CHAPTER 4

SECTORAL-WISE DEVELOPMENT CONCEPTS

4.1 Agriculture

4.1.1 Agricultural Production

According to the national agricultural policy (National Agriculture, Food and Nutrition Strategy, NAFNS), high priorities for Gampaha district are placed on coconut production, fruit production and rubber small holders improvement. Along this policy, ADB has provided a loan for a coconut production project including establishment of a coconut research institute, a new varieties breeding program and strengthening of the extension system. The World Bank has extended financing for a rubber small holders improvement project. Consequently, projects in these sectors have been excluded from priority project consideration under the subject Master Plan study.

With little possibility of new land development as discussed earlier, increase of agricultural production will be attained through intensified use of agricultural land, for which introduction of inter-cropping into the upland fields and subsidiary cropping into the paddy fields is proposed.

Technologies to be applied are:

a) to elaborate optimal mixed planting or inter-cropping in the existing coconut fields for maximum productivity from the limited space of the upland agricultural fields; and,

b) to formulate a rational cropping pattern to bring about higher annual yield from the paddy fields by promoting high-yield and short-term varieties of paddy and subsidiary crops.

These two items are proposed as the main components for enhancement of agricultural production in the Gampaha IRDP.

(1) Fundamental Concept

As for the present farm management scale, farm households with farmland of less than two acres form the majority in the area at 83.9% of the total farm households. On the other hand, the farm area having farmland of more than one acre occupy 82.4% of the total farmland. Small farm households having farmland of less than 0.5 acres and very small

farm households with less than 0.25 acres cannot subsist on farm income alone.

The farm management model for very small farm households assumes the inter-cropping of beans, root crops, pepper, or betel leaf vine with coconut palm trees. However, such small scale farmers will still need employment with large farmers or the G.C.E.C. Very small farmers could raise betel leaf vine as a cash crop, as well as yams and beans for home consumption.

In formulating the farm management plan, farm households are classified by the scale of cultivation area into large (10 ac), medium (4 ac), standard (1.2 ac), small (0.5 ac), and very small scale farm (0.25 ac). The income for each of these farm scales is as presented in the following table.

Table 4.1.1. Expected Returns

Farm Size	Acre	Share		Gross Income (Rs)	Production Cost (Rs)	Net Income (Rs)	Returns (%)
		Paddy Acre	Upland Acre				
Large Scale	10	2	8	109,170	36,064	73,106	67
Medium Scale	4	1	3	45,848	19,418	26,430	57.6
Standard Scale	1.2	0.5	0.7	15,337	5,784	9,553	61.7
Small Scale	0.5	0.2	0.3	8,082	3,953	4,124	51
Very Small Scale	0.25	-	0.25	3,040	1,220	1,820	59

For the development of production in these sectors, a crop-wise approach for improvement of cultivation technology, demonstration, technology extension and establishment or strengthening of required facilities is outlined in the succeeding sections.

1) Minor Export Crops (inter-cropping in the coconut fields)

National agricultural policy (NAFNS) does not designate MEC as priority crops for Gampaha district. Nevertheless, MEC are best suited climatically and agronomically to the district, and are envisioned as a means of earning foreign currency and

providing farmers with cash income. Since cultivation of such crops is very suitable for smallholders, even in the case of home gardens, extension of these crops will be included in the IRDP. Minor export crops can be cultivated in existing coconut fields without any additional investment for dam construction, etc. This would increase cropping intensity two fold and employment opportunities by 19,000 man-days annually1/.

Coconut field area in Gampaha district is 180,000 ac (73,000ha), out of which 81,000 ac (32,000ha) or 45% is planted with coconut trees 16-45 years old where inter-cropping will be undertaken. About one half of the area (40,000 ac), minus the space physically occupied by pineapple, passion fruit and coconut trees, will be planted with minor export crops.

If the 16,000 ha are planted with pepper and coffee trees, the production of pepper and coffee would be some 72,000 wet-tons/annum and 19,200 wet-tons/annum, respectively.

It may take 26 years to achieve the target planting with a planting rate of pepper, 300ha and coffee, 300ha annually. After 13 years, annual production of pepper and coffee will be 91,000 tons for a net income of Rs283 million. However, the middle target of 13 years production could be accelerated for earlier achievement.

The production quantity per annum for each crop would be 4,500kg for pepper, 400kg for coffee (San Ramon) and 800kg for coffee (Robusta) per hectare. Assuming that the farm gate price is Rs 10.00/wet-kg, the gross income per hectare is computed at Rs 57,000 approximately, while the total production cost would be about Rs 22,000 consisting of Rs 15,300 for farm labor (435 persons per day) and Rs 6,700 for input materials such as fertilizers. The net income would accordingly be Rs.35,000.

As mentioned above, the production of export crops is envisioned to be a lucrative enterprise and the reinforcement plan for increased production and for extension facilities should be included in the Integrated Rural Development Project of Gampaha district as one of the priority development schemes.

1/ Required labor per haa is taken as 435 man-days per year.

Table 4.1.1.2 Target Production and Income of MEC

Crop	No. of Trees (ha)	Poten-tial Area (ha)	No. of Trees (mn)	Yield/ha (Wet ton)	Gross Prod. (ton)	Gross Prod. (ton)	Total Value (M.Rs/ann)
Pepper	1,296	16,000	21	4.5	72,000	10	720
Coffee Robusta	220	16,000	35	0.4	6,400	10	64
San Ramon	1.926	16,000	31	0.8	12.800	10	128
Gross Returns Annual input cost (labor + material) 38% of gross returns							912 346
Net Returns							566
(50% development)							(283)

Source: Survey team estimate based on "Delpitiya Mixed Crop Model", Economic Unit, Dept. of MEC, Peradeniya, 1985

Promotion of minor export crop cultivation was launched in 1983 in Gampaha district, and a seedling multipliction program and extension program are presently high priorities.

Long-term objectives concern the post-harvest program, such as:

- Organizing of a MEC producers' society
- Upgrading of cultivation and quality control technologies
- Establishment of processing facilities
- Development of higher level processing technology

2) Paddy

Paddy cultivation in Gampaha district has been traditionally developed utilizing natural wet zone rainfall, with new varieties being gradually introduced along with increased application of fertilizer. However, with lack of on-farm water management due to poor land preparation and still insufficient fertilizer input, unit yield reaches only 40 to 70% of the yield in the Agriculture Research Center farm.

Though the area is suitable for paddy cropping, yearly variation of wet season has resulted in farmers utilizing long-term varieties which hinder triple cropping.

Despite efforts made through the Department of Agriculture for extension of cultivation technology and the Department of Agrarian Services for provision of agricultural inputs, cropping pattern and farming practices in the area are still stagnant. Therefore, the IRDP proposes as a focal component, establishment of means and facilities to transfer modern agricultural technology to farmers. The establishment, demonstration and extension of systematic cultivation technology is to be resolved in the short run.

The following long-term component schemes will be scrutinized:

a) Alignment of irrigation and drainage channels and land consolidation;

b) Introduction of minor irrigation systems into the rainfed paddy field; and,

c) Upgrading of post-harvest technology to produce high quality rice.

Construction of the Agriculture Technology Demonstration and Transfer Center is proposed to develop systematic technology, on the basis of which the attached demonstration farm is to be cultivated. The Departments of Agriculture and Agrarian Services will collaborate with the Center to render the extension of such technology.

The proposed Center will be managed with the advice of agricultural experts from countries where paddy cultivation is highly advanced. It is also important to upgrade the existing facilities and equipment utilized for extension and supporting sevices.

With a yield increase target of 150%, the present average of 3.1 tons/ha is expected to rise to 4.5 tons/ha after full development. To attain the above target, consolidation of paddy land will eventually be required to facilitate water management and other

farm operations. It also seems necessary to elaborate standards of land consolidation with due consideration on cost-effectiveness and farmers' acceptance.

3) Upland Crops

Cultivation of upland crops could be introduced between two paddy crops (Maha and Yala crops), and consist of inter-cropping in the coconut fields of pineapple, passion fruit, etc.

Inter-cropped coconut fields will cover an area of 16,000 ha. A demonstration farm for introducing upland crops in paddy fields will be established at Morenna ATDTC. A demonstration farm for upland fields will be initially established at Ambepussa Farm with improved facilities such as graded land and irrigation water, and will subsequently be expanded to service the entire district in the longer term.

4) Coconut Production

The coconut plant has a longevity of 60 years; therefore, introduction of high yield varieties would take a long period of time. The local coconut variety is small and coconut yield is high but coconut meat production is lower than that of foreign varieties.

Coconut is processed in the traditional way, which should be modernized introducing highly efficient modern technology, such as coconut of mills. The Coconut Project is being funded by the Asian Development Bank loan.

5) Livestock Development Program

Except in the case of a few organized large scale commercial farms, rearing of livestock in Gampaha villages is not regarded as a separate enterprise; it generally forms an integral part of other agricultural systems such as paddy/vegetable/highland crop farming. In such enterprises, cattle are generally tethered for rough grazing from tree to tree and in the evening fed on a little cut grass. The main labor input is provided by the family.

These small holder animal production systems are characterized by a low level of management and productivity.

In order to raise the productivity, improvement of animal varieties, feeding technology and forage crops are to be programmed.

Long-term targets include:

a) Cattle improvement scheme

Land holdings are extremely small and it is essential to maximize the income per unit, and it is vital to demonstrate how this could be achieved by small holders who are in the majority. It is therefore proposed to establish demonstration units of 1 acre, 2 acres and 3 acres separately at Siringapatha Farm where crop and stock integration will be practiced.

In order to improve dairy cattle, 425 stud bulls should be supplied over a five year period.

b) Piggery improvement scheme

The farmers in Gampaha district are faced with severe hardship in obtaining piglings for breeding or for fattening. To meet the requirement of piglings for Gampaha district, Siringapatha Farm at Badalgama could initiate a 150 sow unit. At present, the district has 26,000 pigs at different stages of growth and for different purposes. 15 boars of a suitable breed should be imported and sows could be supplied from National Livestock Development Board farms. From 150 sows, Siringapatha Farm could issue around 2,400 piglings to farmers in Gampaha district.

c) Poultry development scheme

The major constraint facing small farmers intending to raise poultry is the insufficient supply of chicks. Under this scheme 4,500 hens would be imported to produce 120,000 chicks per month.

Of the above described projects, the first two are being implemented with loans from ADB and WB. Consequently, IRDP incorporates a poultry development project as a short-term scheme.

(2) Programming

The agricultural production promotion scheme will be a prop of Gampaha District Integrated Rural Development Project. In the long term the scheme aims;

a) to upgrade farmers' agricultural technology;

b) to establish a modernized agricultural technology system in the new demonstration farm and technology transfer centers;

c) to increase the production of minor export crops which are inter-cropped with coconut trees for a high cropping intensity; and,

d) to enlarge the employment opportunities by increasing the cropping area of export crops.

And in the short-term;

a) to promote the inter-cropping of minor export crops and upland field crops in the coconut fields;

b) to systematize the paddy cultivation techniques, and to increase the land productivity per unit area through education and extension;

c) to introduce the cultivation of upland crops in paddy fields between the Maha and Yala paddy cultivation seasons; and,

d) to raise poultry production (animal husbandry)

1) Intensive Utilization Scheme for Coconut Land

In the Project Area of Gampaha district, the present land utilization is very intensive, and no more reclaimable land can be found for conversion to agricultural land.

The proposed scheme aims to use coconut land intensively by inter-cropping with mainly export crops such as pepper, coffee, cacao, cinnamon, clove and other upland crops such as pineapple, etc. These crops will be raised in the existing coconut fields of which plant age is 16 to 45 years and suitable for inter-cropping. The cropping intensity will rise to 200 percent in this way,

increasing farm income and creating employment opportunities for surplus farm labor.

The reinforcement of extension facilities belonging to the Minor Export Crops Bureau, the construction of high quality seeds facilities, and training facilities for farmers' cultivation techniques and post-harvest techniques are proposed for promotion of this scheme.

2) Improvement Scheme for Land Productivity of Paddy

The present productivity of paddy in Gampaha district is 54 bushels/ac (2.8 tons/ha) in Yala season, and 60 bushels/ac (3.1 tons/ha) in Maha season on an average. The improvement scheme aims to increase the land productivity to 84 bushels/ac in Yala cropping, and 90 bushels/ac in Maha cropping with the average of both cropping at 87 bushels/ac (4.5 tons/ha). In the other words, the scheme aims to increase the land productivity of paddy by 50 percent as compared with the present.

Data of the Rice Research Center show that the yield of high yield varieties differs by variety. However, the average is about 100 to 150 bushels/ac at the Rice Research Center, and 70 to 80 bushels/ac by the more successful farmers in Gampaha district.

The technical methods for inceasing the land productivity are summarized as follows;

a) to make farmers themselves improve the present irrigation and drainage canals (branch canals) and operate and maintain them;

b) to make farmers themselves obtain the techniques for on-farm water management;

c) to practice the land leveling of paddy fields in pudding seasons to enable on-farm water management;

d) to practice fully fertilizing, weeding, and insect and pest prevention which are necessary for paddy cultivation; and,

e) to upgrade farmers' cultivation techniques by demonstration for transfer of technologies, etc.

In order to attain the above targets, the following improvement and reinforcement of facilities are proposed;

a) Establishment of the Agricultural Technology Demonstration and Transfer Center (A.T.D.T.C.), a key station for extension of cultivation techniques to farmers;

b) Construction of paddy field for intensive cropping, and other paddy field for which present irrigation and drainage canals are to be improved to a limited extent at A.T.D.T.C for comparing the effect of intensive cropping;

c) Improvement of the selected diversion dam (anicut) and related canals to realize model irrigation system and facilities; and,

d) Strengthening the extension equipment and facilities of the Agrarian Service Department to give mobile power to supporting organization of farmers.

3) Introduction Scheme of Upland Crops in Paddy Fields

In the present cropping pattern, paddy varieties with a long growth period are mainly raised. The growth period of both Yala season (April to August) and Maha season (September to January) paddy is 4.5 to 5 months. Therefore, non-cropping period of paddy is one to two months only.

The scheme aims to introduce paddy varieties with a short growth period instead of the present ones in order to grow upland crops like cow pea, green gram in the paddy fields between Maha and Yala cropping seasons, that is, from January to March (refer to the Proposed Cropping Pattern).

In case of raising upland crops in paddy fields, it is difficult to stabilize their yield under ill-drained paddy field conditions. Farmers shall improve the irrigation and drainage canals in ill-drained paddy fields. Technical methods for rasing upland crops in paddy fields will be demonstrated at A.T.D.T.C., to be newly established under the Project.

It is proposed to convert the present cropping pattern of paddy to the proposed one shown in Fig. 4.1.1.1.

4) Poultry Hatchery

In order to solve the insufficient supply of chicks, 4,500 hens would be imported to produce 120,000 chicks a month.

5) Short-term Scheme

In the short-term the agricultural production promotion scheme aims to cover the following;

a) Minor export crops nursery center project

b) Agriculture technology demonstration and transfer center project.

c) Livestock development project (poultry hatchery)

(3) Agricultural Scheme for Very Smaller Farmers

As has been discussed previously, the majority of farmers cultivate very small agricultural land. Therefore, this scheme will promote introduction of betel, yam, legumes, and minor export crops such as pepper and coffee to farmers with holdings of less than 1/2 acre.

Cultivation technology would be demonstrated at Walpita and Ambepussa farms of the Agricultural Technology Demonstration and Transfer Center, and extended by farmer supporting organizations. Distribution of seedlings and agricultural inputs would be carried out to the very small farmers.

In home garden cultivation, vegetables for domestic consumption are cropped availing of the immediate house surroundings, although this type of cultivation does not generally serve at present as an income source. However, introduction of pepper and betel cultivation to small farmers is applicable as well to home garden cultivators.

Fig. 4.1.1.1 Proposed Cropping Pattern (Paddy and Field Crops in the Paddy Field)

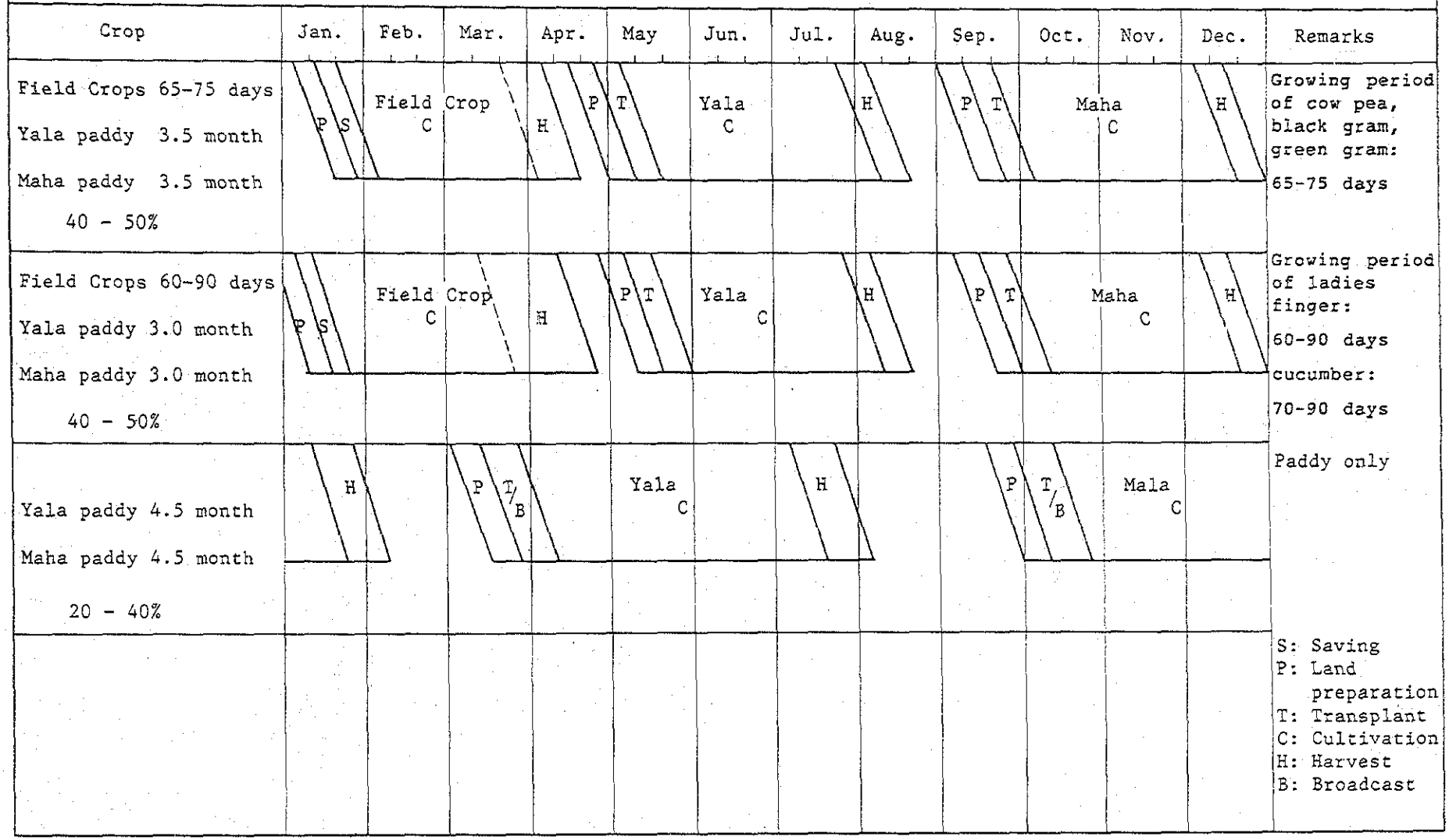


Table 4.1.1.3 Paddy Production Cost

(Unit : Rs)

Farm Size (acre)	Season	Cropping intensity (%)	Seed	Fertilizer			Chemical	Expenses							Self supporting cost	Total
				NPK	Urea	Top-dressing		Leveling	Sowing	Spray	Harvest	Thresh	Clean	Transport		
2	Yala	80	409	900	300	300	290	793	483	70	540	482	24	75	178	4,864
	Maha	100	511	1,130	380	400	370	1,006	736	120	764	774	40	131	222	6,584
	Total		920	2,030	680	720	660	1,799	1,219	190	1,304	1,256	64	206	400	11,448
1	Yala	80	200	450	150	160	150	440	268	40	300	269	16	43	791	3,277
	Maha	100	260	570	190	200	180	560	408	70	425	430	20	74	932	4,319
	Total		460	1,020	340	360	330	1,000	676	110	725	699	36	117	1,723	7,596
0.2	Yala	100	58	130	110	60	40	-	-	-	-	-	-	-	483	881
	Maha	100	57	130	110	60	40	-	-	-	-	-	-	-	495	892
	Total		115	260	220	120	80	-	-	-	-	-	-	-	978	1,773

Note : Fertilizer, chemicals and manuring labor are increased by 50 percent.

