ANNEX–E

AGRICULTURE, SOCIO- AND AGRO-ECONOMY

ANNEX E

AGRICULTURE, SOCIO- AND AGRO- ECONOMY

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ANNEX-E AGRICULTURE, SOCIO- AND AGRO-ECONOMY

E.1 PRESENT CONDITION OF REGIONAL ECONOMY

E.1.1 Socio-Economic Condition

E.1.1.1 Study Area

The study area in this study consists of six Mahaweli Systems and one Zone of NWDZ, which include Systems F, H, IH, MH, I and M. However, as socio- and agro-economic data are available on the basis of administrative divisions, the administrative study area in this ANNEX is defined as a total administrative territory of eight Districts in which six Mahaweli Systems and one Zone mentioned above are included. In this Chapter, the administrative study area is simply called the study area, if nothing is in confusion. These eight Districts are Matale (Systems F and H), Mannar (System I), Vavuniya (System I), Trincomalee (System M), Kurunegala (System H and NWDZ). Puttalam (System H and NWDZ), Anuradhapura (Systems H, IH, MH and I) and Polonnaruwa (System F) as illustrated in Fig. E.1-1.

E.1.1.2 Population

The population within the administrative study area was estimated at $3,369 \times 10^3$ in the 1981 census, as shown in Table E.1.1. In the same year the number of households was recorded at 722×10^3 and the average family size was 4.7 ranging between 4.4 in Kurunegala and 5.1 in Mannar and Polonnaruwa. The average population density was 125 persons per km^2 in 1981, ranging between 49 in Vavuniya and 252 in Kurunegala. This average density was a half of the national average density of 226 persons per km^2 in 1981.

The average population growth rate of the administrative study area for 10 years between 1971 and 1981 was 2.65%, compared with the average Sri Lanka of 1.58% during the same period, so the study area population has grown at a higher rate than the country as a whole. The Districts of Polonnaruwa, Anuradhapura and Vavuniya recorded rates of more than 4.0%. Meanwhile, the Districts of Matale and Kurunegala grew at rates which were less than, or nearly equal to that of the country, because those Districts were more developed and might not have had enough spare land for in-migration.

Table E.1.2 shows natural population increase and net migration in the administrative study area during the two census years. Districts in the Dry Zone, especially in the Northern Provinces such as Mannar and Vavuniya, have recorded high levels of population growth. They had high levels of in-migration, and as a result, their populations grew at high rates of 3.7% and 4.7% per annum on average as seen in Table E.1.1. Out-migration occurred in the Districts of Matale and Kurunegala. Of these Districts, Kurunegala and Matale experienced heavy out-migration in spite of low natural increase rates of 2.0% and 2.3% per annum. Thus, population in those Districts grew at low rates, as mentioned in the previous paragraph.

The educational standards by people in the administrative study area are shown in Table E.1.3. Old people had almost the same level as the national average as discussed in ANNEX-A. In the year less than 29 age groups, however, people had considerably lower standards as compared with the national average. More than 20% of them were never at school, or never progressed beyond primary level, which was a far worse record than the national average (refer to Table A.3.3 in ANNEX-A).

E.1.1.3 Labour Force

In the 1981 census year, the employed population was 984×10^3 in the administrative study area as shown in Table E.1.4, which was 23.9% of the total national employed population of $4,120 \times 10^3$. Of this total number of workers in the study area, 570×10^3 or 58% was engaged in the agricultural sector. This proportion was considerably higher than that of the country of 45.5%. Of the total agricultural population in the country, 30.4% was in the study area.

Districts in the study area where more than 60% of the total labour force was in agriculture in 1981 were: Anuradhapura, Vavuniya, Mannar and Polonnaruwa. Of these Districts, Anuradhapura recorded the highest proportion of agricultural workers of 68.5%, as shown in Table E.1.5. Districts where less than 50% of the total labour force was in agriculture were Puttalam and Trincomalee, both of which accounted for around 47%.

The other sectors were broken down as follows: 99×10^3 or 10% of the total workers in the industrial sector; and 223×10^3 or 23% in the services' sector. The proportion in the industrial sector was 4.4% less than the national average, and the proportion in services, 8.5% less.

Of the total labour force of $1,120 \times 10^3$ in the study area, 136×10^3 or 12.1% was unemployed, as shown in Table E.1.5. This unemployment rate was slightly higher than that of the country of 11.7%. There are 4 Districts where the unemployment rate exceeded the national rate in 1981: Kurunegala of 15.2%; Matale, 12.8%; Puttalam, 11.8%; and Polonnaruwa, 11.8%.

E.1.1.4 Industrial Condition

The administrative study area is still backward in terms of industrialization. Table E.1.6 shows the industrial situation in the study area in 1982. Of all industrial fields in the table, only four industrial groups: (1) food, beverages and tobacco, (2) wood and wood products, (3) non-metallic mineral products and (4) machinery and equipment, exceeded a quarter of the national total number of industrial establishments. However, even in those groups, many establishments seem to be small scale industries according to the table. Therefore, their productivity and capital equipment ratio might be lower than that of the large scale industries, so only "non-metallic products" group in the study area exceeded a quarter of the national production.

In industries in which 5 and more persons are engaged, (1) textile, wearing, apparel and leather industry and (2) non-metallic products groups exceeded a quarter of the national total number of establishments, although its productivity was also small. In

recent years, since this group has grown at the national level, the industrial situation in the study area might have improved since 1982.

E.1.1.5 Infrastructure

The main transport facilities linking the study area to prospective major market places of Colombo, Kandy and Trincomalee are road and railway networks. The national trunk roads which run through the study area are illustrated in Fig. E.1-2 and summed up as follows: A-3 connecting Colombo and Puttalam; A-5, Kandy and Batticaloa; A-6, Colombo and Trincomalee; A-9, Kandy and Jaffna via Matale, Anuradhapura and Vavuniya; A-10, Kandy and Puttalam; A-11, Anuradhapura and Batticaloa; A-12, Puttalam and Trincomalee; A-14, Mannar and Anuradhapura; and A-28, Anuradhapura and Kurunegala. Other paved or gravelled roads connect those trunk roads to villages; and villages to villages. They provide important transportation facilities for marketing of agricultural inputs and outputs.

As of 1986, the existing national roads in the administrative study area are enumerated in Table E.1.7. The road density in the country, i.e., total road length per total land area, was 0.39 km/km^2. Among 8 Districts in the administrative study area, only 2 Districts, Kurunegala and Matale, exceeded the national average road density. The road density of 0.31 km/km^2 in the study area is much lower than that of the country.

Railway services are supplied as a part of national railway network. A trunk line from Colombo to Jaffna runs through the study area from south to north via Kurunegala and Maho in Kurunegala District, and Anuradhapura and Medawachchiya in Anuradhapura District. Other lines connect Districts centres such as Puttalam, Batticaloa, Trincomalee, Kandy, Galle, etc. However, the number of passengers and goods conveyed by the railway is going down gradually year by year. The transport function seems to be changing from railway to road.

Municipal water supply systems covered 40×10^3 families in the administrative study area in 1981, accounting for 5.9% of the total number of families, as shown in Table E.1.8. This proportion is much lower than that of the country of 17.7%. Most of families, 637×10^3 or 84.6%, were getting potable water from protected or unprotected wells. Thus, water supply conditions in the study area are still poor as compared with the national average.

The administrative study area was backward in electrification, as well. Only 44×10^3 families, or 6.5% of the total, had electricity for household lighting consumption in 1981, as shown in Table E.1.9. This was less than a half of the national average of 14.9%. More than 90% of all family used kerosene for lighting.

There were 2,801 schools in the administrative study area in 1983 as shown in Table E.1.10, which accounted for 28% of the national total. In the same year, 838×10^3 pupils were registered, so the average number of pupils per school was 299, which is somewhat smaller than that of the country of 357. Meanwhile, the number of pupils per teacher was almost the same as that of the country.

There were 166 hospitals and central dispensaries in the administrative study area, as shown in Table E.1.11. They accounted for 33.4% of the national total. On average, there is one hospital for every $23x10^3$ people. This is a slightly better situation than for the country as a whole. However, 2.38 beds per thousand population is lower than the national average of 2.81 beds. Besides Western medical facilities, ayurvedic medical treatment is also popular throughout the country. The treatment has been widely accepted, but its medical system is not organized. Accordingly ayurvedic hospitals are not provided as in the Western medical system, as shown in Table E.1.11.

E.1.2 Agricultural Condition

The study area is typical of rural areas in Sri Lanka. Its dominant industry is agriculture, especially paddy production. The administrative study area produced $699x10^3$ tons of paddy in 1987, accounting for 33% of national production of $2,128x10^3$ tons, as shown in Table E.1.12. The land area and population of the administrative study area occupied about 40% and 23% of the national totals, respectively.

Regarding paddy production, the District of Polonnaruwa produced the most among the 8 Districts during the entire year 1987, as shown in Table E.1.13. It produced $242x10^3$ tons and its yields attained 4.3 ton/ha. These yields were also the highest among Districts. In contrast, the District of Vavuniya recorded the least production of $3.5x10^3$ tons in 1987. It recorded poor yield of 0.7 ton/ha. Incidentally, System H is located in the study area, which extends over 4 Districts distributed as follows: 66% of System H area is in Anuradhapura; 27% in Kurunegala; 7% in Matale; and a small portion in Puttalam. It attained the highest average of 4.9 ton/ha in 1987.

The country experienced a serious drought in 1987. Some Districts, such as Kurunegala, Mannar, Vavuniya and Puttalam, drastically decreased areas harvested from sown areas, as shown in Table E.1.13, because of water availability. In this regard, Districts where most of the paddy fields were covered by irrigation schemes were not affected by serious drought problems and attained the usual production.

Table E.1.12 shows minor food crop production in the administrative study area and in the country in 1987. The study area produced more than three - quarters of the national production in regard to the following crops: mustard, soybean, gingelly, black gram and Bombay onion.

Livestock and poultry production relies on the crop production oriented farmers in the administrative study area, in general. Cattle and buffalo populations were $683x10^3$ and $464x10^3$ in 1987, accounting for 45% and 52% of the national populations respectively, as shown in Table E.1.14. The share of sheep and pig populations in the study area were respectively 26% and 46 of the national populations.

In 1986, Sri Lanka produced $183x10^3$ tons of fish products, constituting as follows: $144x10^3$ tons by coastal fishery; $3x10^3$ tons by off-shore fishery; and $35x10^3$ tons by inland fishery. Inland fishery has around a 20% share of total fishery production in the country. Whereas, in the administrative study area, its share is 30% of total production. The study area's production of inland fishery was $15.9x10^3$ tons,

accounting for more than 45% of national inland fishery production as shown in Table E.1.15. Thus, tanks and reservoirs for irrigation water contribute significantly to inland fishery. To promote inland fishery, the Government established 12 inland fishery centres, 3 extension centres and 2 brackish water centres in the country.

E.1.3 Agro-Economic Condition

E.1.3.1 Agricultural Population

Agricultural workers were recorded at $570x10^3$ in the administrative study area, as mentioned in Section E.1.1.3. This population accounted for 58% of the employed worker and for 17% of the total population in the study area.

Table E.1.16 shows the number of agricultural operators in the administrative study area in the 1982 agricultural census. An "agricultural operator" means a person responsible for operations by himself, or with the assistance of others, or simply direct daily operations. There were $506x10^3$ agricultural operators in the study area. Of the total, $373x10^3$ or 74% was in the productive age group, i.e., less than 54 years old. Among operators classified by ten year age intervals, operators aged between 35-44 were the majority, as shown in Table E.1.16. The second group was 25-34 years old. The total of these two groups accounted for $242x10^3$ or 48% of total operators.

In terms of educational attainment, agricultural operators in the administrative study area seem to be at lower levels than the country. In the latter, the majority of grade was more than Grade 6 to 9 or more higher grade. However, agricultural operators in the study area attained Grade 5 or less were the majority, as shown in Table E.1.17.

E.1.3.2 Land Ownership

The number of agricultural holdings of paddy fields was $504x10^3$ in the administrative study area in 1982, as shown in Table E.1.18. Of this total $185x10^3$ or 37% held their own paddy field and the average size was 0.88 ha. 29% of the total paddy field area was owned by the operators. On the other hand, the average size of paddy field owned by others was 0.55 ha. The average size of all paddy holdings was 0.83 ha.

There were $506x10^3$ agricultural operators in the administrative study area, as shown in Table E.1.19. About $69x10^3$ or 14% of the operators cultivated agricultural lands without owning any land. Another $122x10^3$ or 24% owned only home gardens in the area. Thus, $191x10^3$ or 38% of the total operators was doing main agricultural activities on land owned by other owners.

Table E.1.20 shows the distribution of paddy field in the administrative study area in 1982. There were $272x10^3$ units of paddy land, of which total area was recorded at $226x10^3$ ha. Average hectarage of unit was 0.83 ha. The majority of paddy unit was "1 acre to less than 2 acres (0.40 to 0.81 ha)" and "2 acres to less than 3 acres (0.81 to 1.21 ha)" . Their average hectarage of units was 0.49 ha and 0.90 ha, respectively.

E.1.3.3 Extension Services

Official extension services are provided by public organizations mentioned in ANNEX-A, Section A.5.3.2. Besides these services, agricultural operators get information through the following channels according to research by the Agrarian Research and Training Institute (ARTI):

(1) The Kursi Vapthi Sevaka (KVS) is the most important source of information for agricultural operators leading to the adoption of high yield varieties and fertilizer recommendations.

(2) Demonstration and farmer training classes provide operators with their information on improved agricultural practices. Many attendants of these training sessions and workshops accept the information and adopt them in the field.

(3) The use of media such as radio, television and written publications is valuable. They provide a means of reaching a wide range of the rural population. Although educational attainment in rural areas is lower, as mentioned in the previous section, the literacy rate has gone up and most operators are able to understand these mass media effectively.

(4) Private firms which supply agricultural inputs also function as information sources.

(5) Farm neighbours are also an important source. They have a particular influence on their neighbours at the adoption stage of innovation.

The KVS is organized as a direct instructor to farmers. Each KVS covers about 750 farm families as a unit through 12 to 18 Contract Farmers (CFs). The KVS works through a CF and meets him twice a week following a pre-arranged time table. At this meeting the KVS instructs them in a particular extension message based on area, time of year, crop calender, etc. The KVS instructs them through the Training and Visit (T&V) system. The system contains: systematic visits by the KVS to meet farmers in their fields; working through CFs simplified report system; fortnightly training of the KVS and monthly research extension dialogue; frequent in service training facilities for the KVS; and emphasis on on-farm adaptive research activities. The remainder of the community, called a "Follower Farmers (FFs)", get extension information through the CFs between the regular on-farm meetings. FFs may also attend the regular meeting and demonstration.

Table E.1.21 shows that 806 KVSs were provided for extension services in the administrative study area in 1987, accounting for 43% of the national total. The table also shows the whole staffing organization for agricultural extension services by the government including the KVS system. Each District provides several agricultural offices which cover their independent demarcated territories. Every office has an officer, a certain number of subject matter specialists and agricultural instructors. The Department of Agrarian-Service (DAS) works in the same manner as the Department of Agriculture (DA) does, although its main charge is distribution of an agricultural input.

E.1.3.4 Marketing

Marketing channels in the study area are in the same conditions as in the rest of the country. In Mahaweli areas, the Mahaweli Economic Agency (MEA), especially the project office promotes marketing activities from the first stage of settlement in addition to the normal market channels. They provide some markets and warehouses in the Systems.

Farm gate prices of the major agricultural products in 1987 were:

Paddy	-	Rs. 4.40/kg
Green gram	-	Rs. 14.00/kg
Chillie	-	Rs. 31.00/kg
Red onion	-	Rs. 8.30/kg
Long bean	-	Rs. 4.30/kg
Sugar cane	-	Rs. 0.5/kg

The Sri Lanka Government has been implementing a guaranteed price scheme for paddy, and a floor price scheme for subsidiary crops since 1948 to stabilize prices. Fertilizers have been subsidized since 1967 to promote their use to increase crop production. In 1988, 36% of retail price of urea, 52% of the TSP price and 28% of the MP price are subsidized. The details of government support prices of agricultural commodities as of November 1988 are shown in the followings:

Paddy	Rs. 4.07/kg
Maize	Rs. 4.00/kg
Groundnuts	Rs. 7.00/kg
Chiilies	Rs. 28.00/kg (Grade I)
	Rs. 26.00/kg (Grade II)
Cowpea	Rs. 8.50/kg
Red onion	Rs. 3.05/kg (Vethalan)
	Rs. 2.30/kg (Local)
Urea	Rs. 2,990/ton
TSP	Rs. 2,900/ton
MP	Rs. 2,890/ton
Certified paddy seed	Rs. 6.30/kg

E.1.3.5 Agricultural Credit

An agricultural credit scheme has been implemented through the People's Bank, the Bank of Ceylon and the Hatton National Bank as mentioned in ANNEX-A. Table E.1.22 shows the performance of paddy credit by these three banks in 1983- 1986. Paddy producers in the administrative study area received the following amounts of paddy cultivation loans: Rs. 104×10^6 in 1983, accounting for 71% of the national total amount; Rs. 127×10^6 in 1984, 74%; Rs. 84×10^6 in 1985, 69%; and Rs. 103×10^6 in 1986, 63%. In most years, two-thirds of the national amount for paddy loans were granted in the administrative study area. In particular, the Hatton National Bank has granted almost all its paddy loans to the Districts of Mannar and Anuradhapura, as shown in Table E.1.22.

On the other hand, recovery rates were 85% in 1983, 69% in 1984 and 79% in 1986. Thus, nearly 20% of the amounts granted were not repaid. In 1984, the repayment rate was only 69%, because paddy production was affected by bad weather conditions and operators could not afford to repay their loans.

