	Male	8.0	7.2	13.3	12.0	29.4	16.1	34.9	16.8	34.00	16.3
	Female	-	-	11.4	10.3	22.8	12.5	28.4	13.7	29.00	13.9
Threshing	Male	10.0	9.2	1	-	33.1	18.1	41.0	19.7	-	-
Winowing	Male	10.0	9.0	13.9	12.5	25.6	14.0	34.2	16.4	32.00	15.3
C.C.P.I.	-	252.3	-	252.3	-	416.1	-	474.2	-	474.2	-

* Year 1970 was taken as the base year in computing real prices

a = Bolana Village in Hambantota; b = Hambantota District; c = All Island; d = Project Area
C.C.P.I. = Colombo Consumer Price Index

Sources : 1. Perera, U.L.J. and Gunawardena, P.J. "Hired Labour in Peasant Agriculture in Sri Lanka" ARTI, 1980

2. Central Bank of Ceylon, Statistics Department. "Price and Wage Statistics", Colombo 1979.

3&4 Central Bank of Ceylon. "Review of the Economy - 1983". Colombo.

5. Field Survey of the Present Study

is a possibility that some settlers are bound to suffer from low incomes, indebtedness and landlessness. Suitable institutional arrangements would therefore be necessary in the areas of input supply, and credit and marketing to arrest such siutations at least partially.

4.5 Suggestions for Incorporation in the Ongoing Study on Labour Absorption in Agriculture

As rice cultivation forms only a part of the agricultural activities in the project area, it is necessary to examine the labour absorption capacity of the other crops cultivated and the animal production enterprises.

This Chapter taken together with the study by Wanasinghe (1986)[1] could be of help to project implementing agencies in respect of labour use levels in rice cultivation. However, even in this case, a thorough analysis was not possible for want of data at project level. These gaps relate in particular to the technological adoption and labour absorption levels on new lands brought under paddy cultivation, input and product prices, cropping intensities, wage paid, and sources of hired labour. By using these data it would be possible to construct an econometric model of the hired labour market in the project area.

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1 Wanasinghe, Ananda op.cit.

Chapter Five

CONCLUSIONS

As far as the monitoring and evaluation programme of KOISP is concerned, this study should have been restricted to an examination and analysis of the employment creation exercise in the construction activities of Phase I of the project. However, the ARTI proposed in addition, to analyse the factors influencing the long-run dynamism of a project of this kind within a broad regional economic development framework. The present study forms the first part of this exercise and covers the aspect of employment generation in the construction phase and the prospects of employment in rice cultivation. The second part which is now underway would deal with labour absorption in agriculture and non-farm activities. It will also analyse the project effects on economic growth, employment and income levels within the project area as a result of the spread of accumulated capital to the surrounding regions.

The KOISP planners introduced the public works approach to its construction phase as an immediate solution to the pressing unemployment and underemployment problems that existed at the appraisal stage. The findings of the present study confirm that the implementing agencies have, by and large, achieved the targets of employment levels set by the planners, though this was beset with numerous problems.

The most severe problem encountered by the implementing agencies was how to mobilize a large army of skilled and unskilled labourers to perform the required tasks so that the agencies could adhere to the set time schedules and maintain the quality of output as specified levels. Indicators such as rates of unemployment and underemployment poverty line incomes etc. have proved poor performance, on estimating the actual numbers that can be engaged in a programme of this scale

and nature. The involvement of the project beneficiaries in construction activities was suprisingly low when compared with the involvement of the people from outside the project areas, both as sub-contractors and labouiers. Consequently, employment opportunities were widely distributed within and beyond the Hambantota district boundaries.

The proportion of 1:3:13 among the professional, skilled and unskilled workers who contributed directly to the construction programme of KOISP appears to be significantly high. This was coupled with an equally high proportion of those directly involved in construction and administrative activities which worked out to 1:25. This may be partly due to the highly technical complexity and the massive scale of the project itself, and partly due to the weaknesses inherent in most public sector agencies in retaining a large cadre of employees than required.

One of the features that makes labour-intensive modes of construction programme useful instruments of alleviating rural poverty is their relative cost-effectiveness. This does not hold true in the case of KOISP, as only about 15% of the programme funds consisted of wage costs. This points to the fact that KOISP's principal aim was not one of employment creation at the construction phase, but the creation of durable irrigation and other infrastructures to enhance employment opportunities in agriculture.

