owned enterprises have been peoplized, and over 40 others are presently in various stages of divestiture.

(2) Poverty alleviation progrgammes

The stabilization and stuctural adjustment measures that are being adopted to improve economic efficiency and growth will invariably involve certain social costs. The benefits will not become available immediately. The Government poverty alleviation policy is to protect the most vulnerable groups against adjustment costs during the interim period.

a. Janasaviya programme

Janasaviya programme was launched by the Government during the last quarter of 1989. The identification of families for Janasaviya benefits is done by the respective communities, the only selection criteria being a monthly family income and household earning of less than Rs. 700. Each selected family is given a pool of resources valued at Rs. 2,500 a month during a 24 month period for their consumption and investment purposes. Basically, Rs. 1,458 is given for consumption of which Rs. 1,000 is for direct consumption and the balance is deposited in the household savings account. Beneficiaries are free to encash those deposits whenever they need funds for consumption purposes. The balance amount of Rs. 1,042 per month is deposited in their savings account maintained by the National Savings Bank. With the consumption component the beneficiaries could buy locally produced food and non-food items through cooporative and authorised retail outlets.

Each Janasaviya beneficiary family has to contribute 24 man days of labour per month for infrastucture development activities in the area. They were given credit facilities by financial institutions for income generating activities without collaterals.

The present coverage of the Janasaviya programme is shown in the table below.

Round	Date Commenced	No.of Families	AGA Divisions
1.	Oct. 1989	154,345	28
2.	Dec. 1990	104,080	22
3.	Mar. 1992		

Source: Annual Report 1991 Central Bank of Sri Lanka

The programme is expected to cover the entire island in 11 rounds.

Some of the benefits anticipated from the Janasaviya programme are the motivation of the poor towards entrepreneurship, increasing agricultural production, creating awareness of social responsibility, providing skills,training and technical knowhow, improving health and nutrition and generally enhancing the social well-being of the community. In order to realize these objectives, the Janasaviya Trust Fund, financed by several international doners, was established in May 1991.

b. Food stamps

Food stamps are available to poor families with monthly incomes less than Rs. 700. As more families receive assistance under Janasaviya, the number of food

stamp recipients have declined. From a total of 7.797 million persons receiving food stamps in 1989 (46% of the population) the number declined to 6.796 million in 1991 (40% of the population).

c. School mid-day meal

A programme for the provision of a free mid-day meal to 4 million school children in 10,000 schools across the country has been implemented since May 1989. The programme cost Rs. 1,490 million in 1990.

6.1.2 National agricultural development plan

Public Investment, 1991-1995 provides the latest national economic policy for the coming five years. The rolling plan concept in public investment followed by the Government has enabled the programme to be reviewed and revised every year taking into account changes in the availability of resources and national priorities and objectives.

The major goals for the agriculture sector are:

a. moving towardsa higher degree of self reliance in basic food commodities viz. rice, fish, sugar, pulses and milk;

b. increasing the productivity of the tree crop sector to expand export earnings; and

c. promoting diversification and encuoraging the establishment of agro-industries and increasing incomes and employment opportunities in the rural areas;

The key elements in the Governments strategy to these major goals emphasize following development programmes and policies.

a. ehabilitation of existing irrigation facilities while improving land, water, forestry and other resources management;

b. strengthening of agricultural support services, especially in extension and research;

c. focussing of development efforts on a well delimited regional basis;

d. ensuring the adequacy of producer incentives and marketing infrastucture for agricultural commodities; and

e. restucturing and improving the capacity of key institutions in the agricultural sector which provide basic services.

Policy re-orientation measures affected so far include: (i) opening of seed multiplication and distribution to the private sector; (ii) giving the Government sponsored farmer organizations the legal instruments to conduct their affairs more independently; (iii) reforms to the Agrarian Services Act enabling wider crop choices in lands where, by law, only paddy cultivation was permitted; and (iv) divestiture of several Government agencies performing commercial operations.

(1) Fertilizer subsidy

The Government subsidy on fertilizer was removed in January 1990 and its effects were reflected in the sharp decline by 18% in the use of fertilizer in 1990. Paddy sector which accounted for 40% of tital issues dropped significantly by 29%. In 1991, fertilizer use in paddy sector showed a 9% increase over the previous year. With a view to minimize the adverse impact of higher fertilizer prices on farmers, fertilizer recommendations for paddy and some OFCs were revised by the Department of Agriculture in 1990, and use of straight fertilizers were rcommended in place of mixtures.

(2) Peoplization of sugar industry

The development of sugar industry has until recently depended on Government investment and support. This position has changed with the conversion of the Srl Lanka Sugar Corporation into a public company, the Sri Lanka Sugar Company, which owned and managed the plantations and factories at Kanthale, Hingurana and Sevenagala. This company was converted once more, in 1991, to a holding company, and the three pantationa and factories converted into three autonomous public companies as a prelude to peoplization. It is expected that the process of peoplization of these three industries will be completed in 1992.

(3) Privatization of seed production

The Seed Division of DOA through its seed farms and processing units is producing foundation, registered and certified seeds, the latter for distribution throughout the country. The national seed requirement is partly met by private contract growers of too who produce and supply certified seeds of paddy and potato. The Seed Certification Division of DOA provides the quality control services. The DOA seed production programme is heavily subsidized and yet incurrs annual losses. Subsidies to DOA has dicouraged private sector participation in seed production and they confined their activities to importation and distribution of DOA recommended vegetable seeds. The Governments decision to withdraw from commercial seed business has necessitated a published seed policy that will encourage private sector to enter seed business. This is being established with assistance from Diversified Agricultural Research Project (DARP) funded by USAID.

The World Bank/IDA assistance has been proposed to establish seed legislation to attract commercial interest and to accelerate the process of introducing new material and developing recommendations. The Government policy on import of seeds and planting materials was revised in December, 1991, allowing imports under the categories if (i) without restriction; (ii) with special requirements fulfilled; and (iii) prohibited except to research institutes.

6.1.3 Regional development plans

(1) Southern area development strategy

At the national level, development planning for the Southern Province is embodied in the Southern Area Development Strategy of the Central Government. Of the projects considered for implementation, the proposal for the extension of Matara - Kataragama railway line has particular relevence to the Study area. There are three possible traces of which the one proposed by the Provincial Council intersects Embilipitiya town in the Walawe project area. The other traces run close to the Matara - Hambantota trunk road. No final decision has been made as yet. Other elements in the Strategy include Koggala free trade zone, Galle port, Southern province rural development project, etc.

(2) Rural development project

Planning and implementation of regional rural development projects under the Area Development Strategy are carried out by the Southern Province Development Project (SPDP) of the Southern Provincial Council.

a. Integrated rural development programme- Hambantota (HIRDEP)

HIRDEP which is financially supported by NORAD, has been operational in the district since 1979. During the period, the it has implemented many small scale projects in the district with the objective of creating employment, generating income and promoting small scale enterprises. Under the programme, rehabilitation of two minor irrigation tanks located within the extension area, namely, Wediwewa and Kattana tanks has been completed. Settlement assistance provided to each of 95 families under these tanks included housing grant (Rs. 2,500), settlement allowance (Rs. 100 per month for 6 months) and land development payment (Rs.1,200 per plot). Rehabilitation of Bedigantota, Bolhindawewa and Andiyagama tanks, also located in the extension area, were planned. Further, rehabilitation of Belagaswewa, Katuwana and Julgaswekadawewa tanks in the southern region of the extension area were envisaged to rectify the flood problems of Karagan Lewaya.

b. Road development projects

Three road development projects within the study area were identified by the SPDP for construction with ADB financial assistance. Of these, the Suriyawewa-Mirijjawila trunk road that traverses the study area had been approved for implementation. The other two link roads earmarked for rehabilitation were: (a) 7.40 km. Meegahajandura-Suriyawewa class D road segment; and, (b) 9.60 km. Koggalla-Suriyawewa class D road segment.

Work on all proposed tank rehabilitation and road development programmes within the study area have been suspended by the SPDP pending the outcome of Walawe Left Bank Irrigation Upgrading and Extension Project.

6.1.4 Previous sevelopments and sevelopment plans

(1) Walawe development projects during 1960s and 1970s

Project for rehabilitation and resettlement of Udawalawe river valley was first identified by the National Planning Council in 1959. In 1962, Engineering Consultants, Inc., USA conducted a feasibility study of the Walawe Reservoir with dual purposes of irrigation and power generation. The Uda Walawe dam was to collect water from the downstream basin of the planned Samanalawewa and Weli Oya Projects to irrigate 20,000 ha and 15,000 ha in Maha and Yala seasons, respectively.

The Government started construction of the Uda Walawe dam in July 1963, and by end 1967, work on the dam and power plant and part of the Right Bank (RB) and Left Bank (LB) main canals were completed. The Chandrikawewa reservoir was supplimented with water from the Uda Walawe reservoir the same year.

Investigations and planning of agricultural development commenced much later than the engineering studies. Under the Colombo Plan Technical Cooperation Scheme, Huntings Technical Services Ltd., UK completed a development plan in 1968, which covered the cropping, animal husbandry and farm settlement. The plan proposed development of

42,000 ha (17,000 ha in RB and 24,800 ha in LB) cultivating paddy, sugarcane, cotton and subsidiary crops on both settler and estate bases.

In March 1969, the Government requested the ADB to assist in financing part of the development cost of the RB area of the Walawe Development Scheme. At that time, the LB main canal was practically completed up to 27 km. The plan was to connect the Walawe reservoir with existing village tanks and newly constructed Habaraluwewa tank. A township was constructed in Suriyawewa which included houses, roads and other infrastuctures.

The Walawe Development Project under ADB finance aimed at rural and irrigation development exclusively for the Right Bank area. The Government introduced a new cropping pattern which was not conceived in the previous plans. The main features were: (i) double cropping of paddy on lowland soils; (ii) sugarcane on high land soils of the northern LB; and (iii) Yala cotton in rotation with with subsidiary food crops in southern zones of both banks. The total area was estimated to be 32,832 ha (13,422 ha in RB including the Chandrikawewa area and 19,410 ha in LB). The existing and the proposed land use are shown in Table A6.1-6.

The executing agency of the Project was the River Valleys Development Board (RVDB), a Government Corporation created in 1965, responsible for overall development of the Walawe river basin. The Project implementation commenced in 1970. The original disbursement period of the ADB loan was three and one half years. However, it took nine years until works were substantially completed in 1979. An overall assessment of the project works was made by the ADB, and a Project Completion Report (PCR) was prepared in 1979. The main features of the Walawe dam and the reservoir are given in the Table A6.1-7.

(2) Walawe irrigation improvement project during 1980s

The PCR of the Walawe Development Project stated that the project performance was less than satisfactory and the irrigation system had structural and operational problems resulting in inequitable water distribution and low irrigation afficiency. ADB recognized the need for a carefully designed rehabilitation and improvement programme to rectify the physical and institutional inadequacies encountered, if the long term objectives of the project were to be realized. It was anticipated that without the improvement measures, continuing inefficient and excessive water use in the RB area will prevent full development of the irrigation potential of the LB area.

The feasibility study on Walawe Irrigation Improvement Project (WIIP) was prepared in 1984 by the Government with assistance of EEC and ADB.

WIIP aims at improving agricultural productivity, rural employment and farm incomes through rehabilitation and improvement of the existing RB area covering about 12,000 net ha. It is expected that implementation of the project would allow further development of irrigated agriculture on the LB area.

The scope of WIIP includes: (i) irrigation system improvement involving main, branch, distributary canals, on-farm irrigation distribution system and appurtenant structures; (ii) rehabilitation of service roads; (iii) provision of domestic water supply in the scattered settlements and village centers; (iv) provision of essential equipment and vehicles for sustained operationand maintenance; and (v) establishment of a training unit in the project office.

The total project cost was initially estimated at US$13.7, but revised to US$23.0 million in 1989, on account of price escalations and delayed implementation. It was estimated that the increases in the cropped area, cropping intensity and crop yields would result in an incremental production valued at about US$7.4 million (1990 price). EIIR was estimated at 35% at the appraisal of ADB in 1984. Direct beneficiaries were estimated at some 11,000 farm households with a total farm population of about 67,000.

The WIIP was started in 1986 on a five year programme. The Mahaweli Authority of Sri Lanka (MASL) under the Ministry of Lands, Irrigation and Mahaweli Development, which took over the management of Walawe project from RVDB in 1982, is the project executing agency responsible for physical implementation of the project works as well as for its agricultural development. During 1988 and 1989, the project works were suspended due to violent civil disturbances that prevailed in the project area. According to MASL, some 40% of the physical works in terms of the project works have been completed as at end October 1991, and it is expected that the project will be completed by end 1992.

(3) Samanalawewa hydropower project

The Samanalawewa dam and appurtenant power plant are under construction at upstream of Uda Walawe Reservoir. The project is executed under the management of the Ceylon Electricity Board (CEB) in accordance with the Master Plan for the future supply of electricity in Sri Lanka that was made by the CEB in 1987.

At present, the dam and power plant are almost completed and the grouting work is in progress. The commissioning of power generation is scheduled for 1993. The main features of the Samanalawewa Hydropower Project are shown in Table A6.1-8.

6.2 Socio-economic Situation

6.2.1 Administrative organization

In view of the immense magnitude of public investment and the tight time target for completion of the Accelerated Mahaweli Development Programme (AMDP), the Mahaweli Authority of Sri Lanka (MASL) was established in 1979, under the exclusive Government Ministry of Mahaweli Development, as the umbrella organization for planning and implementing the programme, The MASL was also empowered by an act of parliament, to take over some of the functions of other Ministries within its declared zones. A number of functionally specialized executing agencies were set up under the MASL for this purpose. The organizational structure of MASL, which is presently under the Ministry of lands, Irrigation and Mahaweli Development (MLIMD) is shown in Fig. A6.2-1.

Mahaweli Economic Agency (MEA) established under the MASL is the organization responsible for settling of farm families and provision of agricultural and social infrastructures for the socio-economic development of the settlement areas. The project management concept of MEA is based on the `unified system', where a Resident Project Manager (RPM), a Block Manager (BM), and a Unit Manager (UM) take over the responsibility for integrated management and development of a geographic areas at three different levels, namely, the project, the block and the unit comprising 10,000 - 15,000, 2,000 and 300 settler families, respectively. The Project and the Block levels are supported by functional specialists while at the Unit level, the UM is assisted by a Field Assistant (FA) as the field agricultural extension agent. The project management organization is shown in Fig. A6.2-2

The Walawe basin has been declared a Special Area under the Mahaweli Act of 1979, and its administration and management was brought under the purview of MASL/MEA. The MEA management area consists of five administrative Blocks having 34 Unit areas in the RB irrigation area and two administrative Blocks, namely, Kiriibbanwewa with six Unit areas and Suriyawewa with eight Unit areas in the LB irrigation area. In the Suriyawewa Block, three Unit areas have been settled with families, but without irrigation facilities.

Although situated in the Walawe basin, the Sevanagala sugarcane area and the undeveloped areas south of Suriyawewa, both in the LB, were left out of the MEA management. The

Sevanagala sugar factory and the plantation were managed by the Sri Lanka Sugar Corporation until 1989, when the complex was first converted into a public Compny and in 1991, into an autonomous holding company as a prelude to peoplization/privatization.

Administration of the Extension area came under the purview of the Government Agent (GA), Hambantota, through the three divisional offices of Assistant Government Agent (AGA) located at Hambantota, Ambalantota and Suriyawewa. With the implementation of the Provincial Government system, the divisional offices have been converted to Divisional Secretariats each headed by a Divisional Secretary reporting to the Provincial Secretary. The GA is responsible for the district level implementation and administration of the Central Government policy.

6.2.2 Population, households and farmers

(1) Population

Except for the Extension area, recent statistical data on the present population in and around the Study area are not available. Population estimates, therefore, are made based on the records on number of farm and non farm families and the average values derived from the socio-economic survey of 1991.

In the Walawe project area, it is recorded that there are 16,892 resident families in the RB area and 10,082 resident families in the MEA managed LB area. The details are shown in Table A6.2-1. 8,432 families live in the LB existing irrigated area and the balance 1,650 in the un-irrigated area. At an average family size of 5.7 per household, the total population of the area is estimated at 144,350; 96,280 persons in the RB and 48,070 persons in the MEA managed LB irrigated area. The percentages of age class distribution in the survey sample is summerized below.

Age class (years)	<9	10-19	20-29	30-39	40-49	50-60	>60
Percentage distribution	15.4	27.1	20.4	12.4	10.0	7.1	7.6

Source: Socio-economic Survey 1991.

3521 sugarcane farm families are settled in the Sevenagala sugar area both in the irrigated and rainfed sectors. The number of occupants per household is 5.8. Thus the total population in the plantation area is estimated at 20,420.

A census of the inhabitants in the Extension area was carried out by the PMU of MASL in 1991/92. This study covered the Extension area and some adjoining areas as well, since a phisical demarcation of the area was not possible at the time. The total population in the survey area consisted of 26,865 persons. There is a slight over estimation arising from inclusion of settlers in areas outside the Extension area. Double counting of settlers in the unirrigated MEA managed area was avoided by excluding them from the MEA total settlement figure for the LB.

The general population of the Study area is thus estimated at 95,347.

(2) Households

The number of faem households in the Study area is assumed to be equal to the number of resident families.

The total number of households in the LB old area is estimated at 11,953 of which 8,432 are located in the MEA managed irrigated area and 3521 are located in the sugarcane area. The total number of households in the Extension area according to the census survey is 6,018 (see Table A6.2-2) and the total for the Study area is estimated at 17,970.

(3) Farmers

In the sugarcane area, there are 2771 cane farmers. 1,824 farm families have been settled in the Kiriibbanwewa block area, though the present irrigated area is 1,420 ha. In the Suriyawewa Block, the number of farm families is 3983, which includes the 1,650 settlements in presently unirrigated Unit areas. The settlers in the unirrigated areas of Suriyawewa Block and in the Extension area are mostly, part time farmers doing rainfed cultivation in the Maha season. During the off season, they usually work as farm labourers in the irrigated areas.