The New Comprehensive Rural Credit Scheme (NCRCS) started its services for farmers since Yala 1986. Its performance through the Regional Rural Development Banks (RRDBs) is still quite small (5.1% of the total loan in 1987 crop year). However, the NCRCS is expected to grant a large volume of loans to farmers for the purpose of cultivation. As shown in Table E.1.22, although the total amounts of paddy loans largely increase with some fluctuation, the demand of credit for minor food crop cultivation is more expected to increase in these years. Thus, the NCRCS might be effective for this expectation and for crop diversification.

E.1.3.6 Co-operatives

In rural areas, Co-operatives (MPCS) have an important role in agricultural activities, as mentioned in ANNEX-A. Besides MPCS, several single-purpose co-operative societies exist in rural areas, for instance, credit, agricultural inputs and industrial inputs. These societies in the administrative study area were enumerated in Table E.1.23. There were 75 societies of MPCS in the study area, accounting for 27% of the total number of societies in the country.

The 75 societies of MPCS in the study area had 458×10^3 registered members, which accounts for 12% of the total population of $3,811 \times 10^3$ in 1987. The MPCS provide 104 wholesale stores, 1,380 retail stores, 49 petroleum stands and 178 Rural Bank branches, as shown in Table E.1.23.

The MPCS used to distribute food stamps for low income people. In these days, the MPCS supplies food stuff and kerosene (used for cooking and lighting) through the Food Stamp Scheme and the Kerosene Stamp Scheme. These schemes are promoted by Department of Social Services. In the administrative study area, $2,733 \times 10^3$ food stamps and 733×10^3 Kerosene stamps were issued during a year between April 1987 and March 1988, accounting for 36% and 39% of the national total stamps, respectively (Table E.1.24). These rates are higher than the rate of the whole population of 23%. These stamps were used in Co-operatives retail stores as well as other private retail shops.

E.2 DELINEATION OF PROJECT AREA

Distribution of suitable land for irrigated farming is clarified through the soil and land classification study covering 12 Mahaweli Systems as presented in ANNEX-D. Of these, Systems F, H, IH, MH, I, M and NWDZ are screened out as Project component areas mainly based on the results of study on transbasin irrigation water. The location of these Systems is illustrated in Fig. E.1-1.

The whole coverage of the above Systems is 485,300 ha from which a total of 174,850 ha is delineated as land which has good crop suitability and is topographically irrigable area by the proposed plan of transbasin irrigation water as summarized below:

(Unit: ha)

System	Whole Area	Delineated Area in Net*1 (Study Area)	Existing Major Irrigation Net Area Included
F	5,300	1,900	430*2
H	89,200	42,400	42,400
IH	7,100	4,700	4,700
MH	57,400	26,300*3	4,300
I	144,500	61,300*3	12,700
M	85,300	25,000	2,500*2
NWDZ	35,600	13,250	2,550
Total	424,400	174,850	69,580

Remarks: *1 Including rainfed areas
*2 Minor scheme
*3 Including non-irrigated cashew land.

The total area delineated is defined as the Study Area. The land class and soil type of such delineated area are summarized in Table E.2.1.

E.3 PRESENT AGRICULTURAL CONDITION OF PROJECT AREA

E.3.1 Agro-climatic Condition

Climatologically, the Project Area is classified into the following 2 zones according to annual rainfall.

Dry Zone	:	from about 1,000 to 1,900 mm/year
Intermediate Zone	:	1,900 mm - 2,285 mm/year

Systems H, IH, MH, I, M and NWDZ are in the dry zone, while System F is in the intermediate zone. Systems of F, H, IH, MH, I, M and NWDZ have 2 rainy seasons in a year, i.e., the north-east monsoon season from October to February (Maha) and the south-west season from March to September (Yala), as shown in Table E.3.1. There is much variation in monthly rainfall. In Anuradhapura, for example, 59% of the annual rainfall is concentrated from October to January and 27% from March to May. Onsets of the rainy seasons also vary. Too early or too late starting of the rainy seasons was observed. There is little difference in monthly average air temperatures. Mean daily maximum air temperatures are from 29°C to 34°C, and mean daily minimum air temperatures are from 20°C to 26°C.

E.3.2 Agricultural Population

The population within the study area was estimated at 349×10^3 in the 1981 census, as shown in Table E.3.2. The population in the study area was estimated as follows, referring to Fig. E.1-1: (1) the whole population in an Assistant Government Agent (AGA) division was counted if the whole area of the division was included in the Project Area; (2) where a portion of an AGA division is included in the study area, the population in the study area is estimated in proportion to the area covered by the study area out of the entire area of the division; and (3) the population living in an urbanized area such as municipal council, urban council or town council is counted completely, if the urbanized area is included in the study area. In the same manner, agricultural population was estimated at 73×10^3, as shown in Table E.3.2. It accounted for 21% of the total population and 61% of the total labour force in the study area in 1981.

Table E.3.3 shows the agricultural population by the System in 1981. System H had the largest agricultural population among all Systems, which accounted 25% of the total population. Percentage of agricultural population to total population in each System ranged between 32% of NWDZ and 16% in System I. Incidentally, there are two urban centres in the study area, i.e., Anuradhapura Urban Centre and Kekirawa Town Centre. The Anuradhapura UC is in System I and Kekirawa TC in System H. There are no Municipal Councils in the Project Area.

E.3.3 Present Cropping Pattern and Intensity

Based on the crop statistics of the Department of Census and Statistics, present cropping patterns and planted areas in the study area are set up as shown in Tables E.3.4

and E.3.5, and illustrated in Fig. E.3-1. Features of these cropping patterns are briefly described for the respective Systems as below:

(1) System F has a net area of 1,900 ha with cropping intensity of 125%. In irrigated paddy fields covering 430 ha, the cropping intensity increases to 167%, while it reduces to 112% in rainfed areas including 440 ha of paddy field.

(2) System H is wholly provided with irrigation facilities. The present cropping intensity is 165% for irrigated paddy fields of 42,400 ha and featured by Yala chillie planting.

(3) Systems IH is fully irrigated, having a rather low cropping intensity of 138% for the irrigation command area of 4,700 ha due to shortage of irrigation water during Yala season.

(4) System MH includes irrigated paddy field of 4,300 ha accounting for 16% of the whole area (26,300 ha) including 13,000 ha of not-cultivated land. Its cropping intensity is less than 90% because no crops are planted in rainfed areas of 3,800 ha all the year round.

(5) System I covering 61,300 ha in net has cropping intensity of 109% even though there exist 12,700 ha of irrigated paddy field. During Maha, pulses are grown under rainfed condition in 43% of the whole cultivated area. The total area of the System includes 13,500 ha of not-cultivated area.

(6) System M includes irrigated paddy field of 2,500 ha (minor irrigation scheme) accounting for only 10% of the whole area. Its cropping intensity is around 70% because no crops are planted in rainfed areas of 6,400 ha all the year round. The System includes 7,500 ha of not-cultivated area.

(7) NWDZ covers 13,250 ha in net with irrigated paddy field of 2,550 ha. Due to low utilization ratio of rainfed areas, cropping intensity is only 60%. Fallow areas occupy 1,990 ha for Maha and 3,680 ha for Yala. The total area of NWDZ includes 7,800 ha of not-cultivated area.

E.3.4 Present Farming Practices

Present farming practices for paddy in the study area were studied based on the information in the agricultural implementation programme, 1987-88. More than 50% of land is prepared by tractors in less populated areas like Systems I, IH, MH and H. In wetter areas like System F and NWDZ where fodder grasses are more available, more than 50% of the land is prepared for buffaloes. Manual ploughing is practiced in very limited areas. Except in System F, more than 65% of the paddy fields are directly sown. Direct sowing is by broadcasting in most cases. In the transplanting method, random transplanting is predominant. In association with direct sowing, chemical weed control is widely practiced in the study area (Table E.3.6).

Predominant rice varieties are as follows:

- 3 month varieties; Bg 34-8 was introduced in the early 1970's with yield potential of 7.0 ton/ha. Although Bg 276-5 and Bw 272-6B were of practical use in the late 1970's and early 1980's respectively, Bg 34-8 is still the recommended variety for Yala.

- 3.5 month varieties; In the early 1970's, Bg 34-6 was introduced followed by Bg 94-1 and Bg 94-2 in the mid 1970's. In the 1980's, Bw 267-3, Bw 238-1 and Bg 94-1(R) were distributed. Among these, the standard variety is Bg 94-1 with yield potential of 10 ton/ha.

- 4 months varieties; At present, only Bg 380 is a variety used to the limited extent.

- 4.5 months varieties; Since of first introduction of high-yielding variety, many 4.5 month varieties were bred and of practical use. Of these, Bg 90-2, Bg 400-1 and Bg 379-2 are the recommended varieties having yield potential of 10 ton/ha.

Fertilizer application in the study area was studied based on the reports on cost of cultivation of agricultural crops for 1986/87 Maha and for 1986 Yala. Fertilizer amounts applied to paddy are from 73 kg/ha to 104 kg/ha for N, from 27 kg/ha to 65 kg/ha for P_2O_5 and from 30 kg/ha to 48 kg/ha for K_20.

Chillie is the second important irrigated crop in the study area. Chillie is cultivated as a rainfed crop in Maha and also as an irrigated crop during Yala. Thorough land preparation such as ploughing and harrowing, to obtain good soil drainage, is practiced. MI-1 and MI-2 are popular varieties of about 150 growing days. As a Yala crop MI-2 is used in the irrigated areas. In Maha under rainfed conditions seedlings are transplanted in the last week of September to the first week of October. Transplanting is done in May during Yala. Seedlings are transplanted when they are 25 to 30 days old. White fly, aphids, mites, thrips, and pod borers are common pests of chillie. Regular routine spraying is done by farmers to keep the pests under control. Damping off, powdery mildew, bacterial wilt and fungal wilt are observed in plantations. Crop rotations and the use of fungicides like sulphur and Captan are practiced to control the spread of these disease. Only the red ripened pods are picked. Harvesting commences 75-80 days after transplanting and continues for 3-4 months. Once they are picked, the pods are heaped indoor to get a uniform red colour. The pods are sundried for about a week; they are flattened using a wooden plank on the 3rd day of drying which facilitates the removal of moisture from the pod.

E.3.5 Crop Production

Present crop production is expressed as the average of the last 3 seasons, 1984/85 to 1986/87 for Maha and 1985 to 1987 for Yala, based on the crop statistics.

Crop yields both in irrigated and rainfed fields are estimated for net planted area of each crop by referring to crop statistics collected as shown in Tables E.3.7 and E.3.8. Paddy yields in Maha range between 2.8 ton/ha and 4.3 ton/ha under irrigated condition and from 1.5 ton/ha to 3.1 ton/ha under rainfed condition, while in Yala between 2.0 ton/ha and 2.8 ton/ha under irrigated condition and from 1.8 ton/ha to 2.4 ton/ha under rainfed condition within quite limited areas.

Dry chillie yields under irrigated condition are between 0.5 ton/ha and 1.1 ton/ha in Maha and increase from 1.2 ton/ha to 1.5 ton/ha in Yala. Pulses like cowpea, green gram and black gram are in most cases grown under the rainfed condition with unit yields from 0.5 ton/ha to 1.3 ton/ha. Sesame is mainly cultivated in the rainfed fields with yields from 0.36 ton/ha to 0.69 ton/ha. Onion is grown under irrigation. The average yields of onion range between about 0.9 ton/ha and 8.7 ton/ha, as shown in Table 3.9. However, although onion is a "high return" crop, it is also a "high risky" crop. Therefore, it is cultivated in quite limited irrigated fields in the study area at present.

As shown in Table E.3.10, the average annual crop production in the study area is 306,000 tons for paddy, 12,700 tons for chillie, 34,400 tons for pulses, 13,700 tons for maize and 7,200 tons for other crops which are typified by sesame.

E.4 AGRICULTURAL DEVELOPMENT PLAN

E.4.1 Development Strategy

The objectives of agricultural development can be summed up into the following 3 items taking into accounts the limited land, water resources available, steadily increasing population and the unfavorable trade balance.

1. To increase food production to feed the growing population.
2. To create job opportunities for the growing young generation.
3. To improve crop productivity, to promote export-oriented crop production, or to substitute growing imported food crops with the domestic production.

Blessed with plentiful underutilized water resources and large areas of agricultural land with insufficient rainfall, the development strategy should be:

1. Intensification of irrigation agriculture,
2. Intensified cropping,
3. Intensification of labour intensive farmings and
4. Regionalization and privatization in management.

E.4.2 Targets of Development

According to the projected food demand of Sri Lanka in the year 2020, paddy production will need to be 4.22×10^6 tons, as described in ANNEX-A. The total demand of each crop for consumption is summed up in Table E.4.1. Furthermore, export of food crops will be expected to grow at the same level as the major Asian countries. Table E.4.1 shows the export volume in the target year, which is estimated partially, on the basis of the present export condition of Thailand. Thus, the total requirement of major crops in the country is as follows by 2020, which is illustrated in the Table E.4.1 in detail: $4{,}220 \times 10^3$ tons of paddy; 89×10^3 tons of chillies; 131×10^3 tons of onions; 235×10^3 tons of pulses and nuts; 899×10^3 tons of sugar; and $2{,}294 \times 10^3$ tons of vegetables and fruits.

In order to meet such requirement, the administrative study area should play the role of a main food supplier in consideration of such facts that the administrative study area occupies 41% of the national territory has a plenty of suitable land with a slope of less than 8% for promoting irrigated farming. As the administrative study area has a population accounting for 23% of the national population in 1981 census year, it can be expected to receive migrants to a large extent in line with development of new irrigation areas. Therefore, the administrative study area will have to fulfill at least 40% of the total food demand as shown in Table 4.1. Regarding special crops like onion and chillie suitable for the dry climate, the administrative study area will meet 50% of the national demand.

With the proposed transbasin water channel, year-round irrigation water could be supplied to the study area of which irrigation area will increase from 70×10^3 ha for Maha and 36×10^3 ha for Yala to 154,850 ha for each season. This future irrigation command area shares 50% of the future major irrigated field in the administrative study area as shown in the following table.

(Unit: 1,000 ha)

Item		Existing Net Area of Major Irrigated Field	Future Net Area of Major Irrigated Field
(A)	Administrative Study Area	152	more than 317
(B)	Study Area	70	155
(C)	Rate of (B) to (A) (%)	46	50

The future cropping intensity under irrigated condition is expected to be 200% in the study area, while it is about 120% in weighted average of existing major irrigation schemes (refer to Table E.3.5). In addition, the farming practices could be improved to increase crop yields through appropriate agricultural support services. Taking the above difference into account, at least 80% of target production of the administrative study area will be allocated to the study area as indicated in Table 4.1.

E.4.3 Constraints of Development

Agriculture in the study area is extensive in nature being endowed with plenty of arable land. Around 60% of labourers are engaged in agricultural production. Most of them are small holders and rely on heavily paddy production for their income, although paddy production in northern part of the study area has been changed to other crops because of lack of irrigation water. However, the unit yield of paddy as well as other crops is generally low, and harvested areas of crops fluctuate every year. The reasons for unstable and low productivity are many, but major constraints are considered as follows:

(1) Fluctuating water availability: the existing irrigation service area covers 70×10^3 ha in the study area, in spite of a potential area of 155×10^3 ha. Even irrigated lands, which may not be supplied with sufficient water throughout a year, indicated an average cropping intensity of 152%. In the case of rainfed fields, the average intensity is 85% in spite of double crop seasons.

(2) Insufficient provision of agricultural support services: important support services such as distribution of fertilizers, practices of crop protection, marketing information, introduction of innovative varieties, etc, are not sufficiently provided to agricultural operators, although the situation is being improved. Most operators have small paddy farm holding of 1.1 ha on average, so they need such support services.

(3) Sluggish development of irrigation system: there is a lot of potential land for agricultural production in the study area, but most is still cultivated in poor conditions because of insufficient water. This situation is caused by not only long-term strife in the country, but also insufficient capital for investment.

E.4.4 Proposed Cropping Patterns and Farming Practices

Future cropping patterns under the with-project condition were made for most-likely grown crops. The crops were grouped into 6 categories, i.e., paddy, chillie, pulses, maize, onion and others. Cropping calenders proposed for these crops follow existing typical cropping calenders. In formulating future cropping patterns under the with-project condition, basic consideration was paid to realize the target production to the maximum extent in the study area and further to make irrigation benefit as much as possible. The future cropping patterns proposed for the both conditions are given in Tables E.4.2 and E.4.3, and illustrated in Figs. 4-1 and E.4-5.

Maha crops will start in October or November and end in February or March. Yala crops will start in April or May and end from July to September in most cases. As for paddy, shorter growing varieties were proposed for the efficient utilization of irrigation water, i.e., 120 days varieties for Maha and 90 day varieties for Yala in principal.

The major design criteria of proposed farming practices are given in Table E.4.4.

E.4.5 Anticipated Crop Yields and Production

Crop yields have been increasing year by year through improving farming practices not only in irrigation schemes, but also in rainfed farming. Fig. F.4-2 depicts the trend of paddy yield in the country during 14 years. Although the paddy yield of each scheme in 1974/75 Maha was as follows: 3.04 ton/ha in major irrigation scheme; 2.51 ton/ha in minor scheme, and 1.97 ton/ha in rainfed areas, it was improved as follows in 1986/87 Maha: 4.29 ton/ha in major; 3.43 ton/ha in minor; and 2.86 ton/ha in rainfed.

Various crop experiment results have proved high yield potential of recommended rice varieties such as BG 34-8, BG 94-1, BG 9-2 and BG 379-2. When these varieties are grown under ideal crop management and irrigation water supply, crop yields can be expected to attain to a level of 7.0 to 10.0 ton/ha.