The payment of wages in KOISP was according to the market wage rates because it is understood that nothing less than these rates would compensate, from the point of view of the labourers, for the sacrifice of their leisure. In fact, the labourers employed by the public sector agencies received the full package of fringe benefits applicable to public sector employees in the country. Thus, the construciton activities of the KOISP opened up new work opportunities to agricultural labourers, and helped to improve their bargaining position vis-a-vis the farmers who employed them.

The rural artisans, like masons and carpenters, found work opportunities in the project for longer durations than did the unskilled labourers. As most of the unskilled workers comprised small farmers, Chena cultivators and agricultural labourers, the decision relating to the

duration of employment in construction activities would have been taken by themselves, depending on the labour requirements in other pursuits. Many families who could spare labour for construction activities for a longer duration, however, have managed to elevate themselves above the poverty line incomes, at least during the construction phase.

Incomes earned from construction work were distributed within a wide geographical region and were too small to generate inflationary pressure on wage goods. As world food programme aid was also available to be distributed among new settlers, the pressure on prices of food was easily averted. The labour intensity of the programme was followed through although the factors discouraging it were strongly felt during the constructinn programme. The short time tables for completion of the work, the high quality of the output expected, the efficiency levels targetted and the complexity of hiring and paying a large army of workers were among the forceful factors that would have influenced the technical and administrative personnel charged with the implementation, for adopting capital-intensive technology. However, these tendencies were averted at least partially due to the inclusion of employment creation, during the construction phase, as one of the ultimate objective criteria by which the success in implementation was to be measured. On the other hand, there was pressure from local political leaders for providing employment to their constituents in construction work. Therefore, the substitution of capital for labour, though inevitable, was kept at a minimum.

The KOISP programme has also been successful in imparting new skills, like masonry and carpentry, to some of the unskilled workers who worked for a sufficiently long duration in the project. At the latter stage those who acquired skills in this manner found employment opportunities in the project itself.

These points lead to the conclusion that, compared with the results achieved in similar projects of other developing countries, the achievements of KOISP are commendable[1].

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1 J.W. Thomas et al op.cit.

This conclusion implies that the old answer for solving under-employment can be given a new meaning and dimension if such projects can reasonably be phased out to coincide with slack employment seasons, thus enabling the poorest unskilled labourers to participate actively[1]. This also means the widening of the scope of the programme beyond the boundaries of relief operations and reaching the realm of creation of assets for strengthening the agricultural base, thus paving the way to more intensive employment in agriculture. This is important because, in the final analysis, the economic viability of such programmes depends on the ability to convert the surplus labour into an economic surplus and, this in turn, depends on the surplus value produced by the labour force over and above their consumption. Better results could be expected if popular participation by the target groups is obtained in project planning, formulation and implementation through an appropriately structured and decentralised institutional framework. Such participation however is detrimental to the future success of the KOISP itself, particularly in operation and management of the assets already created painstakingly. A proper institutional mechanism is yet to be evolved in the KOISP, for the management of irrigation water and the maintenance of the irrigation infrastructure.

The second issue studied was the potential for labour absorption in rice cultivation in the project area. The analysis undertaken here was meant to be supplementary to that of Wanasinghe (1986)[2]. He has documented the present levels of technological adoption at length and highlighted the inefficiencies in resource allocation in rice

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1 This might become problematic in large scale construction programmes which have to be completed during a given time period. In such schemes phasing out of the construction activities to coincide with slack employment seasons would compells the contractors to suffer heavy financial losses. However, adjusting the timing of the construction programme may be possible in the case of medium and small scale projects undertaken directly by the government.

2 Wanasinghe, Ananda op.cit.

cultivation. Thus the main aim of the Chapter on labour use in rice cultivatinn of this study was shifted to one of assessing the potential for labour use on the basis of the past trends and the present situation.

The evidence from past studies clearly shows a declining trend in labour use in rice cultivation in the Hambantota district in which the old irrigated area of KOISP was one of the most important rice growing areas. The total labour input per hectare per season has dropped drastically from 115 mandays to 102 mandays within a matter of 9 years. The decline would have been more sharp if not for the recouping of the drop in the hired labour input by the use of more family labour.

Hambantota being one of the pioneering districts in Sri Lanka in terms of technology adoption in rice cultivation, still occupies a dominant position in this regard. However, there has been a change in the composition of the technology package which was introduced initially and what is being adopted at present. The package of technology adopted at present consists of some components which help to increase yields and others which displace labour. The widespread use of NHYVs and chemical fertilizer raises yields, while the use of mechanical power in land preparation and threshing, herbicides in controlling weeds and broadcast sowing in crop establishment instead of transplanting tend to displace labour. These management practices adopted by the farmers in the old irrigated area have helped them to achieve higher labour productivities (38Kg/manday), but the irony of the situation is that this was achieved mainly by reducing the labour input. This is tantamount to a premature release of labour, particularly in the context of limited alternative avenues for employment in areas where multiple cropping, animal husbandry and off-farm activities.

