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Democratic Socialist Republic of Sri Lanka

Ministry of Mahaweli Development

Maduru Oya Project

Feasibility Report

Annex I
Settlement Planning

ACRES Acres International Limited, Niagara Falls, Canada

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FOREWORD

The Feasibility Report on the Maduru Oya Project, of which this Annex forms a part, is made up as follows:

Main Report

Annex A - The Project Area

Annex B - Soils and Land Classification

Annex C - Hydrology and Water Balance

Annex D - Engineering Works

Annex E - Agronomic Studies

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1 - INTRODUCTION

The settlement of a quarter million persons is discussed in this annex.

The settlement process, as discussed under Section 2, refers to the planned migration of people into an area: what is required to bring about relocation and migration, and what should be considered in a government-sponsored migration program. The number of settlers and the rate of settlement are indicated.

The planning of settlements, as discussed under Section 3, is concerned mainly with the physical aspects involved in the migration process referred to above. It deals with the regional context of the project area, the indicated future land use for the area, and the settlement, communities and road networks. It also discusses human settlements in five sample areas examined for irrigation feasibility.

The social infrastructure aspects are discussed in Section 4, and matters are raised that will require careful consideration if the project area is to accommodate the settlers successfully.

The settlement planning studies have been materially aided by the Regional and Physical Planning and the Settlement Planning Divisions of MDB. Analysis of settlement experience in the H area (in terms of both the settlement process and the planning of settlements) also provided important contributions.

A special survey of farmers in Pimburettewa (situated within the project area) provided important information about the conditions prevalent in a recent settlement scheme. The

complete survey report is presented as Appendix I; needless to say, various study disciplines have drawn on this information, collected through interviews with farmers.

For reference, the socioeconomic characteristics of the present project area population and the extent of the present infrastructure have been detailed in Annex A.

2 - THE SETTLEMENT PROCESS

2.1 - Number of Settlers

The number of settler families that can be accommodated in System B is directly related to the amount of land that will be brought into production under irrigation. A major planning parameter of this study, and of the Accelerated Mahaweli Programme in general, is that it is the intention of the Government of Sri Lanka to allocate 1 ha of paddy land to Mahaweli settlers. Agroeconomic studies have indicated that 1 ha of paddy land provides sufficient income for, and can be worked by, one family.

The estimated net irrigable area suitable for paddy cultivation is 34 300 ha. This is the amount of land that can be allocated in 1-ha parcels to settlers. It excludes the area for which development should be conditionally deferred to achieve project-wide water balance. This area is located in the eastern part of the left bank. Annexes C and L contain discussions of the rationale for the deferred development and the selection of the area.

The estimate excludes paddy land in the major tank schemes in and adjacent to System B - Pimburettewa, Vakaneri and Punanai. However, it does include areas currently under small tanks, and rainfed paddy lands, totaling 6,700 net irrigable ha. The claims to these lands by present resident and nonresident cultivators will have to b atisfied before the areas can be considered for Mahaweli settler allocation. However, some of the rainfed areas are being worked without claim or permit.

The promise of 1 ha of irrigated Mahaweli land will in most cases be adequate compensation for giving up a larger area currently worked as rainfed land or under a small tank, considering that current Yala production is negligible.

The assumption is made that ultimately all 34 300 ha of net irrigable paddy land identified by the study can be allocated in 1-ha parcels. Proper integration of all small tanks within the overall irrigation system is planned for. Releveling and rebunding of areas under small tanks would be called for in a number of instances, thus facilitating the process of reallocation. The estimate of the number of 1-ha parcels may, however, overstate what can actually be achieved with existing small tanks, in terms of reallocation, though it would not overstate production.

For the purpose of this study the settlement of 34 300 paddy farmers has been assumed.

On the uplands the situation is not quite as clear, due to the limited experience with these types of soil under irrigated conditions. Land classification has identified a total irrigable area of 5,600 ha in 55 blocks of about 35 or more ha. Smaller blocks are not deemed suitable for separate irrigation systems. A number of upland blocks will be required to allow for the homesteads of paddy farmers, reducing the irrigable upland area to 2,200 ha. After allowing for irrigation infrastructure, this would leave 1,800 ha for allocation.

For purposes of this study, it has been assumed that "pure" upland farmers can be induced to settle when allocated

1.8 ha, which would include 0.3 ha of homestead. This would allow 1,000 farmers to be settled.*

However, the results of a special study on upland farm size** and experimentation with upland soils at the proposed System B demonstration farm could indicate that larger upland farm units might be more appropriate. This could reduce the number of farmer settlers although most likely it would at the same time create a need for hired farm labor. A minimum viable upland holding of 1.8 ha has been adopted to achieve maximum settlement. From the above considerations it has been assumed in these studies that the total of upland and lowland settlers would be 35 300.

The present number of families in System B is about 4,000, not including residents of Pimburettewa, Vakaneri and Punanai schemes. A large number of the 4,000 families would likely qualify for settlement under the Mahaweli Programme, being near landless and earning below-average incomes. In fact, the composition of a number of families is such that they would qualify for two plots.

The experience in the H area indicates that more plots are being allocated to resident families than was originally estimated, thus reducing the requirement for outside settlers.

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* Alternatively, upland farmers could be allocated 1.65 ha of upland farm and 0.15 ha of paddy land, the latter for personal consumption; this would have a minimal effect on the total number of settlers.

**Acres International Limited special report on Development of Upland Farming, to be submitted later this year.

Considering that some 4,000 Mahaweli land allocations can be made to those presently residing in System B, an additional 31 300 settler families are to be selected from outside the project area. The latter number would include those who work or have certain claims to land in the area but who do not live within the project area.

For the development of a balanced rural society, it is important that, in the planning stages, and subsequently, attention is paid to the nonfarm population. Already among the existing, sparsely distributed population there is an element of nonfarm employment, in the order of 15 to 18 percent.

A minimum of 25 percent nonfarm employment and population is deemed necessary for the basic functioning of a rural society. This nonfarm component would include services to farmers, commercial and farm industry activities, social and personal services, and government. It does not include hired farm labor for seasonal peaks, which should be satisfied through migrant labor movement. It also does not include the construction and supervision work force present during the implementation period for System B, although the estimate does include the permanent operation and maintenance staff for the system, including agricultural extension and community development workers.

The nonfarm settlers who will make a permanent home in the area would total 11 800 families, assuming the 25 percent guideline. It is recognized that certain nonfarm functions will be performed, from time to time, by unmarried individuals (e.g. teaching). To the extent that this is so, the nonfarm family and population estimates are overstated. The farmer settlers are all considered to be families.

The total number of settler families, both farm and nonfarm and including those now in the area, should number 48 900 by the end of the 1980s, for an estimated population of 244 500.

Toward the end of the century the project area families should number some 56 000 once the nonfarm population increases from 25 percent of the total, to one-third of the total, as it will do, if the development is successful (i.e. generates acceptable standards of living). Creation of one nonfarm job for every two farm jobs is well within the reach of the resources of the area.

As a result of the development of System B, the population of the area will increase tenfold, from about 25 000 to close to 250 000 in the next 10 yr. The influx of such a large number of people into relatively virgin territory over a brief period of time will require a planning effort commensurate with the size of this monumental migration.

The movement of people into System B will be in sharp contrast to the experience in System H, where only one-quarter of the farm settlers are from "outside", as shown below.

	System H	System B
Farm families from area	18 000	4 000
Farm families from "outside"	6 000	31 300
Totals	24 000	35 300

Table I-2.1 shows a summary of the settler population estimates. While by no means precise, the figures serve to indicate the general dimensions of the future population structure of the area.

TABLE I-2.1

SUMMARY OF SETTLER FAMILIES AND POPULATION FOR SYSTEM B

		Families	Population at 5 pers/family
A.	Paddy Settlers	34 300	171 500
	Upland Settlers	1 000	5 000
	Farmer Settlers	35 300	176 500
	Nonfarm Settlers	11 800	59 000
	Total Settlers	47 100	235 500
B.	Farmer Settlers Required	35 300	176 500
	Present in Area	4 000	20 000
	Settlers from "Outside"	31 300	156 500
C.	Nonfarm Settlers Required	11 800	59 000
	Present in Area	1 800	9 000
	Settlers from "Outside"	10 000	50 000
D.	By late eighties:		
	Farm Population	35 300	176 500
	Nonfarm Population	11 800	59 000
	Existing Schemes Population	1 800	9 000
	Total	48 900	244 500
E.	By year 2000:		
	Farm Population	37 100	185 500
	Nonfarm Population	18 550	92 750
	Total	55 650	278 250

Note: Pimburettewa, Vakaneri and Punani Schemes excluded under A, B, C. (Estimated 1979 resident population of 9,000 or 1,800 families.) This population shown separately under D and included with farm population under E.

2.2 - Selection of Settlers

There is ample experience in Sri Lanka with colonization schemes, and hence with settler selection. However, the size of the anticipated program is such that extraordinary settlement planning measures will be required.

System C, which is to be implemented concurrently with System B, calls for the settlement of some 17 000 farm families. Adding these families to the System B projections, some 52 000 farm families are to be settled in this decade.

There is without question a large reservoir of potential settlers. The response to invitations to apply for settlement in System H, extended to certain selected villages in certain selected electorates, indicates many more prospective settlers than settler places. This excess of supply makes it possible to insist that basic selection criteria are met. While one can be confident that sufficient settlers can be selected for System B, the willingness of potential settlers to come foward for subsequent phases of the Mahaweli Development Programme will to some extent depend on how well settler aspirations are fulfilled.

Selection criteria have been the subject of study and administrative innovation for many years. Still, it would be appropriate that the selection criteria for System B settlers be carefully reviewed once again, in the light of (a) experience gained in H area, and (b) the characteristics of the development proposed as detailed in this study. The Mahaweli Authority has recently developed settler selection guidelines for residents of System C. With some modifications a similar selection approach could serve the existing population of System B. For incoming settlers, somewhat

different procedures will need to be developed. Appendix II outlines the latest (February 1980) thinking of the government on settler selection.

Typical characteristics of the System B development plan are

- nearly all settlers will be paddy farmers

- all paddy farmers will have a large, separately located, homestead plot for which homestead crops and livestock are planned

- the use of buffalos is encouraged, and planned for

- there will only be a small number of upland farmers, with homesteads located on the farm

- communities will be low density, reflecting the large homestead plots

- most settlers will come from outside the area

- nonfarm settlement is seen as an integral component of the development of the area.

The selection criteria to be developed for System B should take into account the following.

- Those now living in the area should have the first priority for settlement. In the near future it should be made known to project area residents what residency requirements the

government intends to employ.* It may deserve consideration to move the residency date to 1980 or to reconsider the concept altogether. A positive view of encroachers should be taken: their suitability as settlers rather than their status as encroachers should be considered. Those living in the area and not selected for farming should be allocated nonfarm plots.

- Areas adjacent to System B should receive preference for settler selection. The coastal area between Trincomalee and Batticaloa, the area south of System B and the area north of Polonnaruwa should all be able to supply settlers familiar with living conditions in the Dry Zone. In general, the districts of Trincomalee, Polonnaruwa, Batticaloa and Amparai would constitute the adjacent areas.

- Preferably, the settlers to be attracted from districts farther away from the project area should have Dry or Intermediate Zone living and farming experience.

- The ultimate ethnic composition of System B should be viewed in the context of the overall Accelerated Mahaweli Programme. In keeping with the current situation, the Polonnaruwa District part of the project area could ultimately be predominantly Sinhalese, while the Batticaloa portion could ultimately be Tamil. It will have to be determined whether settlement at the village level is to be based on the concept of integration or segregation with different backgrounds.

*For the first phase of System C, it was determined that those in the area before the date of announcement of the Accelerated Mahaweli Programme (September 1, 1977) could apply for Mahaweli land.

- The settlers should have farming experience, preferably paddy farming. Since over 50 percent of the labor force of Sri Lanka is currently engaged in agriculture, it should not be difficult to satisfy this condition. At a minimum the farmer settlers should originate from rural areas.

- The settlers should not have land elsewhere or other major assets, nor should they now have incomes that exceed the projected family income.

- The settlers should be young (in their 20s or 30s) and energetic. While most farmer settlers will be married, selection of related but unmarried settlers (brothers, sisters, cousins) should be considered.

- A specific program should be developed for nonfarm settlers. To qualify for a nonfarm plot, the settler should be willing to live and work in the area, with the skill or trade he possesses to be the key determinant. Nonfamily individuals should also be considered for nonfarm plots.

Once settlers have been selected in their area of origin, groups of them and their families should be brought together for several orientation sessions. In the preparation workshops, a realistic picture should be painted of the conditions that await the family and what they then can hope to achieve.* If the settler is to be separated from his family for a number of months, the financial provisions for

*The test of a previous settler information booklet is contained in Appendix III. The level of effort that goes into settler family orientation should be raised substantially.

the family left behind should be discussed. In the case where the settler is expected to work on the tertiary system for a period of time, the physical and contractual working conditions under which his labor is to be provided should be communicated clearly.

2.3 - Rate of Settlement

The basis for the rates of settlement (dominated by that of paddy farmers) are the two scenarios for agricultural production which have been developed with respect to the phasing of the completion of the irrigation infrastructure system. Table I-2.2 shows that under Scenario A all new paddy land will be brought into production in 4 years (8 agricultural seasons, starting with 4,900 ha in Maha 1983/84). Under Scenario B it will take 7.5 years to bring all 34 300 ha of paddy into production, starting with 2,300 ha in Maha 1983/84. Both scenarios assume that the first irrigation water will be available in the fall of 1983.

With the Maha 1983/84 estimated as the first irrigated paddy season, it is possible to work back, to determine when settlers should arrive. It is assumed here that all

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*The text of a previous settler information booklet is contained in Appendix III. The level of effort that goes into settler family orientation should be raised substantially.

TABLE I-2.2

PADDY LAND BROUGHT INTO PRODUCTION

	Scenario A (ha)		Scenario B (ha)	
1984 M	4 900		2 300	
Y	4 100		3 200	
1985 M	4 900		2 600	
Y	6 400		2 700	
1986 M	3 400	(600)	3 200	
Y	4 600	(600)	2 500	
1987 M	4 300		3 800	
Y	1 700	(300)	2 000	
1988 M			3 100	(600)
Y			2 100	
1989 M			2 500	(600)
Y			2 600	
1990 M			1 700	(300)
TOTAL PADDY	34 300	(1 500)	34 300	(1 500)

Note: 1984 M = Maha 83/84

1984 Y = Yala 84

Figures in brackets refer to ha of uplands.

Production figures are rounded to nearest 100 ha.

settlers are brought in from outside the System B area even though it is recognized that some 10 to 15 percent are already residing in the project area. Still, those selected from within the area require to be "settled", in terms of allocation of paddy lot, land preparation, assistance, etc.