Figure E.4-3 shows the trend of paddy yields in selected Asian countries. Unit yield in 1986 is varying by country from 6.3 ton/ha in Korea and Japan down to 1.9 ton/ha in Thailand. In this trend, Sri Lanka recorded a yield of 3.1 ton/ha of paddy in 1986. Figure E.4-4 shows the relation between irrigated percentage of paddy land and unit yields of 39 countries in the world in 1981. According to this regression analysis, a 1% increase in irrigation percentage gives a 0.025 ton/ha increase in unit yield. A correlation of these factors is 0.74. Incidentally, Sri Lanka recorded at 2.5 ton/ha at 44% irrigated percentage. According to 1987 data, the average unit yield was 3.1 ton/ha (refer to Table E.1.13), when the irrigation percentage was 46%. In this regard, to increase production within a limited land resource, irrigation development is effective and inevitable. Moreover, the better the irrigation system works, the higher does the unit yield get. In fact, Mahaweli schemes, which work well regarding water distribution, attained higher unit yield than other schemes on average in Maha, as shown in Fig. E.4-1.

Anticipated crop yields under with-project and without-project conditions are estimated as below taking into the above considerations and paying an attention to farms' abilities.

(Unit: ton/ha)

	Crop		Without Project	With Project
1.	Paddy			
	Irrigated	Maha	3.5	5.5
		Maha (System H)	4.5	5.5
		Yala	3.0	5.0
	Rainfed	Maha	2.5	-
2.	Chillie		1.5	1.9
3.	Onion		10.0	15.0
4.	Pulses (Green Gram)		1.0	1.5
5.	Maize		2.0	3.5
6.	Vegetable (Long beans)		5.0	8.0
7.	Cashew (Raw nuts)		-	1.0

Based on the above yields and proposed cropping pattern mentioned in the previous section, anticipated crop production in the study area is estimated as follows:

(Unit: 1,000 tons)

Crop	Present Production	Future Production	
		Without-Project	With-Project
Paddy	306	336	1,339
Chillie	13	13	38
Maize	14	19	31
Onion	-	-	38
Cashew (Raw nuts)	-	-	20
Pulses	34	34	23

The details of production are given in Table E.4.5. Under the with-project condition, major crops such as paddy and chillie will be able to catch up with the production target. However, some minor crops cannot attain the target in the study area even after completion of the Project. Thus, these deficits should be covered by production through surrounding minor irrigated fields, rainfed area and homestead in rural areas. In this context, new settlement of land reclamation by other sectors should be promoted effectively in addition to this current Project.

From the point of view of world market, cashew is recommended to promote foreign trade in Sri Lanka. To meet the demand of the world market, the cashew processing is indispensable for improving its quality at the site close to the planting field. Minimum scale factory of cashew processing requires about 2,500 ha of farming estate for supplying raw materials of raw nuts. Thus, the study area is planned to total

20,000 ha of rainfed field for cashew production beside Systems MH and I. It produces $20x10^3$ tons of raw cashew nuts (equivalent to about $4.5x10^3$ tons of cashew kernels).

E.4.6 Typical Crop Budgets

Typical crop budgets are based on the recommended farming practices, and are prepared for with-project conditions for the financial and economic evaluation of the projects. For internationally traded goods, i.e., paddy and fertilizers, economic prices are derived from the World Bank projected prices for the year 2000. For non-traded goods, a standard conversion factor of 0.85 are used. For the economic evaluation of unskilled labour cost, 30% of discount rate is applied (Phase I report of the current study).

Economic and financial farm (mill) gate prices used in the economic and financial evaluation of the project are given in the following table.

(Unit: Rs./ton)

Item	Prices	
	Financial	Economic
Paddy	4,400	5,500
Chillie	31,000	26,000
Bombay Onion	8,300	7,100
Green Gram	14,000	12,000
Long Bean	4,300	3,700
Maize	3,600	4,300
Cashew (Raw nuts)	22,000	23,000
Urea	2,990	7,638
TSP	2,990	7,607
MP	2,890	4,984

Crop budgets under without- and with-project conditions estimated are shown in Tables E.4.6 and E.4.7.

E.4.7 Agricultural Benefits

Incremental irrigation benefit of the Project is estimated as the difference of net production values between with-project and without-project conditions in future. The net production values under with-project and without-project conditions are calculated on the basis of gross production values and production costs.

On the basis of foregoing conditions, the agricultural benefit is estimated at Rs. $5.3x10^9$ per annum (US\$$162x10^6$ per annum). Unit benefit per ha (the total area of new schemes and rehabilitation schemes) becomes US\$925 per annum.

Each System is expected to produce the following benefits:

System	Total Benefit		Unit Benefit
	(Rs.10^9)	(US$$10^6$)	(US$/ha)
NCRB	4.86	150	926
NWDZ	0.39	12	914
Total	5.26	162	925

The details on calculation of incremental agricultural benefit of each scheme is summarized in Table E.4.8.

Labour requirement for agricultural production under with-project condition in the study area is expected to increase to 37×10^6 man-days/annum or about 2.2 times more than that under without-project condition, as shown in Table E.4.9. Thus, the proposed project will create another labour opportunities of 20×10^6 man-days/annum after completion of the project.

E.4.8 Farm Budget

To assess the projects from a point of view of farmer's capacity to pay, farm budgets under without-project and with-project conditions are financially examined. Net farm income is calculated by the gross farm income minus production cost and irrigation service fee. Net farm income per ha in each irrigation scheme is calculated in Table E.4.10.

Under without-project condition, small holders in Systems H and I can afford to support their living expense by farm income only. Those in other Systems have to get some other income to support their expense. Under with-project condition, all small holders can support their lives only by farm income. Thus, their capacity to pay ranges from Rs. 8×10^3 to 32×10^3 for existing farmers and from Rs. 17×10^3 to Rs. 25×10^3 for new settlers.

LIST OF REFERENCES

No.	Title	Issued on	Issued by
001	Statistical Abstract of Democratic Socialist Republic of Sri Lanka 1985	Jan. 1987	Dept. of Census and Statistic MPI
002	Census of Population and Housing 1981 Population Data for Words and Grama Sevaka Divisions	Sept. 1987	Dept. of Census and Statistic MPI
003	Review of the Economy 1987	Oct. 1988	Central Bank of Sri Lanka
004	Economic & Social Statistics of Sri Lanka	Dec. 1986	Central Bank of Sri Lanka
005	Report on Consumer Finances and Socio-Economic Survey 1981/ 1982 Sri Lanka Part I	Oct. 1984	Central Bank of Sri Lanka
006	Public Investment 1988 - 1992	May 1987	National Planning Division, Ministry of Finance and Planning
007	Central Bank of Sri Lanka Bulletin	June 1988	Central Bank of Sri Lanka
008	Agricultural Statistics of Sri Lanka 1988	July 1988	Dept. of Census and Statistics
009	Census of Industry 1983, Preliminary Report	Dec. 1985	- Dept. of Census and Statistics - Ministry of Plan Implementation
010	Census of Population and Housing 1981, General Report, Volume 3	Mar. 1986	- Dept. of Census and Statistics - Ministry of Plan Implementation
011	Census of Population and Housing 1981, Matale District Report, Volume 1 - Part V	Oct. 1985	Dept. of Census and Statistics
012	Census of Population Housing 1981, Mannar District Volume 1-Part XI	Dec. 1984	Dept. of Census and Statistics
013	Census of Population Housing 1981, Vavuniya District Volume 1-Part XII	Dec. 1984	Dept. of Census and Statistics

No.	Title	Issued on	Issued by
014	Census of Population and Housing 1981, Batticaloa District Volume 1-Part XIV	Feb. 1985	Dept. of Census and Statistics
015	Census of Population and Housing 1981, Ampara District Volume 1-Part XV	Feb. 1985	Dept. of Census and Statistics
016	Census of Population and Housing 1981, Kurunegala District Volume 1-Part XVI	Mar. 1985	Dept. of Census and Statistics
017	Census of Population and Housing 1981, Puttalam District Volume 1-Part XVIII	Mar. 1985	Dept. of Census and Statistics
018	Census of Population and Housing 1981, Anuradhapura District Volume 1-Part XIX	Mar. 1985	Dept. of Census and Statistics
019	Census of Population and Housing 1981, Polonnaruwa District Volume 1-Part XX	Apr. 1985	Dept. of Census and Statistics
020	Census of Agriculture 1982 Central Report	Dec. 1986	- Dept. of Census and Statistics - Ministry of Plan Implementation
021	Census of Agriculture 1982, (Small Holding Sector) Matale District Report	Sept. 1984	Dept. of Census and Statistics
022	Census of Agriculture 1982, (Small Holding Sector) Mannar District Report		Dept. of Census and Statistics
023	Census of Agriculture 1982, (Small Holding Sector) Vavuniya District Report	Oct. 1984	Dept. of Census and Statistics
024	Census of Agriculture 1982, (Small Holding Sector) Batticaloa District Report	Aug. 1985	Dept. of Census and Statistics
025	Census of Agriculture 1982, (Small Holding Sector) Ampara District Report	Nov. 1985	Dept. of Census and Statistics

No.	Title	Issued on	Issued by
026	Census of Agriculture 1982, (Small Holding Sector) Kurunegala District Report	Jun. 1985	Dept. of Census and Statistics
027	Census of Agriculture 1982, (Small Holding Sector) Puttalam District Report	Jan. 1985	Dept. of Census and Statistics
028	Census of Agriculture 1982, (Small Holding Sector) Anuradhapura District Report	Sep. 1985	Dept. of Census and Statistics
029	Census of Agriculture 1982, (Small Holding Sector) Polonnaruwa District Report	Oct. 1985	Dept. of Census and Statistics
030	Census of Agriculture 1982, (Small Holding Sector) Preliminary Report	Feb. 1983	- Dept. of Census and Statistics - Ministry of Plan and Implementation
031	World Development Report 1988	Jun. 1988	World Bank
032	Sri Lanka-1981, Housing Tables Based on a ten percent Samples	Jun. 1982	Dept. of Census and Statistics
033	Report by the High Level Committee of on poverty officials Alleviation through people-based Development Final Report on an Action Programme	Jun. 1988	The High Level Committee of Officials
034	A Thesis-Assessing Irrigation System Programme, A Methodological Study with Application to Gal Oya Scheme, Sri Lanka	Jun. 1986	C.M.Wijayaratna
035	Agricultural Statistics Volume IV	Dec. 1986	- Dept.of Rural Credit - Central Bank of Sri Lanka
036	1987 Country Tables	1987	FAO, Economic and Social Policy Department
037	Food Balance Sheets (1975-1977 Average) and Per Capita Food Supplies (1961-65 Average; 1967-1977)	1980	FAO
038	Food Balance Sheets (1979-81) Average)	1984	FAO
039	Census of Population and Housing 1981, Mullaitive District Report Volume 1 - Part XIII	Feb. 1985	Dept. of Census and Statistics

No.	Title	Issued on	Issued by
040	Census of Population and Housing 1981, Trincomalee District Report Volume 1-Part XVI	Feb. 1985	Dept. of Census and Statistics
041	Census of Agriculture 1982, (Small Holding Sector) Mullaitive District Report	Nov. 1985	Dept. of Census and Statistics
042	Census of Agriculture 1982, (Small Holding Sector) Trincomalee District Report	Aug. 1986	Dept. of Census and Statistics
043	Long-term Trends in Development Report of the Secretary General	May 1982	United Nation
044	Food Balance Sheet 1986	Nov. 1986	Dept. of Census and Statistics
045	Annual Health Bulletin Sri Lanka 1987	1987	Ministry of Health
046	Agricultural Implementation Programme, A Working Document	Oct. 1987	MADR
047	Cost of Cultivation of Agricultural Crop-Maha 1986/87 Volume I-Paddy; Volume II-Other Field Crops	Jan. 1988	MADR
048	Paddy Statistics: 1984-1988		Dept. of Census and Statistics

TABLES

Table E.1.1 POPULATION BY DISTRICT IN ADMINISTRATIVE STUDY AREA : 1981

District	Census Population (1,000) 1971	1981	Average Annual Growth Rate(%)	Number of Household (1,000)	Family Size (Persons)	District Area (km^2)	Population Density (Persons /km^2)
Sri Lanka	12,690	14,847	1.58	-	-	65,609.8	226
Matale	315	357	1.27	73.7	4.8	1,993.3	179
Mannar	74	106	3.66	20.8	5.1	1,996.2	53
Vavuniya	60	95	4.71	19.7	4.8	1,966.9	49
Trincomalee	188	256	3.12	51.8	4.9	2,726.8	94
Kurunagala	1,026	1,212	1.68	275.7	4.4	4,815.8	252
Puttalam	378	493	2.67	111.2	4.4	3,072.4	160
Anuradhapura	389	588	4.22	117.3	5.0	7,179.3	82
Polonnaruwa	164	262	4.80	51.5	5.1	3,293.2	79
Administrative Study Area	2,594	3,369	2.65	721.7	4.7	27,043.9	125
Percentage Share to the Country	20	23	168	-	-	41	55

Source: Ref. 001, 011-013, 016-019 and 040

Table E.1.2 NATURAL INCREASE AND NET MIGRATION BY DISTRICT : 1971-1981

District	Natural Increase	Migration Increase	Ave. Annual Growth Rate of Natural Increase(%)	Ratio of Migration Increase to Natural Increase (%)
Matale	74,627	-32,114	2.1	-43.0
Mannar	19,793	12,317	2.4	62.2
Vavuniya	23,932	11,284	3.4	47.2
Trincomalee	66,212	1,491	3.1	2.3
Kurunagala	217,091	-30,923	1.9	-14.2
Puttalam	104,049	10,054	2.5	9.7
Anuradahapura	127,950	71,209	2.9	55.7
Polonnaruwa	47,828	50,082	2.6	104.7
Total	681,482	93,400	2.0	13.7

Source : Ref.010

Table E.1.3 DISTRIBUTION OF POPULATION 10 YEARS OLD AND OVER BY BROAD EDUCATION GROUP IN ADMINISTRATIVE STUDY AREA : 1981

(Unit: %)

Attending School	Age Group				
	10-14	15-19	20-24	25-29	30 & over
No Schooling	6.7	8.1	7.5	7.1	18.2
Below Primary	25.2	13.1	12.0	12.3	15.9
Grades 5 to 9	67.4	60.9	54.6	55.9	51.4
G.C.E.(O/L) Less Than 6 Subjects	0.1	10.6	13.5	12.7	5.1
G.C.E.(O/L) 6 or More Subjects or (A/L) Less Than 3 Subjects	0.0	6.2	9.6	8.9	6.2
G.C.E.(O/L) 3 or more Subjects or below Degree of Equvivalent	0.0	0.6	2.1	1.8	1.3
Degree of Equvivalent or Post-Graduate	0.0	0.0	0.1	0.9	0.8
Unspecified	0.6	0.6	0.6	0.4	1.1
Total	100.0	100.0	100.0	100.0	100.0

Sources : Ref. 010-013, 016-020 and 040

Table E.1.4 EMPLOYED POPULATION BY INDUSTRY IN STUDY AREA : 1981

(Unit :1000)

Economic Sector	Matale	Mannar	Vavuniya	Trinco-mallee	Kuru-negala	Puttalam
1. Agriculture	60.9	19.6	18.7	31.2	194.4	67.1
2. Industry	8.0	1.5	1.5	7.5	33.2	26.0
Mining	0.3	0.2	0.1	0.2	1.4	0.6
Manufacturing	5.1	0.7	0.9	5.5	24.7	21.9
Construction	2.3	0.5	0.5	1.6	6.5	3.2
Elec. & Water	0.3	0.1	0.1	0.2	0.5	0.3
3. Services	24.6	7.3	6.1	19.0	80.3	35.9
Trade & Hotels	9.0	3.0	2.2	5.9	28.7	13.6
Transport	2.7	0.9	0.8	2.9	10.9	5.8
Finance	0.9	0.1	0.2	1.0	2.4	1.2
Other Services	12.1	3.3	2.9	9.2	38.3	15.3
4. Not Defined	8.9	2.7	3.0	8.1	36.9	13.3
Total	102.4	31.1	29.2	65.8	344.8	142.3

Economic Sector	Anuradha-pura	Polonna-ruwa	Total in Study Area	% Distri-bution in S.Area	Sri Lanka	% Share of S/A to S/L
1. Agriculture	126.6	51.3	569.7	57.9%	1,876.0	30.4%
2. Industry	11.9	8.8	98.5	10.0%	593.0	16.6%
Mining	0.6	0.8	4.2	0.4%	34.0	12.3%
Manufacturing	4.4	4.5	67.9	6.9%	409.0	16.6%
Construction	6.5	0.2	21.2	2.2%	134.0	15.9%
Elec. & Water	0.4	3.2	5.1	0.5%	16.0	32.2%
3. Services	34.7	14.6	222.5	22.6%	1,282.0	17.4%
Trade & Hotels	10.8	5.5	78.7	8.0%	437.0	18.0%
Transport	4.5	1.7	30.2	3.1%	200.0	15.1%
Finance	1.2	0.8	7.7	0.8%	57.0	13.5%
Other Services	18.3	6.6	105.9	10.8%	588.0	18.0%
4. Not Defined	11.4	9.5	93.7	9.5%	369.0	25.4%
Total	184.7	84.1	984.3	100.0%	4,120.0	23.9%

Sources: Ref. 011-013, 016-019 and 040

Table E.1.5 AGRICULTURAL POPULATION IN ADMINISTRATIVE STUDY AREA : 1981

(Unit: 1,000)