6.3 Agrcultural Activities

6.3.1 Cropping pattern and cultivated area

(1) Sugarcane area

A rigid cropping pattern with sugarcane on moderate and well drained RBE soils and paddy on poorly drained LHG soils is practiced in the irrigated sector. Sugarcane is cultivated on a four year crop cycle consisting of one plant crop and three ratoon crops. The plant crop generally takes about 13 - 15 months to harvest while the ratoon crops take about 12 months to harvest. Paddy is cultivated in the two cropping seasons of Maha and Yala. Timing of paddy cultivation generally falls in line with that practiced in the MEA area discussed below. Cultivated extents under each crop is shown in Table (Annex-VII).

(2) MEA managed area

Paddy dominant cropping pattern is practiced in the irrigated areas of Kiriibbanwewa and Suriyawewa Blocks with only a marginal reduction in the paddy extent cultivated during the Yala season. Land preparation usually commences in accordance with the accepted cropping calender in the months of October and April for the Maha and Yala seasons, repectively. Varieties of 3 - 3.5 month age class are recommended for both seasons. In principle, the time period allowed for completion of land preparation is 30 days. Harvesting is completed by mid February and mid August, repectively, for Maha and Yala seasons.

The extent under irrigated banana has been steadily increasing in the area. The recommended production cycle is 7 years. Extents under OFCs is quite small. The present cropping pattern is shown in Fig. A6.3-1 and the cropped areas are shown in Table (Annex-III).

(3) Extension area

In the Extension area, paddy is cultivated under minor irrigation tanks and OFCs in the highlands and chenas durind the Maha season. A limited extent of sesame is grown in the Yala season in the chenas.

Although about 290 ha are situated in the irrigation command of some 17 tanks, Maha paddy cultivation is very irregular as the irrigation water supply is not stable. In the highland homesteads and chenas, annual crops such as pulses, maize, chilli and vegetables are grown but the extents are highly variable from season to season, subject to weather and farmers economic comdition.

6.3.2 Farming practices, yield and production

(1) Sugarcane

Land preperation in the allottees fields involving ripping, cross ripping, harrowing and cross harrowing are carried out using heavy machinery by the Company. In the irrigated sector planting is prefered during June-December period since planting/ratooning prior to May results in profuse flowering later in the year. Seven to nine month old seed cane is laid in furrows spaced 1.4 m apart as three budded sets, with upto 33% overlap, depending on the seed quality and prevailing weather conditions. The sets are then covered with a thin layer of loose earth. Ten to eleven tons of seed cane are used to establish one ha.

Basal application of fertilizer is done at the time of planting or following off-baring in the case of ratoons. First and the second top dressings are applied at 2.5 and 3.5 months later, respectively. Top dressings are followed by earthing up operation to cover the fertilizer and to reshape the furrows into ridges.

Weed growth is controlled by using gramaxone and diuron in combination, three weeks after planting/ratooning. A light manual weeding is required one month later. In rainfed cane, a second application of gramaxone is done following the rains.

Roguing to remove Smut and GSD infected plants is carried out when the crop is about four months and eight months old.

Crop irrigation is done by siphoning the water from the lined field canals into the furrow using short lengths of alkathene pipes. First irrigation is given within two days of planting/ ratooning, and the next eight irrigations at weekly intervals. Thereafter, the crop is irrigated at 2-week intervals until two months before harvesting. Sugarcane is usually harvested green.

Sugarcane yields under rainfed conditions have been subject to variation. Under irrigated conditions, however, the crop performed well, recording yield levels (97.92 t/ha in 1991), that are consistantly higher than those for Hingurana and Kanthale. Yield and production data of Sevanagala sugarcane plantation are shown in Table A6.3-1.

(2) Paddy

Paddy is the predominant crop in MEA managed area in both Maha and Yala seasons. The general cultivation sequence follows the cropping calender agreed upon at cultivation meetings held Block wise, prior to the commencement of each season.

Land preparation under irrigation commences with impounding the field with water which is followed by first and the second ploughing operations. Usually, the repair and plastering of the field bunds are completed before the puddling and levelling operations. Ploughing is most commonly done by 2-wheel tractors. The methods of land preperation are analysed in Table A6.3-2.

Paddy varieties of 3.5 month age class are popular among farmers for both seasons. Crop establishment is almost entirely by broadcast method, and an attempt is being made to introduce row transplanting using the transplanting machine.

Seed paddy is soaked for 24 hours and the pre-germinated seeds are broadcast sown at a rate of 150 - 200 kg/ha on a wet field. The seed rate used, which is higher than the recommended 120 kg/ha, is said to smother weeds and give higher yields. The methods of crop establishment are shown in Table A6.3-3.

Wetting of the sown field is done 2 - 3 days after sowing. Once the plant establishment is complete, a 5-day rotational water issue is practiced.

Basal fertilizer mixture (V mixture), is applied before or within one week of sowing. Top dressings of urea is applied at 3 weeks and 5 week stage. Top dressing mixture (TDM) is applied when the plants are 7 - 8 weeka old. All farmers use fertilizers, often in excess of the recommended dosages, but organic manure is rarely used.

Among pests and diseases, brown plant hopper, stem borer, gall midtch, blast and sheath blight are observed in the area. Agrochemicals are extensively used to control pest and diseases as well as weeds.

Harvesting commences when 80% of the seeds in the panicles are mature and turn brown in colour.

Walawe project area comprising RB and LB irrigated area is considered as a separate agricultural district in the conduct of national paddy production surveys by the Department of Census and Statistics. Paddy production statistics show that Walawe project area has been consistently recording yield levels well above the other production districts in the country, at least over the last eight years. Production and yield data in the area are presented in Table A6.3-4.

(3) Banana

Banana has emerged as an important cash crop in the area with an increasing extents being cultivated in the irrigated fields. Suckers are the popular planting material used and are planted at a spacing of 3m x3m, in pits, usually after the Maha rains. The crop is fertilized regularly at 3 month intervals and the plants are cleaned of dead and hanging trees to avoid possible disease incidence. Only two suckers are maintained per clump to reach maturity. Irrigation of banana fields once every fortnight is adequate to give good bunch yields. The most widely cultivated variety in the area `Embul'is relatively free of pest and diseases. The first harvest is possible in 9 - 11 months and thereafter, successive generations of daughter plants establishes a regular production pattern that will enable the farmer to have a weekly harvest. A seven year production cycle followed by a rotation is recommended for banana.

(4) Other crops

The extents cultivated in other crops under irrigation are very limited. Production and yield data of OFCs are shown in Table A6.3-5.

6.3.3 Livestock

All the important livestock forms such as cattle, poultry, goat, and piggery are found in the study area. In 1990, the Draught Animal and Dairy Development Project (DA&DDP) of MASL formally took over the responsibility of livestock development in the Walawe project area. Since then, the DA&DDP has been actively involved in vaccination and upgrading projects as well as in releasing day old chicks and piglings to the farmers. It also manages two livestock farms: Thunkama farm in the RB area and Mahagama farm in the LB area.

A cattle census conducted in 1990 showed that the Walawe project area carried a population of 28,000 heads. Of this, 12,800 heads (45%) were in the MEA managed area LB, and the Suriyawewa Block alone had 8,800 heads or 31% of the total population. In addition, it is estimated that the Extension area supports further 8000 heads owned by herdsmen locally known as `Gambaras'. The herd is composed almost entirely of the low productive local breed characterized by low body weight and milk yield. The details are shown in Tables A6.3-6 and A6.3-7.

In terms of the large population in the area and the extensive land area required to support them, cattle in the Study area assumes priority over other forms of livestock. An exact assessment of the cattle population in the Extension area within a short time frame is difficult due to the nomadic management system practiced by the herdsmen. The herds are moved frequently from place to place in search of drinking water sources and pastures. According to information gathered through direct interviews, nearly 50 cattle owners with individual herd sizes ranging between 50 to 350 use the Extension area and the largely undeveloped lands to its north-west for grazing their animals. The herdsmen preferred areas north of Wediwewa and Gonnoruwa on account of the abundance of village tanks and better pasture lands. The southern part of the Extension area is mostly used by cattle owners from Ridiyagama settlement and Hambantota/ Ambalantota areas.

The importance of livestock development in the project area can be viewed in terms of the benefits such as supply of draught power, provision of nutritional requirements, generation of additional income, etc.

Use of animal draught for land preparation has declined rapidly from 46% in 1985 to nearly 10% in 1991 as shown in Table A6.3-2. For haulage purposes, use of animal draught is mostly localized in LB areas.

The share of animal protein in the total protein per capita availability for Sri Lanka remain in par with the average for other developing countries. However, it is far below the world average of 35% and that for developed countries of 57%. Findings of a 1992 survey conducted by MEA in Habarugala Unit of Kiriibbanwewa Block indicated that the protein consumption of the inhabitants in the project area could be far below the national level.

The DA&DDP promotes the concept of two cows and a follower per homestead in the Mahaweli project areas. Although the economics of this system has not been fully worked out, the DA&DDP estimates that an annual income of Rs. 6,000 per family is possible.

In any irrigated settlement scheme, livestock in a variety of domestic forms will eventually find its way along with the settlements. Based on the Socio-economic survey (1991) it is estimated that about 12% of the new settler families will take up animal husbandry. Livestock development strategy for the area should give due consideration to: (i) present herd using the Extension area for free grazing; and (ii) rearing of livestock by settlers

Some basic concepts for livestock development planning in the Study area are listed below.

(1) The ongoing extension effort towards an integrated livestock development to establish a balanced system of mixed farming in the homestead of settlers must be extended to the Extension area.

(2) Changing the present nomadic system of cattle management practiced in the Extension area to one of permanent holding system based on the model livestock farm at Medagama managed by DA& DDP.

(3) Optimum utilization of: (i) the 2,000 ha of pasture lands in the proposed land use plan; (ii) the series of tanks and ponds of the cascade system in the proposed irrigation plan

as watering places; and (iii) the large quantity of sugarcane tops (estimated at 5,000 t per year), and by-products of sugar industry as animal feed that will be available on implementation of the proposed cropping pattern.

(4) Adoption of improved livestock management practices such as stall feeding and proper veterinary care.

(5) Growing of rainfed pasture and fodder crops in the Maha season as feed supplement for stall feeding.

(6) Reduction of herd size by replacement with up-graded animal to increase overall production

(7) Early introduction of the F1 (Sinhala x Sahival) and F2 (F1 x Jersey) cross bred animals of DA&DDP capable of milk yields of 4 and 6 lpd, respectively, into the project area.

6.4 Land Tenure and Holdings

The general Government procedure with regard to selection and alienation of land to settlers and other individuals and organizations is summerized as follows:

(a) Land Kachcheries- Selection for alienation is made at Public Inquiry where suitable persons from peasant class are eligible to apply. Permits are issued to selectees under the Land Development Ordinance, and after 3 years of proper land utilization the occupants become entitled to receive a `Swarnabhoomi' grant for the land.

(b) Annual Permits and Long-Term Leases- Selection for award of annual permits and long-term leases for state lands, issued under the Crown Lands Ordinance, are made either through the Land Kachcheries or by preferential selections. Annual permits are renewed each year and are subject to an annual rent of 4% of the unimproved value of the land. Long-term leases are issued covering a period of 30 years and the annual land rent as for annual permits are revised once every five years

(c) Encroachment Regularization- The current Government policy on regularization of encroachments came into operation in 1989, under which, encroachers who were occupying state lands prior to a stated date were considered for regularization. In the MEA managed area, the cut-off date for regularization is fixed as December 31, 1988.

(1) Sugarcane area

In the rainfed sector of the sugarcane plantation area, 1,925 ha of land is alloted to 1,100 cane farmers, each having a holding of 1.75 ha in extent. The holding size per cane farmer in the irrigated sector is 1.15 ha and consists of three plots: (i) homestead plot of 0.15 ha; (ii) sugarcane plot of 0.75 ha; and (iii) paddy plot of 0.25 ha. As at end Dec. 1991, 2,421 homestead plots, 1,671 sugarcane plots and 1,310 paddy plots have been allocated. Awarding of long-term leases for the holdings under Crown Land Ordinance is anticipated in the near future.

(2) MEA managed area

Based on the land tenurial status, the settlers in MEA managed Kiriibbanwewa and Suriyawewa Block areas can be devided into three main categories as: (i) Mahaweli settlers; (ii) private individuals and institutes holding title deeds to land; and (iii) encroachers.

The Mahaweli settlers consist of those settlements taken over by MEA from the RVDB at the time of change in managenent in 1982, and those regularized from time to time by the MEA since then. Agencies responsible for settlements in the Walawe project area prior to 1982 have adopted different unit sizes for land alienation resulting in a variation in the individual farm holding size. In all settlements made after 1982, a uniform 1.2 ha holding per farm family, comprising 1.0 ha irrigable plot and 0.2 ha homestead, has ben maintained. The current position in in the Walawe project area is shown in Table A6.2-1 and the position in the two LB Block areas is summerized below.

	Mahaweli Settlers	Encroach Settlers	Other	Total Families
Kiriibbanwewa	1,457	1,747	35	3,239
Suriyawewa	3,984	2,859	-	6,843
Total	5.441	4,606	35	10,082

Source: Lands Division, Walawe Project Office

Under the encroachment regularization programme, 1,650 families have been settled in the five Unit areas in the extension area of Suriyawewa Block as summerized below.

Unit		No. of Families
Pilimagalayaya	(Unit 9)	308
Andarawewa	(Unit 10)	441
Swodagama	(Unit 11)	375
Unit 12 and 13	(partly)	428
Total		1,650

Source: Block Office, Suriyawewa.

(3) Extension area

Land administration in the Extension area comes under the purview of Government Agent, Hambantota/ Provincial Secretary through three divisional offices of the Assistant Government Agents/ Divisional Secretaries located at Hambantota, Ambalantota and Suriyawewa. Three main types of settlements can be recognized in the Extension area: (i) regularized settlements; (ii) encroachments and non regularized settlements; and (iii) lands allocated to organizations. Present position in the Extension area including parts of surrounding undeveloped area is summerised below.

Tenurial AGA Division	Tenurial Status	No. of Families	Area (ha)	Average Holding Size (ha)
Hambantota	Regularized	1,520	681.27	
	Non Regularized	1,625	657.15	
	Sub Total	3,144	1,338.42	
Suriyawewa	Regularized	281	208.77	
	Non Regularized	853	637.51	
	Sub Total	1,124	846.28	
Ambalantota	Regularized	98	382.42	
	Non Regularized	1,052	586.73	
	Sub Total	1,750	969.15	
Total	Regularized	2,489	1,272.46	
	Non Regularized	3,529	1,881.39	
	Sub Total	6,018	3,153.85	

Source: Udawalawe Left Bank Extension Project Census. PMU/MASL

960 ha around the Madunagala hermitage in the northern Extension area has been declared a forest reserve. 410 ha in the upper Ridiyagama tank has been set apart for the Government livestock farm. Further, 612 ha at the southern end of the Extension area has been allocated to the Sri Lanka Cashew Corporation to establish a cashew plantation.

6.5 Agricultural Marketing, Post Harvest and Prices

6.5.1 Agricultural Marketing system

Marketing activities in the Study area are largely confined to the northern sector where irrigation facilities for crop production are available. In the Extension area, marketable surpluses under rainfed production conditions are both limited and irregular, that no significant market development has taken place.

(1) Markets

The primary market outlets for agricultural products in the Study area can be devided as institutional, periodic and private markets.

a. Institutional markets

(i) The market for sugarcane produced in the area is provided by the sugar factory of Sevanagala Sugar Industries Ltd. which purchases cane from allottees in the company affiliated plantation, farmers in the Walawe RB (Embilipitiya Block) and private growers. Cane received in the factory and other production information for the period 1986 - 1991 are shown in Table A6.5-1.

(ii) Sixty nine primary cooperative society outlets, belonging to 4 Multi-purpose Cooperative Societies (MPCSs), are located in the Walwe project area. Of these, six primaries under the MPCSs of Wellawaya and Hambantota are located in the MEA managed area of the Study area. The main products purchased by the primary societies on behalf of the respective MPCSs have been paddy and greengram.

(iii) Milk Industries of Lanka Co. Ltd. (Milco) operates a 4500 lpd milk chilling center at Embilipitiya town. The center provides a ready market for fresh milk produced in the area. In addition, fresh milk is also puchased by Nestle Lanka Ltd. at their base collecting center situated at Moraketiya

(iv) Seasonal buying centers are operated by the Cooperative Wholesale Establishment (CWE) and Cooperative Marketing Federation (Markfed) to purchase greengram and other grain legumes. Two centers by each organization have been operated in the MEA managed area during the last 3-4 seasons.

b. Periodic markets

The most important market for locally grown fruits and vegetables is the periodic market fairs called the `pola'. Pola is a place where farmers, traders and consumers gather to sell or buy merchandize and is held on one or two scheduled days of the week. The Polas in the area are operated at different locations on a rotational sequance to enable traders to visit them on seperate days of the week. All major Polas in and around the Study area are owned by the relevent Provincial Councils and supervised by their local bodies. The management of the Pola is awarded to private individuals through a public tender on an annual basis.

Details of the Polas in and around the Study area are summerized in Table A6.5-2.

c. Private markets

Private markets are the most important outlet for paddy in the area. Paddy millers, both within and outside the area are the largest outlet for paddy. Large number of private buying centers operate in the principal township of Suriyawewa, main bazzars located at important road intersections such as in Moraketiya, Kiriibbanwewa, Mahagama and Hathporuwa junctions, and in the village boutiques that are scattered in hamlets. These markets usually deal in non-perishable produce. Very often, the buying centers are retail shops that not only buy agricultural produce, but also sell agricultural inputs and consumer goods. They may extend credit to some farmers as well. Recently, purchasing centers, under sponsorship of the Regional Secretariats, are being established in the area by private entrepreneurs. To date 11 such centers, including two in the Study area, have been approved for financial assistance through commercial Banks.