Table 4.1.1.4 Farm Management Plan

Farm size (acre)	Land Use	Area (acre)	Full time or Part time	Person	Cropping Pattern Area (acre)	Cropping Rate (%)	Gross Production Yield (ton/acre)	Gross Production Total Yield	Gross Income Unit (Rs/ton)	Gross Income Gross Income	Production Cost (Rs)	Net Farm Income (Rs)		Income Ratio
Large Farmer 10	Paddy	2.0	Full time	6.0	2.0 Yala paddy	80	1.62	2.59	4.573	11.844	4.864	6.980	4.0 t/ha	59
					2.0 Maha paddy	100	1.82	3.64	4.573	16.646	6.584	10.062	4.5 t/ha	
					2.0 Upland crop	50	0.2	0.2	7.000	1.400	900	500		
	Upland	8.0			8.0 Coconut	100	1.200	9.600	1.8	17.200	5.380	11.910	Nos.	
					1.8 Pepper	23	1.82	3.28	10.000	32.800	10.422	22.378	ton/wet	
					1.8 Coffee	23	1.62	2.92	10.000	29.200	7.914	21.286		
										Total 109.170	36.064	73.106		67
Medium Farmer 4.0	Paddy	1.0	Full time	3.0	1.0 Yala paddy	80	1.62	1.3	4.573	5.945	3.277	2.668		
					1.0 Maha paddy	100	1.82	1.82	4.573	8.323	4.319	4.004		
					1.0 Upland crop	100	0.2	0.1	7.000	700	300	400		
	Upland	3.0			3.0 Coconut	100	1.200	3.600	1.8	6.480	2.430	4.050		
					0.8 Pepper	27	1.82	1.46	10.000	14.600	5.792	8.808		
					0.6 Coffee	20	1.62	0.98	10.000	9.800	3.300	6.500		
										Total 45.848	19.418	26.430		57.6
Standard Farmer 1.2	Paddy	0.5	Full time	1.0	0.5 Yala paddy	100	1.62	0.81	4.573	3.704	1.507	2.197		
					0.5 Maha paddy	100	1.82	0.91	4.573	4.161	1.507	2.654		
					0.5 Upland crop	100	0.2	0.1	7.000	700	160	540		
	Upland	0.6			0.6 Coconut	100	1.200	840	1.8	1.512	810	702		
					0.2 Pepper	33	1.82	0.364	10.000	3.640	1.195	2.445		
					0.1 Coffee	17	1.62	0.162	10.000	1.620	605	1.015		
										Total 15.337	5.784	9.553		61.7
Small Farmer 0.5	Paddy	0.2	Off-farm + Farm	0.5	0.2 Yala paddy	100	1.62	0.32	4.573	1.468	881	582		
					0.2 Maha paddy	100	1.82	0.36	4.573	1.646	892	754		
	Upland	0.3			0.3 Coconut	100	1.200	360	1.8	648	380	268		
					0.3 Pepper	33	1.82	0.182	10.000	1.820	800	1.020		
					0.1 Coffee	40	250.000	25.000	0.1	2.500	1.000	1.500	leaf	51
										Total 8.082	3.953	4.124		
Very Small Farmer 0.25	Upland	0.25	Off-farm + Farm		0.25 Coconut	100	1.200	300	1.8	540	220	320		
					0.1 Betel	40	250 thousand	25.000	0.1	2.500	1.000	1.500	Rs0.1/ 2	
										Total 3.040	1.220	1.820		59.9

Producer price : Economic & Social Statistics of SriLanka 1985
Unit production : Target production — paddy, Coconut
1984 Average production — pepper, Coffee, Betel, cowpea

Production Cost : Data of Agriculture Development Authority Gampaha 1986 and
Mahaweli Agricultural Benchmark Survey 1985 yala, 1985/86 Maha
◎ Present poduction Cost × 50 %

4.1.2 Inland Fisheries

The potential for development of inland fisheries in Gampaha district is high for several reasons outlined below.

In the case of freshwater fisheries, i) interest among the Project area residents is strong and high demand is envisioned due to the low cost of freshwater fish; ii) rainfall in the Study area is abundant and can be diverted for development of fish culture ponds; and iii) the possibility for introduction and extension of giant prawn which would increase income is also high. In the of brackish water fisheries, i) the lagoons could e utilized to increase prawn production for export to met increasing overseas demand; and ii) over 200ha of mangrove swamp in the Negombo Lagoon area can be converted for brackish water fisheries, and installment of a fish crawl covering a 200ha area is feasible for exploitation of the lagoon itself.

In view of the above, the plan for development of inland fisheries is envisioned to encompass the following three points:

a) Establishment of fingerling nurseries, a distribution system, an extension and training system and a research development system as well as establishment of a development base by strengthening administrative agencies and supporting infrastructures.

b) Increased production of freshwater fish in order to raise the present per capita fish consumption in the Project area from 4kg to the national average of 12kg.

c) Increased production of commercially high grade fish such as black tiger prawns and giant prawns in order to raise the income level of local residents.

To achieve the above goals, a short-term scheme and a long-term development plan have been formulated. The short-term scheme involves establishment of an experimental freshwater fishery in Gampaha district and of a model freshwater fish pond, and expansion of the Pambala and Pitipana brackish water fisheries experimental stations. The long-term plan, which is complementary to the above activities, consists of improvement of productivity, construction of new fish culture ponds (target pond area: 1,500ha), introduction of giant prawn,

construction of ponds for black tiger prawn (30ha near Negombo Lagoon), and construction of a fish crawl for milkfish production (100ha in Negombo Lagoon).

4.1.3 Farm Mechanization

Farm mechanization yields maximum effectiveness when implemented under conditions of large single plots, small labor force and ample capital availability. This conditions, however, do not apply to Gampaha district, and accordingly achievement of a high degree of mechanization in the district poses problems.

Following introduction of high profit crops and shift from monocropping to double cropping, farm mechanization would be pursued to offset envisioned labor shortages.

As a coconut inter-crop in upland areas, promotion of cultivation of labor intensive, high profit crops such as pineapple, banana, passion fruit, peppers, coffee and various legumes would offer promising results given the potential market for these items. In conjunction with the introduction of these crops, farmer training in cultivation techniques and establishment of farm-to-market distribution channels would be a prerequisite.

Establishment of irrigation facilities could be expected to permit triple cropping in paddy field. Under this and the above discussed conditions, unit labor input would increase generating labor competition between crops depending on the season. This situation could be alleviated through traditional labor utilization in the foreseeable future and therefore farm mechanization will not be included in the short-term schemes of the Master Plan.

4.1.4 Agricultural Supporting Services

Agricultural supporting services consist of extension and input services. The agricultural extension service is handicapped by the small extension staff. In many cases one extension worker i responsible for 2,000 farmers and must rely on bus or bicycle for transportation. The scheme aims to increase the number of staff and provide adequate transport, as well as to improve the existing training centers for extension workers.

There are two District Training Centers in Gampaha district where agricultural extension officers receive in-service training. These facilities will

play an important role in the field of agricultural development by spreading agricultural new technology. In order for these facilities to function satisfactorily, improvement and strengthening is urgently required.

With regard to input services, existing agrarian service centers can be utilized. At present small farmers rely on high interest loans to purchase fertilizer. The Government should therefore provide the resource capital for an institutional low interest loan.

Short-term target projects are a) strengthening of agricultural extension services and b) improvement of agricultural training centers. Gampaha district has two training centers at Walpita and Ambepussa which lack facilities and equipment. These facilities will play a major role in promoting increased agricultural production and as an information base for new agricultural technology.

Main project features are:

a) Strengthening of agrarian input and extension services
b) Improvement of district training center facilities

4.1.5 Farmers Organizations

Half of the directors for existing farmers organizations have been composed of Government officials and the organizations are regulated by the Government. This has resulted in inefficient management and the reluctance of farmers to remain as members. Consequently, the organizations are lagging behind private enterprises.

IRDP will include organization of the farmers to carry out the following schemes:

a) Seedling production of minor export crops
b) Agricultural technology demonstration farm and new cultivation practice transfer scheme

As a mechanism for the transfer of cultivation technology to farmers the block demonstration under the FAO project is to be introduced in Gampaha district. This system topographically (unit: track) organizes the production activities of farmers, creating small farmer groups where total holdings are 10~25 ha. Instruction to the farmer groups is performed by the more

knowledgable farmers themselves and Agricultural Instructors from the Agrarian Services Centers. Training is carried out during the relevant cropping season. It is considered that this small group approach is most effective for technical transfer. Farmer group activities such as cultivation, loan utilization, post harvest processing, etc. are performed cooperatively by the farmer group on a blockwise basis.

Also, the T&V system recommended by the World Bank is to be adopted on a farmer groupwise basis whereby farmer clusters take part in regular extension activities once every two weeks.

The above two approaches, i.e. extension during the cropping season by the block group method and regular extension according to the cluster group method are to be part of the farmer curriculum at the ATDTC.

Farmers will learn seed quality control, post-harvest quality control, on-farm water management, new cultivation practices, etc.

4.1.6 Marketing

While the privatization policy seems to be fairly successful, scattered interests of numerous small farmers are being gradually impaired by the influence of private buyers who control market information, transportation, processing and cash. Profitable management of farmers' organizations by the members themselves is viewed as a tentative solution. The organization will cater to smallholders' interests in marketing under the control of the members alone. To realize this plan, the items below will be scrutinized:

- Possibility of organizing farmers into a private profit-earning corporation by avoiding outside interference as is set forth in the Cooperative Act.
- Acceptability, willingness and competence of farmers to organize.
- Provision on a preferential or subsidized basis at the initial stage of operation of required resources including transportation, storing and office facilities, training of members or dispatching of suitable advisers, and other monetary or physical support where necessary.

4.1.7 Irrigation and Drainage

(1) Major Irrigation (Attanagalu oya area)

1) Development Concept

Major irrigation by anicut has been pursued in Attanagalu oya area of Gampaha district since the 1930s. Total benefit area is 3,870 ha., which represents 23% of the paddy field in the district. Major irrigation, primarily by anicut, has contributed greatly to paddy agriculture in Gampaha district.

However, performance of these schemes has deteriorated significantly due to superannuation of facilities. In contrast to other paddy field areas, the Attanagalu oya area has effective access to river water. This advantage should be fully realized to increase agricultural productivity through irrigated cultivation. This would include not only rehabilitation of facilities, but also establishment of a new water management structure with full participation of affected farmers and the introduction of inter-crops. Such efforts would have a ripple effect benefit on areas of minor irrigation and rainfed paddy as well.

Towards these ends, the following constraints must be addressed:

- Water shortage in the Yala season
- Flooding during the Maha season

The mean annual temperature of 27° and the mean annual precipitation of 2,700 mm are well suited to paddy cultivation. Nevertheless, constraints of marked fluctuation in rainfall amounts and small catchment area are present. The development plan set out below is aimed at resolving the above discussed problems, all of which have a direct bearing on agricultural productivity in the area.

2) Proposed Development Schemes

a) Overall Anicut Scheme Rationalization

Objectives

Rationalization of the 34 anicut schemes in the Attanagalu oya area would be carried out to enhance agricultural productivity. This would entail preservation and enlargement of more effective anicut schemes and elimination of ineffective anicuts. Such a program would have the following advantages:

- By allowing more rapid downstreamward flow during flooding, anicut operation efficiency would be enhanced. This would in turn reduce operation and maintenance costs.
- During periods of low river discharge, limited water resources could be timely and quantitatively controlled, and effective irrigation requirement distribution implemented for the farmland along both banks of the 100 km stretch of river. Operation costs per anicut for irrigation discharge diversion would be reduced. However, separate consideration would have to be given operation and maintenance costs for on-farm level irrigation canals.

Anicut rationalization would not require rehabilitation of all anicuts, and consequently rehabilitation costs would be reduced. Also, per anicut command area would be increased, yielding a corresponding reduction in operation and maintenance costs per unit area.

Rehabilitation Plan

Study of anicut rehabilitation was carried out from the standpoint of the following factors.

- Natural conditions (area, interval between anicut sites, canal water level, etc.)
- River discharge and diversion discharge at anicut sites
- Construction scale
- Operation and maintenance costs

On the basis of field survey and study results, it was concluded that anicut number should be reduced from the current 34 sites to 25 sites. However, further detailed study should be carried out on the specifics of rehabilitation and rationalization implementation. At such time careful atten-

tion must be given the increased inundation at lower reaches of the river that such a rationalization plan might cause.

b) Rehabilitation of Anicut Gates and Flood Damage Countermeasures for Downstream

Objectives

Anicut rationalization and gate rehabilitation as discussed above would increase flood damage occurring at lower reaches of the river. The reason for this is that at present floodwater backed up at the 34 anicut sites overflows river banks to inundate surrounding farmland, thereby reducing the flood discharge reaching lower portions of the river. The Orutota Yagoda drainage scheme and the Kalu Ela drainage scheme are accordingly planned for the middle reaches and the extreme lower reaches of the river, respectively, as flood damage prevention measures.

Components

The objective of the Orutota Yagoda drainage scheme is to counter peak flood discharge by raising river embankments and constructing supplemental drainage canals. In this manner river water level will be reduced and damage from inundation limited.

The Kalu Ela drainage scheme is planned for the lowermost reaches of the Attanagalu oya and aims to provide a short-cut channel by which flood discharge may be more speedily conveyed into the sea.

c) Rehabilitation of Major Irrigation Facilities

Objectives

Major irrigation facilities include the anicut and related irrigation and drainage canals facilities in the Attanagalu oya area. In conjunction with anicut rationalization steel gates will be installed to facilitate irrigation and drainage discharge control. Rehabilitation of weir body will likewise be implemented where necessary. Measures will also be taken to rehabilitate downstream-side aprons. Canal density

is currently at a high 30 m/ha. The water distribution system utilizing this network requires modification for congruency with the nature of farmer group structure and irrigation methods.

Components

Details of anicut and canal facility rationalization and rehabilitation will be examined by means of a preliminary model scheme in the Morenna area.

(2) Minor Irrigation

1) Development Concept

Minor irrigation is aimed at strengthening agricultural infrastructure necessary for increased agricultural productivity and crop diversification.

Towards this end, rehabilitation of facilities for 750 schemes is necessary.

2) Development Plan

Objectives

Existing facilities are at 750 sites, servicing a total area of 5,900 ha. Anicuts will be rehabilitated to allow diversion of appropriate irrigation requirement.

Components

Anicuts will be equipped with steel gates to permit proper diversion. Weir body rehabilitation and downstream-side river training works will be conducted. A canal network will be planned for congruence with the structure of farmer groups to allow optimum water management.

In the case of tank facilities, spillways and gates will be rehabilitated, and sedimentation purged from tank interiors.

(3) Rainfed Paddy and Upland Field

a) Paddy Field

At present, 44.5% of all paddy field is rainfed. In the future, both major and minor irrigation schemes

(anicut, tank regulator, etc.) would be implemented to provide stable irrigated agriculture for these areas.

b) Upland Field

Upland farming will play an important role in agricultural development in Gampaha district. However, large-scale irrigation facilities will not be planned for such upland areas. The reason for this is that upland fields are scattered over a wide area and would be more rationally served by small-scale well or pump lift (from nearby rivers or canals) irrigation.

(4) Drainage

1) Drainage Plan for Inundated Area along Attanagalu Oya

Objectives

The drainage problem in paddy field along the Attanagalu oya would be resolved by lowering normal river water level through anicut rehabilitation and rationalization, thereby preventing inundation of surrounding farmland during flooding, as well as through drainage canal rehabilitation and new construction in the said area.

Components

- Anicut rehabilitation and rationalization
- River training works
- Drainage canal rehabilitation and new construction
- Orutota Yagoda drainage scheme
- Kalu Ela ~ Dandugam oya drainage scheme

2) Kelani Ganga Minor Flood Protection

Objectives

Required construction scale and project benefit place constraints on total prevention of flood damage along the Kelani ganga under the MEP program. Such would require the implementation of a large-scale project which should be con-

sidered separately from the MEP. Under the subject MEP, backwater prevention sluices at 15 locations would be rehabilitated to prevent backwater inundation from the Kelani ganga. Moreover, flood damage would be prevented for 1,982 ha., thereby increasing productivity of the area.

Components

- Gate rehabilitation
- Weir structure rehabilitation
- Diversion canal rehabilitation

3) Other Drainage Projects in the District

Objectives and Components

A drainage project is planned for the Mudun Ela ~ Nathawa Ela area which has been chronically afflicted by flood damage. This area comprises 18 km^2 of flat lowland on the right bank of the Kelani ganga at its extreme lower reaches.

Farmland and roads in the area are chronically flooded. To rectify this situation, terminal drainage pumps are to be rehabilitated and capacity expanded, and drainage canals (15 km) and appurtenant structures are to be expanded.

4.2 Rural Industries

The development of rural industries plays an important role in increasing employment opportunities and rural income. However, such development depends on availability of raw materials, capital, human resources and marketing, and even if these conditions are satisfied, operation and maintenance is often accompanied by various difficulties.

Private business capital will be invested in rural industries. The possibility for development of new rural industries will be discussed after determining the availability of materials and capital resources, technology, and marketing.

Table 4.2.1 shows rural industry products in Gampaha presently processed or prospected in the near future.

The coconut industry in Gampaha is relatively advanced. However, other upland crop industries show little progress due to competition with coconuts for field cultivation.

At present, the Government is seeking foreign technical cooperation for ceramics, rattan and bamboo processing. Handlooming and artline texture production are seen in Gampaha and show good potential particularly if quality control measures are carried out.

Pepper export from Sri Lanka occupies less than one percent of the world market. Accordingly, expansion of pepper export will have little effect on the said market, and a stable market can be secured (over-production will not occur).

Gampaha district includes GCEC area along the coast where large scale industries are active and these industries would breed supporting industries throughout the district increasing employment opportunities and income.

The Industrial Development Board is keen to establish such pilot projects as the technology development center, new industrial estate, agricultural by-products and recycling of agricultural waste.

The Department of Small Scale Industries manages 27 small scale industry centers; the facilities, however are old. This scheme aims to rehabilitate these facilities and purchase new models of equipment to improve training curriculum and product quality. The following centers are to be rehabilitated:

- Walagoda Ceramic Center
- Katunayake Coir Center
- Mahara Handloom Center
- Weke and Weboda Light Engineering Center

In addition, a Bamboo and Rattan Industry Center will be established.

Table 4.2.1 Agrobased Industry

Material	Product	Present Situation
1. Coconut Pulp	Dessicated coconut mixing material for biscuits, cakes.	All products are exported; portion of world market accounted for has recently become 2nd to the Philippines.
Pulp	Dried copra for coconut oil, soap making and candles.	Most of products are exported; strict competition with soybean oil.
Coir (fibre)	Brush, floor carpet, shoes mat, ropes.	Domestic demand is stabilized; many coir centers exist in Gampaha district.
Coir dust	Contains high moisture and used for field moisture retainer/mushroom bed.	Mass utilization is being studied.
Core nut	Active charcoal, cup, bowl.	Active charcoal is exported to Japan for filter making.
Ekel (leaf ekel)	Ekelbroom, basket.	Exported.
2. Rubber	Crape/sheet rubber.	Exported/processed into shoes, tire, coating materials.
3. Rattan, bamboo	Make-furniture like chairs, tables.	Cotton is imported from India; trial domestic cultivation is underway.
4. Cotton	Handlooming.	Trial cultivation is being carried out.
5. Kapok	Cusion, pillows, fillin g material.	
6. Ramie	Summer clothes, shirt, table cloth.	
7. Sisal	Rope, bags, paper.	Cultivation is only in coastal area of dry zone.
8. Sunhemp	Fibres for net, bags	
9. Fruit (pineapple,passio n-fruit, papaya, mango)	Canned fruit, juice.	Production varies seasonally; factory operation ratio is low; the cost of the containers comprises almost 40% of the final product cost; quality control is required.
10. Vegetables, betel	Raw material is exported.	Cultivated in the home garden; marketing is a problem.
11. Minor export crops (coffee, pepper)	Exported after washing and drying.	Production in Gampaha has just commenced.
12. Sugar cane, sugar palm	Jagrie (raw black sugar).	Competitive with coconut cultivation; little production in Gampaha.

4.3 Human Resources Development

Initial school enrollment and literacy rates in Gampaha district are as high as anywhere in the country. Unfortunately, however, due to various factors, 70% of students reportedly fail to finish middle school. About 2% of students continue on to universities.

Unemployment rate in Gampaha is at a high 26.9% (1981), which is twice the national average. About 87% of unemployed are 15 ~ 35 years of age, and 79% have middle school level educations. Twelve percent have graduated from secondary school. In order to provide these unemployed with jobs, it is necessary to expand opportunities particularly in the industrial sector. In this context, education and vocational training become highly important, especially in regard to the younger segment of the population.

Education and training have the following principal foci:

a) Establishment of adequate education facilities

b) Establishment of an adequate vocational training program

Emphasis would be placed on raising science and engineering levels among middle and secondary school graduates, with a view to promoting creation of a technical workforce from among rural youth as a means of improving their employment opportunities.

(1) Educational Facilities

Under the cluster system, a core school serves as a resource center (personnel and materials) for the other schools composing the cluster. All resources, such as equipment and facilities, and general and specialist teachers belonging to the core school are available to all the schools within the cluster.

In particular, the improvement of science, home science and agriculture curricula at the rural core schools, designated as 1A·B schools, would be expected to reduce the pupil outflow from Gampaha to Colombo. Eventually, all core schools of 58 should be strengthened; however, for the immediate future, priority will be given to 26 core schools.

(2) Vocational Training

1) Vocational Training Centers

There exists a relatively sizeable sector of the youth population which, although unable to continue on to universities, have achieved a high level of education but are unable to find employment due to lack of vocational qualifications or training. In recent years, motorization as well as the introduction of various mechanical, electrical and electronic equipment with the growing modernization of offices and homes has progressed. However, persons with technical capabilities to operate, maintain and repair such equipment are few. This results in long repair time required for broken down equipment, and accordingly the same cannot be utilized at optimum efficiency.

Vocational training facilities to provide such technical know-how do not exist in the district. Accordingly, such facilities and associated curricula should be established. This will respond to social needs for such know-how as well as provide valuable employment opportunities.

2) Strengthening of Existing Training Centers

There currently exist in Gampaha district facilities established by the Ministry of Rural Development to provide raining in traditional industries. Enrollment in this training is roughly 500 persons per year. At present, however, superannuated facilities and equipment prevent adequate training. As an estimated 79% of unemployed have the equivalent of a middle school education, a good basis exists for creation of a well skilled, technical work force through establishment of suitable facilities and training courses.

(3) Short-Term Plan

Due to its importance, and the desirability of prompt benefits, rehabilitation and establishment of adequate educational and vocational training facilities, set-up of apporopriate curricula and recruitment of sufficient teaching and training personnel is to be considered in short-term planning.

4.4 Social Infrastructures

4.4.1 Roads

Second to Colombo, the road network in Gampaha district is the most developed of the 25 districts in Sri Lanka and road density greatly exceeds the national average. Accordingly, rather than construction of new roads, priority should be placed upon improvement of existing roads. Road development policy focuses on the following three items:

a) Improvement of the existing road network and establishment of a maintenance system;

b) Replacement of existing bridges and construction of new bridges; and,

c) Study of an integrated transportation system covering a wide area and including the capital, Colombo.