Some of the key aspects of the settlement phase are

- the male head of the settler household is expected to arrive some period in advance of his family in order to work on aspects of the tertiary irrigation system and on his allotment

- he will be housed in temporary camps and organized with fellow settlers into contract work groups

- he will be allocated his paddy plot and somewhat later his homestead; since it takes about 1 man-year to prepare an allotment from rough ploughing to being ready to receive irrigation water, the bulk of the settler's effort would go into the preparation of his own land

- the settler would be paid the going rate for any work performed, thus allowing him to maintain his family prior to agricultural production

- settler arrivals would be spread over several months, taking into account the rainy season, the proposed first season of production and the period required to pr[illegible]e allotments.

The settlers have been grouped according to the sch[illegible]s of land production indicated in the two development sce[illegible]s.

For Scenario A this entails 8 groups, the first one comprising 4,900 settlers, corresponding to the 4,900 ha for the 1983/84 Maha. This group is divided into 7 subgroups of 700 settlers each. The first such subgroup would arrive in April 1982 and the last in October 1982. No arrivals would take place in the November to January wet season. The settlers would work on land and field channel preparation for part of 1982 and throughout 1983, and with the start of the 1983/84 Maha they would go into production on their allotment. Their first harvest would be around February 1984. From the arrival of the first subgroup of 700 to the first harvest, a period of 23 months would have elapsed (16 months from the arrival of the last subgroup). This is a considerable length of time; for the sake of morale and productivity every effort should be made to ensure that the preproduction period does not lengthen, considering also that for part of this period the settler is separated from his family. The advantages and disadvantages of bringing in settlers much before they can be productively employed on their allocated paddy lands should be weighed carefully.

For subsequent groups, the preharvest period is 19 or 20 months for the early arrivals and 15 or 16 months for the last arrivals. The settlement scenarios are detailed in Tables I-2.3 and I-2.4 and the settlement rhythm is graphically depicted in Figures I-1 and I-2.

For Scenario A the total settlement period is 5 years and for Scenario B it is 7 years (see Table I-2.5).

It should be noted that while the settlers in total are intended to provide some 45 000 man-years of work on the tertiary system and land preparation, this is only about one-third of the total work effort required. The balance would have to come from hired construction labor.

TABLE I-2.3

RATE OF SETTLEMENT - SCENARIO A

Settler Group	Sector of Destination	Arrival Start	Arrival Finish	Avg No. Families Per Mo	Total Settlers Per Group	First Agr Prod Season	No. of mo From Start Arrival to First Harvest
Group 1	1	Apr 82	Oct 82	700	4 900	Maha 84	23
Group 2	1	Feb 83	May 83	1,000	4 100	Yala 84	19
Group 3	2	July 83	Oct 83	1,200	4 900	Maha 85	20
Group 4	2	Feb 84	May 84	1,600	6 400	Yala 85	19
Group 5	3	July 84	Oct 84	850	3 400	Maha 86	20
Group 6	3	Feb 85	May 85	1,150	4 600	Yala 86	19
Group 7	3	July 85	Oct 85	1,100	4 300	Maha 87	20
Group 8	3	Feb 86	May 86	450	1 700	Yala 87	19

TABLE I-2.4

RATE OF SETTLEMENT - SCENARIO B

Settler Group	Sector of Desti-Nation	Arrival Start	Arrival Finish	Avg No. Families Per Mo	Total Settlers Per Group	First Agr Prod Season	No. of mo From Start Arrival to First Harvest
Group 1	1	July 82	Oct 82	600	2 300	Maha 84	20
Group 2	1	Feb 83	May 83	800	3 200	Yala 84	19
Group 3	1	July 83	Oct 83	650	2 600	Maha 85	20
Group 4	1/3 = 1 2/3 = 2	Feb 84	May 84	700	2 700	Yala 85	19
Group 5	2	July 84	Oct 84	800	3 200	Maha 86	20
Group 6	2	Feb 85	May 85	650	2 500	Yala 86	19
Group 7	2	July 85	Oct 85	950	3 800	Maha 87	20
Group 8	3	Feb 86	May 86	500	2 000	Yala 87	19
Group 9	3	July 86	Oct 86	800	3 100	Maha 88	20
Group 10	3	Feb 87	May 87	500	2 100	Yala 88	19
Group 11	3	July 87	Oct 87	650	2 500	Maha 89	20
Group 12	3	Feb 88	May 88	650	2 600	Yala 89	19
Group 13	3	July 88	Oct 88	450	1 700	Maha 90	20

TABLE I-2.5

SUMMARY OF SETTLER ARRIVALS

	Scenario A		Scenario B	
1982	4 900	(7)	2 300	(4)
1983	9 000	(8)	5 800	(8)
1984	9 800	(8)	5 900	(8)
1985	8 900	(8)	6 300	(8)
1986	1 700	(8)	5 100	(8)
1987	-		4 600	(8)
1988	-		4 300	(8)
TOTAL	34 300		34 300	

Note: Figures in brackets refer to the number of months over which actual paddy farmer arrivals take place.

For Scenario A the number of months during which settlement takes place is 39, or 880 settlers on average per month. With 22 working days per months, this comes to 40 settlers per day, or 200 persons. Settler families and their belongings are transported by lorries, allowing two families and effects per lorry. To bring 40 families per day requires 20 lorry trips. In general, Scenario A calls for the daily arrival of some 20 lorries, each carrying two families, from early 1982 to mid 1986, exclusive of the wet season.

For Scenario B, the daily quota of lorry loads of families would be 15 (based on monthly settlement of 660 families), for the period mid 1982 to the end of 1988. The intensity of settlement activity under Scenario B is about 75 percent of that of Scenario A.

The rates of settlement illustrated have as their basis the earliest date the irrigation system and lands can be physically developed. To attain the rate of settlement called for under Scenario A will require a supreme logistic, organizational and administrative effort in line with the overall thrust of the Accelerated Mahaweli Programme. Under Scenario B such effort would be somewhat less intense.

The first group of paddy settlers is scheduled to arrive in 1982. To indicate the approximate sequence of events, the critical dates are shown in Figure I-3. After having been notified of selection for Mahaweli land, the settler and his family would undergo a period of orientation, which would take place in the home village. The first subgroup of 700 would arrive and would be accommodated in temporary camps or prebuilt school buildings (see Section 2.4). The subgroup might be spread over 15 to 20 locations. Further orientation would take place. The settler would initially be asked to work on general, labor-intensive items of irrigation system infrastructure.

To this end, small (perhaps turnout sized) labor groups would be formed who would contract for specific work packages. However, shortly after his arrival the settler would be allocated his plot. Here he would work on leveling and bunding, either alone or in the context of his work group. About 6 months after his arrival the settler would be allocated his homestead and would receive the building materials out of which he would fashion a basic shelter. He would then return to his home village to collect his family; his stay in the temporary camp would have come to an end. With his family on the homestead, the settler would continue to work on land preparation but at the same time he and the members of his family would work on the basic shelter and carry out other homesteading activities, such as clearing and planting fruit trees. At this stage, the first settlers would still have about 1 year before irrigation water became available. (The last families of Group One would have about 5 months.) Some sharing and exchanging of labor and perhaps also outside contract labor will be required if all 4,900 settlers are to have their land ready to receive water. The settlers will be paid for the work they perform at rates allowing them to maintain their families adequately. At the beginning of the first crop season they should qualify for cultivation loans allowing them to bridge the period to harvest and sale of produce.

The foregoing has dealt with the paddy farmers in the project area. As indicated there will be a modest amount of settlement on irrigated uplands, totaling 1,800 ha. This will allow for the settlement of 1,000 farmers, with each receiving 1.5 ha for crop production and, on the same plot, 0.3 ha for homestead. Based on the location of the uplands, and assuming that actual development will lag behind paddy land development by a number of seasons, the settlement of

the first uplands (400 settlers) would take place in the first half of 1985 under Scenario A or 2 years later under Scenario B. This is shown in Figure I-4.

The spatial distribution of settlement is shown in Figure I-5, according to the Irrigation Command Areas of the project. The first group of 4,900 settlers would be located in the areas covered by LB-R1, LB-DA1 and LB-L1. For Scenario B, the first project group of 2,300 would cover only LB-DA1 and LB-R1, which is the area between the Kuda Oya and Maduru Oya, to the east of the Pimburettewa Tank Scheme. Physical planning implications will be discussed in Section 3.

2.4 - Assistance to Settlers

Assistance to settlers will have to be provided, if only to ensure that the investment of Rs 138,000 in each hectare of irrigated land is being utilized with economic efficiency.

Considering the size of the investment in the irrigation system, the investment in settler assistance is comparatively minor. It could be increased without significantly affecting the economic rate of return of the project. However, it still requires a sizable outlay of funds.

For the estimates of settlement cost, a base of 35 000 families has been used. The families now living in the project area who will be allocated Mahaweli land will also fall into most of the categories of assistance listed.

Selection, Orientation and Training

The cost of these activities is estimated at Rs 200/family. Total cost is Rs 7 million.

Transportation of Settlers

Transportation of settlers and their families from place of origin to new homestead is estimated at Rs 300/family. The total cost is Rs 10 million.

Temporary Shelter

This would be the camps specifically constructed to receive the settlers (without their families) when they first arrive to work on their land and other aspects of the system. Since the cost of these camps on a per-settler basis is high (in excess of Rs 3,000) it has been suggested that school buildings should be constructed in advance, to serve as temporary accommodation. This would have the added advantage that the school would be in place at the time the families arrive. Allowing for special fitting and refitting, the building cost per settler would be reduced to about Rs 1,000, for a total of Rs 35 million.

Tools

Each settler would receive some basic agricultural tools. At Rs 200/settler, this totals Rs 7 million.

Housing Materials Allowance

This would be to speedily construct a core shelter once the family arrives on the homestead. Rs 1,500/family is necessary to provide the building materials (mostly posts, poles and cadjan) out of which a modest shelter can be fashioned. Latrine plates and mosquito netting are also considered basic housing necessities. Total cost for housing materials allowance is Rs 53 million.

Wells

It has been estimated that a well to serve 15 families, can be constructed for Rs 12,000, or Rs 800/family. Wells are extremely important from the public health point of view and should be constructed at the time of settlement. Total cost is Rs 28 million.

In areas with particularly poor groundwater conditions, wells may have to be located sufficiently close to the tertiary irrigation system for conveyance leakage to provide the necessary recharge. Wells could also be located adjacent to lined canals, with a filtration gallery

Hamlet, Village and Town Planning;
Surveying of Homesteads

While the cost of designing the irrigation facilities has specifically been taken into account in the irrigation system cost estimate, no similar allowance has been included for the design, planning and surveying of settlements. This matter requires a considerable amount of attention. Rs 300/plot has been allocated, for a total cost of Rs 10 million.

Overhead

On the above items 10 percent has been allowed for miscellaneous management and administration. Total overhead is Rs 15 million.

Total settlement costs amount to Rs 165 million or Rs 4,730 per family. (See Table I-2.6.)

Currently settlers in System H also receive an allowance for seed materials. This cost is considered an agricultural input rather than a settlement cost. Settlers will be paid for work they perform on the irrigation system, on jungle clearing and on leveling and bunding of their farm area. Since this is included as part of the cost of the tertiary system it is not considered a settlement cost. If settlers were paid the going rate for precultivation work this would obviate the need to include World Food Aid as a cost to the project.* Social infrastructure costs are discussed in Section 4.

2.5 - Organizing For Settlement

The task of organizing settlement will fall to the Mahaweli Economic Agency. For each family the settlement process may take a number of years, from selection in the home village, to full production on Mahaweli land. Throughout this period, staff is required to assist in each stage. A number of organizations will be involved.

The actual selection of settlers will be carried out by the Government Agent, under the direction of the MA or the MEA (see Appendix II).

The orientation and preparation of settler families in the home village should be carried out by MEA staff. Special teams should be set up to organize, in cooperation with the Government Agent, groups of selected settlers. The MEA teams

*For an estimate of the current subsistence level of a rural family see Appendix IV.

TABLE I-2.6

SUMMARY OF SETTLEMENT COSTS
(mid 1979 prices)

	million Rupees
Selection, Orientation and Training	7
Transportation	10
Temporary Camps	35
Tools	7
Housing Materials	53
Wells	28
Physical Planning and Surveying	10
Overhead	15
TOTAL	165

would take stock of particular settler group characteristics in order that the best fit with the new environment can be aimed for. Team members would travel with the settler families to the new village in System B and assist them with the initial familiarization and adjustment.

The physical moving of, first, heads of household, and later, families, could be carried out by MDB staff and equipment, on behalf of MEA.

The construction of the temporary camps (or prebuilt schools) would be undertaken by MDB, as is all construction of irrigation and social infrastructure.

The management of the camps and the settler work groups would also be carried out by MDB. Settlers would receive MDB staff assistance in the preparation of their allotments. The laying out of farm plots and homesteads would be undertaken by MDB but the allocation of same would be carried out by the MEA staff in cooperation with the Lands Department.

If the World Food Aid Program is operative, it would be administered by MEA. Roads and wells and health posts would be constructed under the direction of MDB.

Once situated on the homestead, the MEA team that brought the settlers to the area would hand over ongoing duties to the Settlement Service Team and the Field Officers. The service team of three persons would function under the Block Manager at the 2,500-ha level. It would assist settlers in much the same manner as the Agrarian Service Team, also under the Block Manager. Details of this organization structure are given in Annex K. In time the need for the Settlement Service Team would diminish. Through the Block Manager,

the team would have direct dealings with the Assistant Managers for Land Administration and Settlement, and Community Development, at the sector level.

The team would deal extensively with the Unit Managers and Field Officers, (at the 250-ha or settler family level) who would provide the direct contact with the farmer families. In fact, the Field Officer would apply his range of guidance skills to settler problems as they arise and refer settlers to the Settlement Service Team if he is not in a position to satisfy a specific concern.

Typical settlement matters that would occur in the early period include

- land administration matters (boundary disputes, allocation of land and suitability of land to family)

- food and subsistence problems (where food and other aid may not be timely or sufficient)

- health problems (to advise on basic preventive public health measures and where to seek competent help)

- credit problems (to assist the settler in obtaining an appropriate level or credit)

- community development matters (to assist the settlement in attracting key items of social infrastructure)

- housing problems (to assist in securing supplies of building materials)

- general problems of adjustment to a new environment.

The Field Officer should be allowed to operate with a reasonable degree of independence, within a properly organized and communicated framework of settler assistance measures.

The full cost of the settlement organization has been accounted for partially under settlement cost and partially under the cost of operating and managing the system.

3 - PLANNING OF SETTLEMENTS

3.1 - Regional Context

The regional context of System B is illustrated in Figure I-6.

There are various ways in which the region can be defined. It could be referred to as all of the area to the east of the Mahaweli Ganga, or, it could be the area encompassed by the Accelerated Mahaweli Development Programme - Systems A, B, C and D.

The regional context in which System B is considered in this report is taken as the region the area bounded by the centers of Trincomalee, Dambulla, Matale, Kandy, Mahiyangana, Batticaloa and Valachchenai. In terms of the highway network, it is the area bounded by highway A6 and A9 on the north and west, B38 and A5 on the south and A15 on the east, and bisected by A11 and the railroad. The highway and railroad through System B are the main infrastructure assets of the area.