(2) Marketing channels and flows

a. Sugarcane

Harvesting of sugarcane takes place according to schedule prepared by the factory based on the maturity status of cane. Private cane transporters registered with the Company handle transpotation of harvested and loaded cane trailers from field to the factory. Cane is processed at the factory to manufacture Plantation White quality sugar and potable alcohol. Sugar is chanelled to the consumers through CWE or private wholesale traders. The potable alcohol is sold to the State Distilleries Corporation for further processing. Production data of Sevanagala factory are shown in Table A6.3-1.

b. Paddy

Bulk of the paddy produced in the area is channeled thruogh the collectors and millers, both from within and outside the prject area. Local collectors intern supply the paddy to millers. Local millers, after processing the paddy, supplies the rice to wholesalers or to retailers directly. Outside millers usually channel the rice to retailers and consumers through wholesalers. The quantity of rice handled by MPCSs in the area is relatively small. Paddy collected by MPCSs is processed in own mills and channeled to consumer through primary societies, CWE retail outlets and private retailers. A small quantity of locally milled rice is retailed at the Polas and consumer stores for consumption. The paddy purchasing function of the Paddy Marketing Board (PMB) island wide has virtually ceased.

c. Vegetables and fruits

The outside traders/wholesalers operating in the Polas play the major role in vegetable and fruit marketing in the area. Farm produce of individual farmers are brought to the Pola the previous evening, most commonly in collective tranportation provided by owners of 2-wheel tractors. Assembly agents for fruits and vegetables are virtually non existant and the trading takes place directly between the farmer and the trader/ wholesaler. The latter operate on a set schedule of visits to Polas and have developed trading relationships with some farmers.

The main wholesale market is the Pettah market situated in Colombo. Pettah market also serves as the terminal market for agricultural produce grown in the country. Products from all growing areas are brought to the market by assemblers/traders for sale through commission agents who are the main market operators. Wholesaling also takes place in all other principle cities such as Galle, Matara, Ratnapura, etc.

d. Grain legumes

The project area is reputed for its greengram which is grown extensively in the Maha season as a rainfed crop. Three organizations, namely, CWE, Markfed and MPCS, are active in purchasing the crop during harvest time. Boutique and shop owners in town, bazzars and villages who run purchasing points also collect grain legumes and supplies to the organizational buying centers. Some act as collecting agents on behalf of principle traders. The marketing flows of main agricultural products are shown in Fig. A6.5-1.

e. Milk

Milco through its extension division has formed two Milk Producer Cooperative Societies in Embilipitiya and Kiriibbanwewa. These run five milk collecting points with a total daily collection of 2,000 l. In addition, a private collecting point at Suriyawewa collects 300 lpd on behalf of Milco. Areas not covered by the above collecting points are served by the Hambantota Milk Producers Cooperative Society through appointed private collectors. Milk collected by Milco is chilled at the center and transfered to their processing factories on alternate days.

6.5.2 Post harvest and processing

Present post harvest processing facilities for agricultural produce in the area are limited to milling of paddy, processing of sugarcane and chilling of milk.

(1) Sugarcane

The Sevenagala Sugar factory has a mill capacity of 1430 tcd and operates two crushing seasons per year over an average total of 140 season days. The mill is relatively new, being incepted in 1986, and is operating below capacity due to insufficient cane. In 1991, 122,363 mt of cane were received in the factory which operated a 145 day season showing a low operational capacity.

(2) Paddy

A substantial milling capacity for paddy processing presently exisits in the Walawe area. The mills, all privately owned, range from large commercial enterprises to small domestic units processing paddy for local consumption. Processing of raw rice is the rule, though par-boiling facilities are available in some of the larger mills. The recovery of raw rice at 68% - 70% is satisfactory. Paddy purchased is kept in mill stores for 1 - 3 months and disposed almost immediately after milling. Summery of mill survey carried out in the area is given in Table A6.5-3.

(3) Milk

The daily milk collection at Milco collecting points is picked up by bousers operating on scheduled routes and transported to the chilling center at Embilipitiya. The center has a capacity of chilling 4,500 lpd to 5 degrees C and transportation out for further processing is done on alternate days.

Part of the buffalo milk in the area is made into local yoghet or `curd', a popular dessert but with limited market.

(4) Other field crops

Grading and packing of chilli, onion and grain legumes are carried out by the MPCS (Embilipitiya) and few small scale second generation farmer entrepreneurs promoted by the EIED. The quantities handled, however, are not significant.

6.5.3 Prices of agro-products and inputs

(1) Paddy

Prior to 1980, the PMB played the key role in stabilizing the paddy price through administration of thr Guaranteed Price Scheme (GPS). However, the activities of PMB started to decline from early 1980s and in 1991, its paddy purchases accounted for less than 2% of the total national production. In 1988, the monopoly held by the CWE on rice imports was broken and the private sector imports were authorized under Government licensing subject to quota system. A system of bonded warehouse storage was initiated in 1990, where rice imported by the private sector is stored in the Food Commissioners bonded warehouses as buffer stock for later use. Monthly stock requirements are computed based on the estimated production during the season and any stock excesses are sold at prices above the GPS price.

Competitive purchasing of paddy by MPCSs at prices above GPS and the Government import restrictions as a domestic price protection mechanism have contributed in maintaining prices at satisfactory level. The average producer prices of paddy are shown below.

Year	GPS Price (Rs/kg)	Av. Producer Price*2 (Rs/kg)	PMB Perchase*1 National %
1988	4.00	4.61	4.2
1989	4.00	6.24	0.2
1990	5.50	7.96	1.2
1991	6.80	8.10	1.7

Source: *1 Cenral Bank Annual Reports
*2 Marketing Division, Walawe Project Office.

(2) Sugarcane

Price paid per ton of cane is generally determined by the respective management organization, but has been subject to both interest group and political influences. In the recently incorporated sugar industries of Sri Lanka Sugar Corporation, including Sevanagala, a payment system based on cane quality is in operation. Based on the previous years factory sugar recovery rate, the quantity of sugar obtainable per ton of cane is computed. Sugar is valued using the average sale price after the statutary deductions. 45% of this value is apportioned as factory costs and the balance is paid per ton of cane supplied. Further refinements such as zoning the cane supply areas based on Recoverable Sugar Cane (RCA) and enhanced payments according to increase in RCA is also attempted. If the actual recovery rate of the season is higher than that of previous year, the under payment to cane suppliers is adjusted at the end of the season. Cane purchase prices paid by Sevanagala factory in 1991 are as follows.

(Unit: Rs/mt)

Season	Green Cane	Factory Cane, Burnt Cane		Seed Cane
		< 36 Hours	6-48 Hours	
First	790.00	600.00	400.00	800.00
Second	750.00	600.00	400.00	800.00

Source: Plantation Division, Sevenagala Sugar Industries Ltd.

(3) Vegetables and Fruits

There are no Government supported price protection mechanisms for vegetables and fruits. The prices are determined by the market demand and supply situation. The seasonal nature of their production is reflected in the price variation seen through the year. The farm gate and Pola prices of selected vegetables and fruits are shown in Table A6.5-4.

(4) Other field crops

A Floor Price Scheme (FPS) for selected other field crops was implemented in 1979/80 and at present covers nine crops, namely, maize, kurakkan,groundnut, soyabean, sesame, chilli, cowpea, greengram and blackgram. The seasonal floor prices are set by the National Food Policy Committee, based on factors such as cost of production, profits and losses, open market prices, import prices etc. In 1985, the Salvage Price Scheme was introduced to calculate the basic floor prices. The scheme sought to set annual buying prices that would protect the

farmers from a collapse in the open market conditions. Operating prices under the FPS are far below the farm gate prices that it has no relevence in the present context.

CWE, MPCS and Markfed, through their centers in the Walawe project area, have been active in purchasing grain legumes in competition with private traders. Their presence has contributed in maintaining the prices at stable and satisfactory levels. Farm gate, Pola and wholesale prices of some OFCs are shown in Table A6.5-4.

(5) Milk

In a bid to increase national milk production, the Govenment has made substatial increases in the purchase price of milk during the last few years. The price per letre was raised to Rs. 6.77 in 1990 and again to Rs. 8.50 in October 1991, with the promise of futher increase to Rs. 10.00 in 1992.

(6) Farm inputs

The current prices of farm inputs in the study area were estimated based on data collected from Walawe project office and retailer interveiw survey. The details are shown in Table A6.5-5

6.6 Agricultural Supporting System

6.6.1 Agricultural research

There are three agricultural research stations located in close proximity to the Study area, each specializing in sugarcane, OFCs and paddy.

(1) Sugarcane research

Sugarcane research in Sri Lanka is the exclusive responsibility of Sugarcane Research Institute (SRI) established at Uda Walawe in 1988 as an organization independent of the former Sri Lanka Sugar Corporation. The Institute consists of seven departments covering agrometeorology, agronomy, breeding, chemistry, engineering, microbiology and pest management. Varietal improvement is the theme of the current research plan and efforts of all departments are coordinated towards reaching this objective. The SRI, being relatively new, is yet to provide the much needed leadership for growth of the industry.

(2) Horticultural and field crop research

The Regional Agricultural Research Station (RARS) of the Department of Agriculture (DOA) is located at Angunakolapelessa, the southern most administrative block of the Walawe RB. The station consists of eight divisions covering horticulture, pathology, agronomy, soils, Entomology, adaptive research, economics and oil seeds. Present research efforts of RARS are centered on banana, sesame and groundnut as priority crops. Existance of a large extent of rainfed lands in the region has necessitated the concentration of research on crop production under dry farming conditions.

(3) Rice research

Breeding of paddy varieties and conducting of agronomic research and adaptability trials for the region are carried out by the Rice Breeding Station of DOA situated at Ambalantota. Rice breeding work is nationally coordinated by the Central Rice Breeding Station at Bathalagoda in North-Western Province.

(4) Coodination of research

Research activities of the DAO relating to Mahaweli areas are coordinated by the Mahaweli Research Committee (MRC) which is represented by DOA and MEA. Functions of the MRC are to: (i) identify research needs for Mahaweli Systems and decide priorities; (ii) monitor the progress of research programmes; (iii) present research recommendations to Mahaweli management to decide policy; and (iv) allocate necessary funds to RARSs through DOA.

6.6.2 Extension services

(1) Sugarcane area

Plantation Division of the Sevenagala Sugar Industries Ltd., headed by the Plantation Manager is responsible for all agricultural activities in the project area including the provision of agricultural extension services to the sugarcane farmers or allottees. The irrigated and rainfed sector of the plantation are covered by two Agricultural Superintendents (ASs), each assisted by three Divisional Agricultural Officers (DAOs). The DAO covers an area of approximately 300 ha. assisted by three Agricultural Assistants (AAs), each being directly responsible for 100 allottees. An annual agricultural calender giving the timing of cultivation operations is prepared by the Plantation Division and village wise meetings are held with the allottees before commencement of planting and harvesting to explain and discuss the programme details. The allottees fields are frequently visited by the Officers and, though not regular, training sessions are conducted on time related crop production aspects. Apart from sugarcane, the Officers are not actively engaged in providing extension assistence on paddy, OFCs or livestock.

(2) MEA managed old area

Agricultural extension in the MEA managed Kiriibbanwewa and Suriyawewa Block areas conform to the general system adapted in other Mahaweli project areas. The Project Agricultural Division headed by Deputy Resident Project Manager -Agriculture (DRPM(Ag)) is responsible for the agricultural extension activities in the Walawe project area. At the project level, he is assisted by three Subject Matter Officers (SMOs) each specializing in paddy production, OFC production and plant protection. At the Unit level, a Field Assistant (FA) under the UM and at the Block level, an Agricultural Officer (BAO) under the BM maintain an upward functional relationship with the DRPM(Ag) in the MEA management matrix.

The agricultural extension system adapted is designed based on the T&V system applied nation-wide under the World Bank sponsored Agricultural Extension and Adaptive Research Project (AEARP), implemented from 1976 to 1986. It relies on farmer groups at the Field Canal (FC) level as the reference group rather than on the contact farmer approach of T&V system. Each FC group consists of 10 to 15 farmers and is expected to be visited by the FA, the extension agent, once every fortnight on pre-scheduled days and dessimate the extension messages. Field demonstrations are used to supplement the messages and motivate field adaption by farmers. Each FA is expected to cover a Unit area comprising about 300 farmers in 10 - 15 FCs.

The technological backup for the FA is provided through training sessions scheduled fortnighly in Block offices by BAO and SMOs. Issues pertaining to the work programme of forthcoming two weeks and developing the relevent extension messages are the main items of discussion at these meetings.

Project agricultural staff is provided with training opportunities at the In-Service Training Centers of DOA. These include seminars, workshops and the regular pre-seasonal training.

The formal linkage between research and extension is effected through the Regional Technical Working Group (RTWG) instituted by DOA for each agricultural region. Walawe project is represented at the RTWG based in RARS, Angunakolapelessa. RTWG meets twice a year in advance of the cultivation seasons to identify research and extension needs in respect of the forthcoming seasons.

Operation of the extension system has had serious set-backs in the recent years causing its effectiveness to decline. These arise from: (i) expansion of the UM/FA area as a result of amalgamating 2 - 3 original Units to form new larger units, thus increasing the number of families to be served by a single FA to about 700; (ii) reduced mobility of the field staff due to cut-back in the operational expenditure; (iii) shortage of FAs caused by many taking up appointments as `Grama Niladhari' under the `Janasaviya' programme; and (iv) recruitment of untrained FAs who lacked competency.

Present conditions have led the MEA to propose modifications to the extension system, falling in line with the IDA assisted Agricultural Support Services Project (ASSPT), for implementation in the Mahaweli project areas. Under the ASSPT, a farmer centered farming system approach is envisaged, which is focused on: (i) consideration of farm family goals; (ii) their relation to the adoption of agricultural technology; and (iii) the consequent need for close contact between extension agent and household members within the village community and on the farm. The approach will be locality-specific and depend on: (i) identification and use of existing farmer groups with similar resources and technological requirements (reference group) for extension activities; (ii) use of problem census technique to identify extension activities that most farmers need; and (iii) applying a holistic approach to extension.

ASSPT as applied to the Mahaweli project areas envisages placement of suitably qualified Agricultural Assistants (AAs) as the field level extension agents under the BOA, each serving 900 - 1000 farm families who are formed into 20 - 25 reference groups. A reference group will comprise 40 - 45 families belonging to 3 - 5 adjacent F-canal organizations. The AA will hold monthly meetings with each of the groups. The AAs are required to posses a 2 year Diploma in Agriculture and they will replace the present cadre of FAs.

(3) Extension area

In the Extension area, crop production is more or less restricted to the Maha season under rainfed conditions. Irregular cultivation, lower productivity and poor accessibility have resulted in minimum extension effort being applied to the regeon.

In the MEA managed section of the Extension area, some extension services for grain legume production in the Maha season are provided by the Suriyawewa Block office. In the Extension area proper, where seasonal cultivation is done under minor irrigation tanks and in chenas, extension services are expected to come from the respective line organizations such as DOA, Department of Agrarian Services and HIRDP under the Hambantota district administration. Although some basic farming infrastucture and start-up assistance have been provided by the HIRDP, an organized extension service is non-existant in the area.

6.6.3 Agricultural credit

(1) Sugarcane area

A service based agricultural credit package worked out by the Sevanagala Sugar Industries Ltd., is administered to allotteess in both irrigated and rainfed sectors. Land preperation, seed cane including transportation, fertilizer, weedicide and alkathene pipes for irrigated sector are provided by the Company, the cost of which is recovered as deductions when making payments for cane supplied. The costs of land preperation and seed cane is spread over the plant and the first ratoon crop.

(2) MEA managed old area

Institutional credit in the in the two Block areas of Kiriibbanwewa and Suriyawewa are provided by the Bank of Ceylon and the Peoples Bank, repectively. The credit schemes operated by both Banks have essentially the same elegibility criteria, interest rate, and repayment conditions. The present annual interest rate on short term loan is 16%. Funds for the cultivation loans disbursed through the commercial banks are refinanced by the Central Bank of Sri Lanka and any losses are shared. Although a range of crops are covered in the credit scheme, only paddy is granted loans at present.

The procedure of obtaining cultivation loan involves submiting a standard application to the Bank through the UM. Upon approval, the credit to a maximum of Rs. 18,762 per ha is disbursed in nine instalments at the time of respective operation. Loan components for seed paddy, fertilizer and agrochemicals are credited directly to DOA, State fertilizer Corporation and principal agents, repectively, when channeled to the farmers through the Project offices. Credit disbursed and recoveries are shown in Table A6.6-1.

Less than 25% of the farmers in the Walawe project area obtain agricultural credit from Banks. Programmes to rehabilitate defaulting farmers and to reschedule outstanding loans have been launched to bring farmers back to the credit scheme. However, dependence on other sources for agricultural credit remains high as shown in the table below.

(Unit: % Farmers)

Source	Maha	Yala
Cooperatives	3.3	2.7
Peoples Bank	13.3	12.2
Bank of Ceylon	11.6	6.6
Friends	10.0	7.7
Relatives	7.2	5.0
Traders	5.0	5.5
Money Lender	20.5	17.2
No Cedit	29.1	43.1

Source: Socio-economic Survey (1991)

(3) Extension area

Rural Banks for women under the `Janasaviya' programme have been established in areas covered by the programme. Short term loans up to a maximum of Rs. 2,000 at 3% interest is granted farm women for rainfed cultivation.

6.6.4 Farmer organizations

Field canal or turn-out based farmer organizations for participatory water management were first intiated in the Mahaweli project areas in 1978. With the introduction of the unified management model by MEA, the stucture of farmer organization was modified to include two farmer representatives, one on water management and the other on agriculture at the F-canal level. Federation of these organizations at the distributory or Block levels was not attempted at that time.

The degree of effectiveness of these turn-out organizations varied widely; its success in the early settlement stages attributed mainly to the problem solving approach adapted rather than fostering self reliance among farmers. Several other subject based and general purpose organization models have been tried out in the Mahaweli project areas from time to time.