(1) Improvement of Existing Road Network and Maintenance System

The most pressing task is to improve the efficiency of maintenance for the existing road network in order to minimize deterioration caused by the increasing traffic volume. Accordingly, supply of additional road maintenance equipment for the existing maintenance offices and establishment of a management system for prompt repair work is urgently required.

(2) Replacement and Construction of Bridges

There are about 175 bridges in Gampaha district; however, several of these are no longer structurally sound due to age. These bridges should accordingly be replaced. In addition, the construction of new bridges is required in certain locations to promote rural development.

(3) Integrated Transportation System

National routes A-1 and A-3, which are of vital importance to national transportation, run through Gampaha district. Traffic volume over these roads has been increasing yearly and congestion is particularly severe during the commuter rush to and from Colombo in the morning and evening. In order to respond to the increasing flow of traffic between Gampaha district and Colombo, the road network over the entire area, bridges and public transportation systems should be improved. This will require careful preliminary study covering the expanded capital zone.

The following items are envisioned as a short-term plan for achievement of the basic policy outlined above.

a) Allocation of road construction equipment for establishment of a maintenance system, with heavy construction equipment for the Chief Engineer's Office and light equipment for the Executive Engineer's Offices.

b) Replacement of existing bridges as follows:

1/2 on Seeduwa-Udugampola

1/1 on Palliyawatta-Lansiyawatta

1/1 on Veyangoda-Ruwanwella

1/2 on Veyangoda-Keleliya

c) Construction of Muthuwadiya bridge

Road project in the short-term scheme is to provide road maintenance machinery to the Highway Department.

4.4.2 Domestic Water Supply

A stable, clean water supply is absolutely essential for daily life. On the basis of field survey, basic guidelines for the rehabilitation and new development of domestic water supply facilities in Gampaha district are determined as follows:

(1) 1st Stage

Water quality analysis will be implemented for all wells in the district and a well sanitation map drawn up which delineates wells with water suitable for drinking, and those for which water treatment measures are necessary.

(2) 2nd Stage

For wells where water is presently unsuitable for drinking, the following measures will be implemented:

a) Shallow Well Rehabilitation

Area for a six meter radius around shallow wells would be cleaned and protected from sewage and wastewater intrusion. Simple chlorinators would be set up at shallow wells at hospitals, schools, markets, and public regional offices and other points of concentrated human activity.

b) Piped Water Service Schemes

These projects would be carried out in areas of high population density (town centers, etc.) where measures in a) above would not be realistic.

c) Groundwater Development

Deep tubewell development of groundwater would be carried out in medium population density areas. Groundwater development study is required.

In view of the above guidelines, the following short-term schemes would be carried out:

a) Establishment of water quality testing procedures and standards and implementation of district-wide water quality testing

b) Shallow well rehabilitation and installation of simple chlorinators (100 sites)

Water supply schemes would e formulated as approapriate based on the results of (1).

4.4.3 Rural Electrification and Communications

(1) Rural Electrification

rural electrification not only provides safe and efficient illumination, it also promotes indirect effects such as farm mechanization, extension of modern farming practices through night school classes and development of craft industries.

Extension of rural electrification depends upon construction of a distribution network covering a wide area and facilitating inclusion of new subscribers into the system. Following extension of distribution lines and the consequent increase in the electrification rate in rural areas, it will be necessary to increase transformer capacity, and to improve the distribution line by increasing wire diameter, etc. in order to meet increased demand.

With the above objectives in mind, schemes for rural electrification in the Study area have been formulated as follows:

a) Electrification rate will be increased from the present 44.6% at the GS level and 48.6% at the village level to 100% (long-term objective). In addition, the capacity of the existing distribution network will be increased and deteriorated

facilities improved and strengthened in order to expand system capacity and to ensure a reliable supply electricity.

b) A target electrification rate of 65% at the GS and village levels is set for the first 5 years as a short-term objective. 50 kilometers of high voltage line, 200km of low voltage line and other necessary facilities will be installed.

c) In order to successfully realize items a) and b), the distribution route will be planned to ensure reliable supply and necessary repairs will be undertaken.

d) Distribution lines, etc. for irrigation facilities, water supply systems, research facilities, schools, hospitals and other facilities which require electricity for lighting or motor operation will be studied as high priority items separate from general rural electrification.

e) A committee with members from the Gampaha District Office, CEB and LECO will be established to select the most appropriate scheme.

(2) Communications

Communications facilities are essential to integrated rural development as they facilitate rapid and accurate transfer of information. When such facilities are introduced in farm production and transportation, substantial benefits may be expected in the rural economy.

As with electrification, development of communications progresses first in terms of quantity (area coverage) then quality (upgrading of facilities and equipment). At the present stage, SLTD desires extension of quantity under its master plan in Gampaha district. Schemes for communications development in the Study area have therefore been formulated as follows.

a) The objective will be to realize SLTD's master plan with long-term goals of extending the communications network to all GS and to installing public telephones in all centers of every GS. The target coverage rate for public telephones is 0.36 phones/1,000 persons, and that for private telephones is 1.67 phones/100 persons.

b) Short-term plan goals are to increase the present private telephone coverage rate of 0.14 phones/100 persons to 0.54/100 and the public phone coverage rate to 0.20/1,000. This will require installation of 100 public telephones and 250 km of telephone wire.

c) The long-term plan also aims to increase the capacity of the existing communication system and improve or replace superannuated equipment in order to meet future demand increases.

4.4.4 Medical and Health Services

Health standards and the overall condition of the medical and health services system in Gampaha district are lower than the national average. Following the guideline of the PHC Complex program promoted by the Government of Sri Lanka, steps will be taken to improve the health services in the area in consideration of present conditions. The schemes consist of the following.

(1) Improved Medical Standards

1) Improvement of Base Hospitals

The Base Hospitals from the core of medical services in Gampaha district. These hospitals are designed to fulfill the following functions:

a) Management of accurate statistical data;

b) Provision of outpatient services;

c) Provision of clinic care;

d) Provision of in-patient care;

e) Control of communicable diseases; and

f) Consultation to peripheral institutions.

At present, however, the hospitals are often unable to fulfill these functions due to inadequate facilities and equipment. Accordingly, installation of new facilities and equipment is planned to upgrade the existing Base Hospitals.

2) Other Hospitals

District Hospitals, Peripheral Units and Rural Hospitals also require improvement of facilities and strengthening of their functions. These facilities are particularly vital to realization of the PHC Complex program and their improvement will increase the effectiveness of medical staff and health care (preventative care) workers.

(2) Improvement of the Preventive Health Service

It is necessary to establish a health system based on primary health care which provides essential health care to the entire population in

selected areas using community participation and locally appropriate health technology. Major objectives include the following:

a) To strengthen health care services at the local level by providing an adequate number of primary health care complexes through establishment of Gramodaya Health Centers (one for every several villages), and upgraded sub-divisional and divisional health centers;

b) To integrate promotive, preventive and curative health services, aiming at provision of comprehensive health care;

c) To streamline the supervisory and referral components of the district health care system;

d) To create adequately trained, oriented and motivated health personnel with emphasis on Family Health Workers; and,

e) To raise community participation to an adequate level in order to develop primary health care in the rural areas.

The scheme consists of the following main components.

1) Gramodaya Health Center

The Gramodaya Health Center manned by one Field Health Worker is the base of the PHC Complex program. These will be one such health center for every several Gramasevaka (population of about 3,000) operating to fulfill two objectives; to provide a work-place for the Field Health Worker and to provide a base from which PHC services are extended to the community with its active support and participation. This will facilitate the development of Village Health Committees.

2) Sub-Divisional Health Centers (SDHC)

This institution will be staffed by one Asst. Medical Practitioner, two Public Health Inspectors, one supervising Public Health Midwife, one field Public Health Midwife and one Dispenser, who will work both in the institution and in the field. The SDHC will also provide supervision and referral support to the Gramodaya Health Centers.

3) Divisional Health Center

One Divisional Health Center will established in each AGA division. These centers will have inpatient facilities of about 60 beds and an MOH Office, and will provide integrated curative and

preventive services. Working peripheral units and small district hospitals will be converted into DHCs by strengthening them appropriately. Eventually there will be about 7 DHCs, one in each AGA division.

The DHC will provide supervisory, logistic and technical support to the SDGC and the GHC.

(3) Short-Term Schemes

The short-term schemes include priority items which require early implementation for achievement of the above objectives, as follows:

a) Improvement of Base Hospitals

Improvement in the short-term plan will focus on Gampaha and Wattupitiwala (Attanagalla) Base Hospitals.

b) Improvement of Divisional Health Care Program

Divisional Health Centers will be constructed in regions where there is no MOH Office and the health standards are low, in order to ensue efficient health management. The areas designated for construction are Divulapitiya and Minuwangoda. A health inspection vehicle will also be provided.

4.4.5 Social Welfare

(1) Social Welfare Programs

Over two-thirds of government social welfare expenditure is taken up by the Foodstamps Program and consequently other social welfare programs receive limited funding. It is therefore necessary to give more priority to the benefits which can be derived through programs for increased agricultural production and job creation. In addition existing social welfare activities are hampered by lack of adequate facilities and accordingly improvement of public facilities is urgently required. Objectives of the short-term plan are i) improvement of welfare facilities for the elderly in Mirigama, and ii) improvement of the Seeduwa training center for the handicapped.

(2) Income Generation for Rural Women

A pilot phase scheme (1-3 years) should be introduced to overcome the various problems identified under the job creation program implemented under NORAD assistance, including lack of technical training, marketing and management skills. Based on the success of the pilot phase, the scheme scale would subsequently be expanded. Work skills taught during the pilot phase would include dairy and poultry farming, handicrafts, bee keeping and food processing and subsequent project expansion would be implemented under the direction of the Women's Bureau. Prior to commencement of the pilot phase however, preliminary work including appointment of field staff from the Women's Bureau and allocation of an initial budget is required to facilitate planning and study of scheme content and consultation among the various government agencies concerned.

Although it is not directly an income generation program, the IRDP through its home garden program will permit rural women to raise vegetables in their own yard for home consumption, thereby reducing household expenses, and for sale, providing a possible source of income.

(3) Nurseries

The elder children of rural housewives who work at full-time jobs must stay at home to take care of the younger children, and are thus deprived of valuable educational opportunities. Nurseries alleviate this problem and at the same time provide instruction in nutrition for the children's parents. Infant nutrition and health standards in rural area are low and establishment of nurseries and provision of Family Health Workers to instruct mothers in basic health care, etc. is envisioned to significantly contribute to improved nutrition and health. Accordingly, establishment of at least one nursery in each Grama Sevaka is required.

CHAPTER 5

COMPONENTS OF MASTER PLAN

5.1 Master Plan

Master plan is composed of long-term development targets and short-term schemes.

Long-term targets are aimed at the 21st century and focus on basic strategies for developing the rural area. Short-term schemes are to be launched within five years while main development schemes are formulated for later implementation.

5.1.1 Long-Term Targets

As has been designated in Chapter 3, two main projects to be constituted in the Gampaha Integrated Rural Development Project are development of agricultural production to raise income, and improvement of employment opportunities. Development of agricultural production will stimulate regional economic activities. As rice self-sufficiency is being achieved in the country, development of rice production in Gampaha has little meaning; instead, suburban agriculture based on advantages of proximity to GCEC, and Colombo is recommended such as high profitable vegetable and fruit intercrop production. In order to introduce new agriculture practices, the following measures are recommended.

- Multiplication of MEC seedlings and extension service
- New agricultural technology demonstration and transfer farm construction
- Strengthening of agricultural supporting services
- Demonstration of new cultivation practices and water management
- Development of marketing system
- Development of livestock husbandry, fisheries

Multicropping in paddy field cannot be carried out without rehabilitation of superannuated irrigation and drainage facilities. The following basic rehabilitation works are required.

- Attanagalu Oya irrigation project
- Minor irrigation system
- Drainage project
- Flood protection project
- Improvement of swamp area

There are two projects formulated for expanding employment opportunities. One is for the unemployed in general and the other is for creating jobs for students upon graduation and jobless youth. Unemployed workers could be absorbed in intensive agriculture or agro-based industry. However, creation of employment opportunity by agriculture has limitations, and there is no quick yield program for developing agro-based industry. Development of agro-industry would require further detailed study of capital, technology, demand, and marketability. Though the Project area adjoins the GCEC area and Colombo, jobless ratio in Gampaha district is high. Solution of the problem within the area will be much dependent on increased employment opportunities stemming from GCEC/Colombo's industrial development.

As to the latter project to increase job opportunities for students and youth, since the scientific educational level is rather low the project aims at improving educational facilities so as to improve fundamental education in the sciences. Increasing motorization and electric products in daily life has yielded a lack of technicians in these fields which should be addressed through provision of vocational education.

Regarding the social infrastructure, medical facilities are at a level below the national average and should be improved. Shallow wells are widely used in Gampaha for drinking water. However pollution is marked and water quality survey is necessary as a basis for implementing water purification measures.

Electrification and telecommunications must be improved.

Road density in Gampaha is the second highest in the country. Therefore, the Project aims not at new road construction but at maintaining the existing roads.

Income increase and nutritional improvement for rural women are planned through political measures and through agricultural production.

The above mentioned long-term targets aim at increasing agricultural income, increasing employment opportunities and improving rural living

conditions. Achievement of these goals will play an important role in alleviating rural poverty and establishing equitable and satisfactory living conditions.

5.1.2 Short-Term Schemes

(1) Selection Criteria of Short-Term Schemes

Selection criteria for main development schemes under short-term planning are as follows:

a) Congruency with Upper Level Development Planning

At present, specific criteria for prioritization of schemes in integrated rural development have not been formulated at the national level. In the case of integrated rural development implemented in other districts, priorities have been determined on a district specific basis. Nevertheless, nationally the government is emphasizing in its five year investment plan increases in agricultural production and export crop production, human resources development, promotion of industries, and strengthening of education and health care infrastructures.

b) Expansion of Income and Employment Opportunities

A crucial element of integrated rural development is expansion of farm household income through increased agricultural productivity and income opportunities. Priority will accordingly be given to schemes oriented in this direction.

c) Improvement of Daily Living Environment

Another critical element of integrated rural development is enhancement of the daily living environment in rural areas. Consequently schemes will be considered which strengthen social infrastructures pertaining to health care, education, water and electrical supply, sanitation, telecommunications, etc. Such infrastructures play an important role in indirectly supporting agricultural production.

d) Investment Scale and Financial Capability

The Master Plan encompasses a wide range of rural development. In terms of investment scale and financial

capabilities, it would not be practical to implement all schemes necessary to realize this goal. Short-term schemes will accordingly be set at a scale which takes into consideration previous performance on other integrated rural development programs.

e) Widespread Benefit

Schemes will be formulated to benefit the broadest segment of population as much as possible.

(2) Selection of Short-Term Schemes

Short-term schemes comprises those which warrant implementation over the next five years as discussed in Chapter 4, and as per IRDP strategy and short-term scheme selective criteria.

Agricultural technology demonstration farm, new cultivation practice transfer program, and minor export crops nursery centers are aimed at increased agricultural production and crop diversification.

The agricultural supporting service strengthening and agricultural training institute strengthening programs are for improving district-wide extension work.

The agricultural technology demonstration farm and Morenna model irrigation area promote on-farm water management and new cultivation practices and comprise rehabilitation of existing irrigation and drainage facilities and introduction of the block demonstration scheme.

Besides crop production, poultry hatchery program (livestock program), and establishment of a freshwater fisheries station and model ponds for inland fisheries development are also programmed.

Existing irrigation and drainage facilities are too superannuated and damaged to contribute to the above mentioned agricultural production and crop diversification.

To address this situation, a model irrigation area for water management and new cultivation practices is to be established by rehabilitation of existing irrigation and drainage facilities.

Rehabilitation work for Attanagalu oya irrigation system which is the principal irrigation system in the district needs more detailed study, including study of downstream drainage improvement. The said project was excluded from short-term programs on the IRDP principle of low cost

and quick yield. However, an irrigation facilities rehabilitation program is one of the principal goals of IRDP, and Attanagalu oya irrigation system rehabilitation remains as an important objective. Accordingly, the short-term program includes a feasibility study on Attanagalu oya irrigation project, including the downstream drainage problem (Kalu Ela Drainage Canal Program), in order to formulate a suitable project which may be implemented step by step within the framework of IRDP.

The minor irrigation scheme includes 70 of the most urgent out of 700 systems. Kelani ganga minor flood protection rehabilitation program is also included in the short-term program.

Regarding the rural industries which are expected to help absorb unemployment , thorough study or analysis has not been carried out under present program.

Development of local industries, agro-based industries, and promotion of entrepreneurs will be considered in accordance with availability of resources, capital, technology, and market. The short-term program includes improvement of the existing vocational training center facilities and establishment of a vocational school which will provide mechanical and electrical courses. In order to level up scientific educational standards for students, improvement of core school facilities is being considered, and this would be expected to contribute to future vocational training.

Improvement of social infrastructure is oriented towards rectifying gaps with the national average and towards district imbalances.

Table 5.1.1. shows the long-term targets and short-term schemes.

Table 5.1.1 Long-Term Targets and Short-Term Schemes

Development Sectors	Long-Term Targets		Short-Term Planning	
	Targets	Components	Main Development Schemes	Scheme Components
1. Promotion of Agricultural Production	1. Strengthening of existing agricultural support services	Organizational structure and personnel are present; however, due to outdated and superannuated facilities, entities are unable to perform intended role. These facilities are to be rehabilitated and strengthened.	1. Improvement of Agricultural Support System 2. Improvement of Agricultural Training System	Improvement and expansion of agrarian services and extension services facilities Improvement and expansion of facilities at 2 training centers
	2. Development of minor export crops and strengthening of relevant extension activities	Land utilization rate and farm income are to be upgraded through intercropping of export crops (coffee, pepper, cacao,etc.) in coconut fields.	3. Minor Export Crop Promotion Scheme	Construction of MEC seedling center and strengthening of extension activities
	3. Improvement of agricultural productivity and promotion of crop diversification	Low paddy unit yield in Gampaha district is to be raised to a level on a par with projects in other districts. Establishment of necessary facilities and guidance and demonstration in agricultural technology relevant to upland crop cultivation will be undertaken in response to the growing suburban type nature of agriculture in the district .	4. Agriculture Technology Demonstration and Transfer Scheme 5. Morenna Model Irrigation Scheme	Construction of demonstration farm Same as #12
	4. Strengthening of on-farm water management and farm management practices	At present water management is not performed for existing irrigation facilities. Guidance will be provided at the farmer level in water management importance and methods. Farm management training will also be carried out.	6. Block Demonstration Scheme 7. Water and Farm Management Scheme 8. Farmer's Group Promotion Scheme	To be implemented under schemes #4 & 5
	5. Strengthening of farm products distribution system.	With the exception of coconuts, the present farm products distribution system does not benefit the farmer. It is necessary to study and develop a system more beneficial to the small scale farmer.		
	6. Expansion of farm credit	Simplification of procedures and expansion of capital sources need to be performed to make the credit system more readily available to farmers.		
	7. Promotion of animal husbandry and strengthening of related support services	Projects are currently underway to promote beef cattle and hog husbandry under ADB, etc. assistance. Poultry raising will accordingly be promoted as both demand and farmer desire for such exist.	9. Livestock Development Scheme	Poultry hatchery (120,000 birds/month) construction
	8. Promotion of inland fisheries	Increase in rural fish catch and development of inland fisheries will be promoted through farming of fresh water fish and shrimp varieties of high marketability.	10. Inland Fisheries Development Scheme	Construction of freshwater fish experimental farm and model pond; expansion of existing research facilities

Development Sectors	Long-Term Targets		Short-Term Planning	
	Targets	Components	Main Development Schemes	Scheme Components
2. Development of Agricultural Infrastructures	9. Rehabilitation of existing irrigation facilities	Rehabilitation of existing superannuated irrigation facilities is urgently necessary for modernization of agriculture, improvement of productivity and introduction of upland crops.	11. Attanagalu Oya Irrigation Scheme (P/S) 12. Model Irrigation Area Scheme 13. Minor Irrigation Scheme	Feasibility study for rehabilitation of existing irrigation facilities and downstream drainage scheme Implementation of model irrigation scheme in Morenna area Rehabilitation of 70 existing facilities
	10. Drainage facility rehabilitation	Areas of poor drainage exist due to inadequate performance of existing drainage facilities. These facilities will be restored to fulfill their originally intended function.		
	11. Flood protection	Inundation of fields during flooding occurs due to damaged flood protection facilities on the Kelani river. These facilities will be restored to perform originally intended function.	14. Minor Flood Protection Scheme	Rehabilitation of existing backwater sluice gates
	12. Strengthening of water management system	A water management structure will be established along with rehabilitation of irrigation facilities to improve agricultural productivity and permit effective introduction of upland crops.	15. Model Area for Water Management System	To be implemented under schemes #5 & 12
3.Promotion of Rural Industries	13. Promotion of local industry	Improvement of technology and product quality for traditional and local industries will be promoted by upgrading relevant existing facilities.	16. Improvement of Existing Vocational Training Center and Upgrading of Skills	Improvement of existing facilities
	14. Promotion of farm products processing industries	Study will be carried out on promotion of processing of farm products, farm by-products and related industries.		
	15. Enticement of subcontractor firms for manufacturing enterprises	Subcontractor firms for manufacturing enterprises in GCEC and Colombo will be enticed into rural areas to expand employment opportunities.		
4.Human Resources Development	16. Vocational Training	Employment opportunities will be expanded through vocational training of technicians for machinery , and electrical and electronic equipment, the introduction of which is expanding in the district.	17. Improvement of Vocational Training Center Facilities 18. Vocational Training Center Construction Scheme	Same as #18 Training of technicians for computers and electrical equipment
	17. Improvement of educational facilities	Improvement of educational facilities will be carried out to upgrade curriculi in science,agronomy and home sciences at the middle and high school levels.	19. Improvement of Core Schools	Improvement of science curriculum related facilities at 26 core schools

Development Sectors	Long-Term Targets		Short-Term Planning	
	Targets	Components	Main Development Schemes	Scheme Components
5.Improvement of Social Infrastructures	18. Road improvement	Improvement of the road network and bridges will be planned, with new bridge span construction where required.	20. Improvement of Road Maintenance System	Provision of road maintenance machinery Rehabilitation of 6 bridges
	19. Rural electrification	An electrification rate of 100% will be targeted for the GS level. Superannuated and deteriorated facilities will be improved.	21. Rural Electrification Scheme	Upgrading of electrification rate to 75% at GS level
	20. Improvement of telecommunications	In line with the SLTD master plan, telecommunications networks will be improved for all GS. A telephone extension rate of 1.67 units / 100 persons will be targeted. The public telephone rate target will be 0.36 units / 100 persons, with public phones in all GS.	22. Telecommunications Development Scheme	Target telephone extension rate at the GS level of 0.54 units / 100 persons; public telephone rate of 0.2 units /1,000 persons
	21. Improvement of water service and sanitation facilities	Water quality testing will be carried out for shallow wells in the district, and where necessary wells will be rehabilitated and simple chlorinators installed. Where well rehabilitation is not practical, piped water supply systems will be constructed. Groundwater development for water supply will be investigated.	23. Monitoring and Improvement of Shallow Wells	Provision of mobile water testing unit and installation of simple chlorinators at wells
	22. Improvement of health care and nutrition	Improvement of health care and nutritional facilities will be carried out in coordination with the PHC complex project already being pursued by the government. At present health care levels in the district are below the national average. Elimination of geographical imbalances is particularly important.	24. Improvement of Base Hospitals 25. Improvement of Divisional Health Care Program 26. Strengthening of Nutrition Promotion Activities	Improvement of facilities at 2 base hospitals Construction of centers at Divulapitiya and Minuwangoda Strengthening of instructive activities
	23. Improvement of social welfare facilities	Social welfare facilities struggling under the food stamps program will be strengthened.	27. Improvement of Social Welfare Activities	Improvement of facilities at Mirigama and Seeduwa institutions
	24. Problems of rural women	In order to enhance the status of rural women, employment opportunities will be expanded and nurseries established. To be implemented under targets 2 and 3.	28. Home Garden Scheme	To be implemented under schemes #3 & 4; istruction in MEC and garden crop cultivation for both self-sufficiency and as cash crop

5.2 Development of Agricultural Production

5.2.1 Agriculture Technology Demonstration and Transfer Scheme

Development of agricultural production is directed at upgrading cultivation technology of farmers as a means of increasing farm yield. This constitutes one of the main projects of Gampaha Integrated Rural Development. Under the project, an Agriculture Technology Demonstration and Transfer Center (ATDTC) would be established The center would include the irrigation model project and related facilities under the development of agricultural infrastructure. Center functions would cover training focused on intensive cultivation including the subjects presented below. Instruction would be by highly qualified experts in agricultural technology.