Administratively, the region falls within some 7 districts. The population of the 4 Dry Zone districts is shown in Table I-3.1. Currently these districts have a population in excess of 1 million persons. The rate of growth in the Dry Zone districts over the last few years has been considerably higher than the national rate. This reflects in part the introduction of some colonization schemes and the influx of chena cultivators. With the Mahaweli projects, the population of the region could double over the next 20 years. The

TABLE I-3.1

POPULATION OF MADURU OYA REGION (IN THOUSANDS)

District	1968	1978	Increases 1968 to 1978 No.	Increases 1968 to 1978 Percent	Persons per km^2 - 1978
Trincomalee	165	223	58	35	85
Polonnaruwa	134	190	56	42	56
Batticaloa	233	300	67	29	122
Amparai	251	316	65	26	106
TOTALS	783	1,029	246	31	90
Sri Lanka	11,992	14,184	2,198	18	219
Madura Oya Region as a Percentage of Sri Lanka	6.5	7.3			

Source: Table A-4.1

population growth of the region will precipitate the redrawing of municipal, electoral, district and administrative boundaries.

The internal road network of the region is underdeveloped at present. However, the Mahaweli Programme will generate road improvements. One such improvement will be a primary road from Manampitiya to the south, across the Maduru Oya dam, then linking with A5, thus serving the Gal Oya population. Another important road will be from Mahiyangana to Manampitiya. Eventually this road will continue north by way of Welikanda, to connect with A15, thus facilitating north-south traffic through Systems A, B and C.

One of the key elements in the transportation network of the Maduru Oya region is the road/railway bridge across the Mahaweli Ganga, at the westerly entrance to System B. A new bridge will be required once the population east of the river increases significantly. According to the Department of Highways, the World Bank is considering the financing of such a bridge.

The proposals for an extension to the existing railroad, to serve Systems B and C, should be examined with reference to the feasibility reports for these systems. Particular attention should be paid to freight volumes and pattern, and to the comparative cost of commercial transportation by an improved future road system.

Within the region, four component systems of the Accelerated Mahaweli Programme are being studied, designed or implemented. Systems B and C, the current thrust of the Accelerated Mahaweli Programme, will be under the

construction supervision of the MDB. Systems A and D may be implemented by the Irrigation Department. System E, on the left bank of the Mahaweli, opposite System C, also forms part of the region. All activity is coordinated by the Mahaweli Authority.

While detailed attention is being paid to the planning of the component systems, the overall regional framework and inter-system linkages are so far not being examined. This could result in opportunities being lost and a reduction in the region's potential. A plan for the region should, therefore, be developed as a matter of priority. In the planning exercise, attention should be paid to, among other things

- principal transportation facilities (road, rail, air, water)
- relationships between the Mahaweli systems
- functions and locations of major centers
- hierarchy of subordinate centers
- demographic and cultural aspects
- potential of farm and nonfarm sectors
- incentives and organization required to meet development objectives for farm and nonfarm sectors
- administrative boundary matters.

A regional plan would produce a blueprint of how a region should develop and how it can be made to develop along the lines indicated.

3.2 - The Project Area Development Plan

Central to the physical planning for System B is the change in land use that will result from the introduction of irrigated agriculture. Table I-3.2 shows the elements of major change. Agricultural lands will increase from 14 000 ha to 48 000 ha; land for homesteads and settlements will increase from 3,000 to 23 000 ha; and chena and forest land will decrease from 100 000 ha to 46 000 ha. About 54 000 ha, or 44 percent of the overall area, will undergo a complete change in land use, while indirect effects will be felt on the remaining area.

Chena and forest presently account for 100 000 ha, of which 54 000 will be required for cropland, homesteads and settlements. If all of the chena land were used, some 21 000 ha of land classed as forest would still be required. However, since chena land is scattered, not all of it would be used. Hence the requirement for forested areas exceeds 21 000 ha; most of this is characterized as scrub jungle.

The physical impact on the existing project area population will be modest; the existing population of 26 000 will for the most part be able to continue to live in or near their present locations. However, the present settlement pattern already favors the uplands. Any moving will be over a short distance and should not entail great expense to families since most existing homes are not of a permanent nature.

Detailed planning of the location of settlements will be undertaken during project design. However, it is apparent now that the future pattern of settlements would tend to be

TABLE I-3.2

PRESENT AND FUTURE (YEAR 2000)
LAND USE IN PROJECT AREA

	1980*		2000	
	(ha)	(percent)	(ha)	(percent)
Paddy Farms	13 700	11	45 500	37
Upland Farms	-	-	2 200	2
Chena	32 800	27	12 800	10
Forest	66 700	54	32 900	27
Homesteads				
Settlements	2 900	2	22 700	18
Standing Water	3 200	3	3 200	3
Rock Outcrops	3 900	3	3 900	3
Large Farms	600	-	600	-
TOTAL	123 800	100	123 800	100

Notes: A modest land area for future livestock will also be required; this will affect the chena and forest categories.

Total area shown based on airphoto coverage which is about 90 percent of the total project area.

*From Table A-3.1.

diffused rather than concentrated due to the widespread locations of the lands that will be irrigated. Proposed agricultural land, comprising 39 percent of the project area, is located in such a pattern that it will be difficult to plan settlements with only a small range of settlement sizes in mind.

The main criteria for the location of settlements are the distance between the paddy field and the homestead and, of similar importance, the distance between the homestead and the nearest elementary school.

System B is about 45 km by 50 km in extent and covers an area of some 1,300 km^2. From a present population density of about 20/km^2, the area will reach a density of about 188/ km2. This compares with a present national density of about 225 persons/km^2.

System B is divided into 3 planning sectors (see Figure I-5). Sectors 1 and 2 comprise the left bank area of the Maduru Oya with Sector 1 being the area south of the railway and Sector 2 the remaining area of the left bank. Sector 3 is the right bank area. In terms of expected farmer settlement the sectors are comparable. Sector 1 will accommodate about 9,400 settler families, Sector 2 about 11 700, and Sector 3 about 14 200. Sector 1, which includes the Pimburettewa Tank Scheme, presently contains two-thirds of the System B population while Sector 3 contains 10 percent (see Table I-3.3).

A detailed land use, settlements and infrastructure plan should be prepared for Sector 1 of System B, the area to be developed first. The integration of the Pimburettewa Scheme into this sector and the future roles of the centers of Aralaganwila, Ellawewa and Manampitiya should be addressed. This plan should be prepared concurrent and in close

cooperation with the engineering design of the orrigation systems for Sector 1. As can be seen from the map f existing infrastructure (Figure I-7), Sector 1 is the area presently most developed, on account of the Pimburettewa Scheme.

Figure I-8 presents a general (land classification) map of System B. Land suitable for irrigated agriculture is indicated. With one notable adjustment, the paddy area shown is proposed for development. Development of the Nelugala Corridor is included in the proposed plan while the northeastern area is conditionally "dropped-off" to achieve water balance.

Alternatively, water balance could be achieved with the corridor excluded and the northeast area developed. However, this is not recommended because the corridor would divide the project area in two; it would be crossed by a railway, roads and canals and would present significant wildlife/farmer/settlement conflicts. At present the communities of Wadamunne and Uthuchenai are located within the corridor; their position would be uncertain if the corridor is established as a specific land use feature.

The "drop-off" area selection tempered economic rationale with land-use planning considerations. While it would be somewhat more economical to defer a number of separately located areas, it was felt that the integrity of the overall development plan would best be served by deferring the command areas of LB-L10 and LB-R8. Regardless of which areas are decided upon for deferment, special efforts should be made to minimize the amount of encroachment that could take place on such lands.

TABLE I-3.3

POPULATION OF THE
PROJECT AREA - 1979

District	No. of Persons	Percent	Persons Per km^2
Polonnaruwa	20 930	81	29
Batticaloa	4 255	17	8
Amparai	572	2	22
TOTAL	25 757	100	20

Sector	No. of Persons	Percent
1	17 304	67
2	5 849	23
3	2 604	10
TOTAL	25 757	100

Source: Tables A-4.2 and A-4.3

Figure I-8 also shows the irrigable upland soils, in blocks exceeding approximately 40 ha. These lands are widely scattered and in many cases are surrounded by large tracts of potential paddy land. In order to provide homesteads for paddy farmers within reasonable walking distance, certain upland blocks have been designated for unirrigated homestead development. The agricultural suitability of these sites will not be wasted, as homestead crop cultivation will take place on them.

Table I-3.4 shows the 55 identified upland blocks and an allocation, based on locational review vis-a-vis paddy lands, for homesteads or agriculture. The overall allocation between the two land uses should be considered indicative, as detailed planning may well change individual block designations. However, more detailed examination of sample areas (see Section 3.5) has confirmed the general necessity of allocating some upland blocks for settlement.

The development plan exclusive of the deferred area contains some 4,600 ha of irrigable uplands, of which some 2,400 ha may be required for homesteads, leaving 2,200 ha to be developed for irrigated upland crops. This area is spread over 26 individual sites (see Table I-3.5). When irrigation infrastructure losses are accounted for, a wet area of 1,800 ha is available for allocation to farmers.

The future land use for System B is indicated in Figure I-9. It shows future paddy lands mostly concentrated along the Maduru Oya and remaining paddy lands rather scattered. There are significant areas that can be retained and further developed as forest, thus helping to meet the large firewood demand of the future population. Major settlement concentrations are indicated subject to further planning. The basic roads network as shown is discussed in Section 3.4.

TABLE I-3.4

TOTAL UPLAND BLOCKS OF
IRRIGABLE LAND - SECTORS 1, 2 AND 3

Sector 1

Block No.	No. of Hectares	Allocation: Homesteads	Allocation: Agri-culture
1	232	232	-
2	71	-	71
3	50	-	50
4	174	174	-
4A	34	-	34
4B	34	-	34
5	71	-	71
5A	35	-	35
5B	39	-	39
6	46	46	-
7	104	-	104
8	44	-	44
9	129	129	-
10	59	59	-
11	69	69	-
12	131	-	131
13	209	-	209
14	59	-	59
15	63	63	-
16	40	-	40
	1 693	772	921

Sector 2

Block No.	No. of Hectares	Allocation: Homesteads	Allocation: Agri-culture
17	71	-	71
18	129	129	-
19	57	57	-
20	62	62	-
21	127	127	-
22	48	48	-
23	58	-	58
24	49	-	49
25	110	110	-
26	304	-	304
27	150	-	150
28	60	-	60
29	112	-	112
30	70	-	70
31	57	-	57
32	108	-	108
33	90	90	-
34	48	-	48
35	47	-	47
36	65	-	65
37	92	-	92
38	74	-	74
39	432	-	432
40	85	-	85
	2 505	623	1 882

Sector 3

Block No.	No. of Hectares	Allocation: Homesteads	Allocation: Agri-culture
41	150	150	-
42	114	-	114
43	52	-	52
44	305	305	-
45	141	-	141
46	41	-	41
47	110	110	-
48	58	58	-
49	49	49	-
50	294	294	-
51	102	102	-
	1 416	1 068	348

Notes:
1 - Total Sectors 1, 2 and 3: 5,614 ha; 2,463 homesteads, 3,151 agriculture.
2 - Blocks 32 to 40 (1,041 ha) are located in the area to be excluded from development due to water balance.#33 is not excluded.
3 - Blocks 28 and 29 (171 ha) are located in the proposed Nelugala (elephant) corridor.
4 - Part Sector 2 included in base case development concept: 1,464 ha of which 533 ha homestead and 931 ha agriculture.

TABLE I-3.5

UPLAND BLOCKS OF IRRIGABLE
LAND INCLUDED IN SYSTEM B DEVELOPMENT PLAN*

	Total Hectares		Homesteads		Agriculture	
Sector 1	1,693	(20)	772	(7)	921	(13)
Sector 2	1,464	(15)	533	(6)	931	(9)
Sector 3	1,416	(11)	1,068	(7)	348	(4)
Total System B	4,573	(46)	2,373	(20)	2,200**	(26)

* No. of blocks in brackets
** After 18 percent allowance for irrigation system infrastructure, the net area available for agricultural production is 1,800 ha.

3.3 - Settlements

The land currently in use for homestead and settlement is about 3,000 ha. If the proposed 0.4-ha homestead concept is accepted, the land requirement for farmers' homesteads would total some 17 000 ha. Nonfarm settlers on 0.2-ha plots would increase the requirement to 20 000 ha. To accommodate future increases in the nonfarm population a further 3,000 ha should be identified. For homesteads and settlements some 23 000 ha is to be planned for (see Table I-3.6).

Much of the settlement area will be part of the economic base of the area, providing homestead crops and accommodating livestock. The proposals call for the allotment of plots to nonfarm settlers and therefore land-use provisions should be made to allow for a measure of spontaneous nonfarm settlement. Such settlement would be an indication of the attraction of the area; it should therefore not be hampered for lack of sites.

For the H area, and to date in the planning of System B, the basic settlement units considered by MDB are

- the hamlet, with 100 to 125 households and a population of 500 to 600

- the village, with 400 to 500 households and a population of 2,000 to 2,500 (or combination of 4 to 5 hamlets)

- the township, with 2,500 to 4,000 households and a population of 12 500 to 20 000 (or combination of 5 to 8 villages).

TABLE I-3.6

LAND REQUIREMENT FOR HOMESTEADS AND SETTLEMENTS

	Hectares
34 300 paddy farmers on 0.4 ha homesteads	13 720
Allow 25 percent for roads and other infrastructure	3 430
11 800 nonfarm settlers on 0.2-ha plots	2 360
Allow 25 percent for roads and other infrastructure	590
Total land requirement for homesteads and settlements	20 100

Notes: Homesteads for upland farmers not included, as they are situated on-farm.

Allowing for more nonfarm settlement by the year 2000, the total land requirement increases to 22 700 ha.

For each settlement type certain facilities are planned. The hamlet would have a primary school, a cooperative store and post box, while the village and township would have higher levels of services.

The detailed planning of settlements for the area has yet to be undertaken, as it must build on the indicated future agricultural land-use information only recently completed. As a basis for discussion, the following organization of settlements for System B is suggested.

Regional Centers

Whether the area should have its own regional center or whether it should rely on Polonnaruwa to serve this function is still a matter to be determined. The town of Polonnaruwa presently has a population of less than 20 000. With a projected population for System B of some 250 000, a district regional center could well develop at Welikanda, especially if district administrative functions are located there. However, if the project area remains divided between the districts of Polonnaruwa and Batticaloa it is less likely that a regional center would develop.

Towns

Area settlements of significance include Aralaganwila (resulting from the Pimuburettewa development), Manampitiya and Welikanda. The latter two are situated along highway A11 and the railroad. While Welikanda is more centrally located within System B, and with respect to the ultimate population, Manampitiya is at the gateway of the system and Sector 1. It would be appropriate to stimulate development at Manampitiya in the early years of implementation, to assist this commu-

nity in reaching a size sufficient to attract commerce and service. With the development of Sectors 2 and 3, the emphasis would shift eastward to Welikanda, but by that time Manampitiya would be established as a functional center. For Sector 2, north of the railroad, Trikonamadu could well develop as a township, serving population from System A as well.