The level of technology adoption among the settlers who received new lands, however, is bound to be lower than the level achieved in the old irrigated area, as the settlers lack experience either in rice cultivation or cultivating it under major irrigation schemes. Thus the need for a two-pronged strategy of extension education is emphasised. The strategy for the old irrigated area should ideally aim at promoting the efficient use of resources, while in the other, the aim should be to popularise the new technology.

Given the past trends, current situation, and possible future directions on labour use patterns, estimates were made of the ranges within which the potential labour use figures per season and per year would fall. According to these crude estimates per season, the total labour use would be in the range of 0.53 to 0.6 million mandays; the total labour use per year would be in the range of 1.21 to 1.06 million mandays. Likewise the total hired labour requirement was estimated. This would be in the range of 0.34 -0.39m. mandays per season, and 0.68 - 0.78m mandays per year. The estimated hired labour component at the appraisal stage stood at 0.72 million mandays per year. This proves that the employment potential estimated at the appraisal stage would easily materialise at full development of the phase I of KOISP.

The realisation of this potential, however, is largely dependent upon the future labour market conditions within the area. From the demand angle, the nature of composition of the technological package, the changes in the ratio of wages and prices of labour substituting inputs, and the changes of the ratio of real wages to real price of paddy would assert a greater influence on the labour market.

On the other hand, the ratio of agricultural wage to non-agricultural wage rate, the rate of industrial unemployment, and the rate at which it is changing over time, the recruitment-retirement balance of the agricultural work-force, and their levels of educational attainment could affect the supply aspect. It was not possible to study the labour market within a quantitative framework in this study for want of data, and it is suggested that such an analysis be incorporated into the scope of the ongoing study on employment aspects of KOISP.

Meanwhile the active intervention in product and factor markets, credit and agricultural extension through the adoption of policies and designing of an institutional framework more amenable to greater use of labour in agriculture are advocated. Measures should also be taken to avert the emergence of complex tenurial arrangements likely to drive the new settlers towards indebtedness, low incomes and landlessness, as has happened in many other settlement schemes in Sri Lanka. However, it must be re-iterated that it is only through a diversified cropping programme that greater employment opportunities in agriculture can be brought about. This diversification in turn should lead to higher levels of employment in non-farm activities through forward and backward linkages.

APPENDIX A

ENVIRONMENT OF THE STUDY

A.1 The Project Area

The project is located in the South-east quadrant of the country and is about 260 Km from the capital city, Colombo. It falls within the dry zone of Sri Lanka. The project area covers 21,000 ha of land and is made up of two Assistant Government Agents'(AGA) Divisions in the Hambantota administrative district (Tissamaharama and Hambantota AGA Divisions) and another in the Moneragala district (Thanamalwila AGA Division).

The area receives an annual average rainfall of 1077 mm, while the mean monthly temperature is in the range of 26.1^{oc} to 28.3^{oc}. The relative humidity of the area ranges from 76-81%. The topography is undulating from flat to rolling and the natural vegetation consists mostly of scrub jungle with some forest cover.

There are no other known major natural resources within the project area except the undeveloped fertile land. This area is therefore basically agricultural.

A.2 Cropping Patterns

The cropping patterns in the area consist of the cultivation of paddy in irrigated areas and subsidiary food crops such as pulses, chillies and vegetables etc. under shifting cultivation (Chena).

Home gardening is practised by a few farmers, while animal husbandry is also not a popular undertaking[1]. There are two cultivation seasons per year. Maha season extends from November to March.

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1 ARTI. Pre-project socio-economic conditions of the KOISP, Research Study No.59 Colombo, 1984.

Farmers cultivate paddy under irrigated conditions and pulses, chillies, vegetable etc. in Chena lands. During Yala season (April-August) agricultural activities are low due to inadequate rainfall. During this season only about 50% of the lands under major irrigation schemes are cultivated with paddy. Gingelly (sesame) is the only crop grown in Chena during this season. Therefore the cropping intensity of the existing lands is low (about .85). The use of irrigated paddy lands for the cultivation of subsidiary food crops is sporadic.

A.3 Population, Employment and Living Standards

The project area had an estimated population of 42,304 in 1980. Unemployment was about 20% of the labour force. No estimates are available on the level of underemployment, but judging from the cropping patterns and intensities, it can be deduced that the underemployment level is also substantially high.