Formal farmer organizations in the Walawe project area under MEA management did not exist until the Farmer Institution Development Division of MEA promoted efforts to organize farmers were initiated in 1990. These farmer organizations are instituted in all the major irrigation schemes following a policy decision made to that effect by the Ministry of Lands and Mahaweli Development in 1989. It seeks greater farmer participation in the project management prosess, particularly, in the field of water management. The organizations are constituted at field canal, distributory canal, Block and Project levels, the distributory canal organization being statutory while others are informal.

The objectives of the farmer organizations are stated as: (i) to establish a forum to develop close and frequent farmer-farmer and farmer- officer dialogue; (ii) to promote active farmer participation in agricultural planning and water management decision making; (iii) to develop self confidence and leadership among farmers to prepare them for self management; (iv) to hand over in stages a larger share of project responsibilities to the farmer as stipulated in the Irrigation Ordinance; (v) to achieve a higher growth rate in production; and (vi) to instil the sense of responsibility towards the project as a whole and of appreciation and respect towards the needs of fellow farmers.

The farmer organizations in the project area are relatively new and their effectiveness in contributing to project management is yet to be seen.

The village level primary cooperative societies, where farmers are members, operate retail stores for consumer goods and agricultural inputs and purchasing centers for agricultural products. However, the decision making with regard to their largely trading activities is centralized at the electoral level MPCS. Two milk producer societies and two agricultural producer cooperatives have been formed recently, in the MEA managed area of the Study area.

Apart from these formal farmer organizations, there exist a multitude of informal social organizations such as those for youth, women and death donation at the village level. Their main activities relate to running libraries, pre-schools, handicraft and cottage industries, asistance at times of death, etc.

6.6.5 Agricultural inputs

(1) Seed materials

Seed cane for sugarcane cultivation is raised by selected allottees in secondary nurseries, generally established from heat treated material supplied from Company maintained primary nursary. Distribution of seed cane among farmers is arranged by the Company.

In the past, the MEA has been totally dependent on the DOA for its seed paddy requirements. However, the supply of certified seeds from DOA has reduced considerably during the last few

seasons. It is foreseen that entire production of certified seeds in the future will be handled by the private sector through contract growing system. As an interim measure to overcome present shortage, farmers are encouraged to establish secondary seed farms and exchange seed material amongst them. The programme is assisted by issue of 2 kg seed paddy packs to selected farmers for multiplication.

Seeds of OFCs and local vegetables are obtained through the DOA production programmes. The importation and distribution of exotic vegetables is vested in the private sector. In the project area, OFC and vegetable seeds are supplied to farmers by MEA, cooperative outlets and private dealer outlets.

(2) Fertilizers and agrochemicals

Fertilizers and agrochemicals for sugarcane allottees are purchased in bulk, directly from State Fertilizer Corporation and principal agents in Colombo, respectively, and distributed by the Company.

In the MEA area, part of the fertilizer and agrochemical requirements of the farmers, particularly that of Bank credit recepients, is procured and distributed by the project office. The balance requirements are met by cooperative primaries, private dealers and Agrarian Service Centers.

6.7 Farm Economy

6.7.1 Present cropbudget and present agricultural production value

Representative crop budgets have been prepared for the major crops produced in the project area. These are based on published agricultural data, interview with staff of the MEA staff and farmers and socio-economic survey. The full crop budgets are presented Table A6.7-1 (1-2), while summary is presented below.

Crops	Gross Income	Cost	Net Income
Paddy			
Maha	38,400	17,700	20,700
Yala	30,400	17,300	13,100
Sugarcane			
1st	92,000	43,500	48,500
2-4th	76,000	22,300	53,700
Banana			
1st	33,000	24,200	8,800
2-5th	180,000	16,800	163,200
Vegetables	70,000	43,900	26,100

The annual net production value under the present condition in the project area is shown Table A6.7-2 and summarized in the following table.

(Unit: Rs. 1,000)

Crops	Net Production Value (Irrigable Area)
Paddy	86,868
Banana	6,616
Vegetable	16,182
OFC*1	6,725

Note: *1: Estimated value

In the extrension area, the agricultural actibity is depend on rainfall and so unstable. Large part of chena cultivation area in the extension area are abandoned under drought condition and in most of the rainfed paddy area under the exsisting tank system also any crop have not been planted. The annual net production value in the extension area is vely low as shown above.

6.7.2 Present household economy

In order to clarify the economic activities and living standards of farmers in and around the Extension area, the farm economic survey and the farm interview survey were carried out by the Study Team. Based on the Village survey, twenty three villages in and around the Extension area were selected for the survey and the survey of a 3 to 5% sample representing all three categories of the population of each village inhabitants was considered the most appropriate size for the study within the framework of time and resource availability. 80 completed questioner formed the survey sample.

Settlements in the extension area were largely polarized around small tank systems, along the western boundary of the study area as a result of natural expansion of the villages established under the Ridiyagama Irrigation Scheme and and along the Suriyawewa - Mirijjawila trunk road or other access road. Based on the village location survey, villages area divided into 5 area namely southern part, middle part, southern Suriyawewa block, western suriyawewa block and western boarder according to the geographic factors.

The results of the analysis are shown in Table A6.7-3 and summarized as follows:

Item	Gross Income	Gross Outgoing		Balance
		Living	Agr.	
Area 1				
Including Subsidy	38,400	31,800	2,900	3,700
Excluding Subsidy	(33,600)			(-1,100)
Area 2				
Including Subsidy	17,400	14,700	2,300	400
Excluding Subsidy	(11,100)			(-5,900)
Area 3				
Including Subsidy	25,000	16,300	7,900	800
Excluding Subsidy	(12,300)			(-11,900)
Area 4				
Including Subsidy	27,000	23,000	3,900	100
Excluding Subsidy	(18,800)			(-8,100)
Area 5				
Including Subsidy	14,700	15,100	1,900	-2,300
Excluding Subsidy	(10,100)			(-6,900)

Source: Farm Economic Survey
Area 1: Southern part in the Extension Area
Area 2: the area between Area 1 and Area 3
Area 3: Suriyawewa Block in the Extension Area
Area 4: Western part in Suriyawewa Block (Bedigantta)
Area 5: Western boarder in the Extension area

Above Table shows that the farm income of the farmer in and around the Extension area excluding Area 1 is about one half times of farmers in the old area and the sugar area. In Area 1 it is possible to grow paddy under the tank irrigation system once or twice a year, so that farm income is better than others Areas.

However, the seasonal tanks in the Extension area generally do not get enough water each and every Maha for successful cultivation. Only when heavy rains are experienced during a Maha season the cultivation is possible under most of these tanks. So, the paddy cultivation under these tank irrigation system is not a stable income source for farmers. Rainfed cultivation of upland crops including Chena cultivation is the main income source of the most of farmers living in the Extension area. Maha season is the main rainfed cultivation season in the year, and migration to the Extension area from surrounding area can be observed during this time. Some of the farmers who are residing permanently do rainfed cultivation during Yala season also. But, the probability of successfulness is very low during Yala.

The paddy lands under seasonal tanks system in the extension area is mostly owned by the people living outside the extension area. They migrate during the Maha season and reside temporary to do the Paddy cultivation.

The other income source of the farmer living in the Extension area are shown below.

a. Selling firewood to surrounding area
b. Collecting Wood Apple and sell during the season (main market is Hanbantota town)
c. Collecting Margosa Seeds and sell
d. Collecting and Selling Tamarine Fruits
e. Hunting of Wild Animals for meat and skins
f. Work as farm labour mainly outside the extension area (Suriyawewa, Ridiyagama and so on)

Furthermore, one of the most important income source is Janasaviya Programme.which is the grant aid program for poor people. Janasaviya beneficiaries receive Rs. 1,458 every month during two years. They can spend Rs. 1,000 per month for food consumption in cash and deposit Rs. 458 per month into the Banks. The deposited money could be used to buy agro-equipment after two years. Food Stamp Scheme provided by Department of Social Services is also the important income source for low income people. Food stuffs and kerosene are supplied to beneficiaries through Co-operatives.

The number of Janasaviya Beneficiaries and Foodstamp Beneficiaries in and around the Extension area are shown in Table A6.7-4 and summarized as follows.

GN Division		Janasaviya Holders	Foodstamp Holders
Hambantota	Nos.	1,473	434
	%	46.9	13.8
Suriyawewa	Nos.	506	115
	%	44.0	10.2
Ambalantota	Nos.	165	1,082
	%	9.4	61.8
Total	Nos.	2,144	1,631
	%	35.6	27.1

Source: Udawalawe Left Bank Extension Project Census

The income resources for the Janasaviya beneficiaries, Foodstamp beneficiaries and other farmers are given in Table A6.7-5 and summarized below.

(Unit: Rs./year)

Item	Janasaviya Holder	Foodstamp Holder	Other
Agro-products	8,700	4,580	18,090
Livestock	750	230	6,220
Tree crops	30	160	0
Labour fee	3,390	3,380	3,230
Janasaviya	12,520	0	0
Foodstamp	0	2,870	0
Subsidy/Loan	1,870	1,450	4,530
Others	910	600	1,110
Total	28,170	13,270	32,180

Source: Farm Economic Survey

The Table above shows that 44% of the total annual income of Janasaviya beneficiaries is derived from the assistance they receive under the programme. On conclusion of the programme after two years, a general sustainable upliftment in the socio-economic condition of the farming through the efforts of the beneficiary is expected. In the project area, the severe drought conditions has adversely affected all inhabitants, that any chance of achieving Janasaviya objectives appear to be remove. Further, the Janasaviya beneficiaries are not entitled to receive foodstamp in the feature.

The living standard of Foodstamp beneficiaries is much lower than Janasaviya beneficiaries. This appears to be the the minimum level for subsistence. Most of them are included in the list prepared to select new Janasaviya beneficiaries.

It is a fact that most of farmers in and around the Extension area except a few are living condition of extreme poverty. It's necessary to take suitable measures to meet present situation immediately.

Implementation of the irrigation project is one of the most effective measure to give relief to the poverty The result of the farm economic and interview surveys indicate that they are earnestly hoping that a irrigation project will be implemented in near feature. Table A6.7-6 shows farm budget of the farmers in the Old area and the summary of the farm budget of the farmers in the Old area are shown below.

(Unit: Rs./year)

Item	Kiriibanwewa Blocks	Suriyawewa Block	Sevanagala Sugar Area
Gross Income	45,000	48,700	54,200
(Agricultural Income)	(34,700)	(34,800)	(42,400)
Gross Outgo	30,010	19,990	21,920
Net Reserve	800	1,300	6,600

Source: Socio Economic Survey done by the Study Team in Stage I

In the Right Bank of Walawe Irrigation area, Murawasihena and Angunukolapelessa Block have water shortage problem The 5 blocks in the Right Bank are therefore divided into two categories. Major farm income for farmers in the Old area is obtained from the agricultural products under the irrigated agriculture condition. In case of farmers in the Right Bank under better irrigation condition, the annual income from agricultural production is approximately Rs. 45,500 or 7 times of Janasaviya and Food Stamp farmers' one in the Extension area. The result shows that implementation of irrigation project go a long way toward improving well being of the families in the extension area.

6.8 Farmer Intention to Crop Diversification

An assessment of the farmers intentions towards crop diversification and their preference of crops was attempted through the interview surveys carried out during the study period. This was necessitated due to the socio-cultural attachment of the farmers to growing of paddy as evident from the dominant status of the crop in the area.

(1) Interview survey of RB and LB old area (1991)

The survey consisted of 25 direct dicussions with farmers and officers centered on crop diversification and water management. Relevent observations on crop diversification made by 15 leading farmers in the sample are summerized below.

a. Paddy is necessary because it is the traditional crop, provides the staple food, gives a reasonable income and in some fields only paddy cultivation ia possible.

b. Cost of production of paddy is increasing due rising input costs resulting in reduced income.

c. There is an increasing awareness of the higher profit margins that can be realized from cultivation of OFCs.

d. Those already growing OFCs are planning to increase the extents in the future.

e. The land extent under OFCs will progressively increase.

(2) Socio-economic survey of RB and LB old area (1991) and agro-economic survey of extension area (1992)

The socio-economic survey revealed that the majority of the farmers intended to continue paddy cultivation in full or in part of their irrigated fields. In the Extension area, the respose towards crop diversification was more positive. Crop preferences in the two areas are shown in the table below.

(Unit: % Farmers)

Crop	RB and LB Old Area		Extension Area
	Maha	Yala	
Paddy	8	64	100
Chilli	5	11	71
Vegetable	0	1	85
Pulses	1	1	58
Onion	3	4	50
Banana	3	16	74
Sugarcane	1	1	21

Source: Socio-economic Survey (1991)
Agro-economic Survey (1992)

The selection of crops and land use planning will be influenced by the farmers intension and crop preferences.

6.9 Present Agricultural Constraints and Development Potential

6.9.1 Physical conditions

(1) Potential area and soil

Selection of crops for the Study area is based on the land classification recognising the soil, topography and drainage factors. Lands having slopes less than 4% in the command area have been identified for irrigation development. Distribution of soil classes in the development area is tabulated below.

(Unit: ha)

Development Area	Well Dr. RBE	Imp.Dr RBE	Poor.Dr LHG	Total
LB Old Area	0	0	0	0
Extension Area				
Total				

It is clear that most of the crops including paddy, OFCs, sugarcane, etc., grow well in irrigated RBEs through the experiences in Mahaweli areas. However, the sructure of RBEs is extremely vulnerable and once puddled for growing paddy, the soil becomes unsuitable for other irrigated crops. It is, therefore, evident that cultivation of paddy in the RBEs should be minimized. LHGs are most sutable for paddy cultivation owing to its poor drainability.

(2) Climate

Meteorological data obtained from SRI, Walawe (located in DL2 Zone) and RARS, Angunukolapelessa (located in DL5 Zone) are considered adequately representative of the climatic conditions of the Old area and the Extension area. Data from these stations for the five year period, 1985 - 1990, averaged to ten day segments are summerized in Table A6.9-1.

The Study area shows the typical bimodal pattern of monthly rainfall distribution with two dry periods, one short and the other more distinct and prolonged. The annual rainfall at the two stations, SRI and RARS are 1,493 mm and 1,063 mm, respectively. The rainfall pattern at the two locations are markedly similar, with nearly 50% of the annual rainfall occuring in the period of October to mid January, the Maha season. The remaining rainfall is experienced mostly in the period of mid March to mid May, the Yala season, and the other months are relatively rainless. Fluctuations in other climatic parameters, though significant, are slight to cause major limitations on growing of crops under irrigation. The basic climatic parameters of the two stations located in the two agro-ecological regeion are as follows.

Parameter	DL5 (RARS)	DL1 (SRI)
Rainfall Av.Mean Annual	900mm	1,306mm
Temperature Av.Mean Month	26-28°C	31-35°C
Humidity Av.Mean 10 Days	77-88%	76-84%

Source: SRI and RARS

The timing of crop establishment and selection of age class of crops should be considered in harmony with the seasonality of rainfall. The variation in the rainfall and temperature between the DL2 and DL5 Zones will influence the distributon of crops selected to different areas of the development area.

6.9.2 Economic conditions

The food balance problem with which Sri Lanka is currently faced is the primary economic constraint on the choice of cropping patterns for the Study area. The following table shows that the national expenditure for import of rice, flour and sugar has remained high. The drop in flour imports in 1991 has been due to increased wheat grain imports

(Value in Rs. million)

Import of Food	1986	1987	1988	1989	1990	1991
Rice	1,052	687	1,808	3,397	1,758	1,589
Flour	90	96	303	175	1,388	1
Sugar	1,764	2,389	2,927	4,326	5,173	5,139

Source: Central Bank of Sri Lanka

Sri Lanka's greatest immediate need is to achieve rapid increases in the local production of these crops. Two major goals have been set out in the Government policy statement, the Public Investment Programme 1990 - 1994. They are: (i) to move towards a higher degree of self relience in basic food commodities; and (ii) to promote crop diversification and encourage the establishment of agro-industries to increase incomes and employment opportunities in the rural areas.

Sugarcane is one of the most promising crops as the present local production of sugar meets only 15% of the national requirement. The long term plan of the Government envisages 50% self sufficiency in sugar by year 2000. It is the Government policy that the development of sugar industry should be through private sector investment on processing facilities and small holders and outgrowers suppling the raw material.

Demand projections based on nutritional requirement and elastisity of demand indicate that by the year 2000, the shortfall in the local supply of onions to be in the region of 127,000 mt, as shown below.

(Unit: '000 ton)

Year	Onion		Chilli	
	Production	Demand	Production	Demand
1991	91.4	124.3	38.3	41.2
1993	94.3	142.8	41.1	45.4
1995	97.3	164.1	43.5	49.2
1997	100.2	188.5	45.9	53.8
1999	103.1	216.6	8.4	58.8
2000	104.6	232.2	49.6	61.5

Source: Ministry of Agricultural Development and Research

The projected median demend levels would require the present production areas to nearly double by year 2000.

6.9.3 Social conditions

The original development plan to irrigate some 19,000 ha in the LB area was not underaken beyond the 30 km LB main canal and the branch canal. The existing irrigation infrastucture serves an area of about 4,400 ha covering 1,500 ha in the Sevenegala sugarcane area and 2,900 ha in the MEA managed area. Organized development activities in the remainder of the LB area, except for some rehabilitation of minor irrigation tanks, has been minimal. According to the census survey of PMU, there are about 6,000 families presently living in the area.

(1) Household income

The main income sources of the inhabitants are: (i) rainfed agriculture in Maha season which is irregular; (ii) labour work in outside areas; and (iii) selling margosa and tamarine seeds, firewood and wood apple from the jungle. The farm economy survey of the area indicated that the average household income is insufficient for subsistance level existance if not for the subsidies they receive as food stamps and Janasaviya grants. 62% of the inabitants receive the subsidies and the present conditions warrent priority development effort.