For the right bank area, a new community, Meeyankolla, could develop to serve the needs of the population. To provide full access to Sector 3, two bridges across the Maduru Oya will be required; east of Aralaganwila and south of Welikanda. The upgrading of the existing causeway at Kiran will also be required. It may be possible to develop the area without a crossing near Aralaganwila with all of Sector 3 oriented north and east.

Table I-3.7 shows the indicated towns and the population sizes they might attain. On a combined basis, the towns and the regional center would account for some 32 percent of the area population.

For each town, an official land use and developemnt plan is required. For Welikanda, MDB is in the process of preparing such a plan. For Aralaganwila, an Irrigation Department plan exists which requires attention. For towns and villages it will be important to determine optimum dimensions for homestead and nonfarm plots to achieve best utilization of the plots, consistent with infrastructure requirements.

Villages

The village would be 600 families or 3,000 persons.

TABLE I-3.7

INDICATED RANGE OF SETTLEMENTS*

			Population
Regional Center - Welikanda		(5 000 families)	25 000
Towns (or Townships) -			
Manampitiya	15 000	(3 000 families)	
Aralaganwila	15 000	(3 000 families)	
Meeyankolla	7 500	(1 500 families)	
Punanai	7 500	(1 500 families)	
Trikonamadu	5 000	(1 000 families)	
Other	5 000	(1 000 families)	
Total			55 000
Villages - 15 at 3 000 population (600 families)			45 000
Small Villages - 25 at 1 500 population (300 families)			37 500
Hamlets - 50 at 750 population (150 families)			37 500
Subhamlets - 100 at 250 population (50 families)			25 000
Scattered Settlements of less than 50 families			25 000
Total Population (50 000 families)			250 000

*Based on project area population of 250 000.

This is about the same as the village size currently used for planning purposes. Villages would include centers like Ellawewa and Wadamunne.

Small Villages

With 300 families or 1,500 population, small villages would be able to offer a basic range of services, such as commerce, education, health, etc. Forty villages and small villages would, with a total population of 83 000 account for 30 percent of the total population.

Hamlets

Slightly larger than the MDB hamlet, this community of 750 persons (150 families) can provide a school, a cooperative store, some boutiques and mobile health service.

Subhamlets

These communities, with a size of 50 families or 250 persons would be the smallest grouping of dwellings to which a social service can be allocated. A subhamlet could support a small elementary school with two teachers. Educational facilities in settlements of this size would increase the enrolment ratio. A typical subhamlet would have 65 elementary students. The subhamlet with 50 homesteads of 0.4 ha would require a gross area of 25 ha, equal to an area of 500 m by 500 m. Below the subhamlet level there will still be a requirement to settle families in smaller clusters or strips, depending on geographical conditions, present settlement patterns, access conditions, location of paddy fields, etc. Such small clusters should be within easy walking distance of a higher order settlement, so that access to schools is ensured. Many of the present settlements in System B fall within the "scattered" category.

The concept of this wide range of settlement sizes should be reviewed in concert with the 0.4-ha homestead paddy lands within the project area indicated by Figure I-9.

3.4 - Roads

Five categories of roads are identified: access roads, the primary road network, irrigation system road, link roads and roads within settlements. Their costs are summarized in Table I-3.8.

Access Roads

These jeep type roads are to be constructed in advance of main and branch canal construction, for use by engineers and surveyors. The network will cover the 245-km canal network, but after canal construction, these roads will be of limited use. The total estimated cost is Rs 200,000 per km, resulting in a total estimated cost of Rs 49 million. upgrading cost of A11 and the eventual construction of a separate road bridge (leaving the existing bridge for rail) are not considered as project costs.

Consultants sponsored by the Asian Development Bank have estimated costs (about Rs 1.5 million/km) for primary roads in the Maduru Oya area. The cost includes full road formation (including structures) and 24-ft pavement with gravel surface. Metal surface is estimated to add a further 20 percent to costs.

TABLE I-3.8

SUMMARY OF ROAD COSTS
(mid 1979 prices)

Type	Length (km)	Rs per km	Total Cost (million Rs)
Access Roads	245	200 000	49
Primary Roads	155	1 500 000	233
Irrigation System Roads Upgrading	80	200 000	16
Link Roads	250	300 000	75
Roads Within Settlements	450	125 000	54
TOTAL			427

Note: Of the total cost, Rs 311 million was used in the economic analysis.

The primary road network consists of some 10 roads, all of which should be required if System B is fully developed. The network is shown in Figure I-9; it is compatible with regional needs and the location of existing and proposed communities. Many of the roads now exist in basic form or as tracks; the indicated cost is to bring them to or replace them with roads of primary standard.

Table I-3.9 shows that the length of the 8 roads within System B is 155 km, and the construction cost Rs 233 million. Fifty percent of this cost has been taken into account in the project's economic analysis; it is possible that not all will be constructed to the costed standard during the project implementation period.

Irrigation System Roads

These roads will be on the banks of the main and branch canals. As such they make a major contribution to the internal road network of System B; some 245 km of such road will be constructed. While a large proportion will be suitable for moderate traffic volumes, some canal roads will require extra width and graveling or metaling. This basic road network is constructed as part of the irrigation system, and the costs are included under system construction. For surfacing and widening a cost of Rs 200,000/km has been allocated to one-third of the network. The total cost is Rs 16 million.

Link Roads

These would link settlements to other parts of the road network, and would complete the road network, except for roads within settlements. Some link roads already exist (see Figure I-7) but many more would still be required. Total

TABLE I-3.9

PRIMARY ROAD NETWORK

	Total (km)	Total Cost (Million Rs)	System B (km)	System B Cost (Million Rs)
Manampitiya - Aralaganwila	20	24	20	24
Aralaganwila - Maduru Oya Damsite	18	22	18	22
Maduru Oya Damsite - Maha Oya	24	36	NIL	NIL
Manampitiya - Dehiattakandiya	40	64	20	32
Dehiattakandiya - Aralaganwila	25	40	NIL	NIL
Aralaganwila - Meeyankolla	23	42	23	42
Meeyankolla - Welikanda	17	64*	17	64*
Welikanda - Trikonamadu	22	26	22	26
Meeyankolla - Kiran	21	*	21	*
Meeyankolla - Punanai	14	23	14	23
TOTAL	224	341	155	233

*Costs of Meeyankolla - Welikanda and Meeyankolla - Kiran roads are combined.
Source: Mahaweli Area Roads Development Project, Asian Development Bank, December 1979.

length will depend on the pattern of settlement and how well the basic irrigation road system serves the link road function. It has been estimated that 250 km of link road will be required, at a total cost of Rs 75 million.

Roads Within Settlements

These are the internal roads that serve homesteads. They are not required to take any volume of motorized traffic; most need not be more than 12 ft in width. Allowing for existing settlement some 30 000 new homesteads will be added to the area. Each would have some 15 m of road, for a total length of 450 km. At a cost of Rs 120,000/km, this totals Rs 54 million.

3.5 - Sample Areas

Detailed irrigation system layouts were developed for five specific areas within System B. While the prime reasons for doing this were to develop concepts for system design and to provide a basis for estimating tertiary system costs, the resultant designs also afforded an opportunity to consider certain settlement aspects.

The locations of the sample areas - chosen to reflect a range of terrain conditions - are indicated in Figure I-8. Together the sample areas cover some 10 percent of the total project area. The irrigation aspects, which are discussed in Annex D, were developed on the basis of soil and topographic information, with the objective of utilizing within the sample area the maximum amount of land for irrigated agriculture. To this end, two distinct irrigation systems were developed: one for paddy land and one for uplands. The

location of villages in relation to irrigable land was not considered a specific design parameter in the design of the irrigation systems within the sample areas; this matter is addressed here.

In reviewing the sample areas for their potential for village settlement, 0.4 ha was taken as the size of the settler homestead. To this an allowance of 25 percent was added to account for the space required for roads, community facilities, pastures and woodlots. Therefore 0.5 ha was used as the amount of overall nonirrigable land required per settler.

While in general the areas indicated for settlement would serve this purpose well, the soil characteristics could vary considerably, thus making certain areas better for growing homestead crops. This should be taken into account in the final selection of homestead areas.

In addition to homestead size, the distance to the paddy field was considered; it is generally thought that a distance in excess of about 2.0 km would begin to affect productivity.

The sample areas, showing indicated irrigated agriculture and settlement areas, are shown in Figures I-10 to I-14. In reviewing the areas, account has been taken of the surrounding areas since this obviously bears on the location decision.

Sample Area 1 is located just north of the Pinburettewa Scheme, between Tract 9 and the Galnewa tank scheme. It contains exclusively paddy. Some 450 ha of irrigable paddy land is available for allotment to paddy farmers. The westerly section provides sufficient room for the location of

a village of 450 settler families. Up to 25 percent of the settlers would be faced with distances to the paddy field in excess of 1.5 km although few would travel more than 2.0 km. Considering the lack of alternative settlement locations, this situation could be considered acceptable. To the south, Tract 9 of Pimburettewa would seem to preclude settlement there,* while the Kuda Oya to the east and the Galnewa scheme to the north effectively limit settlement potential in those directions.

Sample Area 2, situated in the northwest corner of the project area, lies between the livestock farm reserve and the Mahaweli floodplain. It contains 698 ha for paddy farming and 290 ha for upland farming. The settlement concept for uplands calls for 1.8 ha of uplands per settler, of which 0.3 ha is considered homestead. Some 160 upland farm families would be accommodated. The paddy farmers would be located in three villages: a village of some 450 settlers around branch canal LB-L7A,** a village of some 400 settlers north of Mawa Kulam, and a small village of 150 settlers near the center of the Sample Area. Roads to these settlements would mostly follow the canal systems, with the main road crossing LB-L7 into the Sample Area at 4 km.

While the three villages can absorb 1,000 settlers (for an area with only 700 paddy farms planned) there is nevertheless a conflict in that distances to paddy fields for some of the settlers would be more than 2 km.

*Land in Tract 9 has already been allocated and when water becomes available the absentee settlers would return.
**Paddy farmers just northeast of the Sample Area could also find homesteads here.

If this is considered unacceptable a solution can be found in utilizing part of the uplands for homesteads. For example upland block No. 25 which borders on the floodplain could become a village for some 250 settlers or perhaps the northern part of upland block No. 26 could be used to enlarge the village around LB-L7A. (The possible use of block No. 25 for homesteads was indicated in the review of upland blocks - see Table I-3.4.)

The Rottuwa Wewa tank may become redundant, thus potentially making the tank area available for agriculture; this would increase the requirement for homestead land in the area. A certain amount of settlement of paddy farmers within paddy fields may be inevitable in some areas; in such situations additional paddy land would compensate for lack of a homestead located above gravity command.

Sample Area 3 straddles the highway at the National Paper Corporation farm location. The part of the area north of the highway contains 734 ha suitable for paddy farmers and 106 ha suitable for upland farmers. This latter area - upland block No. 33 - will likely be required for homesteads if the large paddy area to the west of it is to receive reasonable settler access. A village of some 250 settler families could be accommodated on the highlands. A village of some 500 settlers would be indicated along LB-R7, east of Kadawatamadu Kulam, thus making the overall area north of the highway settlement sufficient.

South of the NPC farm, however, is the Maduru Oya floodplain, with an allottable area of 492 ha. The prospects for settlement of these farmers within close range are limited, as elsewhere in the Maduru Oya floodplain. It would seem that

roads leading from the highway to the floodplain at regular intervals would provide a partial solution to settler access. Settlement would be concentrated in locations along the highway and paddy farmers would travel to their floodplain fields by bullock carts, two-wheel tractor carts, or perhaps some form of communal transport. Because of flooding, the strip of uplands along the Maduru Oya levee is not suitable for settlement; instead it is proposed that this area be a forested belt.

Sample Area 4 is difficult in terms of settlement since it covers the area of confluence of the Maduru Oya and Rotuwa Ela - the command area of Branch Canal RB-L2. It contains 1,338 ha for lowland settlement and a potential 404 ha for upland. Some of the uplands are indicated for settlement - block No. 47 with a village of 250 settlers and part of block No. 50 with a village of 125 settlers. (Table I-3.4 showed all of block No. 50 for homestead use but upon review it would seem that most of this block could be used for irrigated agriculture if nearby out-of-command locations prove to be suitable for village locations.) Three contiguous villages, with 250, 375 and 350 settlers, would provide for most of the settlers. Sample Area 4 would be able to accommodate all 1,338 paddy farmers only if some upland are utilized for homesteads.

Along the south of the area would run the proposed Aralaganwila-Meeyankolla primary road with secondary roads going north along Branch Canal RB-L2 and into the out-of-command settlement area.

Sample Area 5 is located on the southern boundary of the project area; it covers the command of RB-R1B. This Sample Area contains 1,039 ha for allocation to paddy farmers and 294 ha for upland farmers. The entire upland block No. 44 has been designated for homesteads in order to achieve paddy farmer settlement within reasonable distance of fields. Even so, some distances will exceed the acceptable norm.

Alternatively the area south of the project area could be considered for settlement. This would require structures across the Meeyankolla Ela. Still, farmers would have to traverse the floodplain south of the Meeyankolla Ela thus perhaps not achieving a locational advantage.

Four villages are indicated for Sample Area 5 ranging from 150 to 450 settlers. To the north of Sample Area 5 the land under the Tharavai Kulam tank has been classified as unsuitable for paddy cultivation. Instead of rehabilitating this small scheme (damaged by the 1978 cyclone) the land could be used for settlement, with present per unit holders being allocated hectarage within Sample Area 5.

The five sample areas require the settlement of 4,800 paddy farmers, 3,000 of which are settled in out-of-command areas.

A further 1,300 are settled on uplands which can therefore no longer be considered for irrigated agriculture. The final 500 could not be designated for settlement since the paddy fields are located in the Maduru Oya floodplain. Table I-3.10 shows the summary statistics.

TABLE I-3.10

SETTLEMENT IN SAMPLE AREAS

Sample Area	Required No. of Paddy Settlers*	Approx No. of Settlers Accommodated in Sample Area on Nonirrigable Land	Deficit of Home-steads	Approx No. of Settlers Accommodated in Sample Area on Irrigable Highlands	Deficit of Home-steads
SA 1	456	450	NIL	NA	NIL
SA 2	698	1,000	NIL	NA	NIL
SA 3	734 492**	500 NIL	234 492	250 NIL	NIL 492
SA 4	1,338	975	363	375	NIL
SA 5	1,039	375	664	675	NIL

* Equals the net lowland hectarage available; each settler is to be allocated 1 ha (from Table D4.1).

** Situated in floodplain.

On the basis of the review of sample areas it can be said that it will be possible to plan for the required settlements in System B within the limits of the three main key parameters: size of agricultural holding, size of homestead, and the distance between. However, homesteads and paddy land can only be "matched" when an amount of irrigable uplands is utilized. This trade-off is a feature of the proposed development plan. Another feature is the need for special attention to the floodplain area since it is clear that many floodplain farmers cannot be housed near to their lands.

In the sample areas some 15 villages were indicated ranging in size from 150 families to 500 families; the average is about 300 (see Table I-3.11). The populations of these villages (or groupings of villages, since many are contiguous) are sufficient to allow for basic social infrastructure, especially schools. Most villages would qualify for their own primary school (about 300 students) and even the smallest villages would amply qualify for a small school (about 100 to 120 students).