Farming is the main occupation of the majority of the population in the area. A few individuals earn their living by fishing. There are a number of government servants in the area such as clerks, school teachers, drivers, bus conductors and so on as well as some other categories as carpenters, masons and weavers. There is also a group of landless labourers who hire out their labour for agricultural and construction work etc.

This area constitutes a depressed region in the country economically, socially and agro-ecologically. Two studies conducted by the ARTI in 1982[1] indicate the existence of destitution of a high order. About two-fifths of the households were below the poverty line with incomes less than Rs. 3600 a year. There was also acute undernutrition among the children. The abnormally low incomes are attributable to low agricultural yields, low cropping intensity and widespread unemployment and underemployment. The depressed conditions of agriculture have been essentially due to inadequate rainfall or irrigation along with unfavourable soils and inefficient practices.

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1 ARTI. Research Study No. 59 op.cit. and ARTI. Dietary Intake and Nutritional Status Survey of KOISP. (to be published)

APPENDIX B

CONSTRUCTION ACTIVITIES OF THE PROJECT

Project Component	Implementing/ Supporting Agency	Description
B.1 Irrigation works	Dept. of Irrigation(ID)	i) Rehabilitation and upgrading the existing irrigation facilities in 3675 ha of land. This includes restoration of the main distributory and field canals, rebuilding of bunds, embarkment roadways, provision of major flow measuring devices, gates and weir regulators, and new turnout- cum-measuring structures.
	River Valleys Development Board (RVDB)	ii) Construction of a high dam 5,000 meters long and 25 meters wide having a net storage capacity of 197.8 million cu. meters with the necessary spillway and sluices.
	ID	iii) Construction of 61.6 Km. of main canal and the development of 8,409 ha to be used as farm land.
B.2 Land Settlement	LDD and LCD	i) Clearing and preparation of 1,980 ha of scrub jungle and unproductive land for settling 8320 families in 28 hamlets of 69 ha each and five village centres, and the construction of 200 Km of village roads.

Project Components	Implementing/ Supporting Agency	Description
	LDD and LCD	ii) Construction of public buildings to house health centres, co-operatives, banks, storage and sales outlets, sub-post offices, schools, and residential quarters for the staff of these establishment for each village centre and a health clinic, a co-operative depot and a primary school for each hamlet.
		iii) Construction of 420 wells for new settlers
B.3 Agricultural Development	LDD and LCD	i) Construction of buildings for a district training centre complex.
	ID	ii) Provision of the necessary facilities such as irrigation and drainage, including water control and measuring devices, and the necessary farm land levelling in the proposed pilot schemes for paddy and cotton cultivation.

Source : Appraisal of the Kirindi Oya Irrigation and Settlement Project in the Republic of Sri Lanka. Asian Development Bank, November 1977.

APPENDIX C

Definition of the Labour Force

Labour force includes : All those in the age group 15 to 64 years.