(2) Labour force

The census survey reveals the existance of a largely under utilized labour force in the area. The labour factor is estimated at 1.9 and the labour force at 11,400.

6.10 Proposed Cropping Pattern

6.10.1 Basic concept and conditions for crop selection

In the process of selecting crops for recommendation as the basis for large scale human settlements, the physical conditions of the Study area, agricultural development policies and the general selection criteria were carefully considered under the following basic concepts and conditions.

(1) Adaptability of the crop to soil and agro-climatic conditions of the area and its ability to perform satisfactorily under irrigation.

(2) Government objectives of maximising the returns to the ecomomy and creating new employment through promotion of agro-industry.

(3) Maximising land use through crop diverification.

(4) Expected level of technology and farm input availability to the farmers.

(5) Ensuring a satisfactory and stable return to the farmers.

(6) Market potential for the agricultural produce.

Based on this study eight crops/ crop groups were identified for consideration, namely, paddy, sugarcane, banana, cassava, onion, grain legumes, oil seeds and vegetables.

6.10.2 Cropping calender

The timing of crop establishment and selection of age class of crops were considered in harmony with the sesonality of rainfall. Crop establishment and plant growth are timed to take best advantage of the rainy periods, while crop maturity and harvesting are timed to coincide with the dry period. To fit the timing of cropping best to the existing climatic pattern, it is proposed that the cropping season in the LB area is advanced. A total land preperation period of 1.5 months is considered practical in view of experiences in the RB and LB existing irrigated areas.

6.10.3 Alternative cropping patterns

In the formulation of alternative cropping patterns the following principles were applied.

(1) The cropping pattern should generate maximum benefits to the farmers and to the nation as a whole.

(2) The cropping pattern should be practical in view of the available labour force in the area. The labour balance study is shown in Table A6.10-1.

(3) LHG soils are cultivated in paddy during both Maha and Yala seasons.

(4) In terms of the current thinking on agro-industry, (i) Sevenagala factory capacity will be increased to 2000 tcd or a new factory having a capacity of 2000 tcd will be established through private sector investment in the project area; (ii) cassava processing factory will be established by the private sector within the project area; and (iii) sunflower oil extraction facility will ba established by the private sector within the project area.

(5) Banana extent of total 1,000 ha is estimated maximum within which the market is expected to remain stable.

(6) The cropping pattern will make optimum utilization of the supplied water resources.

Three alternative cropping patterns were developed using the linear programming method (LINDO) and presented in the Interim Report. The land extents under each crop in the three patterns are summerized below.

(Unit: ha)

Crop	Alternative 1		Alternative 2		Alternative 3	
	Maha	Yala	Maha	Yala	Maha	Yalla
Paddy	4,540	4,540	4,540	4,540	4,540	4,540
Big onion	630	1,130	920	2,780	400	2,340
Sunflower	500	0	1,860	0	1,220	0
Vegetable	0	0	0	0	860	140
Banana	610	610	960	960	1,000	1,000
Sugarcane	3,000	3,000	1,000	1,000	0	0
Cassava	0	0	0	0	1,260	1,260
Total	9,280	9,280	9,280	9,280	9,280	9,280

6.10.4 Proposed cropping pattern

The alternative cropping patterns were subject to detailed discussion with officials of MASL and other relevent Ministries, during which further refinements were made in relation to current agricultural development policies, proposed agro-processing facilities in and around the Study area, proposed crop diversification plans for the RB area and other technical considerations.

(1) Paddy

Although the net return to the grower on a reletive basis has tended to decline, paddy remains an important crop on account of its high productivity in the region, excellent adaptability to LHG soils, consumption requirements and high acceptability among farmers. The paddy extent of 4,540 ha proposed for the LHG area in both Maha and Yala seasons would remain unchanged.

(2) Sugarcane

Its high yielding ability in the Study area (Sevenagala cane farmers record yields that are 30% higher than other irrigated cane growing areas), superior cane quality, low crop water requirement, satisfactory return to outgrowers, industrial by-products and generation of direct employment are seen as benefits of sugarcane. In keeping with the policy priorities, the MASL preferred alternatives 1 and 3 which proposed 3,000 ha and 1,000 ha of sugarcane, repectively. Alternative 1 envisaged establishment of a new sugar factory in the Study area, while alternative 2 considered the expansion of Sevenagala sugar mill under the proposed phase I

development plan. Following the dialogue MASL had with the Ministry of Plamtation Industries, an undertaking has been given that the capacity of Sevenagala mill will be increased to accept cane production from an additional 5,000 ha. On the strengh of the assurance given to the Study Team by MASL, it is decided to include 3,000 ha of sugarcane in the cropping pattern.

(3) Big onion

The supply-demand projections on big onion show a large shortfall that will continue to increase. After making allowances for possible production increases in other producing areas due to expansion of the land area and technological advances, there is still scope for aggressively promoting its cultivation. The problems of high capital investment and level of technology reguired, along with the current risk factors involved in large scale production of big onion were reviewed against the proposals. 630 ha of big onion during the Maha season as proposed in alternative 1 and a reduced extent again of 630 ha in the Yala season was decided on for the development area.

(4) Banana

Banana has emerged as a highly profitable crop in the existing areas as evident from the eight-fold increase in the cultivated extent during the last decade. However, in view of the proposed intensive diversification efforts in the RB area, where a substancial increase in banana culivation is envisaged, banana in the development area will be reduced to aviod possible over-production for the local market. 610 ha as proposed in the alternative 1 will be included in the cropping patten.

(5) Vegetable

A range of popular low country vegetables are presently cultivated in the area. The proposed packhouse and cold chain project in the RB area and the tradition of vegetable growing in the area were considered in favour of increasing the extent under vegetables in the proposed cropping pattern. In order to ensure balance production through the year, the total extent of 1,000 ha proposed in alternative 3 will be equally distributed as 500 ha for each season.

(6) Sunflower and cassava

Due to factors such as non-commitment from private sector investors to establish processing facilities, relatively less experience on growing these crops on large scale and limitation of land, sunflower and cassava will not be considered in the cropping pattern

(7) Proposed cropping pattern

The proposed cropping pattern evolved after giving due consideration to the factors discussed above and by combining the elements of the alternative cropping patterns is presented in Table A6.10-2 and Fig. A6.10-1 and 2.

6.11 Proposed Farming Practices

Specific crop recommendations and comprehensive production guidelines prepared based on agricultural research are available for extension staff as well as the farmers. The information is constantly updated through the regular pre-seasonal training classes. Farmers in and around

the Study area have excelled in paddy and sugarcane production as evident from the high yeild levels recorded for these crops. Inspite of such achievements, there is much to be desired in terms of individual farmers and production potential. Some general and crop specific considerations revealed during the socio-economic survey and field inspections are highlighted.

6.11.1 General considerations

(1) The average cropped area per farmer is below the expected one ha extent. This is ususally due to part of the irrigated land, averaging to 0.1 ha, being used as the house plot. The loss of valuable irrigable land results in reduced farm income as well as production potential of the land.

(2) The period of land preparation and the last date set for sowing of paddy acording to the agreed cropping calender at the cultivation meetings are usually extended, almost as a rule each season, to allow late starters to complete their operations. Taking into consideration the possible limitations of draught power, it is recommended that the water issue for land preperation in the development area is extended to 6 weeks from the present 4 weeks.

(3) The use of agro-chemicals are unavoidable for continuous large scale crop production successfully. However, their indiscreminate use is wasteful of farm budget and harmful from the health and environmental view point. The Intergrated Pest Management Programme conducted by DOA in the existing area is recommended for early introduction to the development area.

(4) The present pactice of using expensive fertilizer mixtures for paddy and other crops is best replaced by DOA recommended straight fertilizers as it will reduce the production costs considerably without adverse effects on the crop yields.

(5) The use of high quality seeds is essental to maintain productivity and profitability. Farmers in the area tended to use their own seed materials, particularly of paddy, over extended time periods on account of scarcity and apparent high price. It is recommended that measures should be undetaken to ensure availability of quality seeds and planting materials and to promote their use among farmers.

(6) Some crop specific proposals on farming practices are as follows:

a. Paddy

Completion of puddling operation immediately after ploughing during land preparation is recommended as a means of reducing high percolation losses at the beginning of the season. To suppliment the straight fertilizer recommendation, recycling of straw in selected paddy fields is recommended when not used for mulching of highland crops or supplied to the Paper Corporation at Embilipitiya. The seed replacement cycle of 4 seasons should be maintained by making available certified seed paddy of recommended varieties is urged. Transplanting method of crop establishment using the row transplanter is advocated as a means of reducing the seed requirement and cost of weed conrtol.

b. Sugarcane

Use of seed cane of less than seven months old from heat treated secondary nurseries is recommended for uniform crop establishment. Earthing up operation following the second top dressing should be deep enough to furrow irrigate without flooding the field. Crop management including gap filling and weed control in the ratoon crops needs the same care as in the plant crop to ensure good

ratoon yields. Correct crop maturing procedures by withholding irrigation prior to harvesting is essential to ensure good milling quality of cane. Harvesting operation needs to be well coordinated to avoid stale cane being sent to the factory.

c. Big onion

Big onion can be grown from seedlings or dry sets. For its cultivation of in the Maha season, use of dry sets is recommended. Raising of the planting material, both seedlings and dry sets, is a skilled operation and it is therefore, proposed that selected farmers are trained and developed as commercial nurserymen. Among the pests and diseases that affect the crop, incidence of purple blotch has been reported to be particularly heavy during the Maha season. In order to avoid the extended rainy period associated with the disease, using the southern parts of the Extension area that fall into the DL5 agroclimatic zone for onion cultivation is preferred. To extend the period of release to the market, proper storage of the harvested crop is important.

d. Banana

At present, only the suckers are used as planting material for the establishmennt of banana. There is high variation in the size, colour and shape of the product though all belong to the same variety 'Embul'. Field selection for product uniformity will be required to establsh a good market. To overcome the short supply of planting material with project conditions, it is recommended to use cut pieces of the comb as propagation material. Preparation and treatment of the propagation material prior to field planting, according to recommendations is vital to ensure a healthy population.

e. Vegetables

Vegetables represnts a range of crops. In general, use of high quality seeds and planting material to ensure quality produce is stressed. Expanding the present range of kinds and varieties is an important factor in marketing.

6.12 Expected Yields and Production

In estimating the expected yields of the crops proposed for the project, be available yield data from the following sources were taken into consideration.

(1) Existing irrigated areas in RB and LB old area of the Walawe project
(2) Outside areas where conditions are similar to the project area
(3) Potential crop yields from experimental data

6.12.1 Paddy

As mentioned previously, the Walawe project area has been consistantly recording the highest national yield for paddy over the last eight years. The extent cultivated, yield and production of paddy in the Walawe project area between 1987-1991 is given below.

Year	Season	Extent (ha)	Yield (kg/ha)	Product. ('000mt)
1987	Yala	8,936	4.602	41
	Maha	8,772	5.103	45
1988	Yala	8,822	4.644	41
	Maha	8,988	5.125	46
1989	Yala	8,344	5.393	45
	Maha	9,199	5.713	53
1990	Yala	8,915	4.949	44
	Maha	10,595	5.093	46
1991	Yala	10,103	4.276	37

Source: Department of Census and Statistics.

The Ministry of Agricultural Development and Research and the Department of Agriculture recognized that an average yield level of 5.0 ton/ha had already been achieved in the Walawe region as well as Mahaweli systems H and G areas. The target yields in the 1991-92 season set by the Ministry were 5.3, 5.5 and 5.5 ton /ha for Walawe, Mahaweli systems H and G, respectively. The average paddy yields of 5.5 ton/ha can be expected as long as the following conditions are satisfied.

i) Stable irrigation water supply
ii) Adoption of proposed farming practices
iii) Utilize of recommendable varieties (BG34/6, BG94/1 and BG 350, etc.) and application op proper quality of fertilizers and agro-chemicals farm inputs
iv) Reinforcement of suitable agricultural supports

6.12.2 Sugarcane

Sugarcane yields recorded in the cane farmers fields at Sevenagala, during the 1987-1991 period are as follows.

(Unit: t/ha)

Crop	1987	1988	1989	1990	1991
Plant	96.65	156.58	182.02	166.33	137.67
Ratoon I	-	126.07	107.00	111.04	96.90
Ratoon II	-	-	103.06	93.82	83.46
Ratoon III	-	-	-	91.04	86.66
Ratoon IV	-	-	-	-	89.44

Source: Plantation Office, Sevenagala Sugar Industries Ltd.

The yield recorded for the outgrowers in the Walawe RB however, tended to be low at 107.3 t/ha. The anticipated yield of sugarcane with project conditions is estimated at 140 t/ha and an averaged 105 t/ha, respectively, for the plant crop and the ratoon crops.

6.12.3 Big onion

Production of big onion in the Walawe project area at present is not significant and the available data unreliable. Yield data of Kalawewa (Mahaweli H area) and that for the country are presented in the table below.

(Unit: kg/ha)

Crop	National Av. (5 Yrs)	Kalawewa	Walawe	Potential
Red Onion	10.28	10.36	13.26	15-20
Big Onion	10.24	9.77	9.80	18-25

Source: (i) Agricultural Implementation Programme, Ministry of Agricultural Development and Research
(ii) Crop Recomendations Technoguide, 1990. DOA.

The anticipated average yield of big onion is estimated at 12t/ha.

6.12.4 Banana

Based on the field observations in the Walawe area, and the potential recorded in DOA experimental plots, the yield of banana is estimated at 5 t/ha and 20 t/ha for the first year and the subsequent 5-6 years, respectively.

6.12.5 Vegetable

The representative vegetable of this group of crops used in the analysis was the gourd. The yield potential of gourd under irrigated conditions is as high as 35-40 t/ha. An average yield value of 25 t/ha is anticipated for the group of crops.

6.12.6 Expected production

The anticipated crop production under thr project conditions are shown in the table below.

Crop	Extent (ha)	Anticipated Yield (t/ha)	Anticipated Annual Production (t)
Paddy	4,540	5.5	49,940
Big Onion	630	12.0	15,120
Vegetables	500	25.0	25,000
Banana	610	18.0	10,980
Sugarcane	3,000	114.0	342,000

6.13 Anticipated Marketing, Processing and Price Prospects

6.13 1 Marketing development

Agricultural marketing is the performance of all activities involved in the flow of agricultural products from the point of initial production to the consumers. For the farming community, marketing development is crucial in increasing income through strengthening of their bargaining powers, reduction of intermediaries, timely marketing operations to get higher sale prices, etc. Marketing development, in general, will also activate the rural economy by promotion of agro-processing industry, increase in the commodity inflow and outflow, etc.

Some major development aspects of the marketing system are discussed below.

(1) The project envisages that 3,000 ha of sugarcane will be cultivated by over 7,000 farmers and the entire cane production will be purchased by the Sevenagala Sugar Industries Ltd. Further to the assurance given on timely expansion of the factory capacity to absorb the cane, it would be necessary lay down definite safeguards to protect the small farmers against uncertaities such as non purchase of cane. It is, therefore, proposed that a Memorandum of Understanding incorporating the guarentees offered for the protection of the cane farmers is prepared and signed between MLIMD and Ministry of Plantation Industries. The resposibilities and obligations of both parties to the farmers need to be considered in the peoplization process of the holding company.

(2) Under large irrigation schemes, such as the proposed project, it is often not possible to completely aviod the seasonal cycle of crop production which coincide with the water issues. The seasonality in crop production invariably results in peroidic market gluts causing severe price declines, particularly, those of the perishable products. In order to minimize the losses, it is proposed to: (i) broadbase the range of vegetables to include non-traditional vegetables; (ii) introduce new varieties of vegetables that are adaptable and have consumer demand; and (iii) select crops and varieties with different age classes to stretch the production period.

(3) Product quality is a basic market price determinant. High quality seed and planting material is an essential prerequisite to ensure the quality of agricultural products. In the case of sugarcane there is an urgent need for varieties having good milling qualities as the cane price is determined by its quality. Cane quality can further be improved by practicing correct field maturing process. The project will benefit by introducing paddy varieties of 3 month age class having red grain character. The variety Embul of banana predominantly grown in the area show high degree of variation in terms of physical characters such as size, colour and shape of fruit. The quality of vegetables are poor due to use of farmers seeds, sometimes the segregated material of original hybrids. The quality improvement should be a priority concern of the researchers and the extension workers.

(4) The project area is characterized by a large number of producers acting individually in the market to sell their agricultural products. In dealing with the private traders, the farmer is at a disadvantage due to a number of factors. These arise from: (i) the smallness of marketable quantities; (ii) perishability of product; (iii) lack of market information; and (iv) poor transport facilities. The low bargaining power of the small farmer makes it possible to control the market prices. Strengthening of farmers bargaining power through farmers marketing organizations is proposed. The marketing function in the newly constituted farmer organizations in the existing area is not well defined. The main and immediate concern of the organization is pivoted on water management. Past experiences have shown that farmers cooperatives in the present form failed to serve the marketing needs of farmers. Formation of peoples companies, for which provision exist under the Companies Act, is proposed on a pilot scale to carry out marketing activities as an alternative to cooperatives and water management organizations.

(5) Marketing information is vital to ensure the best prices for farm produce as well as production planning. It is proposed to set up a marketing information office in the proposed Development Center to collect, process and dissimate maketing information among user groups. This office will establish telephone/faximile links with the Colombo MEA head office and the proposed marketing information centers at relevent Provincial Councils. Dissimation of the infomation will be effected through radio broadcasts from Development Center, agricultural extension agents and publication of marketing bulletin/newsletter

(6) Many farmers depend on private money lenders for agricultural and consumption credit which is usually tied up with farm produce. As a result the farmers are forced to sell the produce to them often at rates lower than that paid by institutional buyers. It is proposed that marketing credit to farmer organizations be institutionalized to enable product storage to realize higher market prices.