① Cultivation/Crop Protection

- Upgrading of paddy cultivation technology: Transition from traditional cultivation to modern cultivation techniques including uniform puddling and transplant technology
- Pest forecasting and prevention

② Water Management/Irrigation

- Appropriate irrigation and water management practices for paddy field: Shift from traditional flood irrigation to more effective methods.
- Water management based on crop water consumption at the field level

③ Upland Crop Cultivation/Horticulture

- Test cultivation of upland and horticultural crops suited to the area: Introduction of inter-crops for paddy field such as beans, etc.
- Introduction to upland fields of inter-crops such as pineapple, etc.
- Trial cropping of decorative plants

④ Minor Export Crops

- Cultivation and post harvest quality control technology for such export crops as peppers, coffee, cacao, cloves, cinnamon, etc.
- Promotion of high quality export products through production of improved seedlings, and introduction of upland irrigation techniques, and cultivation and post-harvest drying technology

⑤ Soil

- Soil analysis, classification and improvement

⑥ Farmer's Organizations

-- Establishment and management of farmer's organizations which contribute to effective farm management. Promotion of farmer's organizations effective in crop management, such as the recently commenced block demonstration scheme.

⑦ Marketing/Research

-- Collection, analysis and dissemination of data pertaining to marketability of agricultural products, market locations and marketing methods.

Operational guidelines for the Agriculture Technology Demonstration and Transfer Center would be determined by a steering committee composed of members as indicated below which an operation committee would be responsible for actual study, planning and implementation of operation. An organizational chart for the center is presented in Fig. 5.2.1.1.

1) Steering Committee Members:

- Director of Agriculture (Ministry of Agriculture)
- Commissioner of Agrarian Service (Ministry of Agriculture)
- Director of Minor Export Crops (Ministry of Agriculture)
- Director of Irrigation (Ministry of Land and Land Development)
- Director of Animal Husbandry and Veterinary Service (Ministry of Rural Development, Animal Production and Health)
- Chairman of Coconut Cultivation Board (Ministry of Coconut Industry)
- Chairman of Agriculture Development Authority (Ministry of Agriculture)
- Director of the New Center
- Director of Planning (Ministry of Plan Implementation)

2) Operation Committee Members:

- Assistant Director of Agriculture
- Assistant Commissioner of Agrarian Service
- Assistant Director of Minor Export Crops
- District Irrigation Engineer
- Regional Manager of Coconut Cultivation Board

- Deputy Director of Agriculture Development Authority
- Expert Group

Principal components of the ATDTC scheme are given below.

Demonstration and Extension Center:

- Establishment of paddy and upland field for demonstration of intensive cultivation methods
- Establishment of a model irrigation area for extensive cultivation methods
- Establishment of classrooms and relevant offices for training as well as bussing procedures for students
- Establishment of laboratory facilities for soil testing, etc. and procurement of pertinent equipment
- Procurement of computer data processing equipment and materials
- Establishment of farm equipment repair facility and procurement of pertinent farm equipment

Demonstration and Extension Subcenters:

- Establishment of upland fields
- Establishment of water source for upland irrigation
- Procurement of pertinent upland farming equipment
- Procurement of necessary equipment and materials for promotion of upland farming

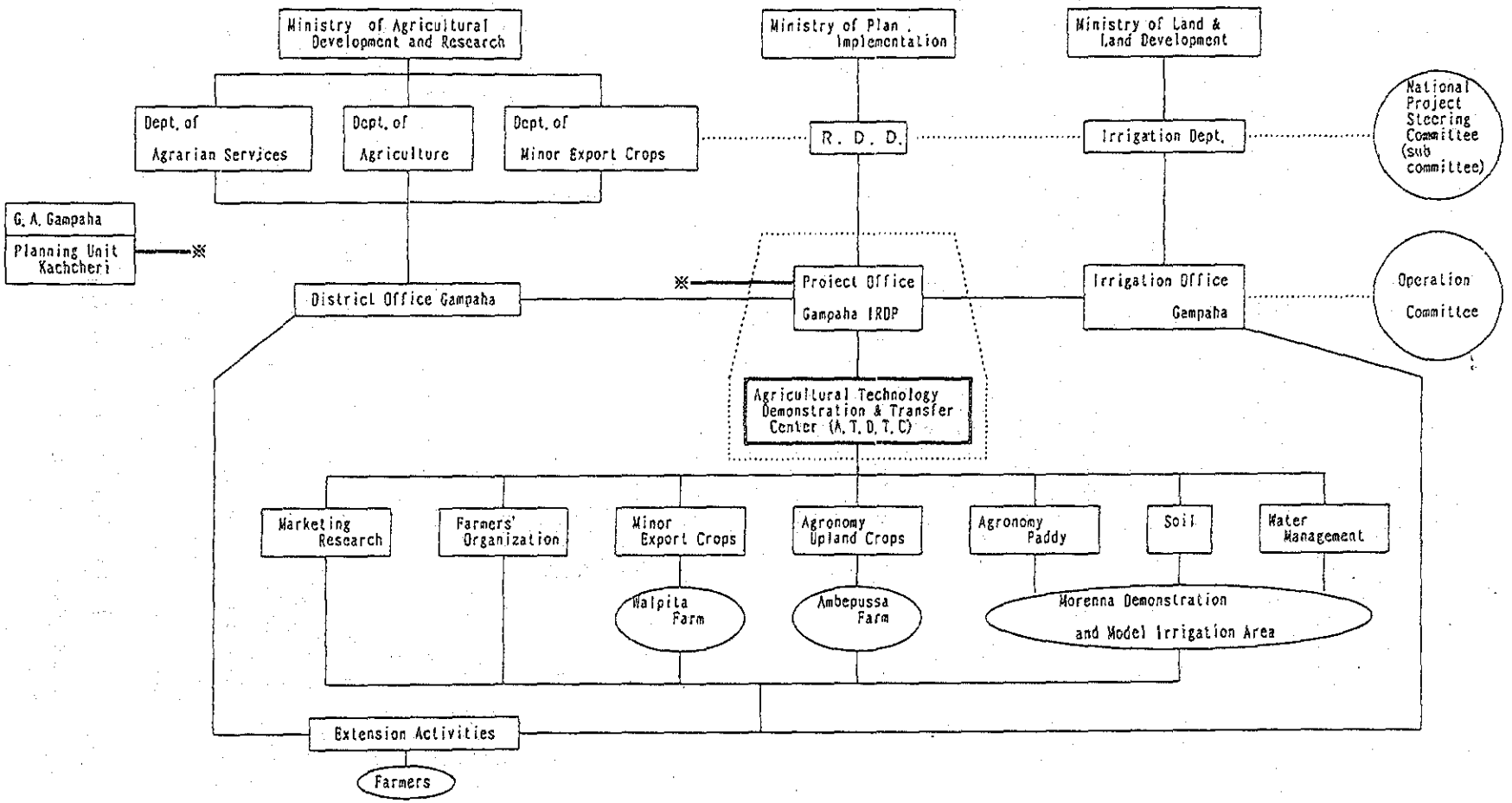
Activity for Small or Very Small Farmers:

The agricultural production development scheme aims at benefitting the whole of farmers of the entire Gampaha district.

Farmers whose holdings are more than the average would be expected to actively introduce the new technology. However, small farmers are busy with off-farm employment and afford less attention strictly to farming. As a result the technology gap between larger scale and small scale farmers would increase. In order to attract small farmers' interest in particular, ATDTC is to be open on Saturday and Sunday as well, and a home garden cultivation model which is of relevance to the small farmers will be demonstrated by the horticultural section of ATDTC. Home garden models are also to be established in farmer gardens.

Extension work by Agrarian Service Centers is being provided for that purpose.

Fig. 5.2.1.1 Agricultural Technology Demonstration and Training Center (ATDTC) Organization



5.2.2 Minor Export Crop Promotion Scheme

Development of export crops is of high importance to future growth of the Sri Lankan economy, and as such is accorded major priority in the Government's 5 year investment plan. Such crops are suitable for cultivation in the small-scale holdings that comprise the majority of farms in the country. The Department of Minor Export Crops provides initial investment assistance for land preparation as well as free seedlings to farmers desirous of cultivating export crops. However, as seedling production is performed by various contract farmers, qualitative and quantitative insufficiencies occur which are deleterious to promotion of such export crops.

Under this scheme, a nursery center would be established under the direct management of the Department of Minor Export Crops. The said center would pursue a planned program of seedling production to facilitate the promotion of cultivation of such crops.

The nursery center would be attached to the Walpita farm of the Agriculture Department of the Ministry of Agriculture. The center would also provide technological supervision to contract farmers producing seedlings. Operation and maintenance of the facility would be carried out jointly by the Department of Minor Export Crops and the previously discussed ATDTC.

Principal project components are as follows:

- Establishment of upland fields for the nursery center
- Establishment of a nursery bed and mixed cropping model farm for minor export crops
- Establishment of irrigation facilities for export crop seedling cultivation
- Establishment of sprinkler irrigation system
- Construction of classroom facilities and appurtenant office facilities for the Department of Minor Export Crops
- Installation of processing unit (for training)
- Provision of pertinent farm equipment

5.2.3 Scheme for Improvement of Farmer Support System

Strengthening of farmer support organizations is an essential element in increasing agricultural productivity. At present, farmer support organizations include the Department of Agricultural Extension, which is engaged primarily in

the extension of paddy and upland cropping technology, the Department of Agrarian Services, which is engaged in extension of fertilizer and other agro-inputs, as well as the construction, operation and maintenance of minor irrigation schemes, and the Department of Minor Export Crops, which pursues extension of export crops. In order to ensure that these support activities are effectively carried out, it is essential that the above organizations be reinforced.

Necessary equipment and materials for such reinforcement is as follows:

- Jeep
- Motorcycle
- Minibus
- Audio-visual equipment
- Fertilizer warehouse
- Fertilizer transport truck
- Other various extension materials and equipment

5.2.4 Scheme for Improvement of Agricultural Training System

Education and training facilities for farmers and extension workers, particularly in the area of cropping technology, is crucial to progress in rural development. In Gampaha district, such facilities were established in 1940 at Walpita and Ambepussa. At present, however, these are incapable of fulfilling their original function due to limited size and superannuation of facilities.

Accordingly, the scheme proposes rehabilitation of the said facilities to a level where adequate training of farmers and extension workers could be achieved. Training center rehabilitation and strengthening would include the following:

- Establishment of a training farm
- Establishment of a water source for the training farm
- Provision of training farm irrigation facilities
- Road construction
- Supply of audio-visual equipment
- Supply of farm equipment for training
- Construction of training classrooms
- Construction of accommodations
- Establishment of adequate transportation

5.2.5 Livestock Development Scheme (Poultry Hatchery)

(1) Objectives

Poultry raising is a suitable activity for small-scale farms in Gampaha district from the standpoint of both nutrition and enhanced income from limited land area. The current poultry population in the district is 1.1 million, which in order to be sustained requires the addition of 800,000 new female chicks per year. However, chick supply suffers shortages, and renewal of the hen population is not carried out in a planned fashion. Under this project 4,500 hens would be imported to produce 120,000 new chicks per month. Demand for hens for egg production stands at about 60,000 ~ 65,000, which requires a new chick supply of 120,000 per month as the male ~ female ratio of newly hatched chicks is 50:50. An incubator of 72,000 capacity would be installed to hatch 12,000 eggs every three days. In addition to incubator facilities, henhouses would also be constructed.

(2) Scale of the Scheme

1) Structures

- Henhouse	$200m^2$ x 7
- Incubator room	$200m^2$
- 40 ton (1 month supply) feed silo	20' x 20'
- Machinery shed	20' x 20'
- Office, inventory room	20' x 20'

2) Water and Electrical Supply Facilities

- Water tank and piping
- Air conditioner and required wiring

3) Import of 4,500 hens

4) Incubators

(3) Implementing Agencies

- National Livestock Development Board
- Siringapatha Farm at Badalgama (near Divulapitiya)

5.2.6 Inland Fisheries Development Scheme

Short-term planning for promotion of inland fisheries would include the following four schemes:

- Establishment of a new freshwater fisheries station at Gampaha
- Establishment of a model fish culture farm
- Expansion of the existing brackish water fisheries station at Pambala
- Expansion of the existing freshwater fisheries station at Pitipana

(1) Establishment of a Freshwater Fisheries Station at Gampaha

1) Rearing and Breeding Facilities for Freshwater Fish

Objective:

- Culture of freshwater seed
- Various culture tests and research
- Extension and training

Production scale:

Yearly production of approximately 5.4 million fingerlings (length: 7cm). (This represents target seed production to meet 1995 demand. After 1996, each administrative district would be responsible for 50% of fingerling production at respective model culture farms.)

Production facilities:

- Nursery pond: 250m^2 x 25nos.
- Rearing pond: 600m^2 x 50nos.
- Black carp spawning pond: 2,500m^2 x 2nos.
- Water supply and drainage facilities
- Aeration facilities

2) Various Test Rearing Facilities

- Main rearing test tank: 0.2ha. x 2nos.
- Giant prawn rearing pond: 0.2ha. x 2nos.
- Net cage culture of carnivorous fish: 4nos.

3) Equipment and materials:

Vehicle, testing, extension and training equipment and materials, etc.

4) Structures:

Office, staff accommodations, etc.

(2) Model Culture Farm

Objective:

- Promotion of communal pond establishment in model villages
- Promotion of awareness of fish rearing technology in other villages
- Test culturing

Facility components:

- Main rearing test pond: 0.2ha. x 1no./administrative unit x 8 units
- 500m^2 rearing pond: 4/administrative unit x 8 units
- Office, storage facilities
- Motorbike for extension purposes: 1/administrative unit x 8nos.

(3) Expansion of Pambala Brackish Water Fishery Station

Objective:

Upgrading of production capacity of giant prawn (5 million/year)

Components:

- Seed production tank (giant prawn)
- Fresh water and brackish water supply system (120t/day, respectively)
- Equipment and materials: vehicle, test, extension, and blower facilities, etc.

(4) Expansion of Pitipana Brackish Water Fishery System

Objectives:

- Upgrading of black tiger prawn seed production (3 million/year)
- Upgrading of natural seed harvesting and distribution capacity for black tiger prawn (1 million/year)
- Strengthening of extension capabilities

Components:

- Seed production tank (black tiger prawn)
- Freshwater diversion and supply system (80t/day)

- Rehabilitation of water supply canal for existing test pond (black tiger prawn and milkfish)
- Equipment and materials: vehicle test and extension equipment, etc.

5.3 Development of Agricultural Infrastructures

5.3.1 Attanagalu Oya Irrigation Scheme

(1) Objectives

In regard to both irrigation and drainage, the Attanagalu Oya Irrigation Scheme (major irrigation) requires the following strengthening works as discussed in Chapter 4, Section 1.

Irrigation:

- Anicut rationalization
- Rehabilitation of anicut gates and flood damage containment measures for downstream
- Irrigation facility rehabilitation

Drainage:

- Basic drainage plan for entire river contiguous area
- Orutota Yagoda Drainage Scheme
- Kalu Ela ~ Dandugam Oya Drainage Scheme
- Drainage canal construction to improve on-farm drainage and prevent inundation

In order to formulate the most effective approach to implementation of the above measures, a comparative study of alternative schemes and their respective benefits must be carried out. This will require further collection and analysis of basic survey data.

(2) Scheme Formulation

The following work items and procedures would be necessary in compilation of basic data and comparative study of alternative schemes.

Preparation of topo-mapping of 1/2,500 scale with 0.25m contour interval would be required. On the basis of this mapping, design irrigation areas would be determined and comparative study of alternative canal layouts carried out. Inundated areas would be identified and various countermeasure options would be examined towards formulation of the

optimum drainage plan. A layout of drainage canals to be constructed would then be drawn up.

In the case of the Orutota Yagoda and Kaluela ~ Dandugam Oya drainage schemes, a detailed study based on topo-maps is necessary. Regarding the Dandugam Oya Drainage Scheme, targeted for a flat lowland area where outside lagoon water level is high, study is accordingly required to determine the necessity of short-cut canal facilities and pump drainage.

(3) Main Rehabilitation and Construction Components

- Several optional schemes would be studied for both irrigation and drainage in the case of anicut rationalization
- Canal system design would include consideration of water management at the field level
- Problems in irrigation and drainage would have to be addressed simultaneously. Requiring particular attention is the fact that drainage countermeasures must be directed at areas considerably downstream from the irrigated area. Possible use and benefits of return flow must also be considered.
- Peak flood discharge and scale of facilities required would have to be determined for the Kalu Ela ~ Dandugam Oya Drainage Scheme at the lowermost reaches of the Attanagalu oya.

Current layouts of the anicut schemes are indicated in Fig. 5.3.1.

(4) Implementing Time

Prior to implementation of this project, ① topographical mapping and ② feasibility study are required. Mapping and feasibility study is to be carried out under the short-term plan, and rehabilitation work is to be implemented under middle-term projects. The feasibility study will elaborate the most applicable implementation plan.

(5) Implementing Agency

Irrigation Department

5.3.2 Morenna Model Irrigation Scheme

(1) Objectives

Through modernization of agriculture, this scheme aims to increase unit yield and permit stable cultivation of paddy during the Maha and Yala seasons. To achieve this, it is necessary to counter seasonal water shortage and flood damage caused by unstable meteorological conditions.

Existing anicut, tank, regulator, and other facilities are present in the Project area. However, at present these irrigation facilities have insufficient impact on paddy cultivation and current yields are low.

Accordingly, model irrigation will be implemented through comprehensive rehabilitation of irrigation facilities in the Morenna anicut sector, and introduction of appropriate water management. The scheme will serve as a demonstration to farmers of the effectivity of modern agricultural practices.

Specifically, the scheme will serve as a model for:

- Effective irrigation by anicut
- Measures for rationalization of anicut schemes in major irrigation
- Water management from diversion to on-farm distribution

(2) Scheme Components

Irrigated area:

392.3ha (determined from 1/10,000 aerophoto-mapping)

Canal rehabilitation length:

- main canal 9,392m

Anicut rehabilitation:

2 sites

The map of the above facilities and irrigated area is given in Fig. 5.3.1 and 5.3.2. A simple irrigation system layout is indicated in Fig. 5.3.3. Irrigation system layout as envisaged under the scheme is indicated in Figs. 5.3.4 and 5.3.5.

(3) Implementing Agencies

Irrigation Department

Agrarian Service Department

5.3.3 Minor Irrigation Scheme

(1) Objective

Of the existing 750 minor irrigation scheme sites (5,900ha.), 70 sites require urgent rehabilitation due to highly superannuated and damaged facilities (Table 5.3.1).

(2) Scheme Components

As indicated in the breakdown of minor irrigation scheme facilities shown in Table 5.3.1, anicuts are located at 56 sites, tanks at 8 sites and regulators at the remaining 6 sites. Anicuts account for 79% of the sites.

(3) Implementing Agency

Agrarian Service Department

5.3.4 Minor Flood Protection Scheme

(1) Objectives

A 36km stretch of the Kelani river, including 1,892ha. of farmland on the right bank is subject to inundation damage by backwater during river flooding. Due to superannuated and damaged facilities, the existing backwater sluices at 15 locations are inoperable, and the natural river flood level prevails.

The minor flood protection scheme is aimed at eliminating flood damage in the above 1,892ha. of farmland, thereby permitting stabilized production and increased yield of paddy rice.

(2) Project Components

Backwater sluice rehabilitation is to be carried out at 15 sites. A breakdown of these rehabilitation works is given below (see Table 5.3.2).