The review of the sample areas has provided a starting point for considering the planning of settlements in System B. It is suggested that detailed physical planning be carried out for the sample areas to assist in the establishment of specific settlements planning benchmarks for System B.

TABLE I-3.11

VILLAGES AND HAMLETS
IN SAMPLE AREAS

Sample Area	No.	Size of Village - No. of Settler Families	Population at 5 Persons Per Family	School Enrollment at 1.25 Pupils Per Family
SA 1	1	450	2 250	560
SA 2	3	450	2 250	560
		150	750	188
		400	2 000	500
SA 3	2	500	2 500	625
		250	1 250	313
SA 4	5	250	1 250	313
		125	625	156
		350	1 750	438
		375	1 875	469
		250	1 250	313
SA 5	4	200	1 000	250
		150	750	188
		450	2 250	560
		250	1 250	313

4 - SOCIAL INFRASTRUCTURE

A significant amount of social infrastructure is required for the project population. The cost of providing schools, hospitals, post offices, and police stations is not considered an economic project cost as these services should be available at no cost to Sri Lankans, wherever they choose to live on the island. However, the financial cost of constructing social infrastructure facilities exceeds Rs 6,600/family.* This, and the considerable operating costs, would normally be borne by the responsible departments and ministries, although MDB would in most cases organize construction. Staffing and staff housing requirements will also be considerable and have been taken into account in developing cost estimates. Those engaged in social services will account for a large part of the area's nonfarm population.

Detailed social infrastructure and operations planning has already been commenced by MEA and MDB but more work on standards and benchmarks is required.

Schools

It has been recommended that small, one-block schools be used extensively in order to reach subhamlet populations. Larger schools are required in the larger centers. For a mix of schools, the cost of school buildings, teachers' accommodation and school furnishing has been estimated to cost

*Added to settlement cost of Rs 4,700/family, the total comes to Rs 11,300/family.

Rs 2,500/student, based on an analysis of MDB school construction data. Considering the 35 000 farm settler families and the existing inventory of area schools, an additional 40 000 student spaces will be required, at a total cost of Rs 100 million.

Health

The project area will need a 90-bed district hospital, four 48-bed peripheral units, 12 central dispensaries and village accommodation for 60 health workers/midwives as a minimum to serve a farm population of 35 000 families. The total cost would be RS 40 million.

Police and Post Offices

A large police complex is already being planned for Welikanda. The costs of this complex including staff accommodation, transportation and other equipment, together with the cost of four smaller police stations and housing in other project area townships are estimated to be Rs 6 million. The Rs 6 million estimate for postal services includes 3 post offices, 20 sub post offices, post boxes, transportation and equipment.

Electricity and Telecommunications

While most of the project area households will not have electrical service, public, community and commercial buildings and paddy processing plant should be served.

This requires a distribution network that touches all settlements of any size. The estimate of area electrical service includes 150 km of 11-kV line, 75 km of low-tension line, three 500-kVa substations, thirty 80-kVa substations, 4,000 service connections and housing for senior operation staff, for a total of Rs 30 million. According to the Telecommunications Department, basic telephone service can be provided to the area's main centers for an estimated Rs 5 million.

Development Centers, etc

This includes a major community development center for the project area, along the lines of the center being developed for System C at Girandurukotte, smaller centers in other towns, community meeting facilities in villages and Grama Seveka buildings. A total requirement of some 17 000 m^2 of buildings is indicated, for a total cost of Rs 21 million.

Markets, Banks, Cooperative Stores

Five markets, 1 for each major urban center, 14 banks, a large central cooperative depot and 20 cooperative centers are indicated at an estimated total cost of Rs 17 million.

Urban Water Supplies

A number of towns will require some form of piped water system. For Welikanda such a system, involving a storage tanks for well water obtained near a tank location, and a gravity distribution network is already being implemented. Other towns with significant nonresidential activity would in time also require piped water. The estimated cost of Rs 6 million does not include any water treatment facilities.

A final miscellaneous cost category of Rs 12 million (5 percent) is included to cover social capital costs not specifically included in the foregoing.

In total, social infrastructure costs are estimated at Rs 243 million (see Table I-4.1). While this is a significant amount, it represents only a very small portion of the overall financial Maduru Oya project cost (4.3 percent). The certain and timely expenditure of these monies would aid materially in helping the settlers achieve the project's social and economic objectives.

TABLE I-4.1

SUMMARY OF SOCIAL INFRASTRUCTURE COSTS
(million Rs [1979])

Schools	100
Health	40
Police and Post Offices	12
Electricity and Telecommunications	35
Development Centers, Town Centers, Community Meeting Facilities, GSD Buildings	21
Markets, Banks, Coop Stores	17
Urban Water Supplies	6
Miscellaneous Infrastructure	12
TOTAL	243

APPENDIX I

PIMBURETTEWA: A STUDY OF AN EXISTING SETTLEMENT SCHEME IN SYSTEM B OF THE MAHAWELI DEVELOPMENT PROGRAMME

PREPARED BY:

A. M. SAMARASINGHE
AND
H. K. D. L. GUNASEKERA

MAHAWELI DEVELOPMENT BOARD,
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1 - OBJECTIVES

The objectives of this survey of the Pimburettewa Settlement Scheme are

- to record specific information pertaining to a recent settlement scheme in the System B area and to develop from this an understanding of settlement factors

- to collect data supplementary to the Paddy Crop Cutting Survey carried out by Acres International in the 1979 Yala and 1979/1980 Maha seasons in the above settlement scheme (see Annex E).

1.1 - Sample Selection and Method of Data Collection

The sample which was used in the crop cutting survey was used to collect supplementary data. This sample consisted of 46 households, which had been selected on a random basis. Only 43 households were interviewed as three householders were away from their homes during the study period.

Information was gathered through informal and open discussions with the 43 chief householders over a period of 3 weeks during May/June 1980. Each of these interviews took approximately 3 hours. In these discussions supplementary information was provided by the wives and adult children of the farmers. In addition, informal discussions were held with some farmers outside the sample.

1.2 - Background of the Settlement Scheme

The Pimburettewa reservoir is located about 2 miles south of Aralaganwila village in Egoda Pattu in Polonnaruwa District. This was an abandoned tank across the Kuda Oya in the Maduru Oya basin. After investigations by the Irrigation Department from 1963 to 1966, proposals were developed to restore this tank to store 40 000 ac ft and irrigate 4,000 acres of paddy land on the left bank of the Kuda Oya. In 1969 the restoration commenced.

The Pimburettewa Reservoir Scheme, which consists of 9 tracts, was designed to absorb 1,330 colonists by providing 3 acres of irrigable paddy land and 2 acres of highland to each colonist. Some 900 colonists were to be brought from outside and the balance were to be selected from the immediate area.

About 100 colonists were selected from Alawakumbura village which was completely submerged by the reservoir. It has been Government policy to give land just below the tank to people whose lands are submerged by such schemes.

Fifty colonists were selected from the Pol (Coconut) Colony. The Pol Colony was started as a nonirrigated colonization scheme in the late 50's for growing coconuts and 100 colonists were each given 5 acres of land and were provided with a small house. This scheme was a failure and about half of the colonists abandoned the colony. Those who stayed on were given 3 acres of Pimburettewa irrigable paddy land at the tail end of Tracts 1 and 4 as those lands are situated near the Pol Colony.

About 300 colonists were selected from the second generation of the Aralaganwila Colonization Scheme bordering Tracts 1

and 4 of Pimburettewa Settlement Scheme. The Aralaganwila Scheme was started in the 1950's to settle about 100 families with 3-acre paddy allotments.

The above three groups of farmers, who make up about one-third of the colonists, were settled in the late 60's under the "Advanced Alienation Policy" of the Government. These settlers were subsidized with food under the World Food Programme until irrigation facilities became operative. The first area, 525 acres, was provided with irrigation facilities in November 1971, with the first large area (Tracts 1 to 3 - 981 acres) cultivated in Maha 1974-75.

The colonists from outside moved in at the end of 1973 and occupied Tracts 4, 5 and 6. Farmers selected for Tract 9 left it as they were never provided with irrigation water. Most of these settlers came from Kollonawa in the Colombo District.

The anticipated total production of paddy from these 4,000 acres of paddy land was estimated at 640 000 bushels/yr from two paddy crops.

Although water is adequate for a Maha cultivation of the entire area, only about 2,900 acres can be cultivated in the average Yala season. The actual Yala crop projected by the Irrigation Department each year depends on the tank level at the beginning of the season.

Parts of the paddy plots are high and therefore unirrigable, and so a considerable area has been left uncultivated. Balancing this, however, is the common practice of cultivating canal and drainage reserves. Tract 9 is not cultivated as water cannot be conveyed.

2 - DEMOGRAPHIC CHARACTERISTICS OF THE SETTLERS

All the sample households were nuclear families except two households. The number of persons living in the 43 households where interviews were held ranged from 1 (bachelor) to 12 persons (husband, wife and 10 children). The median number was 7 persons and the average was 6.6.

2.1 - Age Structure and Dependency

Children under 14 yr and adults over 60 yr of age are considered as dependents.

Table 1 shows that 42 percent of the total population is less than 14 yr of age. The dependency ratio of the population is 0.75, that is, for every one person in the 14- to 60-yr category, there are 0.75 persons in the economically active 14 to 60 age group.

2.2 - Education

The educational attainment of settlers is generally low. As Table 2 shows, only 38 respondents had Grade 10 education or higher. Hardly anybody had gained technical education. The general education qualifications for a white collar job is Grade 10, indicating that only a few have the potential for a job outside the agricultural sector.

Ten percent of the respondents had no educational qualifications whatever; almost all of them were older persons. The educational attainment of the younger generation is higher than that of the older group.

TABLE 1

AGE STRUCTURE

Age Group		Male	Female	Total
To 14 yr	No.	64	56	120
	percent	23	19	42
14 to 60 yr	No.	92	70	162
	percent	33	25	57
Over 60 yr	No.	1	0	1
	percent	0.4	0	0.4
Total all ages	No.	157	126	283
	percent	56	44	100

TABLE 2

EDUCATIONAL ATTAINMENT BY SEX

Level of Education	Male	Female	Total*	Percent of Total
No schooling	14	10	24	10
Grade 1 to 3	39	29	68	28
Grade 4 to 6	41	26	67	28
Grade 7 to 9	27	19	46	19
Grade 10	20	13	33	14
Higher than Grade 10	2	3	5	2
Totals	143	100	243	100

*Excludes children below 6 yr of age.

2.3 - Family Composition

The concept of the life cycle of a family takes into account marital status, age of children and the presence of other persons in the household. Among the 43 households in the sample, 13 consisted of young families in which there were husband and wife only (1 family) or the husband, wife and children aged 14 yr or younger (12 families). Twenty-seven consisted of husband, wife and children over 15 yr of age. Three households were headed by an adult who was either unmarried or widowed. In two of these, household heads were unmarried adult males with no others in the household. The other one was a widow with one small child and four adult children.

2.4 - Household Labor Supply

The household labor supply was measured by using the concept of productive man work units (PMWU). According to this measure it was found the the PMWU for households ranged from .75 to 7.00; the median being 2.75 and the average being 3.18.

Productive man-work units were calculated as follows

Male aged 15 to 45 yr	- 1.00 PMWU
Male aged 46 to 60 yr	- .75 PMWU
Male aged 60 yr and over	- .50 PMWU
Female aged 15 to 45 yr	- .75 PMWU
Female aged 46 to 60 yr	- .50 PMWU
All persons less than 15 yr of age and females over the age of 60 yr	- .00 PMWU

3 - LAND TENURE

Each farmer was given uniform land allotments: 2 acres of highland and 3 acres of lowland under the Land Development Ordinance of 1935. This act was superseded by the Sale of State Lands (special provisions) Law No. 43 of 1973 which required that each farmer purchase his allotment from the state on an installment basis or by outright purchase. With the completion of payments the allottee becomes sole owner of the allotment. Several measures exist to prevent fragmentation and selling of the land to other persons. However, there are provisions for an owner to obtain a mortgage on his property. Mortgage conditions can place effective control of a property in the hands of others.

3.1 - Land Operation

Though the officially accepted form of land operation is owner-operation, several other forms of land operation take place in this settlement scheme. These can include "Ande", lease or mortgage.

In the sample, 19 percent of farmers had given out some portion of paddy land on Ande, mainly due to financial difficulties and labor shortage. Ande is given in two different forms

- The landlord provides only land to the tenant and gets one third of the harvest.

- The tenant is provided with the land, half the expenses of seeds, draft power, and half the expenses of transplanting; for this the landlord is given half of the total harvest.

Usually land is leased out in small portions and for a short period. One-half acre could be leased for Rs 150 for one season. This is a popular farmer method of raising money for urgent financial needs.

A method of obtaining a larger amount of money is by way of mortgage. A farmer faced with a sudden crisis may mortgage his land to a wealthy person and obtain cash. Interest is charged for such money and the money lender can use the land until he is reimbursed with the loan plus the interest. Sometimes the mortgagor works as an Ande tenant under the mortgagee. There are certain cases where the mortgagor could not repay the debt and ultimately sold the land to the mortgagee.

3.2 - Land Encroachment

Encroachment by nonsettlers on land reserved for future development of roads, canals, and pastures, and encroachment of land marked as unsuitable for agriculture is a feature in most settlement schemes in Sri Lanka. There are three groups of encroachers in the area, as follows

- encroachers who live on reserved lands
- encroachers who live around the settlement scheme
- encroachers who obtain land through village level organizations.

Most of the encroachers of the first and the third groups are related to farmers in the settlement scheme. It has been a practice of the settlers to bring their relatives if government land is available in the vicinity or in the settlement scheme itself. This influx has both positive and

negative aspects. In one way it provides the bulk of the labor requirement of the farmers but on the other hand it causes conflicts between settlers and encroachers. There is an instance where the selected farmer still lives on his paddy allotment as his highland is encroached upon by a nonselectee. In another case, an encroacher is running a rice mill in the settlement scheme, providing a necessary service to the farmers. Some encroachers have been able to get government aid to construct an anicut* across the Kuda Oya and they use Pimburettewa drainage water to cultivate a considerable area with paddy.

4 - LAND USE

4.1 - Irrigable Land

Almost all irrigable land is cultivated in paddy. Even in the dry Yala season every farmer grows paddy on his paddy allotment. It is interesting to note that even though most of the farmers run short of water in the Yala season, they still prefer paddy over any other crop on their irrigable farm allotment. In some Yala years, water is issued for a paddy crop for 2 acres only compared to 3 acres in the Maha. This occurred in 1980.

A few farmers are experimenting with subsidiary crops like chillies on certain portions of their irrigable allotments. One farmer complained that seeds for subsidiary crop cultivation are not available on time. There seems to be a

*anicut=diversion structure

potential for subsidiary crop cultivation in this area provided that the necessary extension services and other inputs are made available.

4.2 - Highland

Very few highland allotments are developed in the settlement scheme. Reasons given for nondevelopment of highland include nonavailability of water, sandy soil, and the very recent allocation of the highland.