(7) For the effective functioning of the marketing system, some basic marketing infrastucture facilities are required. It is proposed to provide simple transit store for assembling farm produce and farm inputs at the Unit level. The store will have adequate space for primary processing. It is also proposed to upgrade the Kiriibbanwewa Pola by providing basic services. The two new administrative blocks in the Extension area will be provided with Pola areas along with the basic facilities.

(8) Well organized training programme to guide the farmers through the marketing development process is essential to achieve the desired objective of establishing strong and stable organizations capable of taking over greater responsibilities. The Marketing Division of MEA resposible for the implementation of the programme needs to be strengthened with adequate trained staff.

6.13.2 Processing of agricultural products

It is envisaged that two private investors will be involved in post harvest and marketing activities in the area. These investments will be made on the expansion of the mill capacity of Sevenagala sugar factory in the Study area and on establishment of a packhouse and cold chain project in the RB area.

(1) Sevenagala mill capacity expansion

The Sevenagala Sugar Industries Ltd., is a holding company that is being peoplized, the process scheduled for completion before end 1992. The proposed mill capacity expansion programme is spaced into three development phases, and is expected to be undertaken by a corporate investor who will hold the majority tranche of shares. The proposed mill expansion programme is shown below.

	Development Phase			
	Present	Phase I	Phase II	Phase III
Capacity (tcd)	1,430	2,400	4,000	5,000
Duration (years)		1 - 2	2 - 3	2 - 3

Source: Sugarcane Research Institute. June 1992

The MASL has assured the Study Team that the proposed peoplization of the holding company and the expansion programme will be completed on schedule so that the sugar factory will be in a position to accept sugarcane in the area.

(2) Aitken Spence Agricultural Developments Ltd. (ASAD) has initiated an agricultural production and processing venture in the Walawe RB area to test and develop high value export crops with financial assistance from USAID special project grant administered by the Mahaweli Enterprise Development (MED) project. The ASAD project envisages to construct and put into operation a cold chain facility, including hydro-cooling and cold storage facilities and transport equipment. Further, operating a pickling facility and undertaking of crop and market research

on a variety of items are also envisaged. The funding arrangements have been concluded for this 10 mt per day capacity plant and its implementation is scheduled to commence by 1992.

6.13.3 Price prospects

The proposed cropping pattern takes into consideration the demand and supply aspects and problems of marketability. It is envisaged that the implementation of the programme will not cause drastic changes in the marketing conditions, particularly, the product prices.

(1) Paddy

At full development of the project, the paddy production in the Study area is estimated to be 57,000 mt per year and the consumption requirement within the study area estimated at 15,000 mt per year. The balance 42,000 mt will be supplied to the domestic market and will contribute towards the goal of self sufficiency in paddy. It would be of interest to note that the proposed short term crop diversification programme of the RB area envisages 53% of the irrigated area to be brought under crops other than paddy. The present price stucture is expected to remain unaffected at Rs 8 per kg of paddy.

(2) Sugarcane

Statistics of the supply demand situation of sugar is shown in the table below.

(Unit: '000 mt)

	1987	1988	1989	1990	1991
Local Production	34.54	53.62	53.84	57.16	66.44
Imports	376.00	319.00	320.00	305.00	458.00
Total	410.54	372.00	373.84	362.00	524.00

Source: Annual Reports, Central Bank of Sri Lanka.

The present price level of sugarcane is ensured by the Government decision to maintain a minimum efficiency price of US$500 per ton of locally manufactured sugar. With the expected improvement in the production efficiencies, it is envisaged that the cane price will stabilize at Rs. 900 per ton.

(3) Big onion

The demand and supply of big onion by the year 2000 has been estimated as 232,000 and 105,000, repectively. It is estimated that with project conditions the production of onion will be about 15,200 mt which is only a 12% increase. The present prices are expected to remain unchanged at Rs. 12 per kg.

(4) Banana

Though demand estimates for banana are not available, the present market trends indicate that the prices are high but unstable. Further, a factor to recon with is the normalization of currently disrupted supplies from the traditional producing areas in the nothern districts of the country.

Substantial areas in the RB area too have been earmarked for banana cultivation. Under these circumstances, the banana price at Rs. 10 per kg is expected to remain stable. It has shown some export potential as a speciality fruit crop.

(5) Vegetable

The group of crops classed under vegetables are very conservatively estimated to command a market price of Rs. 4 per kg. The proposed marketing srategy is expected to provide sufficient protection against possible price declines as a result of overproduction.

6.14 Future Crop Budget

On the basis of the estimated production cost and gross income, primary profit per ha of crop was calculated under with project condition. Details are given Table A6.14-1 (1-2) and sumarized as follows.

(Unit: Rs./ha)

Crops	Gross Income	Cost	Net Income
Paddy	44,000	20,600	23,400
Big Onion	180,000	60,000	120,000
Vegetables	100,000	43,900	56,100
Banana			
1st	50,000	24,200	25,800
2-5	200,000	16,800	183,200
Sugarcane			
1st	126,000	44,700	81,300
2-4	94,500	23,900	70,600

6.15 Future Farm Economy

In order to assess the effect of the project on farmers' budget, future farm budget is forecasted. Typical farm size and farm budget are given in Table A6.15-1. The typical farm size is only one instance among many. The basis of the followings assumptions is adopted in order to decide typical farm size.

1) Farm size is 1 ha without exception.
2) Each farmer should have both paddy field and upland field.
3) For the farmer in the extension area, similar net farm income should be earned.

The typical farm size for farmers in the extension area is summarized below.

(Unit: ha)

Block	Paddy Field	Sugar Field	Upland Crop Field
End of BBC			
Pattern-1	0.42	0.15	0.43
Pattern-2	0.43	0.15	0.42
Extension North			
Pattern-1	0.39	0.16	0.45
Pattern-2	0.40	0.13	0.47
Extension South			
Pattern-1	0.45	0.13	0.42
Pattern-2	0.61	0.39	0

Estimated farm income for farmers in the with project condition also is shown in Table A6.15-1and summarised as follows.

(Unit: Rs./year)

Item	Farmer under with project*1	Paddy farmer in Old Area*2	Sugar Farmer
Gross Farm Income	122,000	35,000	42,000
Production Cost	43,200	22,000	21,000
Net Income	78,800	13,000	21,000

Source: Socio Economic Survey done by the Study Team in Stage I
*1: Extension area
*2: Kiriibanwewa and Suriyawewa

After implementation of the irrigation project, the project will provide bases for introduction of irrigation farming through year. As a result, increasa of croppiong intensity and unit yield of each crop will be expected in the future. Under such conditions, farm income after the implementation of the irrigation system, will change drastically. Anticipated gross farm income from agricultural products will amount to Rs.122,000 or 13 times of Janasaviya and Food Stamp farmers' one in the Extension area under the present condition. The annual net reserve or capacity-to-pay under with project condition will be much larger than that under present condition. At least, the living standard of the 6,380 families will be improved by implementation of the project.

6.16 Settlements plan

6.16.1 Present Situation in the Study Area

(1) General

According to the data and information of (i) Uda Walawe Left Bank Extension Project Census of 1991/92 conducted by the PMU of MASL, and (ii) the records at MEA project office, a large number of second generation families in the existing irrigated areas of RB and LB are landless and they are awaiting for the development of the left bank area.

(2) Old area

The present irrigation extent of 2,900 ha in the Old area will increase to 3,940 ha under with project condition. The new developed irrigated area of 1,040 ha will be given to settlers who

have been tentatively allotted the land plot by MASL. They have been cultivated upland crops under rainfed condition. Some modification of land boundary, however, will be required due to construction of project facilities. This will benefit the total recorded 4,157 farm families including 406 farmer in Bedigantota already in the area.

(3) Extension area

In the Extension area, 5,340 ha of new irrigated lands will be developed under the project. According to the census survey, 6,018 families live in and around the extension area. The number includes 1,650 farm families regularized by MASL, 840 farm families who have annual permits or long term leases issued Crown Lands Ordinance, and 3,529 families of encroachers. Regularized families by MASL are settled in the northern part of the area. On the other hand, about 260 farm families who have annual permits or long term leases issued Crown Lands Ordinance lives under minor irrigation tanks. Furthermore, other regularized 579 farm families are scattered in the extension area. The balance of 3,529 families are encroachers. It is considered that re-allotment of land will be required based on the consideration that the regularized farm families will have a priority to get right of settlement.

6.16.2 Selection Criteria and Instructions

The policy on land alienation followed by MASL entitles a farm family to be allocated a total of 1.20 ha consisting of one ha of irrigated plot (farm) and 0.20 ha of upland homestead plot. In line with the policy, the size of the farm holding will be one ha without exception. According to MEA-Land Branch, the selection criteria and instructions for the selection of settlers for the Mahaweli Development Project are as following:

(i) Land Kachcheries for the selection of settlers should be held under the provisions of the Land Development Ordience and its regulations and orders.

(ii) Selections should compulsorily be done at Land Kachcheries.

(iii) Every selectee is entitled to 1 ha of irrigated lands and 0.2 ha of upland homestead plot.

(iv) Every applicant should satisfy the following qualifications:

i. Should be a citizen of Sri Lanka
ii. Should be over 18 years of age
iii. Should be a permanent resident of the Assistant Government Agents/Grama Seva Officer's area.
iv. Should be a peasant
v. Should not own 0.8 ha or more of private or leased land
vi. Family income should not exceed Rs. 9,000 per annum
vii. Should not be Government, Corporation or Private sector employees

It is presumed that the existing procedures with regard to land alienation will be followed in the land allocations. In the process of selection of farm families, it appears appropriate that consideration is given to eligible families already residing in and around the area.

6.16.3 Settlement Assistance

If the selected farm families hail from areas outside the project area, proper orientation of the families to the project conditions will be of particular importance. Orientation programmes should commence prior to physical shifting of the families and should be aimed at minimizing

the re-location and acclamatization problems that are usually associated with transmigration programmes. Settlements during the rainy season should be avoided and the time period between the arrival in the project and showing of the homestead allotments, where the settlers are kept in camps, should be minimized. To avoid social and cultural conflicts, settlers hailing from the same area should be settled in one hamlet/village.

The Mahaweli settlers are provided with a package of settlement assistance. These include housing, sanitation, land development, seeds and planting materials and subsistance assistance. Provision has been made to provide the new settlers with similar assistance with project conditions. The package of settlement assistance is shown Table A6.16-1. The settlements should commence after the rural infrastructure is in place to avoid hardships to the families. The facilities proposed will include drinking water supply, health and medical care, roads, educational services, postal services, etc.

6.17 Proposed Agricultural Supporting System

The major objectives of the project are to increase agricultural production and to improve and stabilize the farmers economy through provision of necessary infrastuctures such as irrigation and drainage facilities. In order to realize the objectives, however, there would remain various ancillary works which would be carried out by the State and private sector organizations concerned and the farmers themselves. These are the components of agricultural supporting system comprising research, extension, credit, inputs and farmer organizations.

6.17.1 Agricultural research

(1) Sugarcane

At present, sugar industry in Sri Lanka is based on a single sugarcane variety: CO 775. While the risks of total dependence on a single variety to support the industry are enormous, the variety itself has many limitations. CO 775 is a poor retainer of sucrose which is high early in the season, but falling rapidly as the season progresses. It also gives poor cane preperation in the mill leading to poor extraction. Research and development efforts of the SRI should be directed to rectify this situation as quickly as possible. Diversifying the varietal spectrum to select for high yielding varieties having resistance to pests and diseases and superior milling qualities should be undertaken as a priority to enable early varietal releases to the growers. Introducing and selecting varieties for early, mid and late maturity is necessary to overcome the seasonal effects on sucrose accumulation.

Development of a cost effective package of cultural practices for small holdings to replace the present estate scale field practices should be pursued. This would involve introducing small farm machinary, wheel tractor and animal draught, intercropping, mulching, addition of organic residues, etc.

(2) Paddy

Increasing the proportion of paddy extent cultivated with varieties of 3 month age class is desirable since the practice will lead to a saving of irrigation water use. From a marketing view point, production of red grained rice is fovoured due to the better demand it has in the southern districts of the country. Presently recommended 3 month paddy varieties for the area lack the red grain character. The Rice Breeding Station shoud give priority for the development of paddy varieties that combine 3 month crop duration and red grain characters

(3) Vegetables

The presently cultivated vegetables in the project area are limited in range, both in type and variety. The relaxation of the conditions for import of seeds and planting materials will make available a new range of vegetables for local as well as possible export markets. However, unlike the former DOA recommended and listed vegetables for which comprehensive cultural practices have been developed, the new materials will have a disadvantage in lack of production technology. Therefore, measures for rapid testing and demonstating the benefits to the farmers should be undertaken by the researchers and the extension workers. Development of farm level storage technology for perishable products is another area that need urgent attention.

(4) Using organic matters and natural pesticides

In view of the high cost of fertilizers and agro-chemicals, as well as possible environmental hazard arising from their indiscriminate application in crop production, it is proposed that use of organic matters and natural pesticides is encouraged in the project area. For this purpose, documentation and testing of natural pesticides to develop practical field applications measures are proposed. Further, development of practical methods to utilize of crop residues, particularly sugarcane and sugar factory wastes for extensive use in the upland crops need to be pursed. It is envisaged that these studies will be undertaken at the proposed Development Center.

6.17.2 Agricultural extension

The MEA proposed modifications to the extension system are based on the assumption that the farming community has reached a stage where the agricultural production has levelled off and the cost effectiveness of further production increases through the simple extension messages of the T&V system has declined. Under the project conditions, however, a large number of new farm settlements and a high degree of crop diversification are envisaged. The intensity of farmer coverage under the proposed system is not considered adequate enough to serve project needs. It is proposed that the reference group should comprise of farmers from 1-2 adjacent field canals and the number of farmers should not exceed 25. The field level extension agent (Agricultural Assistant) should visit the each farmer group every fortnight. At the project level, the elements of T&V system should be retained while the research linkage is maintained through the proposed Provincial Technical Working Group.

Training of agricultural staff specifically on the production of proposed crops will be crucial for the success of the project. The training programmes at relevent institutes should be completed prior to the commencement of agricultural operations.

The broadcast with the radio broadcasting equipment set at the Development Center in Suriyawewa should cover all the Project area. The broadcast programs should consist of the water management, agricultural extension, marketing and living information etc., the useful information for beneficiary farmers should be broadcasted in real time. In preparation for the second phase of agricultural extension where increased cost effectiveness of the extension thrust, it is proposed that elements of multimedia approach are introduced early into the system. The project will provide for the basic equipment and training required for this purpose.

6.17.3 Agricultural credit

The surveys conducted in the MEA managed area revealed hat the dependence of the farmers non-institutional credit to be high. Such credit is often associated with high interest rates and/or a binding that the farm produce is sold to the money lender. It is therefore, necessary to that the programmes such as refinancing at the field level be undertaken as a priority measure to

improve the credit worthiness of the farmers. Reducing the number of installments over which the credit is disbursed at present while keeping the amount of credit same, would ease the present burden on farmers who have to make repeated visits to the Bank to avail its services. Streamlining the procedures and introduction of the anticipated 'one shot' loan system to bank regulars are proposed.

Establishment of branch offices of commercial Banks in the two new Blocks in the Extension area well ahead of the commenencement of agricultural operations will be necessary to take charge of credit disbursement. The coverage of crops which is presently limited to paddy in the area needs to be extended to other crops in the project area. Provision already exists for a range og crops. In instances where such coverage is not available, the MEA should pursue through the DOA, Central Bank and the commercial Banks to get those crops included into the programme.

6.17.4 Agricultural inputs

The MEA holds the responsibility to the farmers for timely procurement and distrbution of the necessary agricultural inputs. Unlike in the Old area, where private dealer networks with regard to distribution of fertilizer and agro-chemicals have established over time, the new settlers in the Extension area would be more or less depend totally on the MEA for their requirements. It is proposed that the Marketing Division with assistance from the Agricultural Department make arrangements with regard to the procurement, transportation, storage and distribution of agricultural inputs prior to the beginning of the season.

6.18 Basic Approach to Organizational Development

6.18.1 Summary of problems of organization

The MEA has been involved in human settlements and post-settlement activities, as the executing agency, of several major projects under the Accelerated Mahaweli Development Programme (AMDF). The experience it has gained over the years could contribute towards successful implementation of the proposed project.

The existing Organizational structure of the MEA, in general, is adequate to undertake the settlement and post-settlement management of the project. Some areas that need strengthening and/or re-organizing for further improvement are highlighted below:

(a) The functioning of the delicate arrangement of management matrix with line and functional relations inter-woven in the Management Organization would require good inter-personal relations in addition to the line authority. Some operational problems are apparent at the unit level, where Field Assistant (Agricultural Assistant), who is functionally responsible to the Block Agricultural Officer, is placed under the line management of the Unit Manager.

(b) The high degree of crop diversification anticipated under with project conditions necessitate the establishment of strong marketing systems. It is therefore, vital that the marketing organization of MEA is strengthened and its scope enlarged to serve the project needs effectively.

(c) The MEA is proposing the expand the area served by a Unit Manager to several villages (hamlets) from the original single village concept. Such an approach may be applicable to old settlement areas where a certain level of consolidation have been achieved. In the new settlement area under with project conditions it is considered best that every village (of about 200 farm families) is served by one Unit Manager.

(d) Provision of full staff complement is vital for effective management of the system.

6.18.2 Basic approach for development

The Basic approach to organizational development are centered on the following concepts:

(1) In the Extension area, a Unit Manager to serve one village of 200-250 farm families.

(2) Emphasize and restrict the functional areas at the block level to Water Management, Agriculture and Community Development.

(3) Strengthen the project level functional areas, particularly those of marketing and credit land administration and farmer institution development, in order to co-ordinate their respective activities directly with farmers through Block Managers and Unit Managers.

(4) To establish an official co-ordinating body at the Project level consisting of representative from Sevenagala Sugar Company Ltd., local Government authorities and other relevant organizations.

(5) As far as possible, the organization to fall in line with the existing organization structure of MEA.