No.	District	Population	Labour Force			Agri-Cultural Worker	Participation Rate (%)	Unemployment Rate (%)	% of Agricultural Worker(%)
			Employed	Unemployed	Total				
1	Matale	357	102	15	117	60	32.9	12.8	58.5
2	Mannar	106	31	2	33	19	30.8	5.0	61.4
3	Vavuniya	95	29	2	31	19	32.6	6.0	64.0
4	Trincomalee	256	66	8	74	31	28.8	10.6	47.7
5	Kurunegala	1,212	345	62	407	194	33.6	15.2	56.4
6	Puttalam	493	142	19	161	67	13.6	11.8	47.2
7	Anuradhapura	588	185	17	202	127	34.3	8.4	68.7
8	Polonnaruwa	262	84	11	95	51	36.4	11.8	61.0
	Total	3,369	984	136	1,120	569	33.2	12.1	57.8

Source : Ref. 002

Table E.1.6 INDUSTRIAL SITUATION IN ADMINISTRATIVE STUDY AREA : 1982

Industrial Group	Sri Lanka			Study Area			Share to the Country (%)		
	Number of Estab.	Number of Workers	Production (Rs.10^6)	Number of Estab.	Number of Workers	Production (Rs.10^6)	Estab.	Workers	Production
1 Five & More Persons Engaged									
Mining & Quarring	1,812	22,931	494	157	2,158	163.2	8.7	9.4	33.0
Food, Beverages & Tobacco	5,697	159,083	15,507	1,128	30,581	3,633.4	19.8	19.2	23.4
Textile & Leather	3,231	111,806	5,183	821	20,027	563.5	25.4	17.9	10.9
Wood & Wood Products	1,162	21,679	1,285	170	2,237	57.3	14.6	10.3	4.5
Paper & Paper Products	352	13,049	1,389	23	359	16.7	6.5	2.8	1.2
Chemical Products	911	54,098	16,224	89	2,881	169.9	9.8	5.3	1.0
Non-Metalic Products	1,922	38,183	2,383	484	11,492	762.8	25.2	30.1	32.0
Basic Metal	38	3,150	375	4	325	7.9	10.5	10.3	2.1
Machinery & Equipment	642	18,270	1,179	78	937	28.4	12.1	5.1	2.4
Other Manufacturing	285	3,661	308	31	356	11.0	10.9	9.7	3.6
Elec., Gas & Water	13	10,679	2,611	0	0	0.0	0.0	0.0	0.0
2 Less Than Five Persons Engaged									
Mining & Quarring	1,104	3,432	23	124	339	2.4	11.2	9.9	10.5
Food, Beverages & Tobacco	27,358	56,778	2,199	9,431	20,156	631.2	34.5	35.5	28.7
Textile & Leather	19,123	39,686	325	1,560	3,845	40.5	8.2	9.7	12.5
Wood & Wood Products	10,527	22,215	322	2,829	5,282	45.2	26.9	23.8	14.0
Paper & Paper Products	538	1,384	52	42	103	2.0	7.8	7.4	3.8
Chemical Products	9,483	15,606	252	203	492	11.2	2.1	3.2	4.4
Non-Metalic Products	9,010	23,500	188	2,958	7,482	58.9	32.8	31.8	31.3
Basic Metal	289	683	25	16	34	1.2	5.5	5.0	4.9
Machinery & Equipment	4,997	10,213	125	1,337	2,619	24.0	26.8	25.6	19.1
Other Manufacturing	4,125	7,755	305	406	704	31.5	9.8	9.1	10.3
Elec., Gas & Water	36	96	1,929	0	0	0.0	0.0	0.0	0.0
3 All Establishments									
Mining & Quarring	2,916	26,363	516	281	2,497	165.6	9.6	9.5	32.1
Food, Beverages & Tobacco	33,055	215,861	17,706	10,559	50,737	4,264.6	31.9	23.5	24.1
Textile & Leather	22,354	151,492	5,508	2,381	23,872	604.0	10.7	15.8	11.0
Wood & Wood Products	11,689	43,894	1,607	2,999	7,519	102.5	25.7	17.1	6.4
Paper & Paper Products	890	14,433	1,441	65	462	18.7	7.3	3.2	1.3
Chemical Products	10,394	69,704	16,476	292	3,373	181.1	2.8	4.8	1.1
Non-Metalic Products	10,932	61,683	2,571	3,442	18,974	821.7	31.5	30.8	32.0
Basic Metal	327	3,833	399	20	359	9.1	6.1	9.4	2.3
Machinery & Equipment	5,639	28,483	1,305	1,415	3,556	52.4	25.1	12.5	4.0
Other Manufacturing	4,410	11,416	614	437	1,060	42.5	9.9	9.3	6.9
Elec., Gas & Water	49	10,775	4,540	0	0	0.0	0.0	0.0	0.0

Source : Ref.009

Table E.1.7 EXISTING ROADS IN ADMINISTRATIVE STUDY AREA : 1986

No.	District	Road Kilometreage Classification					Total	Land Area (km^2)	Road Density (km/km^2)
		A	B	C	D	E			
	Sri Lanka	4,093	4,898	10,322	5,688	492	25,492	65,610	0.39
1.	Matale	105	185	357	160	50	856	1,993	0.43
2.	Mannar	113	22	154	203	-	491	1,996	0.25
3.	Vavuniya	128	24	132	202	-	485	1,967	0.25
4.	Trincomalee	141	125	207	91	-	564	2,727	0.21
5.	Kurunegala	196	421	791	792	11	2,212	4,816	0.46
6.	Puttalum	156	196	486	207	16	1,061	3,072	0.35
7.	Anuradhapura	352	201	800	720	-	2,073	7,179	0.29
8.	Polonnaruwa	123	62	327	52	-	564	3,293	0.17
	Total of 8 Districts	1,314	1,234	3,254	2,426	77	8,305	27,043	0.31
	Share to the Nation	32.1%	25.2%	31.5%	42.7%	15.6%	32.6%	41.2%	-

Remarks:
- "A" Class: Trunk roads (all roads paved and bitumen surfaced with carriage way between 24ft. to 36ft. x widths 36ft. to 56ft.)
- "B" Class: Main roads (metalled and bitumen surfaced roads with 12ft. to 24ft. platfrom)
- "C" Class: Other roads (single carriage way of 12ft. width and a platform width of 22ft. mostly metalled but with a small percentage gravelled)
- "D" Class: Gravelled roads with 8 - 10ft. width surface generally motorable during dry weather only.
- "E" Class: Bridle paths, generally unmotorable but some are jeepable.

Source : Ref.004

Table E.1.8 OCCUPIED HOUSING UNITS BY MAIN SOURCE OF POTABLE WATER : 1981

Item	Sri Lanka		Administrative Study Area		% Share to the Country
	Number (10^3)	Percent (%)	Number (10^3)	Percent (%)	(%)
1. Piped Water	497	17.7	40	5.9	8.0
Within Premises	231	8.2	16	2.4	6.9
Outside Premises	265	9.4	24	3.5	8.9
2. Protected Well	1,470	52.2	416	61.5	28.3
Within Premises	724	25.7	171	25.3	23.7
Outside Premises	746	26.5	245	36.2	32.8
3. Unprotected Well	580	20.6	162	24.0	28.0
4. River, Tank & Other Sources	196	7.0	45	6.6	22.8
5. Not Stated	71	2.5	13	2.0	18.8
Total	2,814	100.0	677	100.0	24.0

Source : Ref. 002, 011-013, 016-019 and 040

Table E.1.9 OCCUPIED HOUSING UNITS BY PRINCIPAL TYPE OF LIGHTING: 1981

Item	Sri Lanka		Administrative Study Area		% Share to the Country
	Number (10^3)	Percent (%)	Number (10^3)	Percent (%)	(%)
1. Electricity	420	14.9	44	6.5	10.5
2. Kerosene	2,321	82.5	619	91.5	26.7
3. Others	12	0.4	1	0.1	5.8
4. None	9	0.3	3	0.4	31.8
5. Not Stated	52	1.9	10	1.4	18.6
Total	2,814	100.0	677	100.0	24.0

Sources : Ref. 002, 011-013, 016-019 and 040

Table E.1.10 EDUCATIONAL FACILITIES : 1983

Item	Number of Schools	Number of Pupils (1000)	No. of Pupils per School	No. of Teachers	No. of Pupils Per Teacher
I. Sri Lanka				*1	
1 Government School	9,575	3,460	361	129,480	26
2 Private School	37	63	1,695	2,361	26
3 Pirivenas	314	28	89	2,426	11
4 Estate School	21	2	89	32	58
Total	9,947	3,553	357	134,299	26
II. Study Area (10 Districts)				*2	
1 Government School	2,731	831	304	31,142	27
2 Private School	1	1	763	32	24
3 Pirivenas	66	6	89	500	12
4 Estate School	3	0	95	5	57
Total	2,801	838	299	31,679	26

Remarks : *1 Excluding teachers in training colleges;
8,382 teachers in training schools
*2 Excluding teachers in training colleges
Source : Ref.001

Table E.1.11 MEDICAL FACILITIES : 1987

Item	Sri Lanka	Study Area
I. Western Medical Situation		
1.Estimated Population (1000)	16,361	3,811
2.No.of Hospitals & Central Dispensaries	497	166
3.Person per Hospital (1000)	33	23
4. No. of Beds	45,953	9,053
5.No.of Beds per 1000 Population	3	2
6.No.of Patients (1000)		
-In-Patient	2,772	1,844
-Out-Patient	34,139	-
7.No.of Doctors	3,608	609
8.No.of Persons per Doctor	4,535	6,143
II. Ayurvedic Medical Situation		
1.No.of Hospitals & Dispensaries	64	18
2.Person per Hospital (1000)	255.6	211.7
3.No.of Patients (1000)		
-In-Patients	19	8
-Out-Patients	1,674	382
4.No.of Beds	1,694	-
5.No.of Beds of 1000 Population	0.10	-

Sources : Ref.003 and 045

Table E.1.12 CROP PRODUCTION IN ADMINISTRATIVE STUDY AREA: MAHA (1986/87) AND YALA (1987)

Crop	Cultivated Area (ha)		Production (tons)			Share to The Nation (%)
	Maha	Yala	Maha	Yala	Total	
Sri Lanka						
Paddy	379,817	217,196	1,392,468	735,364	2,127,832	-
Kurakkan	11,002	596	6,957	367	7,324	-
Maize	34,058	607	41,065	614	41,679	-
Sorghum	85	18	51	12	63	-
Green Gram	16,106	9,471	10,644	6,939	17,583	-
Cowpea	19,352	8,245	15,617	6,552	22,169	-
Gingelly	2,760	9,816	1,266	4,893	6,159	-
Ground Nuts	5,309	2,528	3,182	1,449	4,631	-
Manioc	29,514	17,309	286,463	140,976	427,439	-
Sweet Poteto	6,632	6,044	44,066	36,365	80,431	-
Black Gram	7,929	1,023	6,932	2,376	9,308	-
Green Chillie	13,713	11,415	34,467	39,034	73,501	-
Mustard	1,510	32	1,080	19	1,099	-
Red Onion	4,253	2,561	34,724	21,543	56,267	-
Poteto	3,453	3,496	37,669	43,373	81,042	-
Dhall	14	35	19	37	56	-
Bombay Onion	102	314	591	2,132	2,723	-
Tobacco (Beedi, etc)	1,313	622	1,511	660	2,171	-
Tobacco (Cigarette)	5,428	3,327	5,956	3,862	9,818	-
Meneri	136	484	99	336	435	-
Soybean	2,405	1,088	2,131	1,588	3,719	-
Administrative Study Area (8 Districts)						
Paddy	123,929	53,069	516,065	183,039	699,104	32.9
Kurakkan	6,135	142	3,771	50	3,821	52.2
Maize	12,683	181	16,761	155	16,916	40.6
Sorghum	27	2	16	1	17	27.0
Green Gram	9,975	6,240	5,653	3,686	9,339	53.1
Cowpea	11,859	5,853	8,996	4,432	13,428	60.6
Gingelly	1,908	8,548	825	4,168	4,993	81.1
Ground Nuts	1,992	1,276	880	558	1,438	31.1
Manioc	10,884	5,523	105,809	52,080	157,889	36.9
Sweet Poteto	1,779	1,081	11,211	6,717	17,928	22.3
Black Gram	6,961	759	6,142	701	6,843	73.5
Green Chillie	6,771	4,892	19,904	17,020	36,924	50.2
Mustard	1,381	10	1,023	10	1,033	94.0
Red Onion	1,146	1,089	9,466	8,324	17,790	31.6
Poteto	12	2,608	73	29,891	29,964	37.0
Dhall	0	0	0	0	0	0.0
Bombay Onion	93	198	510	1,281	1,791	65.8
Tobacco (Beedi,etc)	481	173	462	223	685	31.6
Tobacco (Cigarette)	1,603	1,758	2,400	2,137	4,537	46.2
Meneri	52	0	30	0	30	6.9
Soybean	2,207	781	1,926	1,186	3,112	83.7

Sources : (1) Paddy : Ref.018
(2) Minor Crops: Analysis of Agricultural Statistics, Highland Crops 1986/87 Maha and 1987 Yala, Department of Census and Statistics

Table E.1.13 PADDY PRODUCTION IN ADMINISTRATIVE STUDY AREA : MAHA (1986/87) AND YALA (1987)

District	Gross Extent Sown (1,000 ha)	Gross Extent Harvested (1,000 ha)	Net Extent Harvested (1,000 ha)	Total Production (1,000 tons)	Average Yield (tons/ha)
Maha (1986/87)					
Sri Lanka	507.8	432.7	379.8	1,392.5	3.12
Matale	14.5	13.3	12.0	50.0	3.82
Mannar	14.6	6.5	6.2	15.4	1.10
Vavuniya	5.0	1.8	1.7	3.2	0.68
Trincomallee	11.1	10.3	9.6	28.6	2.76
Kurunegala	56.6	18.1	18.1	66.3	1.17
Puttalam	11.9	5.9	5.0	14.3	1.41
Anuradhapura	29.0	23.5	18.9	73.0	3.13
Polonnaruwa	35.9	35.9	31.8	156.0	4.91
System H	23.3	23.1	20.7	109.3	5.23
Study Area	202.0	138.4	123.9	516.1	2.85
Yala (1987)					
Sri Lanka	273.4	246.1	217.2	735.4	3.05
Matale	4.3	3.0	2.7	7.1	1.83
Mannar	0.1	0.1	0.0	0.2	2.46
Vavuniya	0.1	0.1	0.1	0.3	3.35
Trincomallee	4.5	3.3	3.1	11.7	2.82
Kurunegala	34.6	18.2	18.2	60.7	1.75
Puttalam	1.7	1.0	0.8	2.3	1.63
Anuradhapura	3.8	3.2	2.5	7.4	2.46
Polonnaruwa	28.0	26.0	23.0	86.2	3.48
System H	3.3	2.8	2.5	7.2	2.44
Study Area	80.2	57.7	53.1	183.0	2.48
Total in 1987					
Sri Lanka	781.2	678.7	597.0	2,127.8	3.10
Matale	18.8	16.3	14.7	57.1	3.37
Mannar	14.7	6.5	6.2	15.5	1.11
Vavuniya	5.1	1.8	1.7	3.5	0.72
Trincomallee	15.6	13.7	12.7	40.3	2.78
Kurunegala	91.2	36.3	36.3	127.0	1.39
Puttalam	13.5	6.9	5.9	16.6	1.44
Anuradhapura	32.7	26.7	21.4	80.5	3.06
Polonnaruwa	63.9	61.9	54.8	242.2	4.28
System H	26.6	25.9	23.2	116.5	4.88
Study Area	282.2	196.1	177.0	699.1	2.74
% to the Nation	36.1%	28.9%	29.6%	32.9%	88.6%
Anuradhapura		26.7	21.4	80.5	3.75
Polonnaruwa	63.9	61.9	54.8	242.2	4.42
System H	26.6	25.9	23.2	116.5	5.01
Study Area	417.8	331.9	303.7	1,171.1	3.86
% to the Nation	53.5%	48.9%	50.9%	55.0%	108.2%

Sources : Ref. 048

Table E.1.14 LIVESTOCK POPULATION : 1987

(Unit: 1000)

District	Neat Cattle			Buffalo			Goat	Sheep	Pig
	Cow	Bull	Calve	Cow	Bull	Calve			
Sri Lanka	744.6	326.3	457.2	419.9	247.2	228.4	502.2	27.6	96.7
	Cattle Total		1,528.2	Buffalo Total		895.5			
Matale	23.1	7.9	10.2	17.8	11.5	7.8	11.4	0.2	1.8
Mannar	18.3	8.2	12.0	1.7	0.8	1.2	21.2	0.2	0.5
Vavuniya	27.6	7.9	14.3	0.5	0.3	0.5	9.5	0.3	0.4
Trincomalee	33.4	12.9	20.6	41.2	10.9	15.5	22.9	0.2	3.2
Kurunegala	108.0	49.3	50.5	88.0	57.7	39.0	53.1	3.1	14.3
Puttalam	52.9	19.6	29.5	13.6	7.1	6.7	38.0	1.8	18.5
Anuradhapura	55.6	26.0	38.0	34.6	21.7	20.4	30.5	1.3	4.3
Polonnaruwa	26.6	15.1	16.0	28.9	22.1	14.0	13.4	-	1.8
Administrative Study Area	345.4	147.0	191.1	226.3	132.2	105.0	200.0	7.1	44.8
	Cattle Total		683.4	Buffalo Total		463.5			
Share to the Country	46.4%	45.0%	41.8%	53.9%	53.5%	46.0%	39.8%	25.8%	46.3%
	Cattle Total		44.7%	Buffalo Total		51.8%			

Source: Ref. 008

Table E.1.15 FISHERY PRODUCTION : 1986

(Unit: ton)