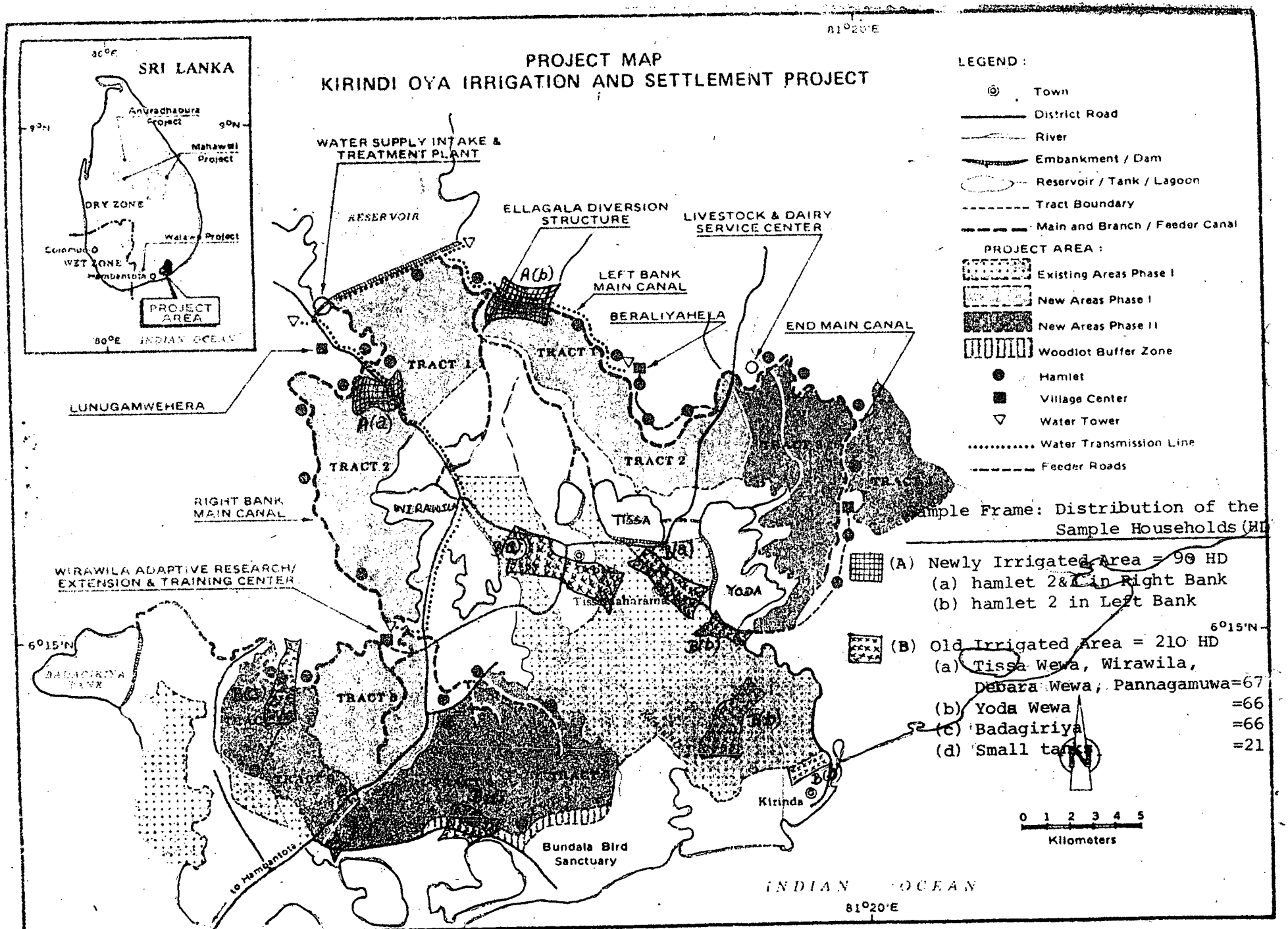
Economically Active Population : (a) Employed
(b) Unemployed

Economically Inactive Population : (c) Housewives
(d) Students
(e) Discouraged Workers
(f) Others

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

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

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


PROJECT MAP
KIRINDI OYA IRRIGATION AND SETTLEMENT PROJECT
SRI LANKA
Anuradhapura Project
Mahaweli Project
DRY ZONE
Walawe Project
Colombo
WET ZONE
Hambantota
PROJECT AREA
80°E
INDIAN OCEAN
81°20'E
LEGEND :
Town
District Road
River
Embankment / Dam
Reservoir / Tank / Lagoon
Tract Boundary
Main and Branch / Feeder Canal
PROJECT AREA :
Existing Areas Phase I
New Areas Phase I
New Areas Phase II
Woodlot Buffer Zone
Hamlet
Village Center
Water Tower
Water Transmission Line
Feeder Roads
WATER SUPPLY INTAKE & TREATMENT PLANT
RESERVOIR
ELLAGALA DIVERSION STRUCTURE
LIVESTOCK & DAIRY SERVICE CENTER
LEFT BANK MAIN CANAL
BERALIYAHELA
END MAIN CANAL
LUNUGAMWEHERA
RIGHT BANK MAIN CANAL
WIRAWILA ADAPTIVE RESEARCH/ EXTENSION & TRAINING CENTER
TRACT 1
TRACT 2
TRACT 3
TRACT 4
A(a)
A(b)
B(a)
B(b)
B(c)
B(d)
WIRAWILA
TISSA
YODA
Tissamaharama
Kirinda
Bundala Bird Sanctuary
To Hambantota
6°15'N
81°20'E
INDIAN OCEAN
Sample Frame: Distribution of the Sample Households (HD
(A) Newly Irrigated Area = 90 HD
(a) hamlet 2&3 in Right Bank
(b) hamlet 2 in Left Bank
(B) Old Irrigated Area = 210 HD
(a) Tissa Wewa, Wirawila, Debara Wewa, Pannagamuwa=67
(b) Yoda Wewa =66
(c) Badagiriya =66
(d) Small tanks =21
N
0 1 2 3 4 5
Kilometers