It was observed that where water is available, the highlands are well covered with a variety of tree crops (including coconut, Jak, etc) and fruit crops. Tree crops like coconut are grown for domestic needs. A few farmers were growing plantain (banana) on a commercial basis. One of them reported a monthly income of Rs 60 from this source alone.

Generally, however, highland development is unsatisfactory. About one-quarter of the sampled farmers still reside on the irrigable paddy land. Sixty percent of the highlands are not or only partly developed as settlers have moved onto the highlands only recently. One settler was given highland in 1978. Only about 16 percent of the highlands are being farmed well.

The highlands are not supplied with irrigation water with the exception of the few plots which get seepage water from the canals. Thus a vast extent of land in this scheme has not been put to intensive agricultural use. The main purpose of alienating 2-acre highland allotments is for development of a homestead rather than for agriculture.

5 - AGRICULTURAL INPUTS

5.1 - Water

The main reasons cited by the 29 farmers reporting water problems in the 1979 Yala season is that they cultivate the entire allotment (3 acres),. though water is issued only for 2 acres. It is difficult to gauge the influence of other factors on problems of irrigation water supply. However, all the farmers who reported water problems in the Yala season mentioned that they experienced a water shortage. This is reflected in the paddy yields obtained. The average per-acre yield reported by these farmers for the Yala season was 60 bushels of paddy while the same farmers reported an average per-acre yield of 83 bushels for the Maha season.

One-third of the farmers who cultivated the entire paddy land in the Yala season mentioned no problems pertaining to water supply for the reason that they had two field inlets instead of one, or that they were getting seepage water from the canals* or because they get additional water from the drainage lines.** Most of the farmers who reported no water problems in the Yala season had their paddy lands close to the main source of water. They are in a more advantageous position than the farmers who are away from the main source of water, taking into account prevailing water management.

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* A farmer in Tract 3 whose paddy plot is the fourth on the field canal No. 4, which consists of sandy, porous soil, does not experience any water shortage even during the Yala season because he benefits from seepage water from field canals running along both sides of his paddy plot.

**A farmer in Tract 4 whose paddy land is situated near the Kuda Oya reported that he is tapping the drainage water from the fields above.

5.2 - Water Problems

(a) Proximity to the Main Water Source

Opportunities of getting the required water into the paddy fields for most of the farmers depend on the proximity to the main source of water. Farmers whose lands are close to the main source of water do not close their field inlets even after their water requirements are met. This is very common in the dry Yala season.

As they cultivate the entire plot, though water is issued only for 2 acres, farmers in the upper sections of the field canals keep their fields inlets open 24 h/day. This causes water shortages for the farmers in the lower sections. The situation gets worse when the water is issued on a rotational basis, i.e., once a week for 3 days continuously. Under this system, farmers in the lower sections get water on the third day after the water requirements of farmers above them are fulfilled.

(b) No Irrigation Canals

Two farmers who got land under the Pol Colony (see Section 1.2) stated that their paddy lands were not provided with irrigation facilities, thus they have not yet started cultivation on those lands. But they have converted the highlands, given for coconut cultivation, into paddy land by tapping water from a nearby canal.

(c) Improper Field Canals and Field Inlets

Some field canals are not big enough to convey the required water issued from the distributary canal. Thus field canals overflow and this results in water wastage, while leaving very little water for the paddy lands in the lower sections.

A farmer in the sample mentioned that all farmers in his turnout had to put in their own field inlets as the Irrigation Department did not do this. Installation of field inlets by the farmers themselved has affected the paddy lands situated below such field inlets. Every year they experience a shortage of water during the Yala season.

Two farmers in the sample reported that their field inlets are lower than the paddy fields. One of them was using a bunded canal to convey water into his paddy field. But these earth (sandy) bunds do not last for a long period.

(d) Uneven Paddy Land

Because of uneven leveling, some certain sections of the paddy allotments cannot be cultivated. In some cases as much as 1.5 acres is above gravity command and is not cultivated.

It is apparent that technical defects have resulted in insufficient water supply at the field level. It should be noted that only one farmer in the sample has complained of excess water in the paddy fields. This was due to improper drainage systems. It was observed that drainage lines are poorly maintained, and this may result in saline soil in the lower sections of the soil catena.

5.3 - Seeds

Generally all the farmers grow improved Batalagoda varieties e.g. BG 11-11, BG 34-8, BG 90-2*. In fact only one farmer

*Crop Cutting Survey - Pimburettewa Scheme - 1979/80 Maha, by Acres International.

used IR8, but he also had grown BG 11-11 on a portion of his field. According to him IR8 is more suitable for sandy soil and he used it as an experiment. The spread of improved varieties in this area seems to have reached the saturation point. The only problem in using improved varieties is that the farmers tend to preserve their seeds for subsequent seasons which might lead to inbreeding depression and loss of valuable traits, if they continue to follow the same practice for a number of years.

5.4 - Fertilizer

Eighty-four percent of the farmers were using the recommended amount of fertilizer and a further 9 percent were using some fertilizer. Three farmers did not use any fertilizer for the last Maha season, two farmers did not apply any fertilizer due to financial reasons, and one farmed in the floodplain. Fertilizers are not normally applied to the fields on the floodplain, as they are subject to minor flooding. Floods occur when the crop is at an early growing stage and subside after a short period of time, leaving silt and nutrients, and making the soil more fertile.

5.5 - Agrochemicals

Thirty-five of the interviewed farmers were using pesticides while four were not; four did not provide information. Insecticides are applied only after diseases are known--and most of the farmers had to use what was available at the cooperative. They did not have any choice or scientific guidance in agrochemical usage.

Sixty-one percent of farmers in the sample were using weedicides, and 16 percent were not; 23 percent provided no data on the subject. Generally, weedicide usage was more prevalent in the Yala season compared to the Maha season. This could be due to more weeds in the Yala season because of water shortages, and excess water in the Maha season which is used for weed control.

Generally pest control and weed control were carried out by using agrochemicals.

5.6 - Draft Power

Draft power (water buffaloes) was reported by 41 farmers. Only one farmer was using a tractor and one did not provide information.

Of the farmers using buffaloes, 56 percent were using their own buffaloes. Farmers who owned buffaloes had at least a pair of animals, the highest number being 10. Thus a shortage of draft power was not reported by the farmers.

Most of the buffaloes belonging to Pimburettewa farmers are being looked after, during the nonworking period, by the Kuda Oya people* or encroachers outside the scheme. The main reason for this is the nonavailability of grazing land in the scheme. Thus there is a potential shortage of pasture in the future if subsequent agricultural expansion takes place in the vicinity.

*Rs 25/month is paid for a pair of buffaloes as looking after fee.

5.7 - Hired Labor

The use of nonfamily labor was reported by 30 of the 43 farmers in the sample: 29 used hired labor and 1 used hired labor and also exchange labor. Only eight families in the sample relied solely on family labor. Five farmers did not provide information.

Hired labor was used in two different ways

- daily paid hired laborers. Usually they are paid Rs 15 a day with meals or Rs 20 without meals. Meals included lunch, tea and a smoke

- contractual labor. Under this arrangement certain payment is promised on a piece-work basis and no meals are provided by the farmer.

It can be concluded from Table 3 that the hiring of labor bears little relation to a low or high number of PMWU being available within the family. Usually labor is needed more during the land preparation and harvesting periods. Labor needs are highest when the transplanting is done which is again contingent on an adequate water supply.

Farmers bring additional labor from outside the area during peak periods. Very often they bring this additional labor from their home villages such as Kegalle, Kotmale, Kandy etc. or get the services of contractual* laborers. Laborers brought from home villages are usually kinsmen.

*These are semiorganized small labor groups which come from the vicinity as well as from outside during the peak seasons. The group leaders are informed by the farmers of their labor requirements.

TABLE 3

AGRICULTURAL INPUTS

Labor Availability	
Less than 2.75 PMWU/family	18 farmers
More than 2.75 PMWU/family	25 farmers
Hired labor used	30 farmers
Hired labor not used	8 farmers
No information	5 farmers
Cultivation under Ande	8 farmers
Draft Power	
Buffalo	41 farmers
Use of Chemicals (Maha 79/80)	
Insecticide used	35 farmers
No insecticide used	4 farmers
Recommended amount of fertilizer used	36 farmers
Other amount of fertilizer used	4 farmers
No fertilizer used	3 farmers
Irrigation Water Supply (Yala 79)	
Technical problems	21 farmers
Nontechnical problems	8 farmers
No problems	14 farmers

TABLE 4

PRESENCE OF IRRIGATION WATER PROBLEMS
REPORTED BY FARMERS, BY SEASON OF CULTIVATION

Presence of Problems	Yala		Maha	
	No.	Percent	No.	Percent
Have problems	29*	67	9**	21
No problems	14	33	30	70
No data	-	-	4	9
Totals	43	100	43	100

* Of these, 21 are technical and 8 nontechnical problems.
**Of these, 8 are technical and 1 nontechnical problems.

Encroachers in the scheme as well as outside the scheme provided the bulk of hired farm labor requirements.

Paddy cultivation under present technology requires seasonal labor. Therefore, migratory labor will play an important role in the future agricultural development of this area. It will not be possible to find agricultural laborers from the area or from the vicinity as those areas also experience this seasonal labor shortage.

5.8 - Method of Planting

In the settlement scheme the recommended method of planting paddy is by transplanting.

Table 5 shows that most prevalent method of planting was broadcasting (54 percent) in the Yala season and transplanting (82 percent) in the Maha season.

The reasons given for broadcasting instead of using the recommended method were: lack of water, nonavailability of labor, financial difficulties, no time, bad soil and experimentation. The supporting data is given in Table 6.

Most of the farmers who broadcasted deviated from the recommended method because of insufficient water supply, mostly due to defects in the irrigation system operation. Some had to broadcast because they could not find labor.

Some broadcasted due to financial reasons: either because they could not repay the loan taken from the Rural Bank in the previous year or their previous crop was a failure. Due to the 1978 cyclone the 1978/80 Maha crop was a failure, and some could not repay the loan. This affected successive

TABLE 5

METHOD OF PLANTING

Method of Planting	1979 Yala Season		1979/80 Maha Season	
	No.	Percent	No.	Percent
Broadcasting	23	54	1	2
Transplanted	16	37	35	82
Partly broadcasted and partly transplanted	4	9	7	16
Totals	43	100	43	100

TABLE 6

REASONS FOR BROADCASTING

Reasons	All Farmers Who Broadcasted			
	Yala		Maha	
	No.	Percent	No.	Percent
Lack of water	9	39		
No labor	4	17		
Financial difficulties	4	17	1	100
No time	2	9		
Bad soil	2	9		
Experimentation	2	9		
Totals	23	100	1	100

crops. As they did not get a good output, they had no money to repay the loans, thus they could not get loans for the next crop. Therefore, they could not use the recommended agricultural inputs in that season, resulting in a low yield. This highlights the necessity for an efficient insurance scheme and credit system. Two farmers claimed not to have enough time for transplanting. One said that he could not follow the recommended method because he was doing an additional 3 acres of paddy land (also broadcasted) on Ande (shared tenancy). Another two did not transplant as their paddy plots are sandy and the potential yield is low.

Two farmers out of the 23 who broadcasted were experimenting. According to them, they had been transplanting and they wanted to test whether it is profitable to broadcast and use agrochemicals instead of the expensive, labor-consuming transplanting method.

6 - FARM COSTS

Collection of information on this was extremely difficult as farmers relied on memory and none had any written records of their costs. Thus sometimes information given by members of a farm family differed and could not be considered.

According to the farmers the highest expense incurred was for labor. Labor rates reported by the farmers ranged from Rs 12 to Rs 15/day for males, with meals. Usually female labor was used for transplanting and harvesting on a contractual basis. Rs 350 is paid for transplanting an acre under contract.

Almost all the farmers were using buffaloes as their draft power and 58 percent of the farmers who used buffaloes were

using their own draft power. Some who hired buffaloes did so on a monthly basis. They hired the animals for a month and sometimes the payment amounted to Rs 600/month. If hired on daily basis, the payment was Rs 40 for a pair of buffaloes.

The cost of fertilizer given by the farmers ranged from Rs 498 to Rs 957. Insecticide costs cited by farmers ranged from Rs 146 to Rs 312, and costs of weedicide ranged from Rs 182 to Rs 405.

7 - PADDY YIELDS

Information obtained through farmer interviews* showed that paddy yields obtained in the 1979 Yala season ranged between 0.9 t/ha to 6.4 t/ha. The average yield for the season was 3.2 t/ha. The lowest recorded yield for the 1979/80 Maha season was 1.3 t/ha. The highest yield was 8.9 t/ha and the average yield was 4.5 t/ha for the season.

Significantly, however, the yields recorded by the Acres Crop-cutting Surveys conducted in 1979 and 1980 were generally higher than the above figures. Several factors account for this difference.

- Usually farmers keep their paddy in gunny bags and they calculate their yield by number of gunny bags. They measure this paddy only at the time of disposal. Even during the survey, some farmers counted the number of gunny bags of paddy and gave their yield figures accordingly; no allowance for personal consumption seemed to be made.

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*The interview survey collected paddy yield data for comparative purposes only.

- Wrong measures of private traders. Generally in calculating their yield figures farmers count the number of bushels they dispose of. As trader measures are often wrong, the farmers' figures are underestimated. The complaint made by some farmers against the private trader was that the measures used are frequently wrong.

- No farmer kept any scientific record of yield figures or inputs.

- No allowance is made by most farmers for bunds and terraces when they quoted yield data on a per-acre basis.

For a comparison of yield figures obtained through crop-cutting and interview surveys, see the postscript to this appendix.

The figures obtained from the Crop-Cutting Survey indicate a significant difference between Maha and Yala yield. The average yield for Maha was 5.2 t/ha vs 4.0 t/ha for Yala. The reasons given by the farmers for low yields in the Yala season include factors such as: lack of water, more weeds due to lack of water, seeds broadcasted instead of transplanted, use of short-term seed varieties and nonuse of agrochemicals in the Yala season. These factors contribute to poor yield in different degrees, depending on the nature of soil and time of cultivation. However, analysis of yield figures shows that the paddy output in the area is primarily dependent on transplanting, availability of water, and seed varieties.

There is usually a significant difference in average yields in each season between farmers who transplant and those who broadcast. However, in Yala 1979, the average yield of

transplanted plots was almost equal to the broadcast yield of 4.1 t/ha. However, the average Maha yield of transplanted plots was 5.6 t/ha, whereas the same figure for the broadcasted plots was 3.8 t/ha.

This shows that transplanting contributes to a great degree to yields, as long as water shortages do not introduce distortions to the overall picture.

At the same time a difference could be seen between yields of transplanted plots for each season. The average yield for transplanted plots in Yala was 4.0 t/ha whereas the same figure for Maha was 5.6 t/ha. This is due mainly to water shortage, as farmers cultivate the entire 3-acre plot although water is issued only for 2 acres.

According to the farmers, short-term varieties such as BG 34-8 which have a duration of 3-1/2 months do not grow into bushes, and result in a low yield. The long-term varieties do grow into bushes with a greater potential for a higher yield.