District	Coastal	Off-shore and Deep-sea	Inland	Total
Sri Lanka	144,266	3,400	35,390	183,056
Matale	-	-	2,457 *1	2,457
Mannar	8,246	-	-	8,246
Vavuniya	-	-	-	-
Trincomalee	10,336	-	334	10,670
Kurunegala	-	-	-	-
Puttalam	21,239	-	1,738	22,977
Anuradhapura	-	-	6,226	6,226
Polonnaruwa	-	-	5,131	5,131
Administrative Study Area	39,821	-	15,886	55,707
Share to the Country (%)	27.60%	-	44.89%	30.43%

Remark : *1 The figure includes the Districts of Kandy and Nuwara Eliya.
Sources: Ref.008 and Ministry of Fisheries

Table E.1.16 AGRICULTURAL OPERATOR BY AGE GROUP IN ADMINISTRATIVE STUDY AREA : 1982

(Unit : 1,000)

District	Less than 20	20-24	25-34	35-44	45-54	55-64	More than 65	Unspe-cified	Total
1. Matale	0.1	1.7	10.9	12.0	11.6	8.1	5.7	0.3	50.4
2. Mannar	0.0	0.4	2.7	3.0	2.7	1.7	1.0	0.1	11.7
3. Vavuniya	0.0	0.7	4.1	3.8	3.0	2.0	0.9	0.2	14.6
4. Trincomalee	0.1	1.0	5.9	5.7	4.6	2.7	1.6	0.2	21.9
5. Kurunegala	0.7	6.9	45.8	52.5	49.1	35.4	26.3	2.8	219.5
6. Puttlam	0.3	2.2	15.0	17.5	15.0	10.4	6.8	0.9	68.1
7. Anurdhapura	0.3	4.0	25.0	21.9	17.8	11.3	7.1	0.6	88.0
8. Polonnaruwa	0.1	1.2	8.2	8.4	6.9	4.3	2.9	0.3	32.2
Total	1.6	18.1	117.6	124.8	110.8	75.8	52.3	5.4	506.5
Percentage Distribution	0.3%	3.6%	23.2%	24.7%	21.9%	15.0%	10.3%	1.1%	100.0%

Sources : REF. 021-023, 026-029 AND 042

Table E.1.17 AGRICULTURAL OPERATOR BY EDUCATIONAL ATTAINMENT IN ADMINISTRATIVE STUDY AREA : 1982

No.	District	No-Schooling	Passed Grade				Higher Academic Qualification	Unspe-cified	Total
			5 or less	6-9	GCE (O/L)	GCE (A/L)			
1.	Matatle	6.1	22.8	14.5	5.6	0.7	0.7	0.1	50.4
2.	Mannar	1.2	6.3	2.7	1.3	0.1	0.1	0.0	11.7
3.	Vavuniya	2.2	7.3	3.4	1.5	0.1	0.1	0.0	14.6
4.	Trincomalee	3.7	11.0	5.1	1.8	0.2	0.1	0.0	21.9
5.	Kurunegala	24.8	101.4	63.0	22.8	3.3	2.6	1.6	219.5
6.	Puttalam	5.1	32.0	22.2	6.8	0.9	0.7	0.4	68.1
7.	Anuradhapura	11.3	41.4	25.5	8.2	0.9	0.5	0.1	88.0
8.	Polonnaruwa	4.6	15.4	9.1	2.5	0.3	0.1	0.1	32.2
	Total	59.1	237.6	145.5	50.4	6.6	4.8	2.4	506.5
	Percentage Distribution	11.7%	46.9%	28.7%	10.0%	1.3%	0.9%	0.5%	100.0%

Sources : Ref.021-023, 026-029 and 040

Table E.1.18 NUMBER AND AREA OF PADDY HOLDINGS BY TYPE OF OWNERSHIP OF PADDY FIELD IN ADMINISTRATIVE STUDY AREA : 1981

(Unit : 1,000)

No	District	Owned by Operator Only		Owned by Others Only		Owned by Operator and Others		Total of Paddy Holdings		Unspecified		Total Holdings	
		Number	Area (ha)	Number	Area (ha)	Number	Area (ha)	Number	Area (ha)	Number	Area (ha)	Number	Area (ha)
1.	Matale	13.6	7.7	9.0	3.5	3.1	2.3	25.7	13.6	24.6	33.0	50.3	46.6
2.	Mannar	5.6	9.5	0.7	0.8	0.6	1.8	7.0	12.2	4.7	3.6	11.7	15.8
3.	Vavuniya	5.5	9.7	1.0	1.3	0.2	1.0	6.8	12.1	7.8	14.9	14.6	27.0
4.	Trincomalee	12.7	18.6	1.9	2.4	0.8	3.0	15.5	24.0	5.4	10.0	20.9	33.9
5.	Kurunegala	71.3	36.7	30.2	12.5	15.0	12.8	116.6	62.1	102.2	154.2	218.8	216.2
6.	Puttalam	12.3	9.0	2.4	1.7	0.7	0.9	15.4	11.5	52.3	50.3	67.6	61.8
7.	Anuradhapura	48.0	50.7	9.0	6.3	3.1	6.4	60.0	63.4	27.6	46.0	87.7	109.4
8.	Polonnaruwa	16.3	20.5	7.7	5.2	0.7	1.5	24.7	27.3	7.5	17.8	32.2	45.0
	Total	185.3	162.4	62.0	33.9	24.3	29.7	271.6	226.0	232.2	329.7	503.8	555.7
	Average Size (ha/Operator)	-	0.88	-	0.55	-	1.22	-	0.83	-	1.42	-	1.10

Sources : Ref. 021-023, 026-029 and 042

Table E.1.19 NUMBER OF OPERATORS AND AREA OWNED BY TYPE IN ADMINISTRATIVE STUDY AREA : 1982

District	Not Owning Any Land	Type of Land Owned					
		Owning Home Garden only		Owning Home Garden and Orther Land		Owning Other Land Only	
	No. of Operators	No. of Operators	Area (ha)	No. of Operators	Area (ha)	No. of Operators	Area (ha)
1. Matale	8.3	17.8	6.5	18.8	22.5	5.6	6.1
2. Mannar	1.1	2.6	0.4	4.8	9.2	3.2	5.0
3. Vavuniya	3.2	0.8	0.4	3.9	9.2	6.7	13.2
4. Trincomalee	1.3	4.0	1.8	9.0	16.1	7.6	12.6
5. Kurunegala	31.2	49.1	14.6	58.4	70.1	80.8	86.3
6. Puttalam	5.1	22.7	7.4	13.1	17.6	27.0	31.5
7. Anuradhapura	9.3	19.5	8.4	51.7	77.4	7.5	8.3
8. Polonnaruwa	9.5	5.3	2.6	16.3	31.8	1.1	1.4
Total	69.0	121.9	42.1	175.9	253.9	139.5	164.3
% Distribution							
No. of Operators	13.6%	24.1%	-	34.7%	-	27.5%	-
Area	-	-	9.2%	-	55.2%	-	35.7%
Average Hectareage (ha/Operator)	-	-	0.35	-	1.44	-	1.18

District	Un-specified No. of Operators	Total		
		No. of Oper-ators	Area (ha)	Average Area per Operator (ha)
1. Matale	0.0	50.4	35.1	0.7
2. Mannar	-	11.7	14.6	1.2
3. Vavuniya	-	14.6	22.8	1.6
4. Trincomalee	-	21.9	30.5	1.4
5. Kurunegala	0.1	219.5	171.0	0.8
6. Puttalam	0.1	68.1	56.5	0.8
7. Anuradhapura	-	88.0	94.1	1.1
8. Polonnaruwa	-	32.2	35.8	1.1
Total	0.2	506.4	460.4	0.9
% Distribution				
No. of Operators	0.0	1.0	-	-
Area	-	-	1.0	-
Average Hectareage (ha/Operator)	-	-	0.9	-

Sources : Ref. 021-023, 026-029 and 042

Table E.1.20 DISTRIBUTION OF PADDY LAND IN ADMINISTRATIVE STUDY AREA : 1982

(Unit : 1,000)

District	Less than 0.5 Acre (- 0.20ha)	0.5 to less than 1 Acre (0.20 to 0.40ha)	1 to less than 2 Acres (0.40 to 0.81ha)	2 to less than 3 Acres (0.81 to 1.21ha)	3 to less than 4 Acres (1.21 to 1.62ha)	4 to less than 5 Acres (1.62 to 2.02ha)	5 to less than 7 Acres (2.02 to 2.83ha)	7 to less than 10 Acres (2.83 to 4.05ha)	10 Acres and over (4.05ha & over)	Total
I. Number of Paddy Units										
1. Matale	4.93	7.04	6.66	5.01	1.24	0.36	0.31	0.08	0.11	25.73
2. Mannar	0.09	0.21	0.99	1.35	1.59	0.62	0.95	0.57	0.60	6.96
3. Vavuniya	0.03	0.17	0.91	1.05	2.04	0.50	1.00	0.47	0.61	6.77
4. Trincomalee	0.03	0.23	1.39	3.64	5.77	1.56	1.30	0.69	0.85	15.46
5. Kurunegala	22.16	33.31	33.04	16.86	5.79	2.40	1.97	0.63	0.45	116.59
6. Puttalam	1.28	2.81	5.26	3.33	1.06	0.56	0.70	0.19	0.17	15.36
7. Anuradhapura	1.01	4.70	11.42	25.42	9.25	2.38	3.79	1.18	0.91	60.06
8. Polonnaruwa	0.18	2.08	4.90	6.63	5.34	1.49	3.48	0.31	0.27	24.67
Total	29.72	50.54	64.56	63.28	32.07	9.87	13.50	4.11	3.98	271.62
Percentage Distribution	10.9%	18.6%	23.8%	23.3%	11.8%	3.6%	5.0%	1.5%	1.5%	100.0%
II. Area Total (ha)										
1. Matale	0.53	1.69	3.23	4.28	1.56	0.61	0.68	0.23	0.77	13.57
2. Mannar	0.01	0.05	0.46	1.14	1.96	1.02	2.08	1.81	3.63	12.17
3. Vavuniya	0.00	0.04	0.42	0.89	2.49	0.82	2.19	1.49	3.73	12.07
4. Trincomalee	0.00	0.05	0.68	3.02	7.03	2.55	2.86	2.20	5.59	24.00
5. Kurunegala	2.27	8.04	16.40	14.98	7.40	4.06	4.33	2.00	2.58	62.07
6. Puttalam	0.13	0.67	2.55	2.84	1.34	0.93	1.51	0.61	0.96	11.54
7. Anuradhapura	0.09	1.04	5.44	24.09	11.47	3.98	8.13	3.72	5.40	63.36
8. Polonnaruwa	0.02	0.44	2.27	5.61	6.55	2.48	7.19	0.99	1.70	27.25
Total	3.04	12.03	31.45	56.85	39.81	16.45	28.97	13.05	24.37	226.02
Percentage Distribution	1.3%	5.3%	13.9%	25.2%	17.6%	7.3%	12.8%	5.8%	10.8%	100.0%
Average Hectareage (ha/Operator)	0.10	0.24	0.49	0.90	1.24	1.67	2.15	3.18	6.13	0.83

Sources : Ref. 021-012, 026-029 and 042

Table E.1.21 AGRICULTURAL EXTENSION SERVICE STAFF IN ADMINISTRATIVE STUDY AREA : 1986

District	Department of Agriculture				
	ADE	AO	SMO	AI	KVS
1. Matale	1	4	8	21	94
2. Mannar	1	3	5	11	41
3. Vavuniya	1	2	5	5	27
4. Trincomallee	1	3	3	17	56
5. Kurunagala	1	8	22	52	302
6. Puttalam	1	3	8	18	74
7. Anuradhapura	1	5	17	37	160
8. Polonnaruwa	1	3	7	9	52
Total of Study Area	8	31	75	170	806
Sri Lanka	26	109	243	526	2,312

District	Department of Agrarian Service				
	ASC	AC	DO	CO	FR
1. Matale	20	2	21	177	538
2. Mannar	11	1	12	27	56
3. Vavuniya	8	1	8	23	82
4. Trincomallee	21	2	14	59	255
5. Kurunagala	52	3	52	519	1,366
6. Puttalam	15	2	17	187	262
7. Anuradhapura	37	3	38	194	1,623
8. Polonnaruwa	11	1	9	60	312
Total of Study Area	175	15	171	1,246	4,494
Sri Lanka	511	53	498	4,496	12,184

District	Department of Minor Export Crops		Agricultural Development Authority	
	AD	EO	DPD	AM
1. Matale	4	25	4	25
2. Mannar	-	-	-	-
3. Vavuniya	-	-	-	-
4. Trincomallee	-	-	-	-
5. Kurunagala	-	-	1	11
6. Puttalam	-	-	-	-
7. Anuradhapura	1	11	-	-
8. Polonnaruwa	-	-	-	-
Total of Study Area	5	36	5	36
Sri Lanka	17	142	17	142

Abbreviations

-Department of Agriculture
- ADE:Assistant Director of Extension
- AO :Agricultural Officer
- SMO:Subject Matter Officer
- AI :Agricultural Instructor
- KVS:Kurushi Vayaphi Sevaka

-Depatrtment of Minor Export Crops
- AD :Assistant Director
- EO :Extension Officer

-Department of Agrarian Service
- ASC:Agrarian Service Centre
- AC :Assistant Commissioner
- DO :Divisional officer
- CO :Cultivation officer
- FR :Farmar representative

-Agricultural Develop. Authority
- DPD:Deputy Provisional Director
- AM :Agriculture Manager

Source: Ref.046

Table E.1.22 PADDY CREDIT IN ADMINISTRATIVE STUDY AREA : 1983 - 1986

(Unit : Rs.10^6)

District	People's Bank		Bank of Ceylon		Hatton National Bank		Total of Credit	
	Granted	Recovered	Granted	Recovered	Granted	Recovered	Granted	Recovered
1983								
Sri Lanka	67.6	62.0	53.4	39.6	26.6	24.2	147.5	125.8
Matale	1.2	1.0	1.4	1.2	-	-	2.6	2.2
Mannar	0.3	0.3	5.6	3.4	4.7	4.3	10.6	8.1
Vavuniya	0.3	0.2	0.2	0.1	-	-	0.5	0.3
Trincomalee	1.1	0.8	5.2	2.8	0.5	0.5	6.8	4.1
Kurunegala	4.6	3.5	5.2	4.2	-	-	9.8	7.7
Puttalam	0.2	0.2	0.1	0.1	-	-	0.3	0.2
Anuradhapura	24.3	23.1	10.5	6.9	21.2	19.1	56.0	49.2
Polonnaruwa	13.4	12.6	4.0	3.8	-	-	17.4	16.4
Total of Study Area	45.3	41.6	32.2	22.5	26.4	24.0	104.0	88.1
% Share to Sri Lanka	67.0%	67.1%	60.4%	56.8%	99.4%	99.4%	70.5%	70.1%
Recovery Rate (%)		91.9%		69.8%		90.9%		84.8%
1984								
Sri Lanka	87.6	62.4	57.2	36.6	27.5	22.0	172.2	121.0
Matale	1.1	0.8	1.8	1.2	-	-	2.8	2.0
Mannar	0.6	0.1	5.0	1.1	5.3	3.5	10.9	4.8
Vavuniya	0.9	0.2	0.4	0.3	0.8	0.8	2.2	1.4
Trincomalee	2.0	1.3	3.6	1.3	1.0	0.8	6.6	3.4
Kurunegala	6.4	4.4	6.1	4.0	-	-	12.5	8.4
Puttalam	1.6	1.0	0.4	0.3	-	-	1.9	1.2
Anuradhapura	30.1	20.8	9.7	5.8	19.9	16.5	59.7	43.1
Polonnaruwa	23.5	18.1	6.4	5.4	-	-	29.9	23.5
Total of Study Area	66.2	46.7	33.3	19.4	27.1	21.7	126.5	87.7
% Share to Sri Lanka	75.5%	74.8%	58.3%	53.1%	98.6%	98.4%	73.5%	72.5%
Recovery Rate (%)		70.5%		58.2%		80.0%		69.3%
1985								
Sri Lanka	54.4	42.2	47.2	34.8	19.6	17.7	121.2	94.7
Matale	0.3	0.2	1.1	0.9	-	-	1.5	1.1
Mannar	0.2	0.1	1.6	0.6	3.9	2.8	5.7	3.5
Vavuniya	0.6	0.1	1.0	0.7	1.1	1.0	2.8	1.8
Trincomalee	1.7	1.2	2.6	0.8	1.2	0.9	5.4	2.8
Kurunegala	2.8	2.2	4.8	3.1	-	-	7.6	5.2
Puttalam	0.9	0.8	0.5	0.3	-	-	1.4	1.1
Anuradhapura	11.4	8.9	6.7	5.3	13.2	12.8	31.3	27.0
Polonnaruwa	19.0	15.2	9.3	8.3	-	-	28.3	23.4
Total of Study Area	36.9	28.6	27.6	19.9	19.4	17.5	83.9	66.0
% Share to Sri Lanka	67.9%	67.8%	58.6%	57.0%	98.8%	99.0%	69.3%	69.7%
Recovery Rate (%)		77.6%		71.9%		90.3%		78.7%
1986 *1								
Sri Lanka	80.9	25.0	65.0	23.7	17.5	9.2	163.4	57.9
Matale	0.3	0.1	2.0	0.7	-	-	2.4	0.8
Mannar	0.1	0.0	0.6	0.1	3.0	1.0	3.8	1.1
Vavuniya	1.0	-	0.6	0.2	1.0	0.1	2.6	0.3
Trincomalee	0.4	-	0.5	0.1	0.0	0.0	1.0	0.1
Kurunegala	4.1	1.3	3.8	1.6	-	-	7.9	2.8
Puttalam	4.5	1.7	1.2	0.3	-	-	5.7	2.0
Anuradhapura	18.9	7.3	8.8	3.1	13.4	8.1	41.1	18.5
Polonnaruwa	19.5	4.0	18.9	7.1	-	-	38.5	11.2
Total of Study Area	48.9	14.4	36.5	13.2	17.4	9.2	102.8	36.8
% Share to Sri Lanka	60.4%	57.6%	56.1%	55.7%	99.6%	99.6%	62.9%	63.5%
Recovery Rate (%)		29.5%		36.1%		52.7%		35.8%