Gate rehabilitation:	13 sites (47 gates)
Sluice structure rehabilitation:	13 sites
Spillway rehabilitation:	3 sites
Embankment rehabilitation:	5 sites
Drainage canal rehabilitation:	10 sites

(3) Implementing Agency

Irrigation Department

Fig. 5.3.1

Existing Irrigation System of Upstream
Anicut -- Attanagalu Oya

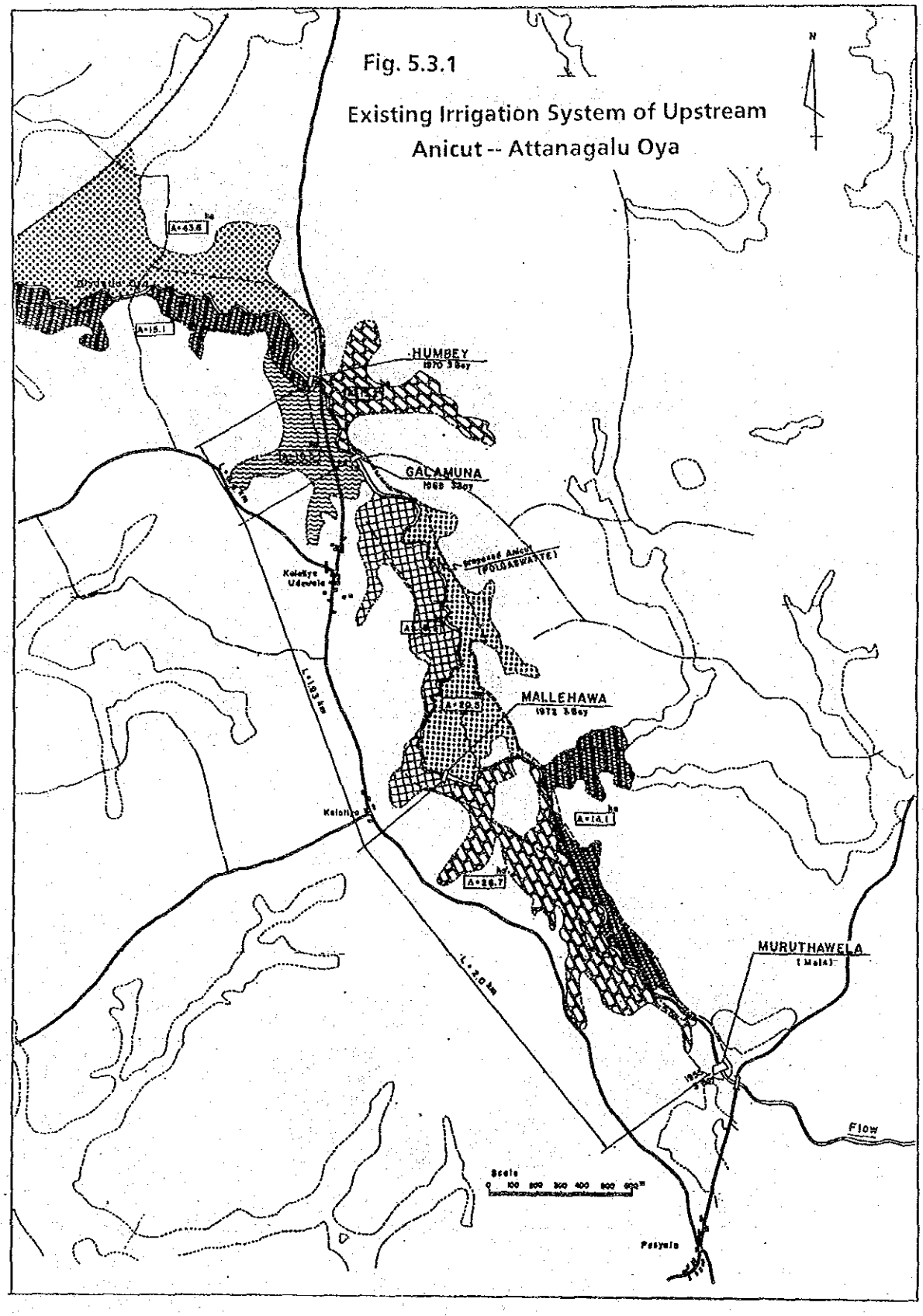


Fig. 5.3.2 Existing Irrigation System in the Morenna Area

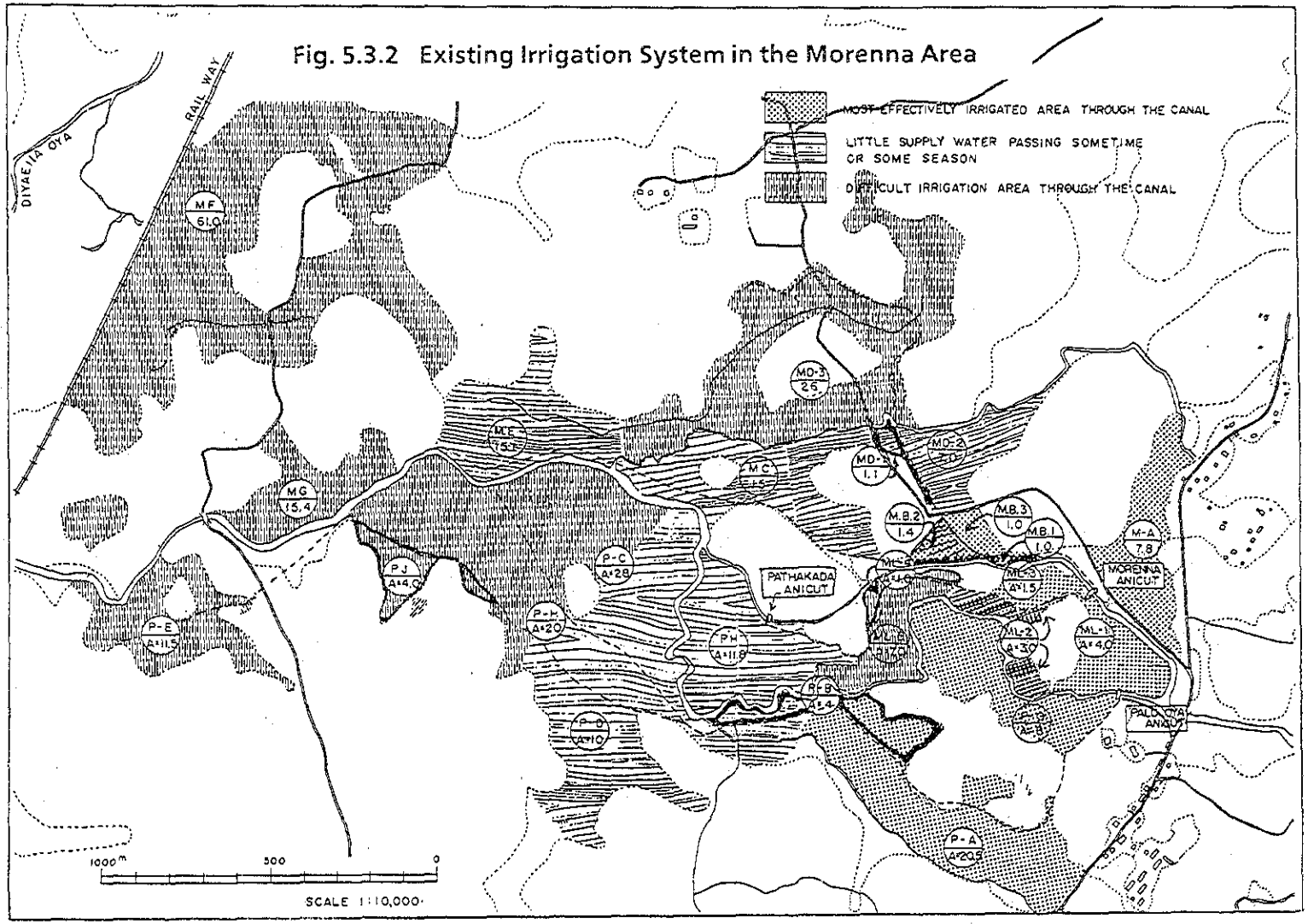


Fig. 5.3.3 Diagram of Existing Irrigation System in the Morenna Area

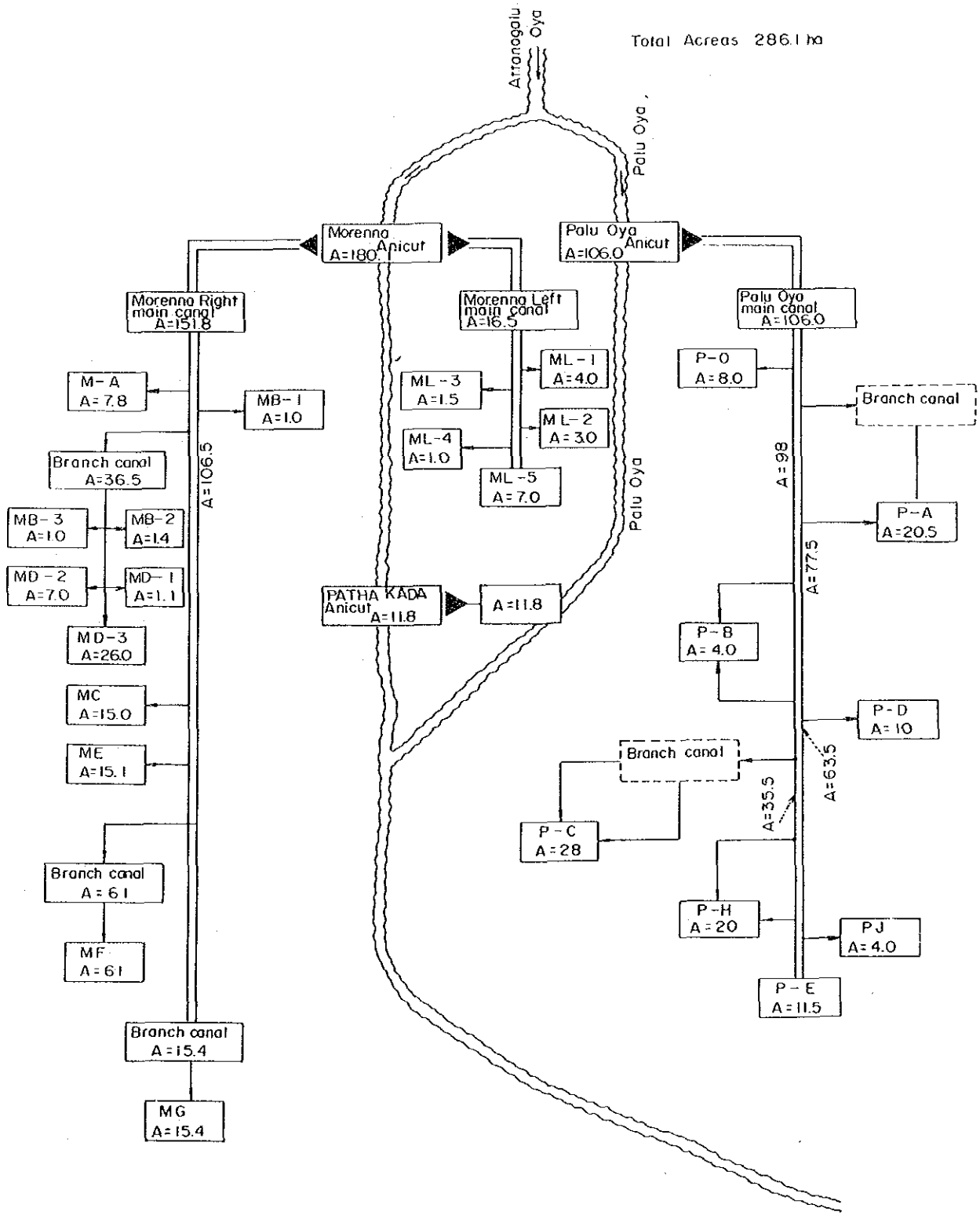
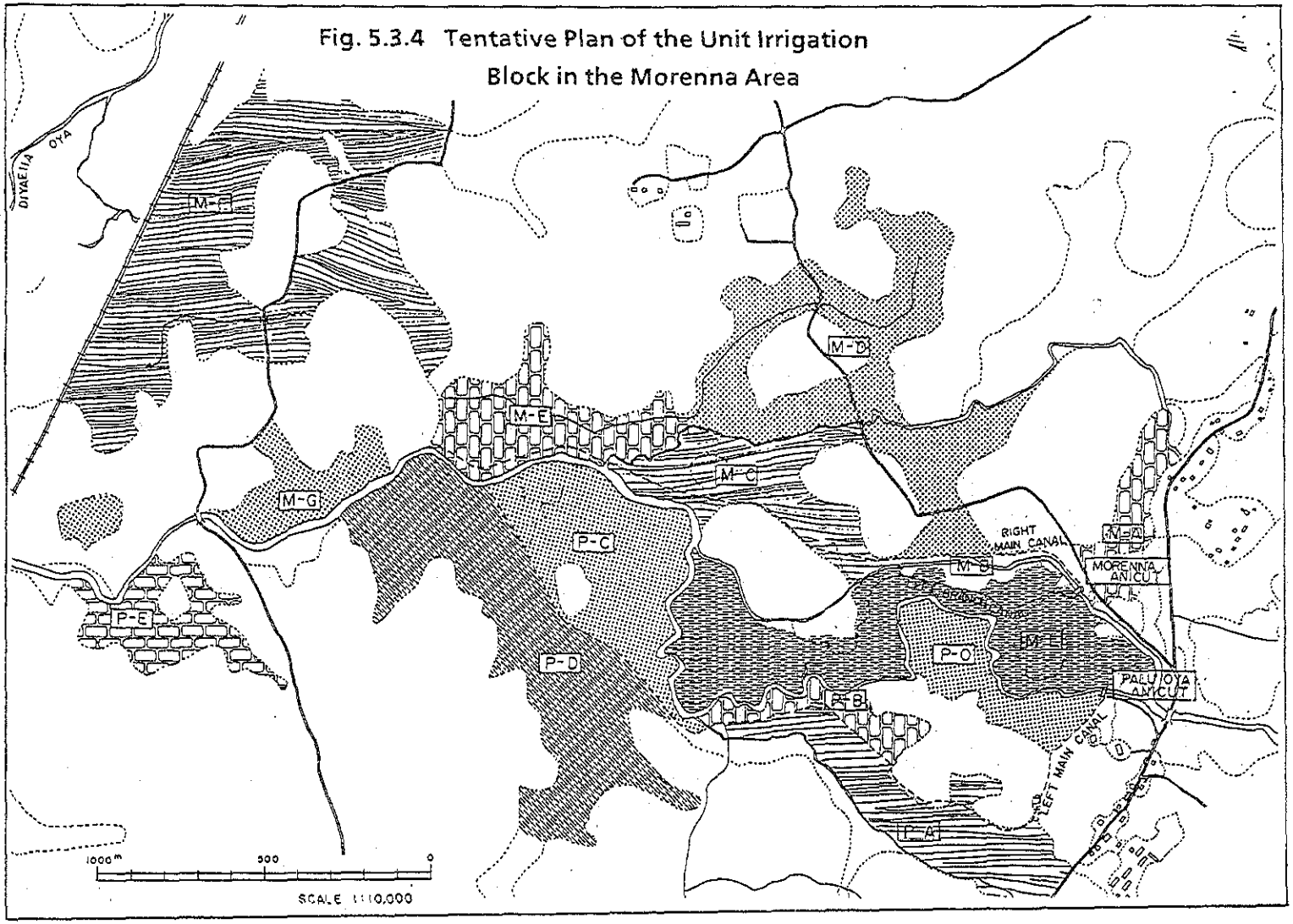


Fig. 5.3.4 Tentative Plan of the Unit Irrigation Block in the Morenna Area



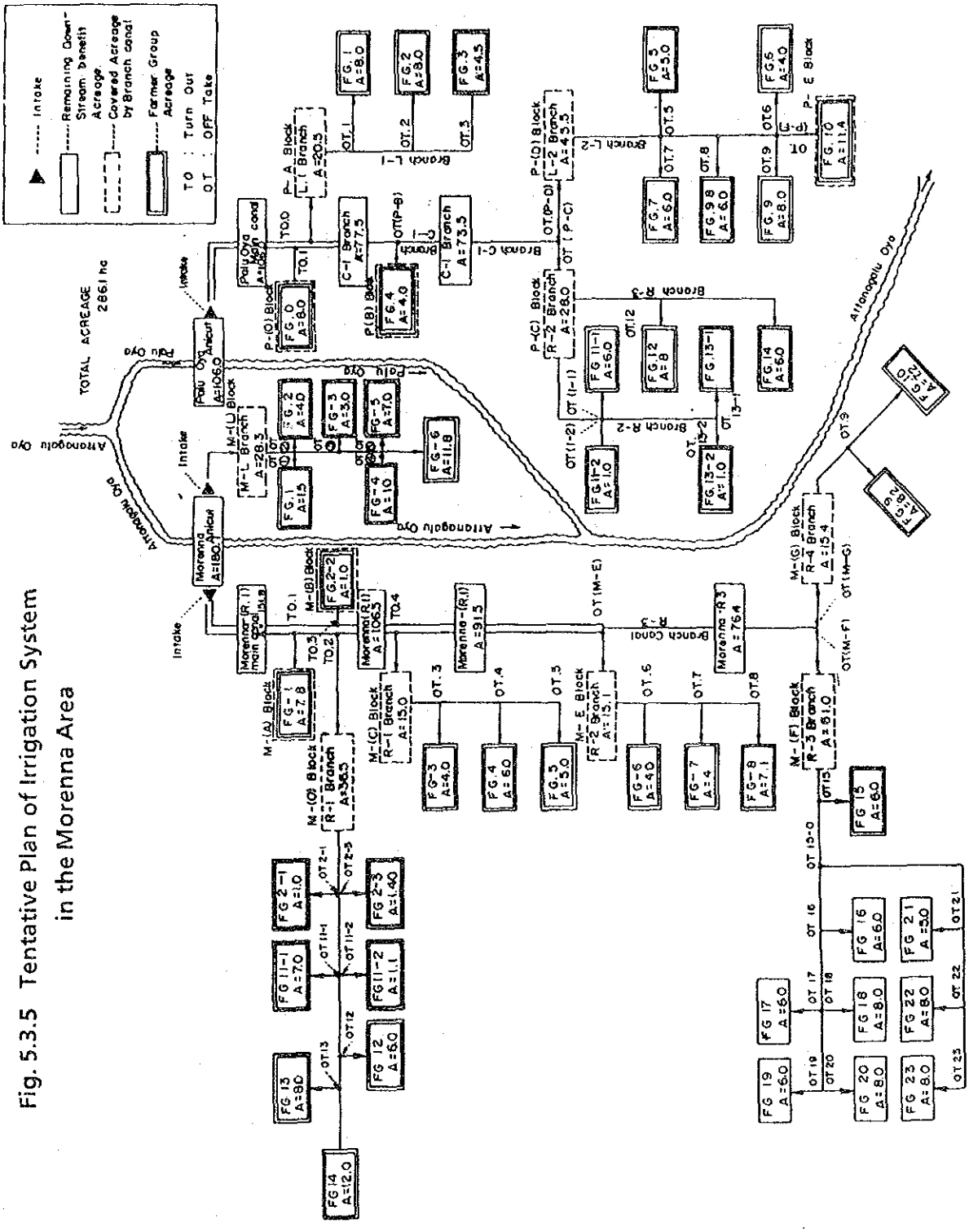


Fig. 5.3.5 Tentative Plan of Irrigation System in the Morenna Area

Table 5.3.1 Salient Features of 70 Priority Minor Irrigation Schemes

Name of Facility	Ani Cut	Tank Other	Average Benefit	No. of Cultivator	Repair Works Gate	Anicut	Others
1. Nahitiyawa	A		18	24	0		
2. Horagasmulla	A		12	18	0		
3. Unamuwa	A		16	39	0		
4. Gonahena Mada	A		12	11	0		
5. Udupila Maha	A		12	22	0		
6. Kalutara Ela	A		26	80		0	
7. Kolondawa	A		19	152	0		
8. Bandarawela	A		8	21	0		
9. Kandurugaha		T	34	200		0	1)T
10. Peralanda		T	20	42			T
11. Wile	A		17	90		0	
12. Gal	A		4	41	0		
13. Thalawatuhenpita Mahara Mudun Ela	A		28	20			
14. Eriyawetiya Ela		E	21	18			2)E
15. Hekitta Madangamawela Ela		E	12	25			E
16. Kurukalawa Kanattapara Ela		E	12	30			E
17. Digaha No. 2	A		8	25	0		
18. Digaha No. 1	A		12	86	0		
19. Beeru Gala	A		9	40	0		
20. Pirisyala	A		6	22	0		
21, Pallewela Halela	A		12	41	0		
22. Galgamuwa Kuda	A		12	71	0		
23. Heediwela		T	45	485			T
24. Waliwela	A		8	15	0		
25. Kottunna Maha	A		20	50		0	
26. Galahitiyawa	A		30	127	0		
27. Gorakawela	A		6	15	0		
28. Ambagahakumbura	A		12	30	0		
29. Kammalwatta Golummahara	A		20	50	0		
30. Madarawa No. 3	A		9	46	0		
SUB TOTAL	24	3 3	480	1,936	20	4	T: 3, E: 3

Note 1) T: Tank
Note 2) E: Ela

Table 5.3.1 (Continued)