6.18.3 Proposed improvement

It is proposed that the RB and LB areas of the Walawe project area are brought under a Resident Project Manager, assisted by two Deputy Resident Project Managers each for RB and LB areas. The functionally specialized divisions of the project will serve both areas.

At the Block level, it is proposed to reduce the present functional areas to water management, agriculture and community development.

In keeping with the current policy of MEA, the Field Assistants as the extension agent will be replaced by Agricultural Assistant. Each Agricultural Assistant will serve about 400-500 farm families in 2 villages and will report directly to the Block Agricultural Officer and not to the Unit Manager.

The proposed organizational structure is shown in Fig. A6.18-1.

6.18.4 Training Programme (Agricultural Training)

The project proposes large scale cultivation of Sugarcane, a crop that is new to Mahaweli projects. The required expertise on Sugarcane 4 is, therefore lacking within the organization. It is proposed that specific training programmes are arranged at the SRI for intensive training of offices before the commencement of settlements. Such specific training is also proposed in the field of high quality vegetable production and storage of agricultural products.

Training of officers and farmers under agricultural extension forms an integral part of the extension system. These programmes include:

i. Pre-seasonal training of officers conducted prior to commencement of each production season by DOA, to constantly update the knowledge.

ii. Bi-weekly training of extension staff conducted by the project subject matter officers at the Block level to develop extension massages.
iii. Bi-weekly farmer group training conducted by the Agricultural Assistants to decimate the extension messages.

TABLES

Table A6.1-1 POPULATION BY AGE

(Unit thousand)

Age Group	1982			1990 (provisional)		
	Male	Female	Total	Male	Female	Total
0 - 4	971	929	1,900	1,081	1,042	2,123
5 - 9	878	850	1,728	980	946	1,926
10 - 14	883	845	1,728	987	946	1,933
15 - 19	834	810	1,644	930	905	1,835
20 - 24	770	774	1,544	877	871	1,748
25 - 29	653	650	1,303	730	729	1,459
30 - 34	583	567	1,150	652	637	1,289
35 - 39	433	425	858	482	477	959
40 - 44	369	346	715	411	387	798
45 - 49	316	308	624	353	344	697
50 - 54	290	264	554	326	292	618
55 - 59	227	206	433	255	229	484
60 - 64	188	162	350	210	180	390
65 - 69	137	124	261	152	136	288
70 - 74	100	85	185	112	96	208
75 - 79	57	52	109	64	57	121
80-	53	50	103	60	57	117
Total	7,742	7,447	15,189	8,662	8,331	16,993

Source: Register General's Department
Economic & Social Statisticsa of Sri Lanka

Table A6.1-2 CURRENT EMPLOYMENT STATUS OF THE HOUSEHOLD POPULATION 10 YEARS OF AGE AND OVER

Age	Household Population (thousand)	Population (thousand)			Labour Force Participation Rate (%)	Percentage(%)	
		Total Labour Force	Employed	Un-Employed		Employed	Un-Employed
10 - 14	1,881.7	92.8	82.5	10.3	4.9	88.9	11.1
15 - 19	1,746.5	550.9	386.2	164.7	31.5	70.1	29.9
20 - 24	1,655.2	1,227.6	800.6	427.1	74.2	65.2	34.8
25 - 29	1,308.5	1,011.3	837.2	174.1	77.3	82.8	17.2
30 - 34	1,116.3	890.7	773.4	117.3	79.8	86.8	13.2
35 - 39	1,087.8	808.3	764.1	44.2	74.3	94.5	5.5
40 - 44	905.9	666.0	638.4	27.6	73.5	95.9	4.1
45 - 49	743.3	532.7	525.5	7.2	71.7	98.6	1.4
50 - 54	650.1	424.6	408.9	15.7	65.3	96.3	3.7
55 - 59	612.9	324.7	323.5	1.2	53.0	99.6	0.4
60 and over	1,362.4	439.2	423.4	15.8	32.2	96.4	3.6
Total	13,070.6	6,968.8	5,963.7	1,005.2	53.3	85.6	14.4

Source: Sri Lanka Labour Force Survey, First Quarter 1990

Table A6.1-3 EMPLOYED POPULATION BY MAJOR INDUSTRY DIVISIONS

Major Industrial Group	Population (thousand)			Percentage (%)		
	1971	1981	1990	1971	1981	1990
1. Agriculture	1,829.0	1,875.8	2,851.1	50.1	45.5	47.8
2. Industry						
Mining and Quarrying	13.1	33.8	161.4	0.4	0.8	2.7
Manufacturing	339.4	408.7	865.8	9.3	9.9	14.5
Electricity Gas and Water	9.6	16.0	13.4	0.3	0.4	0.2
Construction	103.6	134.0	183.1	2.8	3.3	3.1
3. Services						
Trade and Hotel etc.	343.8	437.3	509.7	9.4	10.6	8.6
Transport, Storage and Commun.	178.9	199.6	246.8	4.9	4.8	4.1
Insurance	24.9	56.9	49.5	0.7	1.4	0.8
Personnal Servicces	492.8	587.8	979.5	13.5	14.3	16.4
4. Not Defined	313.9	369.3	99.0	8.6	9.0	1.7
Total	3,649.0	4,119.2	5,959.3	100.0	100.0	100.0

Source: Census of Population and Housing 1981
Sri Lanka Labour Force Survey, First Quarter 1990

Table A6.1-4 ESTIMATE OF GROSS NATIONAL PRODUCT AT FACTOR COST, CONSTANT 1982 PRICES

Sector	Amount (Rs. Million)						Annual Growth Rate (%)					Average
	1986	1987	1988	1989	1990	1991	1987	1988	1989	1990	1991	Growth Rate
1. Agriculture, Forestry and Fishing	29,106	27,409	27,984	27,666	30,100	30,869	-5.8	2.1	-1.1	8.8	2.6	1.2
1) Agriculture	25,037	23,003	23,762	23,311	25,818	26,240	-8.1	3.3	-1.9	10.8	1.6	0.9
2) Forestry	1,958	2,215	1,943	1,985	2,030	2,107	13.1	-12.3	2.2	2.3	3.8	1.5
3) Fishing	2,111	2,191	2,279	2,370	2,252	2,522	3.8	4.0	4.0	-5.0	12.0	3.6
2. Industry	29,770	31,646	32,976	34,104	36,693	38,265	6.3	4.2	3.4	7.6	4.3	5.1
1) Mining and Quarrying	2,615	3,112	3,392	3,576	3,901	3,511	19.0	9.0	5.4	9.1	-10.0	6.1
2) Manufacturing	17,558	18,748	19,622	20,488	22,427	23,979	6.8	4.7	4.4	9.5	6.9	6.4
3) Construction	8,191	8,338	8,463	8,514	8,684	8,963	1.8	1.5	0.6	2.0	3.2	1.8
4) Electricity, Gas, Water and Sanitary	1,406	1,448	1,499	1,526	1,681	1,812	3.0	3.5	1.8	10.2	7.8	5.2
3. Services	55,385	56,867	58,090	59,959	62,463	66,255	2.7	2.2	3.2	4.2	6.1	3.6
1) Transport Storage and Communication	13,377	13,538	13,619	13,883	14,410	15,260	1.2	0.6	1.9	3.8	5.9	2.7
2) Trade	23,821	24,496	25,164	25,588	26,497	28,423	2.8	2.7	1.7	3.6	7.3	3.6
3) Finance	5,174	5,490	5,819	6,168	6,556	6,989	6.1	6.0	6.0	6.3	6.6	6.2
4) Others	13,013	13,343	13,488	14,320	15,000	15,583	2.5	1.1	6.2	4.7	3.9	3.7
Constant Factor Cost												
Total	114,261	115,922	119,050	121,729	129,256	135,389	1.5	2.7	2.3	6.2	4.7	3.5
GNP per Capita (Rs.)	7,089	7,085	7,178	7,243	7,606	7,871	-0.1	1.3	0.9	5.0	3.5	2.1

Source: Annual Report, Central Bank of Sri Lanka

Table A6.1-5 BALANCE OF TRADE

(unit: Rs. million)

Commodity	1985	1986	1987	1988	1989	1990	1991 (Prov.)
I. Export							
1. Agricultural Exports	19,027	15,764	17,437	20,104	22,049	28,886	26,537
1) Tea	12,003	9,253	10,654	12,299	13,664	19,823	17,867
2) Rubber	2,566	2,622	2,929	3,706	3,112	3,080	2,641
3) Coconut	3,093	2,389	2,140	1,538	2,865	2,783	2,619
4) Others	1,365	1,500	1,714	2,561	2,408	3,199	3,409
2. Industrial Exports	14,296	15,878	20,004	22,673	28,470	41,510	50,736
1) Textiles and Garments	7,960	9,629	12,897	14,260	17,631	25,163	33,261
2) Petroleum Products	3,877	2,358	2,592	2,265	2,242	3,974	3,289
3) Othes	2,459	3,891	4,515	6,148	8,597	12,374	14,185
3. Mineral Exports	864	1,182	1,805	2,613	2,693	3,484	2,562
1) Gems	561	755	1,447	2,070	2,204	2,933	2,358
2) Others	303	427	358	543	489	551	204
4. Unclassified	2,021	1,249	1,886	1,536	2,963	5,601	4,543
Total	36,208	34,073	41,132	46,926	56,175	79,481	84,378
II. Import							
1. Consumer Goods	10,462	12,256	13,815	17,439	20,961	28,420	32,357
1) Rice	1,089	1,052	687	1,808	3,396	1,758	1,589
2) Flower	206	90	96	303	175	1,387	1
3) Sugar	1,985	1,764	2,389	2,927	4,326	5,173	5,139
4) Milk and Milk Products	751	922	1,276	1,931	2,298	-	-
5) Other Food and Drinks	1,875	2,918	3,014	3,245	2,940	7,306	10,020
2) Other Consumer Goods	4,556	5,510	6,353	7,225	7,826	12,796	15,608
2. Intermediate Goods	29,330	28,618	34,620	40,324	45,255	55,757	64,265
1) Fertilizer	1,579	1,282	1,299	2,476	1,755	2,958	2,430
2) Petroleum	10,986	6,293	8,716	7,839	8,376	14,372	12,887
3) Chemicals	902	1,587	1,559	1,887	2,117	4,754	3,643
4) Wheat and Meslin	2,765	2,371	1,923	2,800	4,964	3,791	3,303
5) Textile and Clothing	3,799	6,353	8,086	8,796	9,981	13,454	20,611
6) Others	9,299	10,732	13,037	16,526	18,062	16,428	21,391
3. Investment Goods	10,387	10,556	11,334	12,081	12,018	23,412	29,792
4. Unclassified	3,868	3,129	761	1,186	1,990	139	229
Total	54,047	54,559	60,530	71,030	80,224	107,728	126,643
Total Balance	-17,839	-20,486	-19,398	-24,104	-24,049	-28,247	-42,265

Source: Central Bank of Sri Lanka Annual Report, 1989, 1990 and 1991

Table A6.1-6 EXISTING AND PROPOSED LAND USE UNDER WALAWE DEVELOPMENT SCHEME

Category	Area (acrea) Paddy	Sugarcane	Cotton and others	Total
I. Right Bank Area (to be developed under present project)				
A. Land to be newly irrigated				
Northern zone				0
Tract 1		500		500
Tracts 2-7	3,821			3,821
Total	3,821	500	0	4,321
Southern zone				
Tracts 9-21	8,600		12,130	20,730
Sub-total	12,421	500	12,130	25,051
B. Existing Developed Land				
Chandrika area	5,270			5,270
Embilipitiya and other				0
Village tanks	2,844			2,844
Sub-total	8,114	0	0	8,114
Total Right Bank (A+B)	20,535	500	12,130	33,165
II. Left Bank Area (to be developed in subsequent second phase)				
A. Land to be newly irrigated				
Northern zone	6,550	17,280		23,830
Southern zone	7,220		15,030	22,250
Sub-total	13,770	17,280	15,030	46,080
B. Existing DEveloped Land				
Kiriiban and other				
Village tanks	1,881			1,881
Total Left Bank (A+B)	15,651	17,280	15,030	47,961
III. A. Total aal new land				
Both Banks	26,191	17,780	27,160	71,131
B. Total all developed land				
Both Banks	9,995			9,995
Grand Total	36,186	17,780	27,160	81,126

Source: Appraisal of Walawe Development Project, ADB; September 1969.

Table A6.1-7 MAIN FEATURES OF THE WALAWE DAM AND THE RESERVOIR

A. Reservoir	
1) Catchment Area	1,164.8 km2
2) Capacity at F. S. El	268.76 MCM (WL 88.39 m)
3) Capacity at D. S. EL	28.26 MCM (WL 74.98 m)
4) F. S. L	WL 88.39 m
5) H. F. L	WL 90.21 m
B. Dam	
1) Type	Rolled Earthfill
2) Max. Height	36.57 m
3) Length	4.0 km
4) Top Elevation	90.52 m
C. Spillway	
(1) Radial Gated Structure	
1) No. and Size of Gates	5 nos., 18.96 m (W) x 6.60 m (H)
2) Spill EL of Gates	82.18 m
(2) Natural	
1) Length	366 m
2) Crest EL	88.69 m
D. Power Unit	
(1) Right Bank	
1) Type	Kaplan Vertical
2) Installed Capacity	1.8 MW
3) Minimum Operation EL	79.4 m
(2) Left Bank	
1) Type	Kaplan Vertical
2) Installed Capacity	3.6 MW
3) Minimum Operation EL	79.4 m

Table A6.1-8 MAIN FEATURES OF THE SAMANALAWEWA HYDROPOWER PROJECT

A. Reservoir	
1) Maximum Strage	298 MCM (WL 462.55 m)
2) Minimum Storage	60 MCM (WL 424.05 m)
3) Full Supply Water Level (FSL)	WL 460.00 m (278 MCM)
4) Minimum Water Level	WL 424.00 m (60 MCM)
5) Tail Water Levels	1 unit WL 116.40 m
	2 units WL 117.20 m
6) Design Flood Discharge for Spillway	3,600 m3/s
B. Power Plants	
1) Number of Turbine Unit	2 Francis
2) Number of Powerhouse	1
3) Maximum Flow for Power Matrix	40.20 m3/s
4) Maximum Loss Head	8.90 m
5) Maximum Power Supply	120 MW (60 MW x 2)

Table A6.2-1 SETTLEMENT DATA: WALAWE PROJECT

Block/Unit	Farm Families	Non-farm Families	Sub Families	Total
Left Bank				
1. Kiriibbanwewa				
1) Habarugala	359	277	0	636
2) Mahagama	250	605	0	855
3) Bahirawa	136	36	0	172
4) Habaraluwewa	430	133	0	563
5) Happoruwa	217	52	0	269
6) Kiriibbanwewa	432	312	0	744
2 Suriyawewa				
1) Samajasewapura	281	822	0	1,103
2) Suriyawewa Town	210	1,133	0	1,343
3) Beddewewa	424	411	0	835
4) Viharagala I	423	136	0	559
5) Viharagala II	236	305	0	541
6) Bagamarathaya	495	6	0	501
7) Alisiluara	384	3	0	387
8) Bedigantota	308	0	0	308
9) Pilimagalayaya	406	27	0	433
10) Anderawewa/Namba	441	15	0	456
11) Swodhagama	375	2	0	377
Total L.B.	5,807	4,275	0	10,082
Right Bank				
1. Embilipitiya				
1) Thimbolketiya	236	168	0	404
2) Gangeyaya	497	43	0	540
3) Kalagediara	447	274	0	721
4) Moraketiya	312	93	0	405
5) Uda-walawe	0	2,041	0	2,041
6) New Town	0	653	0	653
2. Chandrikawewa				
1) Halmillaketiya	259	113	0	372
2) Therunnansegama	276	254	0	530
3) Kuttigala	355	305	0	660
4) Padalangala	162	191	0	353
5) Liyangastota	458	123	0	581
6) Thoragala	129	233	0	362
7) Abeysekaragama	316	261	0	577
8) Bingalayaya	78	183	0	261
3. Binkama				
1) Uswewa	210	139	0	349
2) Kohombagaswewa	211	76	0	287
3) Binkama	232	74	0	306
4) Gopelessa	219	67	0	286
5) Pahalagama	303	8	0	311
6) Helekada	307	82	0	389
7) Guruwela	422	24	0	446
4. Murawasihena				
1) Barawakumbura	524	177	0	701
2) Hedawinna	502	128	0	630
3) Deniya	473	65	0	538
4) Ethbayuwa	514	58	0	572
5) Murawasihena	394	98	0	492
5. Angunukolapelessa				
1) Jandura	241	79	97	417
2) Angunukolapelessa	374	126	0	500
3) Kanuketiya	190	48	0	238
4) Gajamangama	266	66	0	332
5) Gotaimbaragama	263	34	0	297
6) Andupelena	301	11	0	312
7) Kattakaduwa	457	166	0	623
8) Bataatha	242	21	0	263
Total R.B.	10,170	6,482	97	16,749
Ground Total	15,977	10,757	97	26,831