Remark : *1 Recovery in progress
Source : Ref.004

Table E.1.23 CO-OPERATIVES IN ADMINISTRATIVE STUDY AREA : 1987

District	Number of Societies						
	MPCS	Credit	Agriculture	Industry	Others	Secondary*1	Total
Sri Lanka	283	5,608	334	263	1,025	34	7,547
1.Matale	10	185	2	2	46	1	246
2.Mannar	6	69	1	-	12	1	89
3.Vavuniya	4	75	4	1	6	-	90
4.Trincomalee	9	7	1	3	4	1	25
5.Kurunagala	9	390	20	9	62	1	491
6.Puttlam	8	180	24	10	19	1	242
7.Anuradhapura	20	200	8	2	16	1	247
8.Polonnaruwa	9	35	7	8	9	-	68
Total of Administr Study Area	75	1,141	67	35	174	6	1,498

District	Only on MPCS					
	Number of Members	Number of Employees	Number of Stores			
			Wholesale	Retail	Petroleum	No.of Rural Bank
Sri Lanka	2,168,037	30,140	621	7,241	261	904
1.Matale	37,372	1,142	11	171	6	16
2.Mannar	17,864	145	6	55	5	6
3.Vavuniya	25,771	120	5	43	3	4
4.Trincomalee	56,747	342	4	71	3	5
5.Kurunagala	107,656	1,514	17	372	8	58
6.Puttlam	80,050	918	24	226	4	35
7.Anuradhapura	98,641	919	26	262	11	29
8.Polonnaruwa	34,022	643	11	150	9	25
Total of Administr Study Area	458,123	5,743	104	1,350	49	178

Remark : *1 Regional head office of Co-operatives
Source : Depertment of Co-operative Development

Table E.1.24 FOOD STAMPS ISSUED FOR POVERTY RELIEF : 1987/88

(Unit : 1,000)

District	Food Stamps				Kerosene Stamps
	0-8 Years	8-12 Years	12 & over	Total	
Sri Lanka	1,689.2	801.3	5,074.2	7,564.8	1,884.4
1.Matale	47.7	22.1	334.5	404.2	120.5
2.Mannar	18.7	8.6	417.7	445.0	119.1
3.Vavuniya	20.7	9.0	51.7	81.4	17.9
4.Trincomalee	40.6	17.0	188.6	246.2	65.7
5.Kurunagala	153.9	74.1	94.2	322.2	35.6
6.Puttlam	78.7	35.5	516.2	630.3	203.0
7.Anuradhapura	95.9	43.4	217.3	356.5	87.8
8.Polonnaruwa	35.7	14.0	197.0	246.6	83.4
Total of Administrative Study Area	491.8	223.5	2,017.2	2,732.5	733.0
	29.1%	27.9%	39.8%	36.1%	38.9%
% Share to Sri Lanka	29.1%	27.9%	39.8%	36.1%	38.9%

Remarks : 1. The eligibility of food stamps as of 1988

Household Income per month	Number eligible
Rs.600-700	2
Rs.400-599	3
Rs.301-399	4
Less than Rs.300	Whole members

2. The money value of the food stamps
   a.Children below 8 years old : Rs.25 per month
   b.Children over 8 and below 12 years old : Rs.20 per month
   c.Persons 12 years old and over : Rs.15 per month

Sources: Poverty Relief Office, Department of Social Services

Table E.2.1 LAND CLASS AND SOIL TYPE BY SYSTEM

(Unit: ha)

Irrigation System	Irrigation Area (ha)	Land Class (ha)									
		1		2k		2d		2kd		3d	
		RBE	LHG	RBE	LHG	RBE	LHG	RBE	LHG	RBE	LHG
F	1,900	1,400	-	500	-	-	-	-	-	-	-
H	42,400	21,200	-	-	-	-	-	-	-	-	-
IH	4,700	-	-	200	-	500	-	-	-	100	-
MH	26,300	1,500	-	11,800	-	1,000	-	-	-	-	-
I	61,300	1,300	-	29,400	-	-	-	-	-	-	-
M	25,000	900	-	11,000	-	-	-	-	-	-	-
NWDZ	13,250	5,000	-	-	-	2,600	-	-	-	-	-

Irrigation System	Irrigation Area (ha)	Land Class (ha)									
		3v		4Rd		4Rdv		4Pv		4Stk	
		RBE	LHG	RBE	LHG	RBE	LHG	RBE	LHG	RBE	LHG
F	1,900	-	-	-	-	-	-	-	-	-	-
H	42,400	-	-	-	21,200	-	-	-	-	-	-
IH	4,700	-	-	-	3,900	-	-	-	-	-	-
MH	26,300	-	-	6,700	5,300	-	-	-	-	-	-
I	61,300	-	-	-	30,600	-	-	-	-	-	-
M	25,000	-	-	9,600	3,500	-	-	-	-	-	-
NWDZ	13,250	-	-	2,600	3,050	-	-	-	-	-	-

Remarks: RBE: Reddish Brow Earth
LHG: Low Humic Gley Soils

Table E.3.1 CLIMATIC CONDITION AT SOME MAJOR STATIONS IN STUDY AREA

(1) Anuradhapura

Item	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Relative Humidity(%)	82.0	76.5	72.5	77.5	77.0	72.5	71.0	70.0	69.5	78.0	84.5	85.0	76.5
Mean Daily Max. Temperature(oC)	28.6	30.7	33.2	33.3	32.7	32.2	32.7	33.0	33.4	31.8	29.9	28.5	31.7
Mean Daily Min. Temperature(oC)	20.7	20.7	21.9	23.6	24.8	24.7	24.3	24.2	24.0	23.1	21.9	21.3	22.9
Mean Daily Wind Speed(km/h)	6.0	6.3	5.6	5.2	10.3	13.5	12.7	12.7	11.8	7.7	4.5	5.6	8.5
Monthly Rainfall(mm)	123.2	53.6	98.8	186.9	99.6	13.5	31.8	46.7	69.9	232.9	248.4	242.3	1,447.0
Number of Rainy Days	12.0	6.0	7.0	13.0	8.0	4.0	3.0	5.0	5.0	16.0	19.0	17.0	115.0
Monthly Pan-Evaporation(mm)	118.0	134.0	189.0	174.0	198.0	207.0	220.0	220.0	207.0	143.0	108.0	102.0	2,020.0

(2) Trincomallee

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Relative Humidity(%)	77.0	74.5	74.5	74.5	68.5	63.5	65.0	66.5	68.0	75.0	79.0	79.0	72.0
Mean Daily Max. Temperature(oC)	27.0	28.1	29.9	32.0	33.6	33.7	33.7	33.5	33.5	31.3	28.7	27.3	31.0
Mean Daily Min. Temperature(oC)	24.2	24.3	24.8	25.4	26.1	26.2	25.6	25.3	25.1	24.3	23.8	24.0	24.9
Mean Daily Wind Speed(km/h)	18.8	14.3	10.5	10.3	16.7	21.8	19.8	18.4	16.4	13.4	13.8	18.4	16.0
Monthly Rainfall(mm)	210.6	95.2	48.3	76.7	67.8	18.5	54.1	102.9	88.9	234.7	355.1	373.9	1,727.0
Number of Rainy Days	13.0	6.0	5.0	7.0	6.0	2.0	4.0	7.0	6.0	16.0	19.0	18.0	109.0
Monthly Pan-Evaporation(mm)	164.0	162.0	198.0	207.0	251.0	258.0	282.0	260.0	243.0	174.0	138.0	133.0	2,470.0

(3) Batticaloa

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Relative Humidity(%)	81.0	79.5	78.5	78.0	72.5	67.5	68.5	70.5	73.0	78.5	82.0	82.5	76.0
Mean Daily Max. Temperature(oC)	27.5	28.2	29.7	31.1	32.4	33.6	33.2	32.5	32.1	30.6	29.0	27.8	30.6
Mean Daily Min. Temperature(oC)	23.2	23.2	23.9	24.9	25.5	25.4	25.0	24.5	24.6	24.1	23.5	23.2	24.3
Mean Daily Wind Speed(km/h)	14.3	13.0	10.9	9.5	9.2	9.3	9.8	9.7	9.7	9.5	10.4	12.9	10.7
Monthly Rainfall(mm)	279.1	178.3	84.8	22.4	31.2	18.5	37.8	61.7	47.8	178.1	285.2	429.8	1,705.0
Number of Rainy Days	16.0	10.0	8.0	7.0	5.0	3.0	4.0	6.0	9.0	14.0	18.0	20.0	116.0
Monthly Pan-Evaporation(mm)	133.0	143.0	164.0	183.0	205.0	207.0	220.0	214.0	198.0	164.0	138.0	118.0	2,087.0

Source : Department of Meteorology
Refer to ANNEX-B.

Table E.3.2 POPULATION IN STUDY AREA : 1981

(Unit : 1,000 in Population)

District	Administrative Study Area			Study Area		
	Census Population	Labour Force	Agri-cultural Population	Estimated Population	Labour Force	Agri-cultural Population
Matale	357.4	102.4	60.9	8.8	3.1	2.2
Mannar	106.2	31.1	19.6	0.7	0.2	0.1
Vavuniya	95.4	29.2	18.7	13.1	4.1	3.2
Trincomalee	255.9	65.8	31.2	18.6	5.6	3.8
Kurunagala	1,211.8	344.8	194.4	38.6	14.0	10.7
Puttalam	492.5	142.3	37.1	5.8	2.3	1.9
Anuradhapura	587.9	184.7	126.6	262.1	90.5	50.9
Polonnaruwa	261.6	84.1	51.3	1.0	0.4	0.3
Total	3,368.8	984.4	539.8	348.6	120.1	73.1

Source : Ref.002, 010-013, 016-019 and 040

Table E.3.3 ESTIMATED AGRICULTURAL POPULATION BY SYSTEM IN STUDY AREA : 1981

System Zone	Estimated Population (1,000)	Labour Force (1,000)	Labour Partici-pation Rate	Agricultural Population (1,000)	Rate of Agricultural Labour Force	Rate of Agricultural Total Population	Gross Area (km^2)
F	3.0	1.2	39.7%	0.9	73.9%	29.3%	78.2
H	141.8	51.8	36.5%	35.0	67.6%	24.7%	941.3
IH	28.7	8.8	30.5%	4.8	55.2%	16.9%	178.2
MH	27.4	8.6	31.3%	6.3	73.1%	22.8%	439.4
I	118.8	40.5	34.1%	19.3	47.7%	16.2%	1,268.8
M	22.1	6.7	30.2%	4.7	70.2%	21.2%	546.7
NWDZ	6.8	2.6	38.8%	2.2	82.8%	32.2%	104.2
Total	348.6	120.1	34.5%	73.1	60.9%	21.0%	3,556.8

Source : Ref. 011-013, 016-019 and 040

Table E.3.4 PRESENT CROPPING PATTERN BY SYSTEM

(Unit : %)

Crop	F		H		IH		MH	
	Maha	Yala	Maha	Yala	Maha	Yala	Maha	Yala
1. Irrigated								
Paddy	22.6	11.6	95.8	28.1	100.0	23.0	32.3	7.4
Chillie	-	2.6	0.9	16.7	-	6.0	-	2.0
Pulses	-	1.1	1.2	20.0	-	9.1	-	2.9
Maize	-	-	2.1	-	-	-	-	-
Sub-total	22.6	15.3	100.0	64.8	100.0	38.1	32.3	12.3
2. Rainfed								
Paddy	23.1	3.2	-	-	-	-	-	-
Chillie	3.7	-	-	-	-	-	-	-
Pulses	15.8	-	-	-	-	-	24.1	0.6
Maize	19.5	-	-	-	-	-	12.0	-
Others	15.3	6.3	-	-	-	-	3.0	3.4
Sub-total	77.4	9.5	-	-	-	-	39.1	4.0
3. Fallow	-	75.2	-	35.2	-	61.9	28.6	83.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Cropping Intensity		125		165		138		88

Crop	I		M		NWZD		Total	
	Maha	Yala	Maha	Yala	Maha	Yala	Maha	Yala
1. Irrigated								
Paddy	26.0	5.4	14.3	2.3	46.8	20.2	50.7	13.7
Chillie	0.6	0.5	-	0.6	-	0.9	0.5	6.1
Pulses	-	0.7	-	1.1	-	-	0.4	7.4
Maize	-	-	-	-	-	-	0.7	-
Sub-total	26.6	6.6	14.3	4.0	46.8	21.1	52.3	27.2
2. Rainfed								
Paddy	1.0	-	-	-	6.4	6.4	1.0	0.3
Chillie	-	-	-	-	0.4	-	0.1	-
Pulses	43.9	-	29.7	-	7.4	2.8	22.6	0.2
Maize	12.6	-	15.4	-	0.7	-	8.0	-
Others	7.3	10.5	4.0	4.0	1.8	2.2	3.8	4.8
Sub-total	64.8	10.5	49.1	4.0	16.7	11.4	35.5	5.3
3. Fallow	8.6	82.9	36.6	92.0	36.5	67.5	12.2	67.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Cropping Intensity		109		71		96		120

Remarks: Maha; average of 1984/85, '85/'86m '86/'87
Yala; average of 1985, '86, '87

Source: MASL, P.M.U., 1988 & Dept. of Census and Statistics.

Table E.3.5 ESTIMATED PRESENT PLANTED AREA BY SYSTEM

(Unit : ha)

Crop	F		H		IH		MH	
	Maha	Yala	Maha	Yala	Maha	Yala	Maha	Yala
1. Irrigated								
Paddy	430	220	40,600	11,900	4,700	1,080	4,300	990
Chillie	-	50	400	7,100	-	280	-	260
Pulses	-	20	500	8,500	-	430	-	390
Maize	-	-	900	-	-	-	-	-
Sub-total	430	290	42,400	27,500	4,700	1,790	4,300	1,640
2. Rainfed								
Paddy	440	60	-	-	-	-	-	-
Chillie	70	-	-	-	-	-	-	-
Pulses	300	-	-	-	-	-	3,200	80
Maize	370	-	-	-	-	-	1,600	-
Others	290	120	-	-	-	-	400	450
Sub-total	1,470	180	-	-	-	-	5,200	530
3. Fallow	-	1,430	-	14,900	-	2,910	3,800	11,130
Cultivated Area	1,900	1,900	42,400	42,400	4,700	4,700	13,300	13,300
4. Not Utilized	-	-	-	-	-	-	13,000	13,000
Total	1,900	1,900	42,400	42,400	4,700	4,700	26,300	26,300
(Cropping Intensity)		(1.25)		(1.65)		(1.38)		(0.88)

Crop	I		M		NWZD		Total	
	Maha	Yala	Maha	Yala	Maha	Yala	Maha	Yala
1. Irrigated								
Paddy	12,400	2,600	2,500	400	2,550	1,100	67,480	18,290
Chillie	300	260	-	100	-	50	700	8,100
Pulses	-	340	-	200	-	-	500	9,880
Maize	-	-	-	-	-	-	900	-
Sub-total	12,700	3,200	2,500	700	2,550	1,150	69,580	36,270
2. Rainfed								
Paddy	500	-	-	-	350	350	1,290	410
Chillie	-	-	-	-	20	-	90	-
Pulses	21,000	-	5,200	-	400	150	30,100	230
Maize	6,000	-	2,700	-	40	-	10,710	-
Others	3,500	5,000	700	700	100	120	4,990	6,390
Sub-total	31,000	5,000	8,600	700	910	620	47,180	7,030
3. Fallow	4,100	39,600	6,400	16,100	1,990	3,680	16,290	89,750
Cultivated Area	47,800	47,800	17,500	17,500	5,450	5,450	133,050	133,050
4. Not Utilized	13,500	13,500	7,500	7,500	7,800	7,800	41,800	41,800
Total	61,300	61,300	25,000	25,000	13,250	13,250	174,850	174,850
(Cropping Intensity)		(1.09)		(0.71)		(0.96)		(1.20)

Remarks: Cropping intensity of the total project area is estiamted below:

Item	Net Area	Total Area Cultivatec Maha	Yala	Intensity
Irrigated	69,580	69,580	36,270	105,850	1.52
Rainfed*	63,470	47,180	7,030	54,210	0.85
Total	133,050	116,760	43,300	160,060	1.20

Note: * Including fallow area.