Name of Facility	Ani Cut	Tank Other	Average Benefit	No. of Cultivator	Repair Works Gate	Anicut	Others
31. Nanathatakaya	A		20	60	0		
32. Bulugaha	A		8	10	0		
33. Katapitiya	A		19	80	0		
34. Moonalgaha	A		12	40	0		
35. Galkaranda No. 1	A		16	60		0	
36. Galkaranda	A		20	60		0	
37. Welikumbura		T	5	18			T
38. Heenwana	A		9	28	0		
39. Peragasowita	A		11	24	0		
40. Kuniwila Ela		E	75	170			E
41. Dandeniya Ela		E	24	92			E
42. Impana Ela		E	10	50			E
43. Buwakgahadeniya		T	7	42			T
44. Gonnagaha Ela	A		12	57		0	
45. Sri Pada No. 1	A		16	50	0		
46. Sri Pada No. 2	A		24	45	0		
47. Welagana Damwalkauwa		T	14	60			T
48. Bolagala		T	18	9			T
49. Thammita No. 1	A		14	32	0		
50. Thammita No. 2	A		16	38	0		
51. Erabaddu Muruthagahaowita	A		8	9	0		
52. Russapanawatte (New)	3)A		10	10		4)0	
53. Peragasowita	A		12	37	0		
54. Apalawatta	A		2	7		0	
55. Dadagamuwa		T	8	61			T
56. Nadungahamula	A		16	35		0	
57. Welekade	A		16	60		0	
58. Galbatta Kumbura (New)	(A)		13	32		(0)	
59. Udammita Hubutiyawa	A		55	380		0	
60. Cilmapamula	A		12	37		0	
SUB TOTAL	22	5 3	502	1,693	12	10	T: 5, E: 3

Note 3) (A) : New anicut
Note 4) (O) : New anicut

Table 5.3.1 (Continued)

Name of Facility	Ani Cut	Tank Other	Average Benefit	No. of Cultivator	Repair Works Gate	Anicut	Others
61. Meegaspitiya	A		10	35		0	
62. Kandana Kambura	A		8	15		0	
63. Kataroope	A		14	80		0	
64. Gal Amuna	A		4	15		0	
65. Pansala Langawela	A		10	18		0	
66. Puwakpitiyayaya	A		5	8		(0)	
67. Nugayaya	A		6	22		(0)	
68. Kirindiwela oya	A		8	30		0	
69. Hanwadiweli	A		14	37		0	
70. Pahala Biyanwilayaya	A		12	50		(0)	
SUB TOTAL	10		91	310		10	
TOTAL	56	8 6	1,073	3,939	32	24	T: 8, E: 6
AVERAGE	% 79	% 11 % 10	15.3	56			

Note 3) (A) : New anicut
Note 4) (O) : New anicut

TABLE 5.3.2 MINOR FLOOD PROTECTION SCHEME

No.	Name of Scheme	Average Benefited	Method of Lifting	No. of Bays	Gate Size	Actual Conditions	Rehabilitation Works				
							Replacing Gate	Structure	Spill	Bund	
1.	Sanasungoda	141.6	Filap	7	1.21x1.52	Gates not in order	7	0	0	0	wall
2.	Pugoda	108.5	- do -	8	1.82x1.21	- do -	8	0	0	0	wall
3.	Nikawala	91.1	Screw type & Filap	6	1.21x1.82	- do -	6	0	-	-	wall
4.	Kapugoda	137.6	- do -	5	1.82x1.21	- do -	5	0	-	-	wall
5.	Modarakada	95.9	Screw type	2	1.82x1.21	- do -	2	0	-	-	o
6.	Yattowita	87.0	- do -	2	1.82x1.21	- do -	2	0	-	-	o
7.	Kadatiyawatta	93.5	Filap	2	1.37x1.82	- do -	2	0	-	-	improve
8.	Mora Ela	88.2	- do -	2	1.52x1.37	- do -	2	-	-	0	improve
9.	Malwana Pahuru Oya	643.1	- do -	6	1.52x1.21	- do -	6	0	0	0	wall
10.	Nagahawatta	121.4	- do -	3	0.91ø	Working order	-	0	-	-	improve
11.	Yabaraluwa	80.1	- do -	3	0.91ø	- do -	-	0	-	-	improve
12.	Kokkaluwila	74.9	Screw	3	(0.6x0.6(1) (0.91x1.06(2)	Gates not in order	3	0	-	0	o
13.	Pattiwila Amung	111.3	Screw & Filap	2	(1.37x1.82(2) 0.45ø	- do -	2	0	-	-	improve
14.	Bollegala Pelawatta	8.5	Filap	1	1.21x1.21	- do -	1	0	-	-	o
15.	Koskumbura	9.3	- do -	1	0.91x0.6	- do -	1	-	-	-	improve
	TOTAL	1,892.0									

o: only rehabilitation of wall
wall: Rehabilitation of wall & Structure
improve: Improvement of channel

5.4 Development of Rural Industries

5.4.1 Scheme for Improvement of Vocational Training Programs

(1) Objective

The Department of Small Industries maintains 58 training and production centers for small industries in Gampaha district. These include 8 carpentry centers, 2 centers for light industries, 4 for ceramics, 10 for coir, and 3 for hand looms. The scheme aims to rehabilitate and strengthen center facilities to upgrade their training capabilities and the quality of goods produced.

(2) Project Scale

1) Walagoda Ceramic Center

Rehabilitation of structure and appurtenant facilities; supply of truck and machinery

2) Katunayake Coir Center

- Modernization of dying facilities; supply of truck
- Provision of fiber knitting machine
- Provision of laboratory and test equipment
- Modernization of packing equipment

3) Mahara Handloom Center

- Provision of high pressure weaving equipment
- Strengthening of laboratory and design center facilities
- Establishment of new finishing plant

4) Weke and Weboda Light Engineering Center

- Supply of tools, lathe, etc.
- Rehabilitation of structure and appurtenant facilities

5) Bamboo and Rattan Industry Center
(to be newly established under project)

- Structure and electrical facilities
- Supply of machinery and equipment
- Supply of truck

(3) Implementing Agency

Department of Small Industries

5.5 Development of Human Resources

5.5.1 Scheme for Improvement of Core Schools

According to "A Plan for the Development of Facilities of the School System, 1986" published by the Ministry of Education, the Government has focused emphasis on science and agronomy related education. In order to contribute to realization of this goal, this scheme will provide new educational facilities, rehabilitate existing ones, and supply pertinent classroom equipment. Facilities indicated below will be provided.

a) Science units and laboratories
b) Agronomy units
c) Home science units
d) Music, dance units
e) Computer training facilities
f) Classrooms, toilet facilities, well/water service facilities, workshops
g) Teacher accommodations at isolated schools

Facilities will be planned bearing in mind the future curriculum emphasizing sciences (physics, chemistry, botany, zoology), agronomy, and home science. Under short-term planning, this will be carried out for the 26 designated core schools of the cluster system.

5.5.2 Scheme for Establishment of Vocational Training Center

(1) Objective

In order to promote employment opportunities for youth, vocational training will be implemented in the following fields within which demand for personnel is expanding.

a) Electronic engineering
b) Repair of refrigerators, air conditioners, etc.
c) Repair and assembly of electrical appliances
d) Computer technology
e) Video film manufacture technology
f) Repair of radios and audio equipment

Table 5.5.1.1 Equipment for Core Schools

AGA Division		Core School	Science Unit		Agricultural Unit		Home Science Unit	
			Equipment	Building	Equipment	Building	Equipment	Building
BIYAGAMA	1	Biyagama M.M.V.	○	○	○	×	○	○
	2	Daranagama M.V.	○	○	○	○	○	×
	3	Sapugaskanda M.V.	○	×	○	○	○	×
WEKE (DOMPE)	4	Kirindiwela M.M.V.	○	×	○	×	○	○
	5	Dekatana Padmawathic M.V.	○	×	○	○	○	×
MIRIGAMA	6	Mirigama D.S.S. M.M.V.	○	○	○	○	○	×
DIVULAPITIYA	7	Divulapitiya M.V.	○	○	○	○	○	○
NEGOMBO	8	St. Mary's M.V.	○	○	×	×	×	×
	9	Harischandra M.V.	○	○	○	○	×	×
KELANIYA	10	Dharmaloka M.V.	○	×	○	○	○	×
KATANA	11	Timbirigaskatuwa M.V.	○	×	○	×	○	×
GAMPAHA	12	Madduma Bandara M.V.	○	○	○	○	○	×
	13	Yakkala C.M.V.	○	○	○	○	○	○
	14	Galahitiyawa M.M.V.	○	○	○	×	○	○
MAHARA	15	Kadawatha M.V.	○	○	○	○	○	○
	16	Kendaliyaddapaluwa M.V.	○	○	○	○	○	×
WATTALA	17	Mattumagala K. M. V.	○	○	○	○	○	○
	18	St. Anthony's M.M.V.	○	○	×	×	×	×
	19	Gorsalwes M.V.	○	×	○	○	○	
	20	Good Shepherd's Convent Nayakkanda	○	○	×	×	○	×
JA-ELA	21	St. Sebastian M.V.	○	○	○	○	×	×
	22	Batuwatta M.V.	○	×	○	○	○	×
	23	Christ King College Tudella	○	○	○	○	×	×
ATTANAGALLA	24	Nittambuwa S. M.V.	○	○	○	○	○	○
	25	Urapola	○	×	○	×	○	○
MINUWANGODA	26	Japalawatta M.V.	○	○	○	○	○	○
Total			26	17	23	18	21	10

(2) Course Layout

Number of students, course length and graduation level for the envisioned courses are indicated in the table below.

	No. of Students	Duration	Level of Study
Electronics Engineering	50	2 years	Diploma course
Techniques to repair Refrigerators and Air Conditioners	25	1year	Certificate course
Techniques to repair and assemble electric appliances	25	1 year	Certificate course
Computer Technology Engineering Programming	 50 50	 2 years 1 year	 Diploma Course Certificate Course
Video Film Production Junior classes Senior classes	 25 25	 6 months 1 year	 " "
Techniques to repair Radio and Acoustic Engineering	25	6 months	"
Total	275	-	-

(3) School Site

Two vocational training schools are to be constructed in Gampaha district since there are many jobless youth and demand for technicians is high. Approximately 2.8 ha are available at Yakkara in Gampaha AGA division in the center of the district as one school site. The second site is to be determined through subsequent survey and study.

(4) Technical Cooperation

The envisaged courses at the vocational training school represent fields within which instructors are in short supply in Sri Lanka. Consequently, international technical cooperation would be necessary to help provide qualified teaching personnel.

5.6 Development of Social Infrastructure

5.6.1 Scheme for Improvement of Road Maintenance System

(1) Provision of Road Construction Machinery at the District Level

At present, heavy construction equipment is jointly shared at the regional level. As the same machinery must be mobilized for numerous road maintenance sectors, access for utilization within Gampaha district specifically is extremely limited. This places a constraint on the effective execution of road maintenance in the district.

In order to remedy this situation, heavy construction equipment must be provided to the Chief Engineer's Office. The machinery indicated in the table below would constitute the minimum requirement.

TABLE 5.6.1.1 EQUIPMENT FOR DISTRICT LEVEL

Machine	No.	Remarks
1. Motor Grader	1	With a 12ft mold board, 20"wide
2. Backhoe Machine	1	Mounted on a heavy duty industrial tractor with a loading bucket in front for drain cutting
3. Tipper	2	3 tons
4. Metal Crasher	1	10 tons per hour, upto 20mm rotary screen

(2) Provision of Road Construction Machinery at the AGA Division Level

There are 4 Executive Engineer's Offices and 30 Road Maintenance Depots at the AGA division level. Eventually, adequate construction machinery will be required at all road maintenance depots; however, for the immediate future machinery would be provided to the 4 Executive Engineer's Offices under the scheme. The minimum equipment requirement is indicated in the table below.

TABLE 5.6.1.2 EQUIPMENT FOR DISTRICT LEVEL

Machines	No.	Remarks
7 ton Vibrating Tandan Roller	4	1 unit for each Executive Engineer's Office
750kg Double Drum Pedestrian Roller	4	"

These equipments are utilized not only for paved roads but for rural gravel road maintenance.

5.6.2 Rural Electrification Scheme

Under short-term planning, electrification rate at the GS level would be upgraded to 65%. The scheme proposes installation of 50km of high tension transmission line, and 200km of low tension transmission line and appurtenant facilities.

Implementing agencies would be Gampaha district office, CEB and LECO.

Details of transmission and distribution line routing would be determined by a committee consisting of representatives of the district office, CEB and LECO.

5.6.3 Telecommunications Development Scheme

Under short-term planning, the current telephone coverage rate of 0.14 units/ 100 persons would be improved to 0.54 units/ 100 persons. The coverage rate for public telephones would be upgraded to 0.2 units/ 1,000 persons.

The scheme would require construction of 250km of telephone cable, and installation of public telephones at 100 locations. The implementing agency would be the Sri Lanka Telecommunication Department. Details on cable routing would be determined by a committee comprising representatives of the Gampaha district office and the SLTD.

5.6.4 Scheme for Monitoring and Improvement of Shallow Wells

(1) Water Quality Survey

Water quality analysis for all shallow wells in Gampaha district would be carried out by a mobile water testing unit to determine water potability.

(2) Well Water Purification

Well water purification measures would be implemented at wells where water is not suitable for drinking. This would be particularly important for wells which are located in areas of concentrated human activity, i.e. public meeting places, hospitals, schools, markets, etc. Purification method would be by simple sterilizer (for example, chlorinators) to be installed at wells for continuous purifying.

(3) Facilities

-	Mobile water testing unit	1 unit
-	Water testing equipment	1 set
-	Simple sterilizer	100 sets

5.6.5 Scheme for Improvement of Base Hospitals

Base hospitals are currently located in Gampaha city, Wattupitiwala city, and Negombo city. An equipment and materials supply project is underway with assistance from Japan,under which Negombo city hospital will be adequately outfitted by April of next year. Rehabilitation and strengthening of the remaining two base hospitals will be carried out under the scheme.

Principal scheme components are as follows:

a) Construction of medical examination rooms and outfitting of the same
b) Provision of premature baby care unit
c) Provision of intensive care unit equipment
d) Construction of mortuary and outfitting of the same with refrigeration equipment
e) Rehabilitation of sewage facilities
f) Rehabilitation of water service facilities
g) Construction of doctors accommodation

5.6.6 Scheme for Improvement of Divisional Health Care Program

Adequate preventive health care is of extreme importance. However, establishment of a primary health care complex including village health care centers would be highly costly and require a long implementation period. Of most immediate urgency is the need to establish bases for mobile health care service in areas where health care is most lacking.

For this purpose, divisional health centers would be created for the two areas discussed below, and said centers would be equipped with mobile health care units.

(1) Divulapitaya Divisional Health Center

The existing district hospital at Divulapitaya could serve as the site for a divisional health center. Adequate space is available on the hospital grounds to construct the necessary facilities.

Although Divulapitaya division has a population in excess of 100,000, it does not have a Medical Officer of Health (MOH), but rather is served by the MOHs of Mirigama, Minuwangoda and Kochichikade.

Such inconvenience would be eliminated through construction of the subject center which would contribute to upgrading the low BCG and infant immunization rates in the area as well as to reduce the high incidence of diarrhea and viral hepatitis.

The Divilapitiya district hospital is located at a major transportation crossroads and thus is easily accessible by the area population. If need be, joint activities could be readily carried out with the Negombo Base Hospital as well.

(2) Minuwangoda Divisional Health Center

Minuwangoda district hospital is located centrally in the division and would be capable of serving as a divisional health center. At present there is a health care clinic located separately from the hospital. Under the project an additional new clinic would be constructed adjacent to the said district hospital. Means of transportation would be provided to allow staff to carry out their health care activities in the villages. Supervisory bodies would be the Negombo and Gampaha Base Hospitals.

5.6.7 Scheme for Improvement of Social Welfare Facilities

(1) Water supply is by private well at the Mirigama welfare facilities for the elderly (Government run). However, water shortage occurs during the dry season when the well dries up. To remedy this, new water supply facilities by shallow well will be established.

(2) Five units of pedal-operated sewing machines would be provided to the vocational training facility at Seeduwa for mentally handicapped girls. Implementing agency would be the Ministry of Social Services.

CHAPTER 6

ESTIMATED PROJECT COST

6.1 Cost Estimate Criteria

Project costs for development schemes identified under the subject Master Plan were calculated on the basis of prices as of September 1986 (1st Phase Field Survey). Unit prices are in Sri Lankan rupees. Official exchange rates as of September 1986 were applied: US$1 = Rs28.0 = ¥ 160; Rs1 = ¥ 5.7

Scheme costs are not broken down into foreign currency portion and domestic currency portion.

6.2 Estimated Costs

Total estimated cost for the short-term schemes envisaged under the Master Plan is Rs 617.3 million. Estimated costs for each scheme are presented in Table 6.2.1.

Table 6.2.1 Estimated Cost of Short-Term Schemes

Development Objectives	Main Development Schemes	Estimated Cost (Rs)
Development of Agricultural Production	Agriculture Technology Demonstration and Transfer Scheme	42,275,000
	Minor Export Crops Promotion Scheme	53,683,000
	Scheme for Improvement of Agriculture Supporting System	19,044,000
	Scheme for Improvement of Agricultural Training System	63,516,000
	Livestock Development Scheme (Poultry Hatchery)	3,965,000
	Inland Fisheries Development Scheme	23,840,000

(continued)

Table 6.2.1 Estimated Cost of Short-Term Schemes

(continued)

Development Objectives	Main Development Schemes	Estimated Cost (Rs)
Development of Agricultural Infrastructure	Attanagalu Oya Irrigation Scheme (F/S)	50,000,000
	Morenna Model Irrigation Scheme	39,214,000
	Minor Irrigation Scheme	17,966,000
	Minor Flood Protection Rehabilitation Scheme	24,000,000
Development of Rural Industries	Scheme for Improvement of Vocational Training Programs	21,620,000
Development of Human Resources	Scheme for Improvement of Core Schools	28,356,000
	Scheme for Establishment of Vocational Training Center	40,997,000
Development of Social Infrastructure	Scheme for Improvement of Road Maintenance System	12,650,000
	Rural Electrification Scheme	59,600,000
	Telecommunication Development Scheme	49,600,000
	Scheme for Monitoring and Improvement of Shallow Wells	19,600,000
	Scheme for Improvement of Base Hospitals	34,237,000
	Scheme for Improvement of Divisional Health Care Program	12,950,000
	Scheme for Improvement of Social Welfare Facilities	200,000
Total		617,313,000

Note: Construction cost for project office is estimated at Rs. 6,062,000.

CHAPTER 7

PROJECT IMPLEMENTATION

7.1 Implementing Agencies

Agencies responsible for schemes are indicated in Table 7.1.1 on a scheme-wise basis. As integrated rural development covers numerous areas of endeavor, and as the Sri Lankan Government is a complex structure comprising 48 ministries, a wide range of agencies is involved under the Master Plan.

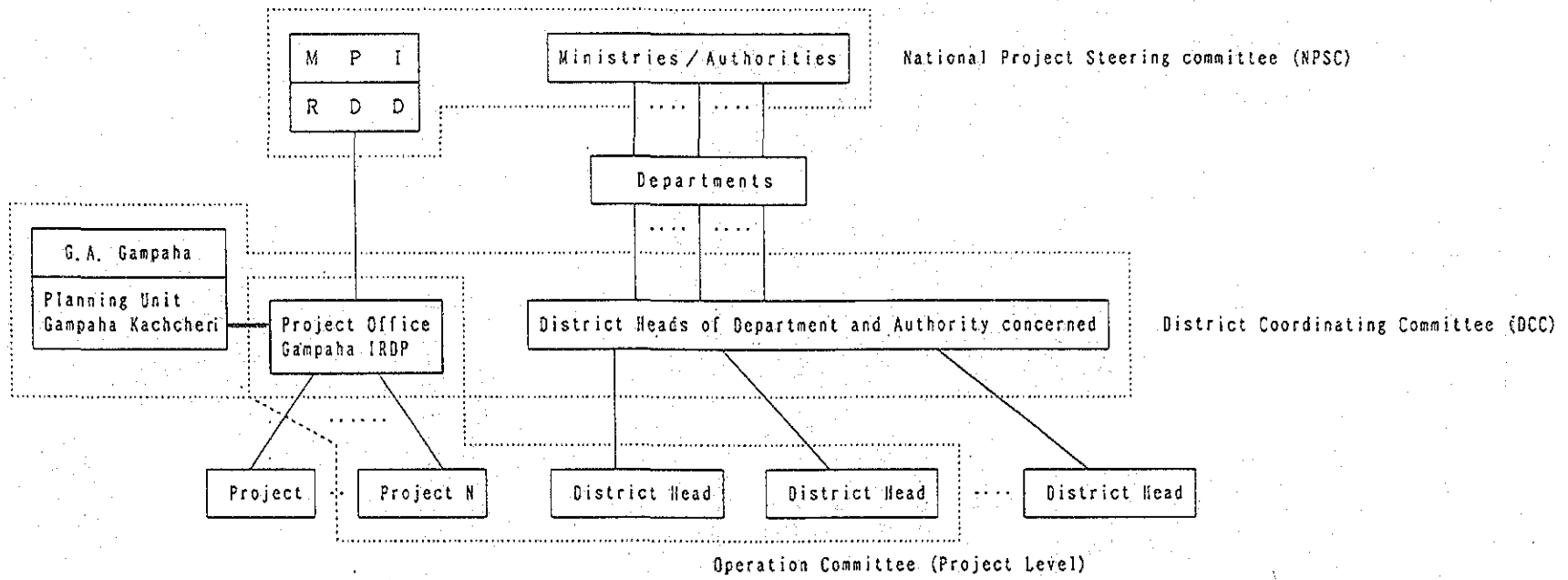
In order to effectively implement the Master Plan, an entity capable of coordinating these agencies is necessary. In the case of numerous other integrated rural development programs, the Ministry of Plan Implementation has performed this function, establishing a project office in the project area.

In the case of the subject Master Plan, an Integrated Rural Development Project Office, Gampaha will be established in Gampaha district under the Regional Development Division of the Ministry of Plan Implementation. A National Project Steering Committee (NPSC) will be formed at the national government level, a District Coordinating Committee (DCC) at the district level and Operation Committees for each individual scheme. These entities, in concert with the IRPD Office, Gampaha, will coordinate activities and facilitate communication among the various line agencies involved in project implementation.

7.2 Implementation Schedule

The implementation schedule for short-term planning is indicated in Fig. 7.2.1.