7.1 - Crop Disposition

Paddy surplus to personal requirements is marketed through the co-op and private dealers. About 50 percent of the farmers sell their paddy to the co-op. The guaranteed price for paddy is Rs 1.95/kg. This means that farmers can get at least Rs 40 a bushel if it is sold to the co-op; sometimes the price exceeds Rs 40 depending on the weight of the paddy variety. But generally farmers prefer to sell their paddy to the private dealers on account of price and institutional factors.

7.2 - Price Factors

This has to be looked at in a sociological dimension. The gap between the guaranteed price and the open-market price has been widening. Today the guaranteed price is lower that the open-market price.

It is profitable for the farmer to sell his paddy to the private dealer who comes to the farmer's house or to the threshing floor and buys uncleaned paddy without any complaint for Rs 40 a bushel. Even if he pays a lower price of Rs 38 a bushel it is profitable for the farmer since he does not have to incur any transport cost and because he can sell his uncleaned paddy without any problem. To the farmer, the private trader facilitates his marketing by bringing gunny bags and paying cash on the spot.

7.3 - Institutional Factors

Institutional factors which make the farmer sell his paddy to the private dealer can be described as follows.

(a) Shortcomings of cooperatives

- cooperatives accept paddy only on specified days and this does not always correspond with the farmers' needs

- sometimes cooperatives do not have enough cash or gunny bags to purchase paddy

- cumbersome procedures adopted by the cooperative when compared with the private dealer: paddy has to be transported to the cooperative where it will be tested

with comparatively sophisticated equipment and, if rejected the farmer has to transport it back after having waited a long time in a queue.

(b) Difficulties in obtaining institutional credit makes the farmer borrow from the mudalalies (private businessmen) to whom he will sell his paddy.

8 - LIVING CONDITIONS

8.1 - Housing

Housing types can be categorized in three main groups: modern, traditional, and temporary.

Very often housing is taken as a good indication of a farmer's performance and prosperity in the new environment compared to earlier peasant conditions. It is noted, however, that farmers who perform very well may still live in a traditional type of house. Although a house may look semipermanent or temporary to an outsider, it is still a permanent house for these farmers of peasant origin. Thus 58 percent of the farmers in the sample live in traditional houses - small, with one to two rooms and a separate kitchen area, mud floor (to which cowdung is applied), mud and wattle walls (some are plastered with mud) and cadjan roofs. Almost all of the houses surveyed were kept clean.

One in four of the sample farmers had more spacious, modern houses with cement floors, brick walls and tiled or asbestos/zinc sheeted roofs. About one in five lived in temporary dwellings, with one room, mud/wattled or cadjan walls, and cadjan or "illuk" roofs.

8.2 - Domestic Water Supply

People who live near canals have their own dug wells, most of which are unprotected. Drinking water is taken from these wells as well as from the canals. No farmer in the sample boiled water before using it for drinking.

Bathing was done mostly at the nearest canal and at the tanks.

8.3 - Sanitation

Most of the farmers had at least a temporary latrine; they expressed a desire to receive the concrete lavatory slabs promised by the Government.

9 - INFRASTRUCTURE

9.1 - Access Roads and Mode of Transport

Easy access is provided with a tarred road leading from the Polonnaruwa - Batticaloa highway at Manampitiya. At the fourteenth mile one enters into the settlement scheme. This tarred road runs right through the middle of the scheme, to Aralaganwila, and continues from there as a gravel road to the Maduru Oya campsite. The entire road length is being widened or relocated by the Mahaweli Development Board in preparation for System B development.

Within the settlement scheme, homesteads are provided with access roads in addition to the canal roads, thus providing adequate access.

Public transport is provided both by Ceylon Transport Board (CTB) buses and by a private bus service. Although the CTB bus service provides the biggest part of public transport, two out of three farmers expressed some dissatisfaction, mostly due to the lack of punctuality.

The traditional cart still plays a role as a mode of goods transport.

9.2 - Educational Facilities

Generally farmers are pleased with the available educational facilities. About 17 percent expressed their dissatisfaction mainly due to lack of required furniture at the schools. Certain farmers mentioned that some primary schools are being neglected by the Department of Education. A few farmers had boarded their children at Polonnaruwa for lack of adequate secondary education facilities.

9.3 - Health Facilities

The settlement scheme is provided with a rural hospital at Aralaganwila. Treatment is provided here for ordinary illnesses. In cases of serious illness, farmers have to go to Polonnaruwa. The rural hospital, like the irrigation scheme, has no electricity. A generator donated to the hospital after the cyclone of 1978 has yet to be installed.

10 - FARMER INTERACTION

Among the farmers who originated within the area, kinship relations are important. They prefer to do most of their dealings with kinsmen. One farmer was living with his mother until very recently; he was allocated his highland in 1976.

Among many farmers the immediate social group is the neighborhood. But the intimacy and the degree of social obligation is less at this level than among the kinsmen farmers. Though neighborhood is important in day-to-day life, kinship relations become dominant in times of major crisis. Therefore, farmers who come from outside tend to maintain their relations with the original villages.

When taken as a whole, a well-united society is not found in this settlement scheme. The heterogeneity of the colonists could be a reason for this, but perhaps it is too early to expect a well-knit society.

Money-oriented contractual relations are important among most of the farmers. "Kaiya" or"Attan" (types of labor reciprocity) are almost nil. A reason for this could be the labor shortage under existing conditions. Farmers with 3 acres of paddy cannot spare a single unit of family labor. Under home village conditions he might spare a labor unit for a fellow villager if he had the assurance of obtaining the required labor under kinship relations if he falls behind the cultivation calendar.

Although there are community organizations, such as the Rural Development Society, Women's Societies and Temple Societies, participation and representation in these are at low levels.

The only functional organization is the Death Donation Society. Other societies functioned only for a short time, because their necessity was felt by only a few or only for a short period of time.

11 - POSTSCRIPT

The survey provided an informal opportunity to compare paddy yields systematically measured by the Acres Crop-Cutting Survey, with yield information obtained through farmer interviews.

In the interviews, the question was asked how much the settler had produced on his 3-acre allotment; the answers provided were divided by 3 to obtain an estimate of per-acre yield.

The methods employed by the Crop-Cutting Survey are detailed in Annex E.

The results of the two surveys are contrasted in Table 7. There are significant differences between the results of the two surveys. Given that the Crop-Cutting Survey should be considered the bench-mark survey, because of its objective and systematic nature, the reliability of the interview results may be questioned (see comments in Section 7). Out of 42 observations, 29 interview yields were lower than actual, by 27 bushels on average. Thirteen interview yields were higher than actual, by 16 bushels on average.

On overall average, interviews indicated 14 bushels per acre less than actual Crop-Cutting Survey tests.

It seems from this comparison that yield data obtained from subjective farmer estimates are likely to be biased on the low side and subject to considerable variance. Systematic crop-cutting surveys are preferable.

TABLE 7

PADDY YIELD COMPARISON MAHA 1979/80
(bushels per acre)

Farmer Identification Number A	Interview Survey- May 1980 B_1	B_2	Crop-Cutting Survey - Feb 1980 C	Difference Between Surveys D $(C-B_2)$
1	100	105	131	26
2	128	134	135	1
3	50	53	107	54
4	68	71	106	35
5	90	95	96	1
6	67	70	93	23
7	-	-	92	-
8	50	53	70	17
9	95	98	92	(6)
10	67	70	89	19
11	33	35	71	36
12	42	44	54	10
13	87	91	74	(17)
14	103	108	106	(2)
15	25	26	99	73
16	83	87	104	17
17	100	105	78	(27)
18	64	67	78	11
19	150	158	144	(14)
20	80	84	117	33
21	75	79	134	55
22	102	107	122	15
23	58	61	122	61
24	80	84	143	59
25	100	105	134	29
26	83	87	125	38
27	127	133	126	(7)
28	127	133	121	(12)
29	33	35	54	19
30	60	63	104	41
31	80	84	122	38
32	67	70	77	7
33	100	105	89	(16)
34	107	112	92	(20)
35	70	74	70	(4)
36	98	103	101	(2)
37	67	70	80	10
38	103	108	119	11
39	83	87	90	3
40	92	97	56	(41)
41	167	175	138	(37)
42	70	74	89	15
43	67	70	138	68

A - Farmers in Pimburettewa included in crop-cutting survey and interview survey.

B_1 - Farmer-reported yields based on acre of allocated land; to estimate yield per cropped acre, 5 percent has been added, in recognition of bunds, ditches etc.

B_2 - Farmer-reported yields adjusted to approximate acre of cropped land.

C - Crop-Cutting Survey results per cropped acre.

D - Difference in number of bushels between crop-cutting survey (C) and adjusted interview survey (B_2).

APPENDIX II

SETTLER SELECTION PROCEDURES

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SETTLER SELECTION PROCEDURES

Early in 1980 the Mahaweli Authority initiated the settler selection process in the new Systems under the Accelerated Mahaweli Programme. The Authority advised the Government Agent in Badulla to commence the selection of settlers from within Zone 2 of System C. A letter from MASL outlining the selection procedures, together with a public notice and application form, is hereby presented. This material gives an excellent overview of the procedures that, perhaps with some changes, would also apply to the residents of System B who desire Mahaweli land. Selection procedures for 'outside' settlers are in the process of being developed.

13th February 1980.

Government Agent,
Kachcheri,
BADULLA.

Dear Sir:

Accelerated Mahaweli Programme - Selection of Settlers from within Zone 2 of System C

I. General

You will recall that the Settlement Programme in the new Systems under the Accelerated Program was briefly outlined at the meeting held at the Mahiyangane AGA's Office on 19.01.1980. As you are aware, System C was gazetted a Special Area under Section 3(1) of the Mahaweli Authority Act No. 23 of 1979 by Gazette Notification of 15.06.79. The Hon. Minister of Mahaweli Development desires that the task of selection of settlers be entrusted to you, and I seek your co-operation in accomplishing this task.

The Hon. Minister has decided that -

(a) initial settlement will be in a part of Zone 2 of System C and will centre around the new township to be created at Giranduru Kotte;

(b) the programme for System C in 1980 will comprise 1,500 settlers;

(c) the first 1,500 settlers will comprise those -

(i) from the area;
(ii) from among displaced persons;
(iii) from outside the area.

(d) in respect of settlers from the area, only settlers who have come into residence by 01.09.1977, i.e. the date of announcement of the Accelerated Mahaweli Programme, will be considered eligible for selection.

This note relates specifically to the selection of settlers from within the area.

On the basis of information available at present, it could be expected that around 600 settlers from the area would ultimately be considered eligible. Taking into consideration special circumstances, e.g. size of the family, it may be necessary to accommodate approximately another 100 as being eligible.

An important change from the practice normally adopted hitherto in relation to the settlement programme requires mention. Hitherto, settlers were normally brought in about three months before irrigation water was issued. In this instance, they will be selected and brought into the area much ahead of this time, and will be expected to participate in a planned programme of work, whereby they could contribute, by the provision of their manual labour, to the development of the area, before being allotted the irrigable lots for the commencement of production activities. The work expected of them will include: cutting of distributory and field channels, clearing of jungle and secondary growth, stumping, construction of minor roads, construction of hamlet wells, etc.

Along with the criteria for selection, disqualification criteria will also be published. Settlers who are selected will be subject to the operation of disqualification criteria while engaged in the programme of work. The selection of a settler could thus be set aside in terms of the disqualification criteria. Settlers who ultimately qualify will be given 2-1/2 acres of irrigated land and 1/2 to 1 acre of unirrigated land. Only those who agree to participate in this programme of work and abide by the rules and regulations imposed by the Mahaweli Authority will be selected. Terms and conditions applicable to settlers who are selected are detailed in the "Notice Relating to Selection of Settlers".

Commencement of settlement is to start in May 1980. In order to give time for the Project Staff to make their preparatory arrangements, it would be necessary to have the tentative selection list ready by mid-March and the final list at least by early April. It is appreciated that the schedule is tight. It is envisaged, however, that with your co-operation, as well as that of your Officers, it should be possible to keep to these dead-lines.

These explanatory notices are intended to guide you in planning and expediting the selection process.

II. Calling for Applications from Eligible Settlers

1. Area from which Settlers are to be Selected

It has been decided that development and settlement in 1980 will not encompass the entire Zone 2 of System C, but will be confined to the Aluththarama and Galporuyaya Grama Sevaka Divisions. Of these two Grama Sevaka Divisions too, while the entirety of the Aluththarama Grama Sevaka Division (excepting the Ceylon Tobacco Company colony) is included, only some of the villages in the Galporuyaya Grama Sevaka Division falls within the target area. A list of villages from which applications should be called is mentioned in Schedule I of the "Notice Relating to the Selection of Settlers" attached.

2. Notice Relating to Selection of Settlers

The Notice Relating to the Selection of Settlers for Zone 2 of System C under the Accelerated Mahaweli Programme is attached. In view of the changes envisaged in respect of the Land Sales (Special Provision) Law and the Land Development Ordinance, this notice inviting applications from eligible settlers takes the form of a Special Notice, and the inquiries held will take the form of 'Public Interviews' in place of the usual 'land Kachcheries'. This procedure would make room for the issue of permits to selected allottees under the changed legislative framework.

Copies of the Notice should be displayed prominently in appropriate places in the area. Since applications are invited only from two Grama Sevaka Divisions, it is considered sufficient to restrict the period given for the calling of applications to 14 days.

3. Issue and Receipt of Application Forms

The application form to be issued to eligible settlers is attached. It is necessary to ensure that application forms are issued only to those deemed qualified to apply in terms of the qualifications spelt out. In terms of those qualifications, it is to be expected that more than one member of a family will apply. It should be noted, however, that application forms should not, for instance, be issued to relatives of the householder staying with him. Husband and wife should be considered as one unit, and issued with only one application. The Householder's Lists should be used

for the issue of applications. I have instructed the Land Officer, MDB, at Mahiyangane to prepare these lists with the assistance of your Div. AGA, Mahiyangane. 2,000 application forms are sent herewith. In order to ensure that application forms are only issued to those eligible, as well as to cater to the convenience of applicants, arrangements should be made for the distribution of application forms from one point, i.e. through the relevant Grama Sevakas. The Grama Sevakas should mark the issues on the copies of the Householder's Lists supplied by Land Officer, Mahiyangana. Again, for the convenience of applicants, the collection of forms once completed, should be arranged through the Grama Sevakas. These arrangements, indicating the date, time and place of distribution and collection of application forms should be detailed. Applicants should be asked to hand over the applications from each family unit, together. This will facilitate handling of selections in terms of family units. At the time of collection of completed forms, a receipt should be issued to each applicant. Applicants wishing to do so, could send their applications by registered post to the Divisional AGA, Mahiyangane. The top left-hand corner of the envelopes containing such applications should be clearly marked, "Application for Selection of Settlers in Zone 2". A separate register for the registration of such applications should be maintained at the Div. AGA's Office.

III. Holding of Public Interviews

1. Information to Settlers

The date and time of Public Interviews should be published and such information displayed prominently in the area at least seven days before the holding of such interviews.