Table E.3.6 ESTIMATED PRESENT AREAL COVERAGE BY PADDY CULTURAL PRACTICES

(Unit: %)

System	Crop Season	Land Preparation			Plant Establishment		
					Direct Sowing		
		By Buffalo	Manu-ally	By Tractor	Dry Sown	Mud Sown	Row Sown
F	Maha	58	5	37	1	37	0
	Yala	53	11	36	0	50	1
H	Maha	33	1	66	22	59	1
	Yala	35	2	63	1	72	2
IH	Maha	26	1	73	25	60	1
	Yala	29	2	69	0	77	2
MH	Maha	26	1	73	25	60	1
	Yala	29	2	69	0	77	2
I	Maha	21	6	78	50	39	1
	Yala	24	1	75	0	84	1
NWDZ	Maha	57	1	41	10	55	1
	Yala	51	2	47	9	55	1

System	Crop Season	Plant Establishment		Weed Control		
		Transplanting				
		Random	Row	Manual Weeding	Rotary Weeding	Chemical Control
F	Maha	54	8	46	12	42
	Yala	42	7	48	9	43
H	Maha	16	2	14	5	81
	Yala	19	6	22	14	65
IH	Maha	12	2	8	4	88
	Yala	15	6	17	15	68
MH	Maha	12	2	8	4	88
	Yala	15	6	17	15	68
I	Maha	9	1	8	2	90
	Yala	11	4	14	9	77
NWDZ	Maha	29	5	34	7	59
	Yala	29	6	34	8	58

Source: Agricultural Implementation Program 1987/88, MADR

Table E.3.7 UNIT YIELD OF CROPS IN IRRIGATED FIELD BY SYSTEM

(Unit : ton/ha)

Crop	System				
	F	H	I	IH/MH	NWDZ
Maha					
Paddy	3.62	4.33	2.81	3.02	3.31
Chillie	-	1.12	0.50	0.50	-
Cowpea	-	1.19	-	-	-
Green Gram	-	0.97	-	-	-
Black Gram	-	0.84	-	-	-
Maize	-	0.93	-	-	-
Soybean	-	1.81	-	-	-
Red Onion	-	8.55	-	-	14.70
Bombay Onion	-	9.90	-	-	-
Ground Nuts	-	1.02	-	-	-
Sesame	-	0.40	-	-	-
Yala					
Paddy	2.70	2.74	2.02	2.50	2.76
Chillie	1.19	1.50	1.45	1.45	1.17
Cowpea	-	1.50	-	-	-
Green Gram	0.83	1.47	-	-	-
Black Gram	-	-	1.04	1.04	-
Maize	-	-	-	-	-
Soybean	2.00	1.57	1.48	1.48	-
Red Onion	-	10.00	-	-	-
Bombay Onion	7.90	10.00	-	-	-
Ground Nuts	1.30	1.59	-	-	-
Sesame	-	-	-	-	-

Source: Dept. of Census & Statistics, 1988

Table E.3.8 UNIT YIELD OF CROPS IN RAINFED FIELD BY SYSTEM

(Unit: ton/ha)

Crop	System F	H*1	I	NWDZ
Maha				
Paddy	3.09	1.68	1.46	2.40
Chillie	-	-	-	1.52
Cowpea	1.28	1.02	1.09	0.68
Green Gram	1.13	0.87	1.03	0.56
Black Gram	0.79	1.07	0.99	0.83
Maize	1.11	1.48	1.46	0.85
Soybean	1.06	0.80	0.56	0.59
Ground Nuts	0.66	0.70	0.56	0.48
Sesame	0.67	0.40	0.69	0.36
Yala				
Paddy	1.81	2.43	-	2.27
Chillie	-	-	-	-
Cowpea	1.15	1.21	1.17	0.69
Green Gram	1.10	0.88	0.96	0.56
Black Gram	0.66	0.64	0.79	0.45
Maize	-	-	-	-
Soybean	1.08	0.78	0.80	0.43
Ground Nuts	0.70	0.52	0.16	0.28
Sesame	0.63	0.46	0.59	0.58

Remark: *1 Outside of the project area boundary.

Source: Dept. of Census and Statistics, 1988.

Table E.3.9 UNIT YIELD OF ONION BY SYSTEM

(Unit: ton/ha)

Crop	System F	H	I	NWDZ
Maha				
Red Onion	7.08	5.71	7.94	5.92
Bombay Onion	8.35	3.96	8.00	4.91
Yala				
Red Onion	4.22	6.50	0.87	3.73
Bombay Onion	8.38	4.01	7.12	8.72

Source: Dept. of Census and Statistics, 1988

Table E.3.10 ESTIMATED PRESENT CROP PRODUCTION

(Unit : 1,000)

System		Paddy		Chillie		Pulses		Maize		Others *1	
		Maha	Yala	Maha	Yala	Maha	Yala	Maha	Yala	Maha	Yala
F	Irrigated	1.56	0.59	-	0.06	-	0.02	-	-	-	-
	Rainfed	1.36	0.11	0.04	-	0.34	-	0.41	-	0.19	0.08
	Sub-total	2.92	0.70	0.04	0.06	0.34	0.02	0.41	-	0.19	0.08
H	Irrigated	175.80	32.61	0.45	10.65	0.49	8.25	0.84	-	-	-
IH	Irrigated	14.19	2.70	-	0.41	-	0.45	-	-	-	-
MH	Irrigated	12.99	2.48	-	0.38	-	0.41	-	-	-	-
	Rainfed	-	-	-	-	2.56	0.08	1.36	-	0.28	0.27
	Sub-total	12.99	2.48	-	0.38	2.56	0.49	1.36	-	0.28	0.27
I	Irrigated	34.84	5.25	0.15	0.38	-	0.35	-	-	-	-
	Rainfed	0.73	-	-	-	16.80	-	8.76	-	2.42	2.95
	Sub-total	35.57	5.25	0.15	0.38	16.80	0.35	8.76	-	2.42	2.95
M	Irrigated	7.03	0.81	-	0.15	-	0.21	-	-	-	-
	Rainfed	-	-	-	-	4.16	-	2.30	-	0.48	0.41
	Sub-total	7.03	0.81	-	0.14	4.16	0.21	2.30	-	0.48	0.41
NWDZ	Irrigated	8.44	3.04	-	0.06	-	-	-	-	-	-
	Rainfed	0.84	0.80	0.03	-	0.22	0.08	0.03	-	0.04	0.07
	Sub-total	9.28	3.84	0.03	0.06	0.22	0.08	0.03	-	0.04	0.07
Total in Study Area											
	Irrigated	254.85	47.48	0.60	12.07	0.49	9.68	0.84	-	-	-
	Rainfed	2.93	0.90	0.07	-	24.08	0.16	12.87	-	3.41	3.78
	Total	257.78	48.38	0.67	12.07	24.57	9.85	13.70	-	3.41	3.78
	Grand Total		306.16		12.74		34.41		13.70		7.19

Remark: *1 Typified by sesame.
Refer to Table E.3 ~ 7, 8, 9

Table E.4.1 TARGET PRODUCTION FOR FUTURE FOOD DEMAND : 2020

(Unit : 1,000 ton)

Crop	Total Requirement in Sri Lanka			Target Production		
	Domestic	Export	Total	Sri Lanka	Administrative Study Area	Study Area
1. Paddy	4,220	-	4,220	4,220	1,688	1,350
2. Maize	61	40	101	101	40	32
3. Pulses	145	90	235	235	94	75
4. Chillie	74	15	89	89	45	36
5. Onion	124	7 *3	131	131	66	52
6. Garlic	- *2	1	1	1	0	0
7. Ginger	- *2	3	3	3	1	1
8. Sesame	- *2	50	50	50	20	16
9. Cashew (Kernels)	- *2	25	25	25	13	10
10. Caster Seed	- *2	6	6	6	2	2
11. Sugar *1	899	-	899	539	216	173
12. Oil Palm	-	50	50	50	20	16
13. Cotton	20	-	20	20	10	8
14. Vegetables & Fruits	2,249	45	2,294	2,294	918	734

Remarks : *1 60% of consumption is supplied by domestic industry.
*2 Domestic requirement is included in the item 14 of Vegetables and Fruits.
*3 Assumed that Sri Lanka attains the level of Thailand's export in 1987.

Table E.4.2 FUTURE CROPPING AREA BY SYSTEM UNDER WITHOUT-PROJECT CONDITION

(Unit : ha)

Crop	F		H		IH		MH	
	Maha	Yala	Maha	Yala	Maha	Yala	Maha	Yala
1. Irrigated								
Paddy	430	220	40,600	11,900	4,700	1,080	4,300	990
Chillie	-	50	400	7,100	-	280	-	260
Pulses	-	20	500	8,500	-	430	-	390
Maize	-	-	900	-	-	-	-	-
Sub-total	430	290	42,400	27,500	4,700	1,790	4,300	1,640
2. Rainfed								
Paddy	440	60	-	-	-	-	-	-
Chillie	70	-	-	-	-	-	-	-
Pulses	300	-	-	-	-	-	3,200	80
Maize	370	-	-	-	-	-	1,600	-
Others	290	120	-	-	-	-	400	450
Sub-total	1,470	180	-	-	-	-	5,200	530
3. Fallow	-	1,430	-	14,900	-	2,910	3,800	11,130
4. Not Utilized	-	-	-	-	-	-	13,000	13,000
Total	1,900	1,900	42,400	42,400	4,700	4,700	26,300	26,300

Crop	I		M		NWZD		Total	
	Maha	Yala	Maha	Yala	Maha	Yala	Maha	Yala
1. Irrigated								
Paddy	12,400	2,600	2,500	400	2,550	1,100	67,480	18,290
Chillie	300	260	-	100	-	50	700	8,100
Pulses	-	340	-	200	-	-	500	9,880
Maize	-	-	-	-	-	-	900	-
Sub-total	12,700	3,200	2,500	700	2,550	1,150	69,580	36,270
2. Rainfed								
Paddy	500	-	-	-	350	350	1,290	410
Chillie	-	-	-	-	20	-	90	-
Pulses	21,000	-	5,200	-	400	150	30,100	230
Maize	6,000	-	2,700	-	40	-	10,710	-
Others	3,500	5,000	700	700	100	120	4,990	6,390
Sub-total	31,000	5,000	8,600	700	910	620	47,180	7,030
3. Fallow	4,100	39,600	6,400	16,100	1,990	3,680	16,290	89,750
4. Not Utilized	13,500	13,500	7,500	7,500	7,800	7,800	41,800	41,800
Total	61,300	61,300	25,000	25,000	13,250	13,250	174,850	174,850

Table E.4.3 FUTURE CROPPING AREA BY SYSTEM UNDER WITH-PROJECT CONDITION

(Unit: ha)

Crop	F		H		IH		MH	
	Maha	Yala	Maha	Yala	Maha	Yala	Maha	Yala
1. Irrigated								
Paddy	1,800	1,500	40,300	23,280	4,500	3,900	15,500	12,900
Chillie	-	100	800	10,300	100	400	330	1,400
Pulses	60	90	420	3,300	60	130	200	670
Maize	-	90	300	2,300	-	120	130	700
Onion	40	30	280	920	40	30	140	150
Others	-	90	300	2,300	-	120	-	480
Sub-total	1,900	1,900	42,400	42,400	4,700	4,700	16,300	16,300
2. Rainfed								
Cashew	-	-	-	-	-	-	10,000	10,000
Sub-total	-	-	-	-	-	-	10,000	10,000
Total	1,900	1,900	42,400	42,400	4,700	4,700	26,300	26,300

Crop	I		M		NWZD		Total	
	Maha	Yala	Maha	Yala	Maha	Yala	Maha	Yala
1. Irrigated								
Paddy	48,600	41,100	23,700	20,000	8,250	8,250	142,650	110,930
Chillie	1,000	2,900	500	1,500	-	700	2,730	17,300
Pulses	550	3,000	190	1,570	2,860	2,120	4,340	10,880
Maize	370	1,800	200	800	1,000	1,000	2,000	6,810
Onion	430	700	210	330	140	180	1,280	2,340
Others	350	1,800	200	800	1,000	1,000	1,850	6,590
Sub-total	51,300	51,300	25,000	25,000	13,250	13,250	154,850	154,850
2. Rainfed								
Cashew	10,000	10,000	-	-	-	-	20,000	20,000
Sub-total	10,000	10,000	-	-	-	-	20,000	20,000
Total	61,300	61,300	25,000	25,000	13,250	13,250	174,850	174,850

Table E.4.4 DESIGN CRITERIA OF PROPOSED FARMING PRACTICES

Item	Paddy	Chillie	Bombay Onion
Variety	BG-379-2 BG-34-8	MI-1 MI-2	Ponna Red Early Grand
Growing Period	BG-379-2: 4 Months BG-34-8: 3 Months	MI-1: 150 days MI-2: 150 days	3 Months
Planting Method	Transplanting	Transplanting	Transplanting
Seed Sown	107 kg/ha	1.85 kg/ha	8.4 kg/ha
Nursery Period	20 days	25-30 days	1.5 Months
Planting Space	15cm x 15cm	MI-1: 60cm x 60cm 75cm x 60cm MI-2: 60cm x 60cm	15cm x 10cm 10cm x 10cm
Ferilizer			
N	120 kg/ha	150 kg/ha	104 kg/ha
P2 O5	80 kg/ha	100 kg/ha	108 kg/ha
K2 O	80 kg/ha	100 kg/ha	92 kg/ha
Labour Requirement	86 man-days/ha	229 man-days/ha	552 man-days/ha
Family Labour	25 man-days/ha	147 man-days/ha	408 man-days/ha
Hired Labour	61 man-days/ha	82 man-days/ha	144 man-days/ha

Item	Green Gram	Long Bean	Maize
Variety	MI-5 IPEM-79-13-45		T-48 Thai Composits
Growing Period	75 - 90 days	90 days	90 days
Planting Method			
Seed Sown	26 kg/ha	41 kg/ha	20 kg/ha
Nursery Period			
Planting Space	30cm x (7-8)cm	5 - 10cm x 5 - 10cm	0.5-1.0m x 0.5-1.0m
Ferilizer			
N	25 kg/ha	28 kg/ha	60 kg/ha
P2 O5	60 kg/ha	149 kg/ha	68 kg/ha
K2 O	60 kg/ha	56 kg/ha	32 kg/ha
Labour Requirement	229 man-days/ha	375 man-days/ha	70 man-days/ha
Family Labour	174 man-days/ha	280 man-days/ha	55 man-days/ha
Hired Labour	55 man-days/ha	95 man-days/ha	15 man-days/ha

Table E.4.5 INCREMENT OF AGRICULTURAL AREA AND CROP PRODUCTION IN STUDY AREA

Item	Present Condition	Future Condition		Production Target	
		Without Project	With Project	Study Area Total	National Total
1. Net Agricultural Area (ha)					
Irrigated	69,580	69,580	154,850	-	-
Rainfed	63,470	63,470	20,000 *1	-	-
Not Utilized	41,800	41,800	0	-	-
Total	174,850	174,850	174,850	-	-
2. Production (1,000 ton)					
Paddy	306.1	335.9	1,339.2	1,350	4,220
Chillie	12.7	13.3	38.1	36	89
Pulses *2	34.4	34.6	23.3	75	235
Maize	13.7	19.0	30.8	32	101
Onion	-	-	54.3	52	131
Cashew (Kernels)	-	-	4.5	10	25
Others *3	34.1 *4	34.1	67.5	734	2,294
3. Increment from Present Production (1,000 ton)					
Paddy	-	29.8	1,033.1	-	-
Chillie	-	0.5	25.4	-	-
Pulses *2	-	0.2	-11.1	-	-
Maize	-	5.3	17.1	-	-
Onion	-	-	54.3	-	-
Cashew (Kernels)	-	-	4.5	-	-
Others *3	-	0.0	33.4	-	-

Remarks : *1 Cultivated for cashew production.
*2 Estimated as green gram.
*3 Estimated as long bean
*4 Equivelant to long bean.

Table E.4.6 CROP BUDGET UNDER WITHOUT-PROJECT CONDITION

(Unit: Rs./ha)

Crop	Item	Gross Income	Production Cost								Net Benefit
			Material					Draught/			
			Seed	Fertilizer			Agro-chemicals	Machinery Power	Labour	Total	
				N	P2O5	K2O					
Paddy											
Irrigated (Maha)	Quantity	3.50	100	105	51	24					
	Financial	15,400	440	683	332	115	298	3,144	2,700	7,711	7,689
	Economic	19,250	550	1,743	842	199	256	2,672	2,678	8,940	10,310
Irrigated (Yala)	Quantity	3.00	100	77	51	24					
	Financial	13,200	440	501	332	115	298	3,144	2,700	7,529	5,671
	Economic	16,500	550	1,278	842	199	253	2,672	2,678	8,472	8,028
Irrigated (System H) (Maha)	Quantity	4.50	100	115	55	30					
	Financial	19,800	440	748	358	144	298	3,144	2,700	8,036	11,764
	Economic	24,750	550	1,909	908	249	256	2,672	2,678	9,379	15,372
Rainfed	Quantity	2.50	100	77	15	15					
	Financial	11,000	440	501	98	72	298	3,144	1,575	6,127	4,873
	Economic	13,750	550	1,278	248	125	253	2,672	1,890	7,015	6,735
Chillie											
Irrigated	Quantity	1.50	2	150	100	100					
	Financial	46,500	368	975	650	480	4,131	761	2,970	10,335	36,165
	Economic	39,000	313	2,490	1,650	830	3,511	647	5,796	15,237	23,763
Rainfed	Quantity	0.80	2	150	100	100					
	Financial	24,800	368	975	650	480	4,131	761	2,250	9,615	15,185
	Economic	20,800	313	2,490	1,650	830	3,511	647	4,379	13,820	6,980
Bombay Onion											
Irrigated	Quantity	10.00	9	78	81	69					
	Financial	83,000	11,050	507	527	331	1,868	2,678	4,860	21,821	61,179
	Economic	71,000	9,393	1,295	1,337	573	1,588	2,276	13,041	29,502	41,499
Green Gram											
Irrigated	Quantity	1.00	20	52	23	14					
	Financial	14,000	520	338	150	67	1,955	354	1,845	5,229	8,771
	Economic	12,000	520	863	380	116	1,662	301	5,418	9,260	2,740
Rainfed	Quantity	0.50	10	36	16	10					
	Financial	7,000	260	234	104	48	1,369	248	1,125	3,388	3,612
	Economic	6,000	260	598	264	83	1,163	211	3,276	5,855	145
Long Bean											
Irrigated	Quantity	5.00	41	28	149	56					
	Financial	21,500	3,239	182	969	269	523	0	3,195	8,376	13,124
	Economic	18,500	2,747	465	2,459	465	530	0	8,852	15,517	2,983
Rainfed	Quantity	3.00	31	21	112	42					
	Financial	12,900	2,449	137	728	202	392	0	2,070	5,977	6,923
	Economic	11,100	2,077	349	1,848	349	398	0	5,765	10,785	315
Maize											
Irrigated	Quantity	2.00	20	60	68	32					
	Financial	7,200	400	390	442	154	1,506	1,035	450	4,377	2,823
	Economic	8,600	600	996	1,122	266	1,280	880	2,048	7,192	1,408
Rainfed	Quantity	1.00	20	20	0	0					
	Financial	3,600	400	130	0	0	0	935	225	1,690	1,910
	Economic	4,300	600	332	0	0	0	1,100	1,890	3,922	378