Fig. 7.1.1 Implementation Organization



Notes : MPI : Ministry of Plan Implementation
REE : Regional Development Division
G.A. : Government Agent

Table 7.1-1 AUTHORITIES RELATED TO SHORT-TERM SCHEMES

Development Objectives	Main Development Schemes	Relevant Office	
Development of Agricultural Production	Agriculture Technology Demonstration and Transfer Scheme	MADR MLLD	Agrarian Services Extension Services MEC Irrigation Dept.
	Minor Export Crops Promotion Scheme	MADR	MEC
	Scheme for Improvement of Agriculture Supporting System	MADR	Agrarian Services Extension Services
	Scheme for Improvement of Agricultural Training System	MADR	Training Center
	Livestock Development Scheme (Poultry Hatchery)	MRID	Livestock Dept.
	Inland Fishery Development Scheme	MF	Dept. of Inland Fishery
Development of Agricultural Infrastructure	Attanagalu Oya Irrigation Scheme	MLLD	Irrigation Dept.
	Morenna Model Irrigation Scheme	MLLD MADR	Irrigation Dept. Agrarian Services Extension Services MEC
	Minor Irrigation Scheme	MADR	Agrarian Services Extension Services
	Minor Flood Protection Scheme	MLLD	Irrigation Dept.
Development of Rural Industries	Scheme for Improvement of Vocational Training Programs	MRD	Small industries, Textiles
Development of Human Resources	Scheme for Improvement of Core Schools	ME MES	
	Scheme for Establishment of Vocational Training Center	MYAE MHE	

(continued)

Table 7.1-1 AUTHORITIES RELATED TO SHORT-TERM SCHEMES

(continued)

Development Objectives	Main Development Schemes	Relevant Office	
Development of Social Infrastructure	Scheme for Improvement of Road Maintenance System	MH	Road Development Dept.
	Rural Electrification Scheme	MPE	CEB LECO
	Telecommunication Development Scheme	MPT	SLTD
	Scheme for Monitoring and Improvement of Shallow Wells	MLGHC	National Water Supply and Drainage Board
	Scheme for Improvement of Base Hospitals	MH MWATH MIM	
	Scheme for Improvement of Divisional Health Care Program	MH MWATH MIM	
	Scheme for Improvement of Social Welfare Facilities	MSS	

MADR	Ministry of Agricultural Development and Research
MLLD	Ministry of Land and Land Development
MLGHC	Ministry of Local Government, Housing and Construction
MYAE	Ministry of Youth Affairs and Employment
ME	Ministry of Education
MES	Ministry of Education Service
MHE	Ministry of Higher Education
MH	Ministry of Health
MSS	Ministry of Social Services
MF	Ministry of Fisheries
MRD	Ministry of Regional Development
MT	Ministry of Transport
MH	Ministry of Highways
MRD	Ministry of Rural Development
MPT	Ministry of Posts and Telecommunications
MPE	Ministry of Power and Energy
MRID	Ministry of Rural Industrial Development
MWATH	Ministry of Women's Affairs and Teaching Hospitals
MIM	Ministry of Indigenous Medicine

Fig. 7.2-1 Implementation Schedule of Short Term Scheme

: Survey / study : Implementation/construction : Rainy Season B/D : Basic Design D/D : Detailed Design F/S : Feasibility Study

Development Objectives	Short-Term Scheme	1st Year	2nd Year	3rd Year	4th Year	5th Year	6th Year
Development of Agricultural Production	Agricultural Technology Demonstration and Transfer Scheme	Preparation B/D D/D Tender					
	Minor Export Crops Multiplication Scheme						
	Scheme for Improvementof Agriculture Supporting System						
	Scheme for Improvement of Agricultural Training System						
	Livestock Development Scheme (Poultry Hatchery)						
	Inland Fishery Development Scheme						
Development of Agricultural Infrastructure	Attanagalu Oya Irrigation Scheme (F/S)			Topographic Survey	F/S		
	Morenna Model Irrigation Scheme						
	Minor Irrigation Scheme						
	Minor Flood Protection Rehabilitation Scheme						
Development of Rural Industries	Scheme for Improvement of Vocational Training Programs						
Development of Human Resources	Scheme for Improvement of Core Schools						
	Scheme for Establishment of Vocational Training Center (2Nos)						
Development of Social Infrastructure	Scheme for Improvement of Road Maintenance System						
	Rural Electrification Scheme						
	Telecommunication Development Scheme						
	Scheme for Monitoring and Improvement of Shallow Wells						
	Scheme for Improvement of Base Hospitals						
	Scheme for Improvement of Divisional Health Care Program						
	Scheme for Improvement of Social Welfare Facilities						

CHAPTER 8

PROJECT BENEFITS

8.1 Outline

The Gampaha District Integrated Rural Development Project was envisaged to achieve three major goals: increase in agricultural production and farm income, expansion of employment opportunities and improvement of rural living standard. The sectoral development projects and component schemes were formulated accordingly. The various schemes were selected on the basis of maximum benefit technically and economically attainable within the restrictions of the physical environment, resource distribution and socio-economic conditions of the Study area.

Introduction of minor export crops and other upland crops supported by irrigation schemes and modern agricultural technology will increase productivity, farm income and employment opportunities, and eventually enable smallholders to make a living without depending on off-farm income. Improved education and vocational training will provide qualified manpower which will meet the needs of accelerated industrialization and urbanization. At the same time, improved water supply and augmented medical services at the Base Hospitals and Divisional Health Centers will improve health conditions in the rural areas. Prompt impact is envisioned from the major development schemes in the education and social infrastructure sectors.

The benefits derived from major and minor irrigation schemes and accompanying extension of modern agricultural technology and introduction of minor export crops will be measurable over the medium and long term. Benefits from education and social infrastructure schemes will accrue to various population segments, and methodology for measuring such benefits has not yet been established. These schemes may therefore be evaluated in terms of immediateness of effects, the extent of benefits and concurrency with national policies. The ultimate criterion for evaluation is whether or not living conditions in the rural area are directly improved.

8.2 Improvement of Agricultural Production and Farm Income

Introduction and extension of water management at the on-farm level and of systematic farming technology will promote improved yield and more intensive use of land including triple cropping of paddy field and intercropping in coconut fields. The present paddy yield of 3.1tons/ha will increase to 4.5tons/ha, and in addition, upland crops may also be cultivated in the paddy fields. Introduction of intercropping of minor export crops is aimed at income and employment generation. The combined effect of these programs is envisioned to result in an increase in the present annual net income of Rs5,240 to Rs9,553 for the average farmer in Gampaha cultivating 0.48ha or 1.2 acres of farmland. This would release such farmers from dependency upon off-farm employment.

Development of livestock and inland fisheries will also improve the cash income, as well as the nutritional standards of the area, making a significant contribution to improvements in rural living standards.

8.3 Employment Creation

Through improved school facilities and establishment of an advanced vocational training center, local manpower will be trained to take advantage of the opportunities in Gampaha, the most industrialized district in Sri Lanka. Workers with competitive skills represent potential small entrepreneurs who can establish their own enterprises, thus stimulating economic development at the grassroots level.

Extension of minor export and upland crops will result in the creation of approximately 25,000 new jobs in the agricultural sector. Private employment for supporting services and post-harvest activities such as quality control and marketing will also be increased. The same effect is envisioned in the livestock and inland fishery sectors as well.

8.4 Improvement of Living Standards

Improvement of the transportation network, electricity supply and telecommunication facilities will provide both direct and indirect benefits to area residents. These infrastructures will expedite urbanization and industrialization and improve agricultural production, thereby vitalizing the regional economy, particularly in areas of accelerated urbanization such as Gampaha.

The infant mortality rate will decrease as general health conditions in the area are ameliorated with the improvement of shallow wells and the consequent elimination of water-borne diseases. A further increase in health standards is envisioned with improvement of the medical services provided by the Base Hospitals and Divisional Health Centers.

The reliability of the labor force greatly depends upon general health conditions. Improvement of health standards in Gampaha will thus attract investors to establish local manufacturing plants, in turn generating more employment.

CHAPTER 9

SELECTION OF PRIORITY SCHEMES

9.1 Selection Criteria

Selection criteria for priority schemes are given below.

a) Degree to which scheme serves to increase agricultural production and expand employment opportunities: The primary objective of integrated rural development is to upgrade agricultural productivity and thereby improve farmer income and promote new employment opportunities.

b) Degree to which implementation of the scheme will serve as a foundation upon which subsequent integrated rural development schemes can be built: Priority projects identified under the Master Plan will constitute a first step to integrated rural development in Gampaha district, and as such these schemes must be formulated so that they can be expanded upon by later projects.

c) Degree to which prompt implementation is desirable within the framework of IRDP

d) Degree to which scheme benefits accrue to as broad a spectrum of population as possible

e) Degree to which scheme will yield ripple effect to entire district.

f) Degree to which urgency is required for realization.

g) Rapidity of realization of scheme benefits

h) Degree to which scheme is congruent with overall development planning of the national and Gampaha district governments.

9.2 Selection of the Priority Projects

The principal target of Gampaha's IRDP aims at increasing rural income and employment opportunity so as to improve and alleviate imbalances in rural living conditions. Selection of the priority projects from the short-term program is based on selection criteria, and the prospect of multiple effect in combination with other projects.

The schemes to improve rural income are the minor export crops nursery center to provide seedlings for intercropping in coconut field, and the agricultural technology demonstration and transfer scheme. These two schemes are not sufficient to achieve extension throughout the district, and therefore the establishment of a model area in the district to demonstrate the new cultivation

practices is needed. Improvement of existing agricultural supporting services for extension, and strengthening of the educational and training institute for extension workers is also needed.

The agricultural production improvement model project is composed of the above mentioned schemes. Multiple effect will be expected if these five schemes are implemented at once.

An additional 25,000 man-days of employment would be created from the agricultural production improvement model project. The effective development of rural industries awaits further detailed study. Although not directly creating employment opportunities it is considered important to upgrade the educational level of labor through improvement of educational facilities at 26 core schools. This is designated as one of the high priority short-term schemes.

Improvement of social infrastructure puts first priority on improvement of base hospitals, the standards of which are below the national average, and on studying the degree of shallow well pollution from organic waste and counter measures therefor.

As has been mentioned, priority projects cover three broad sectors and include:

(1) Agricultural production improvement model project

- a) Agricultural technology demonstration farm and agricultural technology transfer scheme
- b) Minor export crops seedling production scheme
- c) Farmers supporting system strengthening scheme
- d) Agricultural education and training institute strengthening scheme
- e) Morenna Model Irrigation Area Rehabilitation scheme

(2) Human resources scheme

- a) Improvement of educational facilities (26 core schools)

(3) Social infrastructure

- a) Improvement of two base hospitals
- b) Establishment of water quality check system and water quality improvement of shallow wells

Table 9.2.1 Selection of Priority Projects

	Development Scheme	Location/Responsible area	Basis of selection	Cost	Beneficiaries	Project Benefit
Development of agricultural production	Minor Export Crops Promotion Scheme: - nursery farm of 3 ha - irrigation facilities (water source, pipeline) - office and training rooms - agricultural machinery	Walpita (Divulapitiya)/entire Gampaha district	1. Increasing agricultural production is the first priority and in order to achieve this intercropping of export crops in the coconut field occupying 75%of the farmland will be carried out. 2. Marketable and farmers income generation directly 3. Inaugulate in early stage of the scheme 4. Labor intensive and increases employment opportunity in rural area. 5. National 5 years investment program puts high priority on the development of minor export crops.	(Rs. Million) 53.6	- 165,000 farmholders of entire district - increase of 19,000 employment opportunities	- Higher cropping intensity yields maximum benefit from the farm. - Labour intensive cultivation yields greater employment opportunities - Post harvest work yields additional value - Ripple effect could be expected in the field of agro-based industry and marketing.
	Agricultural Technology Demonstration and Transfer Scheme: - paddy and upland field land consolidation (10ha) - irrigation facilities - road construction - offices and training rooms - vehicle - agricultural machinery	Morenna(Gampaha)/Ambe-pussa (Mirigama)	1. In order to introduce new technology, demonstration and practical cultivation with training are required. 2. Demonstration and training are indispensable for new agricultural technology extension. 3. Crop diversification is required for Gampaha farmers as early as possible and the scheme carries out testing, demonstration and extension of the crops to be introduced.	42.2	- all farmers in Gampaha	- Agricultural production demonstration - Demonstration of new agricultural technology and cultivation practices - Demonstration of crop diversification - Stimulating of agricultural production activities
	Morenna Model Irrigation Scheme - rehabilitation of anicuts and irrigation facilities - irrigated area: 450 ha - new construction of canal infrastructure	Morenna (Gampaha)	1. In order to introduce new agricultural technology for introduction of upland crops in paddy field, establishment of model area equipped with irrigation and drainage facilities is required. 2. Located in the center of Attanagalu Oya Irrigation Scheme and near to National highway A-1 which is effective for demonstration. 3. Located at uppermost reaches of Attanagalu Oya and can be undertaken independently from Attanagalu Oya Irrigation Rehabilitation Scheme. 4. Will serve as land consolidation model for other districts.	39.2	- Benefitted area of 450ha - Beneficiaries total 500 farmers	- Block Demonstration Scheme and ATDTC scheme improve agricultural production - Plays a role as model for paddy field crop diversification - After improvement of agricultural infrastructure, irrigation water is distributed to farms thereby contributing to agricultural production
	Scheme for Improvement of Agriculture Supporting System - vehicles for extension services	26 offices of entire Gampaha district	1. Activities realized in the agricultural technology demonstration farm and Morenna Model Irrigation area will be extended to entire district. 2. Provision of agricultural inputs 3. Needed for extension activities in Morenna Model Irrigation area.	19.0	- all farmers inclusive of part time farmers	- Agricultural supporting services will be strengthened with mobility - Extension works activated in cooperation with ATDTC. - Agrarian service centers are improved
	Scheme for Improvement of Agricultural Training system - office and training wards - office supplies - vehicles - agricultural machineries - field development for 3 ha	Walpita and Ambepussa(Divulapitiya and Mirigama)	1. Required for increasing the number of extension workers and their quality improvement. 2. Development of new agricultural technology and extension work. 3. Education and retraining of the extension workers should be carried out as early as possible.	63.5	- all farmers inclusive of part time farmers	- Educational and training curriculums are improved. - Number of extension and farmer trainees is increased, and extension work is activated. - Training in upland irrigation agriculture is provided. - Technical level of extension workers is improved.

Selection of Priority Projects

	Development Scheme	Location/Responsible area	Basis of selection	Cost	Beneficiaries	Project Benefit
Development of human resources	Scheme for Improvement of Core Schools - facilities and equipment for scientific, agricultural, and home scientific courses.	26 core shcools over entire district.	1. In accordance with the national educational program, aims at levelling up of scientific courses and improvement of educational facilities of schools. 2. As basic knowledge for vocational training, level up of scientific courses is required 3. Youths of rural area will acquire better pay conditions in industries.	28.3	- all students of Gampaha who avail themselves of these facilities	- Scientific educational level of high school students is improved. - Basic level of vocational training is improved. - Graduates can meet higher recruiting conditions - Will help prevent the student flow to Colombo
Development of social infra-structure	Scheme for Improvement of Base Hospitals - improvement of medical laboratories and equipment - provision of premature baby care unit - provision of intensive care unit equipment - construction of mortuary and outfitting of the same with refrigeration equipment - rehabilitation of sewage facilities - rehabilitation of water service facilities - construction of doctors accomodation	Gampaha and Wattupitiwala (Gampaha and Attanagalla)	1. Medical care level of Gampaha district is lower than the national average. 2. Highest priority for improvement of medical facilities in the district is placed on the two base hospitals in order for them to function satisfactorily as soon as possible. 3. National 5 year Investment Program also plans improvement of medical facilities.	34.2	two thirds of the population (one million) of Gampaha district	- Negombo Hospital was improved in 1986, and improvement of additional 2 base hospitals would be achieved. - Improvement of medical facilities improves medical standards. - Upper level facilities of the PHC Complex are improved.
	Scheme for Monitoring and Improvement of Shallow Wells - water quality testing vehicle - chemical agents - simple sterilizer - water quality test	Gampaha/entire district	1. Many shallow wells have been contaminated by sewage. 2. Water quality of shallow wells of entire district is to be tested, and wells equipped with simple sterilizers to supply safe water. 3. Wherever special improvement is required after the water quality testing throughout the district, piped water supply projects will be considered.	19.6 Total Rs 299.9 million	Population throughout district utilizing shallow wells	- Pollutive situation of entire district can be grasped from basic data for purposes of water supply administration. - Present pollutive situation in GCEC and adjoining areas is clarified. - Residents can recognize safe domestic water supply.

CHAPTER 10

IMPLEMENTATION PLAN FOR PRIORITY PROJECTS

10.1 Model Project for Improvement of Agricultural Production

The model project for improvement of agricultural production consists of the 5 schemes set out below. Short-term objectives for improved agricultural production are to be achieved through the integrated implementation of the said schemes.

1) Agricultural technology demonstration and transfer scheme (strengthening and diversification of agricultural production)

2) Minor export crop promotion scheme (intercropping in coconut fields)

3) Scheme for improvement of farmer support system (strengthened support to farmers)

4) Scheme for improvement of agricultural training system (strengthened training for farmers and agricultural extension workers)

5) Morenna model irrigation scheme (farmer level demonstration in the Morenna model area)

10.1.1 Agricultural Technology Demonstration and Transfer Scheme

(1) Background and Scheme Description

Upland field comprises a large portion of cultivated land in Gampaha district, and the principal upland crop has traditionally been coconuts. Paddy cultivation has been practiced since ancient times. As discussed in "(3) Paddy" of section 2.3.4, Chapter 2, expansion of level land for cultivation in the case of both paddy and upland agriculture is constrained by such factors as i) absence of virgin land in the district, ii) high population density due to proximity to urban center of Colombo and iii) average holding per household, i.e. 0.5 acres (0.21ha) in the case of paddy field and 0.7 acres (0.29ha) in the case of upland field, due to the traditional custom of equitable distribution of property to surviving family members in the event of owner's death, etc.

As a result of the above described constraints, increase of overall agricultural productivity must be achieved through increased productivity of already available cultivable land by conversion to higher yielding cropping patterns and technology. Said strengthening of land productivity is particularly important in terms of realizing the primary objective of integrated rural development, i.e. enhanced income for the rural population.

Introduction of new farm technology will be necessary to achieve improved land productivity. Due to the unfamiliarity of farmers and land holders with such technology, the creation of a mechanism to perform agricultural transfer technology will be required. The subject agricultural technology demonstration and transfer scheme has been formulated towards this end.

The agricultural technology demonstration and transfer scheme has as its specific objectives the following:

a) Improvement of cropping intensity and yield for paddy field:

- Improvement of cropping intensity through introduction (crop diversification) of upland crops such as beans, etc. to be cultivated between Maha and Yala seasons.
- Introduction of modern agricultural technology to improve land productivity.

b) Improvement of land use rate for upland field:

- Introduction of inter-cropping of general upland crops, fruits, minor export crops, etc. in coconut fields in order to improve land use rate.

Objectives are to be obtained through demonstration and transfer of cultivation technology pertaining to intercropping and crop diversification in both paddy and upland fields. The training and demonstration program for specific crops is to be conducted an average of 15 times per month during the relative cropping season, with 20~40 farmers attending each session. The said program will be directed at all farmers in the district.

The Government of Sri Lanka is composed of numerous organizational entities which often operate independently of one another. Within such a context, it becomes difficult to implement agricultural policy

in a consistent and focused manner. The envisioned agricultural technology demonstration and transfer scheme is accordingly designed to provide lateral linkage between various concerned agencies in pursuit of the common objective of increased farm production under the proposed integrated rural development. The organizational framework under the scheme will perform a guiding role in focusing the activities of the various involved agencies into a concerted and cooperative effort towards improvement of agricultural productivity and crop diversification. Objectives are to be achieved utilizing to the degree possible the institutional structure of existing agencies.

The agricultural technology demonstration and transfer scheme will provide the central organization framework for operation of the minor export crop promotion scheme, scheme for improvement of farmer support system, scheme for improvement of agricultural training system and the Morenna model irrigation scheme, all of which are to be implemented under the model project for improvement of agricultural production.

This type of demonstration and technology transfer scheme is under study by the Department of Agriculture for possible implementation nation-wide, and careful attention will be focused on the results of the program envisioned for Gampaha district as a model case.

Furthermore, under the subject agricultural technology demonstration and transfer scheme, research, guidance and extension will be performed towards upgrading home garden technology appropriate for the numerous small scale land holders in the district.

(2) Scheme Scale

1) Site Selection

A site for the agricultural technology demonstration and transfer scheme has been selected within the Morenna area in the center of the Attanagalu oya irrigation scheme area. This selection was made on the basis of such factors as i) central locality within the overall Gampaha district, ii) ready accessibility by national highway, iii) availability of irrigation water, iv) ease of land acquisition as site for required facility construction and field preparation.

The 2.1ha (5.2ac) of government-owned paddy field located directly downstream of the M-2 canal intake of the Morenna anicut will be acquired as model farm for intensive cultivation methods. Various facilities for agricultural technology transfer will be constructed at this site as well.

Approximately 5.8ha (14.5ac) of land in the government owned Ambepussa farm in the northern part of Gampaha district will be utilized as demonstration farm for upland crop cultivation.

2) Demonstration Farm

Demonstration farm will consist of two sectors: paddy field and upland field.

a) Paddy Demonstration Farm

Three types of paddy demonstration field are envisioned.

① Intensive Cultivation Method

2.1ha (5.2ac) of government owned land in Morenna area is to be utilized for demonstration of intensive cultivation in paddy field. At present this land is leased to farmers and is under cultivation. Said land is under the jurisdiction of the Land Reform Committee, with guidance to farmers provided by the Agrarian Services Department.

② Drainage Improvement Method

Drainage facilities will be improved for 3.5ha (8.6ac) of farmer owned land surrounding the intensive cultivation demonstration farm. Emphasis will be placed on farmer's self-help, with guidance provided under the scheme in construction operation and maintenance of drainage facilities.

③ Model Irrigation Method

Demonstration under this category will be aimed at the 450ha Morenna area which is one of 10 schemes composing the Attanagalu oya irrigation project. Said sector will be converted into a model irrigation area through rehabilitation of existing irrigation and drainage

facilities. The irrigation scheme will serve as a model for facility rehabilitation and irrigated agriculture in other portions of the Attanagalu oya irrigation project area.