Source: Walawe Project Office

Table A6.2-2 AGE/SEX/DISTRIBUTION OF HOUSEHOLD POPULATION

A.G.A. Div.	G.N. Div.	Total House-holds	Total Household Population			Age/Group/Years (Male/Female)											
						0 - 5		5 - 10		11 - 17		18 - 40		41 - 65		Above 65	
			M	F	Total	M	F	M	F	M	F	M	F	M	F	M	F
Hambantoa	Sisilasagama	508	1,159	1,149	2,308	152	107	105	107	210	220	463	497	200	191	29	27
	Miriggwila	338	762	727	1,489	81	84	71	76	144	126	313	322	133	108	20	11
	Siribopura	365	786	778	1,564	83	81	115	75	137	147	293	316	136	128	22	31
	Samodagama	188	455	434	889	53	50	47	32	72	82	182	176	85	80	16	14
	Galwewa	224	544	526	1,070	74	68	73	68	95	92	206	202	76	77	20	19
	Bellagaswewa	391	907	859	1,766	116	106	110	122	162	120	366	355	111	134	42	22
	Siyambalagasvila South	253	583	547	1,130	88	69	82	75	100	81	210	228	85	76	18	18
	Uda Baragama	81	167	166	333	20	47	20	23	23	26	61	49	36	17	7	4
	Arawanamulla	157	381	332	713	42	39	62	45	58	53	148	135	54	51	17	9
	Pahala Beragama	233	507	543	1,050	66	69	61	67	64	90	220	220	75	84	21	13
	Managgawa	135	326	327	653	34	55	43	60	66	50	124	116	53	41	6	5
	Badhigantota	271	609	597	1,206	80	66	92	74	96	111	236	244	93	87	12	15
Sub-total		3,144	7,186	6,985	14,171	889	841	881	824	1,227	1,198	2,822	2,860	1,137	1,074	230	188
Suriyawewa	Mahawalokadaara	373	738	738	1,476	128	138	109	122	87	88	298	283	94	87	22	20
	Namadagaswewa	517	1,143	1,015	2,158	209	189	157	182	160	117	441	415	157	103	19	9
	Andarawewa	234	522	459	981	86	69	78	71	76	69	200	193	73	51	9	6
Sub-total		1,124	2,403	2,212	4,615	423	396	344	375	323	274	939	891	324	241	50	35
Ambalantota	Godakoggalla	208	531	492	1,023	62	60	75	73	82	83	213	191	80	81	19	4
	Koggalla	243	545	556	1,101	71	91	78	78	71	88	237	217	69	73	19	9
	Habarattewala	339	819	755	1,574	88	83	116	91	132	137	337	304	124	119	22	21
	Modarapiliwala	195	476	444	920	52	56	59	50	67	67	199	178	72	75	27	18
	Siyambalagasvila North	175	412	391	803	49	52	62	48	56	72	168	159	71	54	6	6
	Wadiwewa	299	753	624	1,377	111	79	105	91	121	114	279	238	121	94	16	8
	Liyangastota	291	659	622	1,281	107	113	110	98	99	95	223	239	112	67	8	10
Sub-total		1,750	4,195	3,884	8,079	540	534	605	529	628	656	1,656	1,526	649	563	117	76
Total		6,018	13,784	13,081	26,865	1,852	1,771	1,830	1,728	2,178	2,128	5,417	5,277	2,110	1,878	397	299
%					100.00	13.44	13.54	13.28	13.21	15.80	16.27	39.29	40.34	15.31	14.36	2.88	2.29

Source: Census Survey

Table A6.3-1 SUGARCANE PRODUCTION AND YIELDS DATA

Crop	Item	1986		1987		1988		1989		1990		1991	
		Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated
Plant	Tonnage (ton)	73,141	-	30,566	4,889	51,161	44,390	18,713	46,280	2,541	37,964	17,000	25,497
Crop	Yield (ton/ha)	99	-	63	97	91	157	49	182	25	153	67	138
Ratoon I	Tonnage (ton)	5,302	-	16,905	-	32,136	11,183	7,075	32,665	848	24,984	246	21,895
Crop	Yield (ton/ha)	73	-	42	-	62	125	25	107	17	111	65	99
Ratoon II	Tonnage (ton)	2,005	-	629	-	13,216	-	3,039	8,966	552	31,735	447	23,800
Crop	Yield (ton/ha)	49	-	33	-	54	-	26	103	20	94	28	86
Ratoon III	Tonnage (ton)	-	-	-	-	2,506	-	471	-	480	7,852	-	25,226
Crop	Yield (ton/ha)	-	-	-	-	37	-	40	-	28	91	-	85
Ratoon IV	Tonnage (ton)	-	-	-	-	11	-	-	-	-	-	-	7,448
Crop	Yield (ton/ha)	-	-	-	-	26	-	-	-	-	-	-	94
Total	Tonnage (ton)	80,448	-	48,100	4,889	99,030	55,573	29,298	87,911	4,422	102,534	17,692	103,865
	Yield (ton/ha)	94	-	53	97	71	149	37	136	22	114	64	98

Source: Sevanagala sugar corporation

Table A6.3-2 METHOD OF LAND PREPARATION

Season	Kiriibbanwewa Block (ha)				Suriyawewa Block (ha)				Left Bank Total	Percentage			
	2-Wheel Tractor	4-Wheel Tractor	Manual	Buffalo	2-Wheel Tractor	4-Wheel Tractor	Manual	Buffalo		2-Wheel Tractor	4-Wheel Tractor	Manual	Buffalo
1985 Yala	739	0	24	457	1,016	0	19	1,065	3,320	53	0	1	46
85/86 Maha	584	1	50	488	1,334	0	172	506	3,135	61	0	7	32
1986 Yala	739	5	29	475	1,423	0	25	731	3,427	63	0	2	35
86/87 Maha	774	17	19	409	1,482	0	46	642	3,389	67	1	2	31
1987 Yala	737	2	15	279	1,520	0	60	585	3,198	71	0	2	27
87/88 Maha	739	29	62	305	1,222	8	15	442	2,822	69	1	3	26
1988 Yala	470	15	53	546	1,186	6	7	436	2,719	61	1	2	36
88/89 Maha	719	18	29	293	1,282	0	8	400	2,749	73	1	1	25
1989 Yala	976	188	28	235	1,207	82	11	456	3,183	69	8	1	22
89/90 Maha	1,020	0	2	410	2,001	8	86	663	4,190	72	0	2	26
1990 Yala	966	12	7	560	2,081	24	70	755	4,475	68	1	2	29
90/91 Maha	1,425	0	43	331	2,577	3	63	481	4,923	81	0	2	16
1991 Yala	1,052	35	31	136	2,224	35	34	239	3,786	87	2	2	10

Table A6.3-3 METHOD OF PLANT ESTABLISHMENT

Season	Kiriibbanwewa Block				Suriyawewa Block				Left Bank Total	Percentage			
	Row Sown	Broad-cast	Trans-plant	Row Tran-splant	Row Sown	Broad-cast	Trans-plant	Row Tran-splant		Row Sown	Broad-cast	Trans-plant	Row Tran-splant
1985 Yala	1	1,195	8	0	2	2,067	24	0	3,297	0	99	1	0
85/86 Maha	0	1,085	21	4	0	1,925	85	2	3,122	0	96	3	0
1986 Yala	0	1,141	11	1	9	2,107	30	17	3,316	0	98	1	1
86/87 Maha	0	1,193	10	13	8	2,076	31	50	3,381	0	97	1	2
1987 Yala	1	1,026	4	2	5	2,075	10	25	3,148	0	99	0	1
87/88 Maha	1	1,054	3	0	1	1,664	11	11	2,745	0	99	1	0
1988 Yala	0	1,027	7	0	4	1,547	26	0	2,611	0	99	1	0
88/89 Maha	0	1,013	38	0	2	2,682	47	2	3,784	0	98	2	0
1989 Yala	0	1,018	4	0	4	1,494	74	7	2,601	0	97	3	0
89/90 Maha	1	1,298	8	3	1	1,318	71	9	2,709	0	97	3	0
1990 Yala	0	1,257	3	1	1	1,338	23	1	2,624	0	99	1	0
90/91 Maha	0	1,279	4	0	1	1,312	5	6	2,607	0	99	0	0
1991 Yala	0	1,243	3	4	0	1,276	1	1	2,528	0	100	0	0

Table A6.3-4 PADDY PRODUCTION AND YIELDS DATA

Block	1985 Yala	1985/86 Maha	1986 Yala	1986/87 Maha	1987 Yala	1987/88 Maha	1988 Yala	1988/89 Maha
Embilipitiya								
Production (ton)	5,864	7,284	5,489	7,951	6,407	8,014	5,510	8,557
Yield (ton/ha)	3.6	4.4	3.3	4.8	4.0	5.0	3.5	5.3
Chandrikawewa								
Production (ton)	10,018	11,666	9,183	13,085	8,578	9,955	8,724	11,458
Yield (ton/ha)	4.3	4.8	3.8	5.4	4.0	4.5	4.1	5.1
Murawasihena								
Production (ton)	1,503	2,922	2,421	3,882	2,045	2,421	3,318	3,381
Yield (ton/ha)	2.4	3.4	3.0	4.6	2.8	4.5	3.9	4.4
Binkama								
Production (ton)	6,762	7,409	7,179	9,329	7,158	7,597	6,887	9,245
Yield (ton/ha)	3.3	3.7	3.5	5.4	4.0	4.0	3.5	4.7
Agunokolapelessa								
Production (ton)	2,108	5,051	3,172	5,489	3,903	5,364	5,259	6,094
Yield (ton/ha)	1.8	3.7	2.5	4.5	3.3	4.2	4.2	4.8
Kiribbanwewa								
Production (ton)	3,903	5,781	3,924	6,344	4,237	4,132	4,132	5,677
Yield (ton/ha)	3.2	5.2	3.4	5.2	4.1	3.9	4.0	5.4
Suriyawewa								
Production (ton)	6,428	9,392	9,183	12,146	8,807	7,284	7,138	9,558
Yield (ton/ha)	3.1	4.7	4.2	5.6	4.2	4.3	4.5	5.7
Walawe Total								
Production (ton)	36,585	49,504	40,550	58,227	41,135	44,766	40,968	53,970
Yield (ton/ha)	3.3	4.3	3.5	5.2	3.9	4.3	3.9	5.1

Table A6.3-5 PRODUCTION AND YIELD OF OTHER FIELD CROPS

Block		1986 Yala	1986/87 Maha	1987 Yala	1987/88 Maha	1988 Yala	1988/89 Maha	1989 Yala	1989/90 Maha
Chilies	Production (ton)	72	104	91	102	58	73	146	147
	Yield (ton/ha)	0.6	0.5	0.6	0.5	0.6	0.5	0.7	0.6
Red Onions	Production (ton)	163	183	245	200	361	253	651	369
	Yield (ton/ha)	9.9	9.3	9.9	11.9	9.6	8.3	10.0	9.9
Groundnuts	Production (ton)	23	66	7	49	49	64	10	47
	Yield (ton/ha)	1.0	1.0	0.9	1.0	1.1	1.0	1.0	1.0
Green Gram	Production (ton)	75	690	64	948	26	610	39	819
	Yield (ton/ha)	0.7	4.5	0.6	0.6	0.6	0.6	0.7	0.6
Cow Pea	Production (ton)	7	135	15	124	32	82	13	111
	Yield (ton/ha)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6
Maize	Production (ton)	1	103	-	47	1	47	1	36
	Yield (ton/ha)	0.2	0.5	-	0.3	0.4	0.5	0.5	0.5
Gingelly	Production (ton)	18	27	9	15	7	4	8	5
	Yield (ton/ha)	0.6	0.6	0.5	0.5	0.5	0.4	0.6	0.5
Kurakkan	Production (ton)	1	140	-	44	1	38	3	53
	Yield (ton/ha)	0.3	0.5	-	0.5	0.4	0.5	0.5	0.6
Manioc	Production (ton)	-	1750	267	1480	1300	106	518	884
	Yield (ton/ha)	-	14.9	15.0	14.9	14.8	1.5	15.0	15.0
Soya Beans	Production (ton)	-	-	-	-	-	-	4	-
	Yield (ton/ha)	-	-	-	-	-	-	1.9	-
Lanka Paripp	Production (ton)	2	16	3	13	1	24	1	25
M135	Yield (ton/ha)	0.6	0.5	0.5	0.5	0.4	0.5	0.7	0.6
Sweet Potato	Production (ton)	-	185	15	100	145	210	166	103
	Yield (ton/ha)	-	10.0	10.0	10.0	10.0	9.6	10.0	10.0
Sorghum	Production (ton)	-	-	-	-	-	-	-	-
	Yield (ton/ha)	-	-	-	-	-	-	-	-
Vegetables	Production (ton)	-	-	-	-	-	-	-	-
	Yield (ton/ha)	-	-	-	-	-	-	-	-
Meneri	Production (ton)	-	-	-	-	-	-	-	0
	Yield (ton/ha)	-	-	-	-	-	-	-	0.8
Black Gram	Production (ton)	-	-	-	-	-	-	4	-
	Yield (ton/ha)	-	-	-	-	-	-	0.7	-
B. Onions	Production (ton)	13	-	6	2	134	28	85	35
	Yield (ton/ha)	5.4	-	10.0	8.0	9.0	9.7	10.0	9.9
Banana	Production (ton)	-	-	-	-	-	-	-	-
	Yield (ton/ha)	-	-	-	-	-	-	-	-
Sugar Cane	Production (ton)	-	-	-	-	-	-	-	-
	Yield (ton/ha)	-	-	-	-	-	-	-	-

Table A6.3-6 POPULATION OF BUFFALOES

Block	Stud Bulls	Draught Animals	Cows	Heifers	Bull Calves	Heifer Calves	Total
Embilipitiya	26	315	600	194	78	89	1,302
Chandrikawewa	55	418	395	248	153	156	1,425
Binkama	38	388	433	255	243	259	1,616
Murawasihena	43	201	371	188	103	98	1,004
Angunukolapelessa	191	781	1,028	356	268	305	2,929
Kiriibanwewa	57	400	867	327	243	249	2,143
Suriyawewa	30	200	2,000	1,000	747	800	4,777
Total	440	2,703	5,694	2,568	1,835	1,956	15,196

Source: Cattle Population Census 1990
Draft Animal and Daily Development Project, Walawe Office

Table A6.3-7 POPULATION OF NEAT-CATTLE

Block	Stud Bulls	Draught Animals	Cows	Heifers	Bull Calves	Heifer Calves	Total
Embilipitiya	29	51	368	199	121	128	896
Chandrikawewa	98	285	477	269	165	304	1,598
Binkama	31	118	291	282	179	174	1,075
Murawasihena	19	55	386	264	181	227	1,132
Angunukolapelessa	40	220	1,175	695	259	437	2,826
Kiriibanwewa	43	181	810	352	212	289	1,887
Suriyawewa	20	50	1,500	1,390	657	420	4,037
Total	280	960	5,007	3,451	1,774	1,979	13,451

Source: Census of Neat Cattle 1990
Draft Animal and Daily Development Project, Walawe Office

Table A6.5-1 CANE RECEIVED IN SEVANAGALA FACTORY-1991

(Unit: ton)

	Producer	Programme	Progress		
			1st Season	2nd Season	Total
1.	Cane received from nucleus plantation (Rainfed)	3,855	1,285	1,325	2,610
2	Cane received from allottees (Rainfed)	12,704		15,244	15,244
3	Cane received from allottees (Irrigated)	94,311	26,654	71,371	98,025
4	Cane received from allottees (U. W.)	4,950		5,817	5,817
5	Cane received from out growers	615	135	298	433
6	Cana received from S. R. I. (U. W.)			190	190
7	Cane received from Kantalai Sugar Factory		6		6
8	Road collection		17	39	57
	Total	116,435	28,098	94,285	122,383

Source: Plantation Division-Sevanagala Sugar Industry Ltd.

Note

1st Season: Factory cane harvesting was commenced on 16th Febluary '92 and continued up to 23rd March '91.

2nd Season: Factory cane harvesting was commenced on 8th June '91 and continued up to 24th September '91.

Table A6.5-2 GENERAL INFORMATION OF EXISTING POLAS

Name of Pola	Embilipitiya	Tunkana	Danduma	Mahagarna	Kiriibanwewa	Suriyawewa	Barawakumbuke	Angunkolapalassa
1. Open Days	Tuesday	Fraday	Tuesday	Monday	Sunday	Saturday	Sunday	Sunday/Wednesday
2. Management Details	Embilipitiya Provision Council	Embilipitiya Provision Council	Privatesector	Monaragala Thamanaluika	Moneragala Provision Council	Hambantota Provision Council	Ambalantota Provision Council	Angunakolapalassa Provision Council
3. Infrastucture.								
3.1 Total Land Area (acre)	2	1	4	2	2	4	2	2
3.2 Permanent Bldgs (Nos.)	3	2				4	2	1
3.3 Tot. Floor Area (Sq. Ft.)	2,700	1,500				5,400	1,900	960
3.4 Temporary Bldgs (Nos.)		4	4	5	5			5
3.5 Tot. Floor Area (Sq. Ft.)		850	650	950	800			800
3.6 Toilets (Nos.)	4	2	5	1	1	6	2	2
3.7 Usable Toilets	Yes			Yes	Yes	Yes		Yes
3.8 Pipe Water								
3.9 Tank Water	Yes					Yes		
3.10 Parking Area				Yes		Yes		Yes
3.11 Av. No.of Stalls (Nos.)	1,800	800	550	1,050	330	2,000	1,400	650
3.12 No. Occupied (Nos.)	1,250	650	400	760	280	1,550	785	550
4. Main Market	Colomboo Hodana Hakumana Uru-Bokka Maharagama	Maharagama Hatton Pettah Avissawewa Ambarangoda Uru-Bokka	Herana (Mohagama pola and Danduma)		Colombo	Ambalangoda Matara Colombo Hatton Bandarawewa Kandy Ratnapura Rakwana Hakman Horana Matugama Alawwa	Colombo Maharagama Mti havinia Honagama Panadura Galle	Colombo Benuwala
5. Main Operators (Nos.)								
1) Operator	375	425	35	400	40	800	600	250
2) Collector	30	20	8	30	5	40	30	6
6. Transaction (Rs)								
1) Operator	130,000	80,000	130,000	160,000	6,000	260,000	450,000	55,000
2) Collector		60,000	90,000			235,000		
7. Rent and Charges								
7.1 Payments made by Pola Keeper								
1) Tender	531,000	156,000	135,000	571,000	95,000	756,000	355,555	538,000
2) Monthly Rent	53,100	15,000	9,072	47,585	7,916	68,600	29,630	53,800
3) Deposit	177,000	52,000	27,000		31,665	252,000	5,000	179,000
4) Monthly Collection	54,000	16,000	125,000	46,500	9,600	175,000	29,000	3,000
7.2 Payments made by Farmer (% of sell amount)	5	5	5	5	5	5	5	5

Source: Pola Survey '92 by study team