Remarks : (1) Unit of Quantity : Crop yield - t/ha; Seed and fertilizer - kg/ha

(2) Unit values (Rs./kg) were as follows:

Item		Paddy	Chillie	Onion	G.Gram	L.Bean	Maize	Fertilizer		
								N	P2O5	K2O
Product	Financial	4.40	31.00	8.30	14.00	4.30	3.60			
	Economic	5.50	26.00	7.10	12.00	3.70	4.30			
Seed	Financial	4.40	199	1,300	26	79	20	6.50	6.50	4.80
	Economic	5.50	169	1,105	26	67	30	16.60	16.50	8.30

Table E.4.7 CROP BUDGET UNDER WITH-PROJECT CONDITION

(Unit: Rs./ha)

Crop	Item	Gross Income	Production Cost								Net Benefit
			Material					Draught/ Machinery Power	Labour	Total	
			Seed	Fertilizer			Agro-chemicals				
				N	P2O5	K2O					
Paddy											
Maha	Quantity	5.50	100	115	55	30					
	Financial	24,200	440	748	358	144	298	3,144	2,925	8,056	16,144
	Economic	30,250	550	1,909	908	249	256	2,672	2,835	9,379	20,872
Yala	Quantity	5.00	100	100	55	30					
	Financial	22,000	440	650	358	144	298	3,144	2,925	7,959	14,042
	Economic	27,500	550	1,660	908	249	253	2,672	2,835	9,127	18,374
Chillie	Quantity	1.90	1.85	150	100	100					
	Financial	58,900	368	975	650	480	4,131	761	3,690	11,055	47,845
	Economic	49,400	313	2,490	1,650	830	3,511	647	7,213	16,654	32,746
Bombay Onion	Quantity	15.00	8.50	104	108	92					
	Financial	124,500	11,050	676	702	442	1,868	2,678	6,480	23,896	100,604
	Economic	106,500	9,393	1,726	1,782	764	1,588	2,276	17,388	34,917	71,584
Green Gram	Quantity	1.50	20	25	60	60					
	Financial	21,000	520	163	390	288	1,955	354	1,845	5,515	15,486
	Economic	18,000	520	415	990	498	1,662	301	7,213	11,599	6,401
Long Bean	Quantity	8.00	41	28	199	74					
	Financial	34,400	3,239	182	1,294	355	523	0	4,275	9,868	24,532
	Economic	29,600	2,747	465	3,284	614	530	0	11,813	19,453	10,148
Maize	Quantity	3.50	20	75	85	40					
	Financial	12,600	400	488	553	192	1,882	1,294	675	5,483	7,117
	Economic	15,050	600	1,245	1,403	332	1,600	1,100	2,205	8,485	6,566
Cashew	Quantity	1.00	(0.225 ton/ha of kernels)								
	Financial	22,000	625	300	(Total of		100	490	1,800	3,315	18,685
	Economic	23,000	625	750	Fertilizer)		85	420	1,260	3,140	19,860

Remarks : (1) Unit of Quantity : Crop Yield - t/ha; Seed and fertilizer - kg/ha

(2) Unit values (Rs./kg) were as follows:

Item		Paddy	Chillie	Onion	G.Gram	L.Bean	Maize	Cachew	Fertilizer		
Product	Financial	4.40	31.00	8.30	14.00	4.30	3.60	22.00			
	Economic	5.50	26.00	7.10	12.00	3.70	4.30	23.00	N	P2O5	K2O
Seed	Financial	4.40	199	1,300	26	79	20	-	6.50	6.50	4.80
	Economic	5.50	169	1,105	26	67	30	-	16.60	16.50	8.30

Table E.4.8 AGRICULTURAL ECONOMIC BENEFIT

Item	F	H	IH	MH	I	M	NCRB	NWDZ	Total
I. Net Area (ha)	1,900	42,400	4,700	26,300	61,300	25,000	161,600	13,250	174,850
II. Without Project condition									
1. Production (1,000 tonnes)									
Paddy	3.4	218.4	19.7	18.0	52.5	10.0	321.9	14.0	335.9
Chillie	0.1	11.3	0.4	0.4	0.8	0.2	13.2	0.1	13.3
Pulses	0.3	9.0	0.4	3.0	17.1	4.4	34.2	0.4	34.6
Maize	0.4	1.8	0.0	1.9	7.2	3.2	14.6	0.0	14.7
Others	1.2	0.0	0.0	2.6	25.5	4.2	33.5	0.7	34.1
Net Benefit (Rs.10^6)									
2. Paddy	9.6	719.6	57.1	52.3	152.1	29.0	1,019.7	39.8	1,059.5
Chillie	1.7	178.2	6.7	6.2	13.3	2.4	208.5	1.3	209.8
Pulses	0.1	24.7	1.2	1.5	3.9	1.3	32.7	0.1	32.8
Maize	0.1	1.3	0.0	0.6	2.3	1.0	5.3	0.0	5.3
Others	0.1	0.0	0.0	0.3	2.7	0.4	3.5	0.1	3.6
Total	11.6	923.8	65.0	60.9	174.3	34.1	1,269.7	41.3	1,311.0
III. With Project Condition									
1. Production (1,000 tonnes)									
Paddy	17.4	338.1	44.3	149.8	472.8	230.4	1,252.6	86.6	1,339.2
Chillie	0.2	21.1	1.0	3.3	7.4	3.8	36.7	1.3	38.1
Pulses	0.2	5.6	0.3	1.7	5.3	2.6	15.8	7.5	23.3
Maize	0.3	9.1	0.4	2.9	7.6	3.5	23.8	7.0	30.8
Onion	1.1	18.0	1.1	4.4	17.0	8.1	49.5	4.8	54.3
Cashew	0.0	0.0	0.0	10.0	10.0	0.0	10.0	0.0	20.0
Others	0.7	20.8	1.0	3.8	17.2	8.0	51.5	16.0	67.5
2. Net Benefit (Rs.10^6)									
Paddy	65.1	1,268.9	165.6	560.5	1,769.6	862.1	4,691.8	323.8	5,015.6
Chillie	3.3	363.5	16.4	56.7	127.7	65.5	633.1	22.9	656.0
Pulses	1.0	23.8	1.2	3.6	22.7	11.3	63.6	31.9	95.5
Maize	0.6	17.1	0.8	5.4	14.2	6.6	44.7	13.1	57.8
Onion	5.0	85.9	5.0	20.8	80.9	38.7	236.3	22.9	259.2
Cashew	0.0	0.0	0.0	198.6	198.6	0.0	397.2	0.0	397.2
Others	0.9	26.4	1.2	4.9	21.8	10.1	65.3	20.3	85.6
Total	75.9	1,785.6	190.2	850.5	2,235.5	994.3	6,132.0	434.9	6,566.9
IV. Incremental Benefit									
Paddy	55.5	549.3	108.5	508.2	1,617.5	833.1	3,672.1	284.0	3,956.1
Chillie	1.6	185.3	9.7	50.5	114.4	63.1	424.6	21.6	446.2
Pulses	0.9	(0.9)	0.0	2.1	18.8	10.0	30.9	31.8	62.7
Maize	0.5	15.8	0.8	4.8	11.9	5.6	39.4	13.1	52.5
Onion	5.0	85.9	5.0	20.8	80.9	38.7	236.3	22.9	259.2
Cashew	0.0	0.0	0.0	198.6	198.6	0.0	397.2	0.0	397.2
Others	0.8	26.4	1.2	4.6	19.1	9.7	61.8	20.2	82.0
Total									
(Rs.10^6)	64.3	861.8	125.2	789.6	2,061.2	960.2	4,862.3	393.6	5,255.9
(US$10^6)	2.0	26.5	3.9	24.3	63.4	29.5	149.6	12.1	161.7
V. Benefit per Unit Area (US$/ha)	1,041	625	820	924	1,035	1,182	926	914	925

Remark : *1 Raw nut basis

Table E.4.9 LABOUR REQUIREMENT UNDER WITHOUT- AND WITH-PROJECT CONDITION

Item	F	H	IH	MH	I	M	NWDZ	Total
(A) Without Project Condition								
I. Planted Area (ha)								
1 Irrigaed Field								
Paddy(Maha)	430	40,600	4,700	4,300	12,400	2,500	2,550	67,480
(Yala)	220	11,900	1,080	990	2,600	400	1,100	18,290
Chillie	50	7,500	280	260	560	100	50	8,800
Pulses	20	9,000	430	390	340	200	0	10,380
Maize	0	900	0	0	0	0	0	900
2 Rainfed Field								
Paddy(Maha)	440	-	-	-	500	0	350	1,290
(Yala)	60	-	-	-	0	0	350	410
Chillie	70	-	-	-	0	0	20	90
Pulses	300	-	-	3,280	21,000	5,200	550	30,330
Maize	370	-	-	1,600	6,000	2,700	40	10,710
Others	290	-	-	850	8,500	1,400	220	11,260
II. Labour Requirement (1,000)								
1 Family Labour								
Paddy(Maha)	22	1,015	118	108	323	63	73	1,719
(Yala)	7	298	27	25	65	10	36	468
Chillie	12	885	33	31	66	12	8	1,046
Pulses	26	1,179	56	310	1,704	437	43	3,756
Maize	20	50	0	88	330	149	2	639
Others	40	0	0	116	1,165	192	30	1,543
Sub-total	127	3,426	234	678	3,652	862	192	9,170
2 Hired Labour								
Paddy(Maha)	41	2,436	282	258	762	150	165	4,094
(Yala)	15	714	65	59	156	24	78	1,112
Chillie	7	495	18	17	37	7	4	585
Pulses	8	369	18	98	539	138	14	1,184
Maize	2	9	0	8	30	14	0	63
Others	13	0	0	39	391	64	10	518
Sub-total	87	4,023	383	480	1,914	397	272	7,555
3 Total	214	7,449	617	1,157	5,566	1,258	464	16,726
(B) With Project Condition								
I. Planted Area (ha)								
1 Irrigaed Field								
Paddy(Maha)	1,800	40,300	4,500	15,500	48,600	23,700	8,250	142,650
(Yala)	1,500	23,280	3,900	12,900	41,100	20,000	8,250	110,930
Chillie	100	11,100	500	1,730	3,900	2,000	700	20,030
Pulses	150	3,720	190	870	3,550	1,760	4,980	15,220
Maize	90	2,600	120	830	2,170	1,000	2,000	8,810
Onion	70	1,200	70	290	1,130	540	320	3,620
Others	90	2,600	120	480	2,150	1,000	2,000	8,440
II. Labour Requirement (1,000)								
1 Family Labour								
Paddy(Maha)	45	1,008	113	388	1,215	593	206	3,566
(Yala)	38	582	98	323	1,028	500	206	2,773
Chillie	15	1,632	74	254	573	294	103	2,944
Pulses	26	647	33	151	618	306	867	2,648
Maize	5	143	7	46	119	55	110	485
Onion	29	490	29	118	461	220	131	1,477
Others	25	728	34	134	602	280	560	2,363
Sub-total	182	5,229	385	1,414	4,616	2,248	2,182	16,257
2 Hired Labour								
Paddy(Maha)	117	2,620	293	1,008	3,159	1,541	536	9,272
(Yala)	98	1,513	254	839	2,672	1,300	536	7,210
Chillie	8	910	41	142	320	164	57	1,642
Pulses	8	205	10	48	195	97	274	837
Maize	1	39	2	12	33	15	30	132
Onion	10	173	10	42	163	78	46	521
Others	9	247	11	46	204	95	190	802
Sub-total	251	5,706	621	2,136	6,745	3,289	1,670	20,417
3 Total	433	10,935	1,006	3,550	11,361	5,537	3,852	36,674
(C) Increment of Required Labour (1,000)	219	3,486	389	2,392	5,795	4,279	3,388	19,949

Remarks : Unit requirement of labour (man-day/ha) is as follows:

		Paddy(M)	Paddy(Y)	Chillie	Pulses	Maize	Onion	Others
Irrigated (W-P)	Family	25	25	147	174	55	408	280
	Hired	65	65	82	55	15	144	95
Irrigated (W/O-P)	Family	25	25	118	131	55	306	210
	Hired	60	60	66	41	10	108	71
Rainfed	Family	25	-	89	79	55	-	137
	Hired	35	-	50	25	5	-	46

Table E.4.10 NET FARM INCOME AND CAPACITY TO PAY

Item	F	H	IH	MH	I	M	NWDZ
(A) A Typical Existing Farmer							
- Average Size of Farm Holding (ha)	0.7	1.1	1.1	1.1	1.1	1.4	0.8
I. Without Project Condition in Irrigated Field							
1. Planted Area (ha)							
Paddy (Maha)	0.70	1.05	1.10	1.10	1.07	1.40	0.80
(Yala)	0.36	0.31	0.25	0.25	0.23	0.22	0.35
Chillie	0.08	0.19	0.07	0.07	0.05	0.06	0.02
Pulses	0.03	0.23	0.10	0.10	0.03	0.11	0.00
Maize	0.00	0.02	0.00	0.00	0.00	0.00	0.00
2. Net Farm Income (Rs./annum)							
Paddy (Maha)	5,382	9,721	8,458	8,458	8,258	10,765	6,151
(Yala)	2,031	1,751	1,433	1,436	1,277	1,270	1,957
Chillie	2,944	7,037	2,370	2,405	1,754	2,025	567
Pulses	286	2,048	883	875	258	982	0
Maize	0	66	0	0	0	0	0
Total	10,643	20,622	13,144	13,175	11,548	15,042	8,676
3. Capacity to Pay (Rs./annum)	(6,277)	3,702	(3,776)	(3,745)	(5,372)	(1,878)	(8,244)
II. With Project Condition							
1. Planted Area (ha)							
Paddy (Maha)	0.66	1.05	1.05	1.05	1.04	1.33	0.50
(Yala)	0.55	0.60	0.91	0.87	0.88	1.12	0.50
Chillie	0.04	0.29	0.12	0.12	0.08	0.11	0.04
Pulses	0.06	0.10	0.04	0.06	0.08	0.10	0.30
Maize	0.03	0.07	0.03	0.06	0.05	0.06	0.12
Onion	0.03	0.03	0.02	0.02	0.02	0.03	0.02
Others	0.03	0.07	0.03	0.03	0.05	0.06	0.12
2. Net Farm Income (Rs./annum)							
Paddy (Maha)	10,706	16,879	17,003	16,887	16,824	21,426	8,042
(Yala)	7,760	8,481	12,817	12,224	12,375	15,727	6,995
Chillie	1,763	13,778	5,599	5,586	4,001	5,359	2,022
Pulses	856	1,495	689	909	1,179	1,526	4,656
Maize	236	480	200	399	331	399	859
Onion	2,595	3,132	1,648	1,969	2,438	3,042	1,944
Others	813	1,655	689	795	1,131	1,374	2,962
Total	24,729	45,899	38,644	38,768	38,278	48,853	27,480
3. Capacity to Pay (Rs./annum)	7,809	28,979	21,724	21,848	21,358	31,933	10,560
4. Incremental Farm Income (Rs./annum)	14,086	25,277	25,500	25,594	26,731	33,810	18,804
(B) A New Settler							
- Average Size of Farm Holding (ha)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
I. With Project Condition							
1. Planted Area (ha)							
Paddy (Maha)	0.95	0.95	0.96	0.95	0.95	0.95	0.62
(Yala)	0.79	0.55	0.83	0.79	0.80	0.80	0.62
Chillie	0.05	0.26	0.11	0.11	0.08	0.08	0.05
Pulses	0.08	0.09	0.04	0.05	0.07	0.07	0.38
Maize	0.05	0.06	0.03	0.05	0.04	0.04	0.15
Onion	0.04	0.03	0.01	0.02	0.02	0.02	0.02
Others	0.05	0.06	0.03	0.03	0.04	0.04	0.15
2. Net Farm Income (Rs./annum)							
Paddy (Maha)	15,294	15,344	15,457	15,352	15,294	15,305	10,052
(Yala)	11,086	7,710	11,652	11,113	11,250	11,234	8,743
Chillie	2,518	12,525	5,090	5,078	3,637	3,828	2,528
Pulses	1,223	1,359	626	827	1,072	1,090	5,820
Maize	337	436	182	362	301	285	1,074
Onion	3,706	2,847	1,498	1,790	2,216	2,173	2,430
Others	1,162	1,504	626	722	1,028	981	3,703
Total	35,326	41,726	35,131	35,244	34,799	34,895	34,350
3. Capacity to Pay (Rs./annum)	18,406	24,806	18,211	18,324	17,879	17,975	17,430

Remarks : (1) A typical farm size is derived from asn average size of a District with which a System is concerned.

(2) Net farm income (Rs./ha) was as follows:

	Paddy (M)	Paddy (Y)	Chillie	Pulses	Maize	Onion	Others
Without-Projec	7,689	5,671	36,165	8,771	2,823	-	13,124
With-Project	16,144	14,042	47,845	15,486	7,117	100,604	24,532

But paddy in System H was Rs.9,225/ha in Maha under without project condition.

(3) Living expense is assumed at Rs.16.920/family (refer to Phase I report).