With the exception of intake facilities, field preparation in this model area will be the responsibility of farmers themselves. However, guidance will be provided in farm management technology under the scheme through introduction of block demonstration, farmer organization for effective water management, etc.

The demonstration farm for intensive agriculture will be under direct management of the agricultural technology demonstration and transfer scheme.

b) Upland Demonstration Farm

In addition to paddy cultivation, demonstration and extension of cultivation technology for standard upland crops, fruits, pineapple, etc. are to be carried out under the project, 5.8ha (14.5ac) of land in the government owned Ambepussa farm is to be appropriated for utilization for upland cultivation demonstration.

3) Agricultural Technology Transfer Center

Said center will comprise the the technology transfer facilities other than model field. As discussed in section 5.2.1 of Chapter 5, the center will include facilities such as administrative, research, computer, laboratory, farm mechanical, etc. as required for technology transfer activities of experts in 7 agricultural sub-sectors.

4) Appurtenant Facilities

In order to carry out the intended functions of the scheme, permanent residency of experts is recommended. As a result, housing accommodation is planned proximate to the scheme site. Appurtenant electrical, communications, water service and parking facilities are also necessary.

5) Facility Scale

a) Paddy Model Farm : Morenna Area

Intensive agriculture model farm	2.1ha
Drainage improvement model farm	3.5ha
Morenna model irrigation area	450ha

(see section 10.1.5 for details on facilities)

b) Upland Model Farm : Ambepussa Area

Model farm	5.8ha
Irrigation facilities	1.7km pipeline; one set sprinkler facilities; 2.0km pump lift from source at Maha Oya.

c) Agricultural Technology Transfer Center

Administration offices	760m^2 : director's office, experts' offices (7), laboratory, administrative office, computer room, audio room, conference room, study room, etc.
Workshop	400m^2
Farm equipment garage	200m^2
Drying yard	300m^2
Others	parking lot (200m^2)

d) Farm machinery

4 wheel tractor	3 (1)
2 wheel tractor	2 (1)
2 wheel rice transplanter	3
2 wheel harvester (paddy)	3
Sprayer (automatic and manual)	3 + 5 (2 each)
Mist duster	5

e) Vehicles

Minibus (35 passenger capacity)	2 (0)
Jeep	6 (3)
Autobike (125cc)	8 (2)

(Note: In consideration of fuel, driver, etc. costs, number in brackets will be supplied at the initial stage of the project.)

(3) Operation and Maintenance

1) Organization

Under the overall integrated rural development project, a National Project Steering Committee (NPSC) at the national level and a District Coordinating Committee (DCC) at the district level are to be established. A Project Office, Gampaha IRDP is to be created within the Ministry of Plan Implementation with an office at the ministry and within Gampaha Kacheri. The institutional set up for the subject ATDT scheme will exist within this organization framework.

a) Sub-Committee of NPSC

This committee is to consist of leading officials at the national level of the Agricultural Department, Agrarian Services Department, Minor Export Crops Department, Irrigation Department, Agriculture Development Authority and other agencies involved with the functions of the agricultural technology demonstration and transfer scheme. The committee will study and determine scheme strategies, basic program per cropping season, procurement and disbursement of operational budget, selection of facilities director, etc. Said committee will convene once every 3 months.

b) Operation Committee

This committee will consist of district level representatives of the same departments as in a) above, manager of ATDTC, and the Project Office. Said committee will provide

liaison and coordination between concerned agencies in project implementation at the district level.

2) Technical Staff

A deputy director class individual is envisioned. The various sectoral experts should be permanently assigned from agencies as indicated below:

Cultivation/crop protection: Department of Agriculture, Ministry of Agriculture

Upland farming/horticulture: "

Soil: "

Water management/irrigation: Irrigation Department, Ministry of Lands and Land Development

Minor export crops: Minor Export Crops Department, Ministry of Agriculture

Farmer Organizations: Agrarian Services Department, Ministry of Agriculture

Market research: Agrarian Research and Planning Institute, Ministry of Agriculture

3) Facility Operation and Maintenance

a) Technology Transfer Center

Administrative office, workshop, farm machinery garage, vehicles, etc. will be operated and maintained by the ATDT center administration section.

b) Computer Processing and Dissemination of Information

The marketing research section will collect and analyze data relevant to meteorology, cropping trends, domestic and international market trends, production cost and other pertinent agricultural data. Results of analysis will be disseminated to farmers.

Software of the Agrarian Research and Training Institute (ARTI) will be principally utilized. ARTI, in consultation

with ATDT center, will oversee computer operation and maintenance.

c) Intensive Agriculture Model Farm

To be directly operated and maintained under the ATDT scheme.

d) Upland Model Farm

The upland model farm to be established at Ambepussa is to be under the jurisdiction of the upland crop horticultural section of the ATDT scheme. However, facilities will be jointly utilized by the neighboring district agricultural training center of the Department of Agriculture. Actual operation of the subject model farm will be principally under the said district agricultural training center. The upland crop horticultural section of the ATDT scheme will provide supporting advice and guidance in farm operation and formulation of demonstration curriculum.

e) Minor Export Crops Nursery

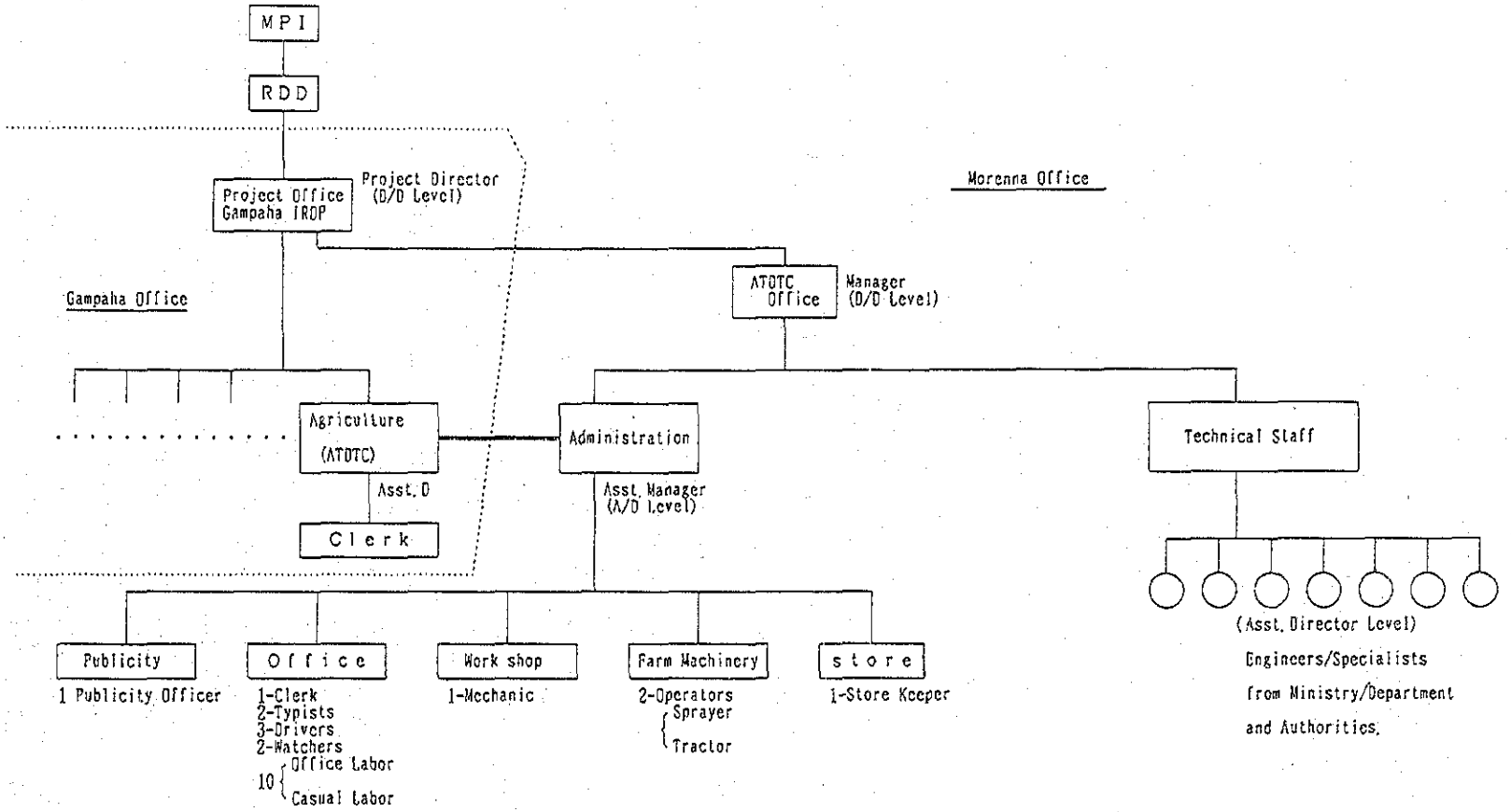
The minor export crops nursery is to be operated and maintained by the Minor Export Crop Department of the Ministry of Agriculture. In concert with the subject center, the minor export crop section of the ATDT scheme will engage in minor export crop extension within Gampaha district.

f) Morenna Model Irrigation Area

Water management for trunk canal and paddy field as well as farm management guidance will be necessary within the Morenna irrigation area. Demonstration of appropriate methodology to improve paddy productivity as well as guidance in effective upland cropping technology for paddy fields are to be provided. A block demonstration scheme will also be introduced.

Main canal operation is under the jurisdiction of the Irrigation Department, while the Department of Agrarian Services is responsible for field level water and farm management guidance. It is anticipated that these two

Fig. 10.1.1.1 ATDTC Organization and Staffing



agencies will act in concert to establish the sector as a model for other irrigated areas (major and minor irrigation).

4) Operation and Maintenance Cost

Excluding remuneration and other costs for experts assigned from other agencies, annual budget for the ATDT scheme is preliminarily estimated at Rs 652,400. This includes remuneration for facilities director and other staff, fuel for vehicles and equipment, electricity, communications, water service, seed, agro-chemicals, fertilizer, office supplies, etc.

10.1.2 Minor Export Crops Promotion Scheme

(1) Background and Project Description

Under an Assistant Director, the MEC Department operates an extension and training section, an administration section, and assigns extension workers to 9 agricultural service centers (ASC). The Department also supervises 26 contract farmers for seedling production and 30 demonstration farms run by coconut farmers (coconut inter-cropping) utilizing private farmer fields.

Extension workers receive technical training every three months (1 week per session) at the MEC Research Center in Matale district. Extension education for farmers is conducted by each extension worker for groups of 20~40 farmers each week (1,600~1,900 farmers annually). Extension workers are provided with equipment consisting of 1 jeep only.

Minor export crops cultivated in Gampaha district consist of pepper, coffee, cacao, clove, cinnamon, and betel. Traditionally, these spices and beverage crops have been cultivated in small quantities in coconut fields. At present, cultivated area for these crops remains small.

The Minor Export Crop Department commenced concerted efforts at minor export crop extension in 1983. Increase of area cultivated with these crops since then is 1,800ha.

Under the subject Project, increase of minor export crop cultivation centering on pepper and coffee will be promoted in 16,000ha, or 1/2 of available inter-cropping area in coconut field. However, expansion of cultivated area for these crops is premised on the availability of an

adequate supply of improved seedling varieties. A priority will thus be the establishment of seedling nurseries. At the same time, a model farm for mixed cultivation of coconuts~minor export crops and a seed farm appropriate for Gampaha district are to be constructed.

If expansion of minor export crop production is targeted at 600ha annually, production per year of 800,000 seedlings is required. Considering that 300,000 seedlings per year are produced at present by private farmers under contract, an additional supply capacity of 500,000 seedlings (50 new seedling beds) is necessary.

At the initial stage of the Project, the above described plan to expand seedling production by 50 new beds will be pursued. However, in the future it is recommended that shift be made to an accelerated bed construction plan whereby 80 new beds are created in the 2nd phase and 125 beds in the 3rd phase of the Project.

Phase	Year	Required Beds (/100m2)	Annual increase of cultivated area	Total (5 years) Cropped area (ha)
First Phase	1~5 years (1987~1991)	50	600	3,000
Second Phase	6~10 years (1992~1996)	80	1,000	5,000
Third Phase	11~15 years (1996~2001)	125	1,500	7,500
Total				15,500

In order to provide for effective implementation of the minor export crops promotion scheme, extension activities of the Gampaha district office of the Minor Export Crop Department must be upgraded. This will necessitate strengthening of the district office facilities and extension equipment. Also, new construction of facilities for education and training in cropping technology, as well as a demonstration farm are to be established. Development of necessary staff, and operation and maintenance are to be carried out by the Minor Export Crop Department.

(2) Scheme Scale

1) Site Selection

5.6ha within the government-owned Walpita farm are to be utilized as the site for a seedling farm. The site is located in northern Gampaha district where the potential for expansion of minor export crop cultivation is high.

2) Facilities

Facilities include seedling bed (5,000m^2), soil mixing facilities (5 nos.), model farm for mixed cropping of minor export crops (1.2ha (3.0ac)), seed farm (1.4ha (3.5ac)), administrative and research facilities, farm equipment garage, etc.

3) Facility Scale

a) Seedling Bed

Seedling bed:	100m^2×50 beds=5,000m^2
Irrigation facilities:	Sprinkler (one set)
Shading facility:	Shading net over steel frame (one set)

Soil mixing facility

b) Mixed Cropping Model Farm

Farm:	1.2ha (3.0ac)

c) Seed Farm

Farm:	1.4ha (3.5ac)

d) Water Source and Water Conveyance Facilities

Water source:	shallow well
Pumps:	2
Storage tank:	20m^3 capacity×2
Conveyance facilities:	One set each for seedling beds, seed farm, administrative office, others

e) Administrative Facilities

Gampaha district office of Minor Export Crop Department, and Seedling Center Administrative Office:

District head's office, expert offices, circuit engineers office, general office, conference room, nursery manager's office, extension workers rooms, farm administration office, etc.:

(780m^2)

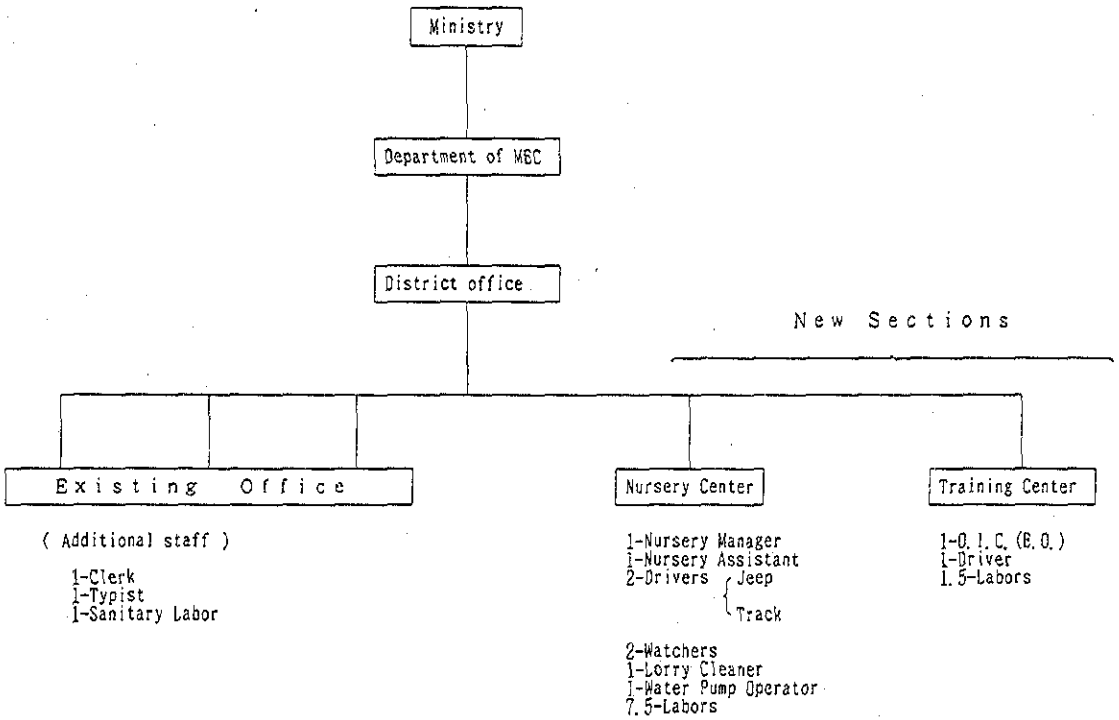
Farmer training hall:	250m^2 (with audiovisuals)
Post harvest facilities:	300m^2
Farm equipment:	4 wheel tractor (1)
	2 wheel tractor (2)
	power sprayer (2)
	manual sprayer (3)
	2 ton truck (1)
	dryer (1)
Farm equipment shed:	240m^2

(3) Operation and Maintenance

Under the scheme, a seedling production farm is to be constructed to achieve the target of the Minor Export Crops Department for cultivation increase of 16,000ha for minor export crops. Scheme operation and maintenance will be overseen by experts dispatched from the Minor Export Crops Department.and based at the Gampaha district office. However, as facilities under the scheme are to be jointly utilized by the minor export crops section of the aforediscussed ATDT scheme, operation will be performed cooperatively with a central role played by the Regional Development Division of the Ministry of Plan Implementation and the Project Office.

Jurisdiction over the scheme is envisioned for future transfer to the Minor Export Crop Department, of the Ministry of Agriculture. However for the time being regular reporting to MPI on operation and maintenance of the scheme will be required.

Fig. 10.1.2.1 MEC Nursery Center Organization and Additional Staffing



A farm manager, and post harvest and product quality control experts will supervise operation of the seedling production farm and mixed cropping model farm.

Produced seedlings will be distributed to farmers through the existing minor export crop extension system.

Further training will be performed annually for 2,000 households by the Minor Export Crop Department district office and ATDT scheme minor export crop section acting in concert.

10.1.3 Scheme for Improvement of Farmer Support System

The institutional framework for farmer support services includes a District Agriculture Extension Office. Assigned extension staff include an Assistant Officer in Charge, an Agricultural Officer (AO) and 5 Subject Matter Officers (SMO).

Twenty six Agricultural Instructors (and assistants) are assigned at 26 Agrarian Service Centers throughout the district, or in other words roughly 1~3 locations per division. Said instructors engage directly with farmers in extension activities, dissemination of information relevant to agriculture and sounding out of farmer opinions and needs. 83 Agricultural Workers (KVS) are assigned to villages, with each worker responsible for 5~6 hamlets. Each worker establishes cooperative contract farmers within this territory of responsibility and visits them once every 2 weeks.

Follower farmers are organized under each contact farmer for implementation of group extension activities. However, extension activity materials and equipment are severely lacking. The district agricultural office possesses only one jeep, and KVS utilizes bus transport for extension activities.

Farmer support institutions also include the Agrarian Services Department. Staff is headed by an Assistant Commissioner assisted by 5 Senior Technical Assistants. Twenty six Divisional Officers and Technical Assistants are assigned to agrarian service centers in each AGA division with a total of 393 such staff throughout the district.

The duties of cultivation instructors are as follows:

① Promotion of development and improvement of varieties of paddy and other crops.

② Confirmation of utilization of appropriate cultivation techniques.

③ Overseeing of operation and maintenance of irrigation facilities, and water management.

④ Distribution of fertilizer, agro-chemicals, seed, farm equipment, etc.

⑤ Collection of land taxes and water use tariffs.

⑥ Compilation of statistics on land area under cultivation and yield amounts

⑦ Recording of land registration, etc.

Agrarian Services Department equipment for its activities consists of one jeep at the district level, and one automobile per Agrarian Services Center. Cultivation instructors make their rounds on foot or by bus.

In order to effectively implement the model project for development of agricultural production, the extension equipment and materials of the farmer support organizations must be strengthened. These institutions include principally agricultural extension organization of the Agricultural Department, farmer support organization of the Agrarian Services Department, extension organization of the Minor Export Crop Department, and district organization of the Agricultural Development Authority.

(2) Scheme Scale

The above described farmer support organizations maintain offices at the district level. There exist 26 Agrarian Service Centers in the 13 AGA divisions composing the district which engage in activities to promote agricultural production. Under the subject scheme, support and extension activities of district level offices for farmer support organizations as well as the 26 Agrarian Service Centers within the district will be improved through strengthening of facilities and equipment.

Facilities and equipment to be provided are as set out in Table 10.1.3.1.

Table 10.1.3.1 EQUIPMENT AND FACILITIES

Item	Specification	Required amount			Total
		Extension Service Dept.	Agrarian Services Dept.	Agriculture Development Authority	
1. Vehicles					
(a) Mini-bus	35 passenger capacity	1 (0)	1 (0)	-	2 (0)
(b) Automobile	Pick-up	4 (1)	4 (1)	1	9 (3)
(c) "		-	-	5 (1)	5 (0)
(d) Autobike	90cc	85 (bicycle)	436 (bicycle)	-	521 (bicycle)
(e) "	125cc	7 (90cc)	13 (90cc)	-	20 (90cc)
2. Audio-Visual vehicles		4 (0)	1 (0)	-	5 (0)
3. Fertilizer godown	24m²	-	26	-	26
4. Fertilizer transport vehicle	2W tractor with pull car	-	26	-	26
5. Copy machine		1	1	1	3

Note: On the basis of consultations with MPI regarding fuel costs, driver remuneration, and relationship to other projects, the number in ( ) will be procured at the initial project stage. Mini-bus and audio-visual vehicles deployed at the Project Office will be utilized.

(3) Operation and Maintenance

Operation and maintenance activities will be carried out by the various farmer support organizations. However, in order to effectively implement integrated rural development, extension activities should be pursued in a coordinated fashion with such activities being undertaken as well under the agricultural technology demonstration and transfer scheme. The fruits of this latter scheme must be adequately extended to farmers and land holders.

Although, as mentioned above, operation and maintenance will be carried out by the individual farmer support organizations concerned, the imperatives of integrated rural development require that these organizations consult with and report to the Project office as to their activities in this regard.