2. Composition of the Panel

Applications will be considered by a Panel of Officers at Public Interviews. The Panel to be appointed by you, should be chaired by a Staff Officer, preferably a District Land Officer or AGA. The other members of the Panel could be drawn from among divisional and field level Officers of Government Departments operating in the area, e.g. Colonization Officers of the Land Commissioner's Department, Agricultural Instructors and K.V.SS. of the Agriculture Department, Divisional Officers, Field Assistants and Cultivation Officers of the Agrarian Services Department. It is

also advisable to include a few representatives of local level institutions, e.g. Rural Development Societies, as observers on the Panel. It is also proposed that Project Staff too should sit on the Panels as observers. Early intimation of the dates of Public Interviews would enable me to allocate Project Staff for this purpose.

3. Procedure to be Adopted by the Panel

(i) Submission by applicant: The applicant should be given an opportunity to make his submissions and to substantiate his case by recourse tc either documentary or verbal evidence. This should be recorded.

(ii) Examination of submission: In relation to the submission made, the panel should -

(a) examine the applicant by way of appropriate questions, e.g. relating to legal title to land, period of residence, main occupation, size of family, etc. and

(b) examine official evidence available, e.g. checking with G.S. making use of data collected in the Socio-Economic Survey, other official data.

(iii) Recommendation: The Panel should record its recommendation of acceptance or rejection of the application, along with reasons.

4. Criteria for Determination

(i) Legal title to land and period of residence in the area: A crucial criterion will be whether the applicant had come into residence in the area prior to or after 01.09.1977.

This implies that the following categories will qualify for acceptance on the basis of this criterion:

(a) Those having some form of legal title to land in the area and residing in the area, e.g. traditional villagers, those who have purchased land in the area, LDO allottees.

(b) Encroachers who have settled in the area prior to 01.09.1977.

(c) Absentee landowners, i.e. those who have some form of legal title to land in the area, but residing outside the area for various reasons.

One category distinctly fails on this basis, i.e. encroachers who have settled in the area after 01.09.1977. Such applications should be rejected.

If acceptance is recommended on the basis of (i), then the following criteria should also be brought to bear:

(ii) Type of allotment recommended: This is to be based on his main occupation and source of income. If it is agriculture, then the determination should be in favour of an irrigable allotment. If the main occupation and source of income is not agriculture, e.g. trade, then a recommendation in favour of a houseplot is indicated.

In considering non-agricultural allotments, it will be useful to keep in mind the additional skills necessary to weave the settlers into a socially cohesive unit, e.g. masonry, carpentry, smithy, bicycle repair, ayurvedic medicine, snake-bite medicine.

(iii) Readiness to participate in the planned programme of work and to abide by the terms and conditions stated in the Notice: If agreeable, relevant details regarding person ready to participate, i.e.

(a) chief householder;

(b) if he is unable to do so for an acceptable reason, his son;

(c) in the case of married female applicants, the husband, or,

(d) in the case of widows with grown-up children, one adult male.

(iv) Exceptional circumstances pointing to inability to participate in the programme of work directly or by way of substitute: In the following special circumstances, a favourable recommendation is considered possible -

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(a) Where Chief Householder is unable to work, being old, infirm or sick, and has no substitute available.

(b) Where Chief Householder is engaged in another full-time occupation, e.g. engagement in public or private sector occupation, and has no substitute capable of replacing him.

(c) Where Chief Householder resides outside the area and is unable to provide a substitute.

(d) Where Chief Householder is temporarily unable to work, e.g. due to accident, and has no possible substitute.

5. Recommendations for more than one Allotment

All applications from a family unit should be taken up for consideration together, and under normal circumstances, only one allotment should be recommended. However, on the following basis, the grant of more than one allotment may be considered:

(i) In relation to size of family: Where the main occupation of the Chief Householder is agriculture, and where the number of grown-up children is large, recommendation of a second allotment may be considered. However, the maximum in such circumstances should be two allotments in respect of one family unit.

(ii) In relation to extent of land owned:

(a) Applicant owns between 5 acres to 7-1/2 acres of land - 2 allotments may be recommended.

(b) Applicant owns more than 7-1/2 acres - 3 allotments may be recommended.

Thus, if an applicant owns below 5 acres, only one allotment should be recommended.

IV. Publishing of Tentative Selection List: Consideration of Objections and Appeals and Finalisation of Selection List

Once the Public Interviews are completed, a tentative selection list should be published, and a copy of this list sent to this office. Objections and appeals in respect of this tentative list may be entertained, and a period of one week be given to send in such objections and appeals. The date for inquiry into objections and appeals should be notified. Forms to be used in respect of objections and appeals are attached.

Objections would relate to selection of ineligible persons, while appeals will relate to claims of applicants.

Inquiries into objections and appeals should be held preferably by another Pannel of Officers. Procedures outlined in respect of Public Interviews should be adopted here too. The guide-lines indicated earlier would suffice to make a termination in each case. A clear recommendation should be given in each case, which, applicants should be told is to be the final decision.

Once this task is completed the final list should be published and a copy made available to this Office.

Yours sincerely,

MAHAWELI AUTHORITY OF SRI LANKA

Notice Relating to Selection of Settlers for Allotment of Land in Zone 2 of System C under the Accelerated Mahaweli Programme

Applications are invited from permanent residents in the villages of ..... who have taken up residence prior to 1.09.77 for allotments in these villages in Zone 2 of System C under the Accelerated Mahaweli Programme. The date and place of Public Interviews for selection of settlers will be notified through public notices.

All lands coming within the area to be developed will be taken over and reblocked out in terms of the new irrigation lay-out and the aforesaid category of permanent residents interested in obtaining allotments under the new arrangements should send in applications in terms of this Notice.

(1) Since it is the intention of Government to develop the areas included in the Accelerated Mahaweli Programme very rapidly, the terms and conditions applicable to those selected will differ in many respects from the terms and conditions applicable to those selected for earlier Colonization Schemes.

These conditions are set out so that those who desire land under the Accelerated Mahaweli Programme can decide for themselves whether they are prepared to endure the inconveniences and discomforts that they will have to bear from the time of work for the development of the area till they harvest their first irrigated crop and the full development of the area is completed. Only those who are prepared to endure these difficulties should apply.

(i) The settlers will ultimately be given 2-1/2 acres of irrigated land with an assured water supply and 1/2 to 1 acre of unirrigated land. The new villages will be fully developed by the Mahaweli Authority over a period of time after the settlers are brought into the Scheme and provid with the normal community facilities, such as, ensary, Post Office, Banks, Co-operative Soci and other organizations to provide suppo services to farmers.

(ii) They will be expected to contribute t energy (Shramaya) for the development of the allotments they will ultimately receive and channels and roads which will serve them.

(iii) For this purpose the settlers will be asked to form groups of about 35 and select a Leader who will be given work on contract by the Mahaweli Development Board. The task of each group will be to clear their new irrigated area and then to clear their new homestead tract (Yaya). The work done by each group will generally be measured fortnightly and paid for. It will be the responsibility of the group leader elected by the settlers to apportion the monies received in a reasonable manner.

(iv) The clearing, piling and burning of jungle in both the new village areas and the new Yayas should be completed by September, before the rain sets in.

(v) Settlers will be given assistance for the purchase of the following materials for the construction of temporary houses: cadjan, coir string, round timber, wattle and arecanut reepers.

(vi) The settlers may do chena cultivation on their irrigable yayas during the first Maha season.

(vii) The settlers are expected to undertake contracts through their group leaders for the construction of field channels and roads for the levelling and ridging of their irrigated allotments.

(viii) The selection of those settlers who do not conform to criteria laid down by the Mahaweli Authority during the period of pre-settlement development will be set aside and they will not be given homesteads or paddy allotments. In this way the Mahaweli Authority will ensure that the settlers have an opportunity to earn an adequate income to sustain themselves until such time as they receive irrigation water from the channels for cultivation of their allotments during this second Maha season.

(ix) The disqualification criteria that will operate for selected settlers during the programme of work are given below. The Mahaweli Authority reserves the right to set aside the selection of any settler who falls into one of the following categories.

(a) Behaviour which, in the opinion of the Authority, is detrimental or prejudicial to his continuance as a worker-settler.

(b) Continuous absence from work over two weeks without obtaining prior permission and without reasonable cause.

(c) Failure to maintain a satisfactory record of attendance (a person who has failed to attend to work for 200 working days or 85% of the number of days of work offered would be deemed to fall within this category).

(d) Fraudulent practices.

(e) Inability to maintain a satisfactory output of work.

(f) Drunkenness and/or disorderly behaviour.

(g) Engaging in activities which would, in the opinion of the Authority, lead to the disruption of the Worker Settler Programme.

(h) Causing or attempting to cause damage to property falling within the Accelerated Mahaweli Programme.

(i) Alienation of the rights or the transference of obligations accruing to settlers without the prior written sanction of the Mahaweli Authority.

(2) Qualifications

Every applicant should be -

(i) A citizen of Sri Lanka;

(ii) Over 18 years of age on 1.05.1980, and,

(iii) A permanent resident in one of the villages of the Grama Sevaka Divisions mentioned in Schedule I before 1.09.1977.

(3) Allotments will normally be limited to one per family.

(4) Application forms will be distributed by the Grama Sevaka of your Division. Arrangements regarding the distribution of application forms and collection of completed application forms, indicating the date, time and place of distribution and collection, are detailed in Schedule II.

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(5) Applications may be handed over personally to your Grama Sevaka on the dates, times and at the places detailed in Schedule II and a receipt obtained from him. Applications from one family unit should be handed over together. Applications could also be handed over personally at the Divisional AGA's office or be sent by registered post to reach the Divisional AGA, Mahiyangana, on or before ..... Late applications will not be entertained. The top left-hand corner of the envelope containing applications sent by post should be clearly marked "Application for Selection of Settlers in Zone 2".

(6) Applications will be considered by a Panel of Officers appointed by the G.A. Badulla. Every applicant should personally attend the Public Interview for selection. In the absence of the applicant, the Panel will proceed on the assumption that the applicant has no further interest in respect of his application and that it is the applicant's wish that no further action need be taken in regard to it, and no objections will be entertained in the case of non-attendance of the applicant.

(7) The applicant should be prepared to accept all instructions and conditions imposed by the G.A./Mahaweli Authority in respect of the programme of development prior to cultivation of lands outlined earlier, the development of the irrigable and homestead allotments, water management, irrigation regulations, rules and charges in relation to his allotment.

(8) The G.A./Mahaweli Authority reserves the right to set aside any selection in the instance of an applicant submitting false or incorrect data.

Government Agent

Application for Land in Zone 2 of System C Under the Accelerated Mahaweli Programme

District :
AGA's Division :
Electorate :
Grama Sevaka Div. :
Village :

Full Name:
Permanent Address:
Date in which you came into residence in this area:
Period of residence in the village:
Occupation of the applicant:
Occupation of husband/wife:
If other members of the family have applied, give particulars:

Name	Relationship to the Applicant
1.	
2.	
3.	
4.	

Are you the Householder? If not, the name of the Householder.

1. Date of Birth: Age: Male/Female*
2. Married/unmarried/divorced/widowed/separated:
3. Unmarried children of the applicant:

	Name	Age	M/F	Occupation	Income per year if employed
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					

*Cut off inapplicable words.

Details of married children living with the applicant:

	Name	Age	M/F	Occupation	Income per year	No. of children
1.						
2.						
3.						

Land owned by the applicant (if married, land owned by wife and children also to be included).

	Free holdings		L.D.O.		Long-term lease	
	Paddy	Highland	Paddy	Highland	Paddy	Highland
Acreage						
ituation						

Can you read Sinhala? Yes/No

Can you write Sinhala? Yes/No

What are the agricultural implements you possess?

Mammoties / Alavangoes / Axes / Kathi / Ploughs / Harrows / Tractors / Sprayers / Dusters

(Delete items you do not possess.)

Do you own draught animals?
If you do, how many?

Are you an owner cultivator? Yes/No
If so, extent cultivated last Maha season?
Are you a tenant cultivator? Yes/No
If so, extent cultivated last Maha season?
In respect of last Maha season -
(a) Did you use improved seed material? Yes/No
(b) Did you use chemical fertilizer? Yes/No
(c) Did you engage in transplanting? Yes/No
Did you engage in chena cultivation last Maha season? Yes/No
If so, extent cultivated.
Did you engage in Pittani paddy cultivation last Maha season? Yes/No
Which highland crops have you grown?
Coconut / Jak / Plantains / Lime

Are you a member of a -
(i) Rural Development Society?
(ii) Co-operative Society?
(iii) Young Farmer's Society?
(iv) Death Donation Society?

Do you possess any of the following skills?
(i) Masonry?
(ii) Carpentry?
(iii) Smithy?
(iv) Bicycle repair?
(v) Ayurvedic medicine?
(vi) Snake-bite medicine?

Are you prepared to accept the terms and conditions set out in the "Notice Relating to Selection of Settlers for Allotment of Land in Zone 2 of System C under the Accelerated Mahaweli Programme"?

Yes/No

.....
Signature of Applicant

APPENDIX III

WHAT EVERY SETTLER SHOULD KNOW

APPENDIX III

WHAT EVERY SETTLER SHOULD KNOW

For the benefit of the settlers of the H area, the Government of Sri Lanka, a few years ago, produced a booklet outlining the settlement features of the Mahaweli Programme. This guide was distributed to resident settlers as well as incoming settlers. While some of the information may be out of date and settlement procedures and conditions will be different for the System B settlers (as already indicated in Appendix II) an awareness of the information presented may, nevertheless, be instructive in appreciating settlement aspects. It should be noted that the organizational functions mentioned refer mostly to MDB, which until recently was the prime organization dealing with settlement and operations and management. The booklet was published in Sinhala; the English translation, courtesy of Mrs. S. de Silva, is as follows:

MAHAWELI: WHAT ALLOTTEES OF LAND SHOULD KNOW OR
A GUIDE BOOK FOR RECIPIENTS OF MAHAWELI LAND

The Mahaweli Development Project has three stages but the three are not connected. Each of the stages can begin according to its usefulness and necessity. We hope to launch all three at once.

What is meant by this? It means that ten lakhs of acres will be available for cultivation. Water can be supplied for cultivating 650 000 acres of new land and 350 000 of old land during both seasons. By our scheme employment

will be found for ten lakhs of persons who will eventually be raised to the status of settlers (land owners) in the area.

J. R. Jayewardene
President

MY GOOD WISHES

From this day onwards, you will be inheritors of a home in this Mahaweli area which from time immemorial has been covered with thick jungle but today is a pleasant dwelling place for man. I am very fortunate to be able to offer you my good wishes at such an opportune moment.

I am sure that you who will live here, setting up villages and towns, will dedicate yourselves, at all times, with unfailing zeal, courage and unity. Then the land of our birth will prosper and a golden age will dawn for us and generations to come.

It is my sincere wish that your many aspirations and hopes will be realized and that you will get the necessary courage and strength to serve your native land.

Gamini Dissanaike
Minister of Irrigation,
Power and Highways

MAHAWELI DEVELOPMENT PROJECT

Introduction

You have no doubt read much about the Mahaweli Development Project. However, many know it as a Land Development Project under the Kalawewa scheme, where the waters of the Mahaweli River have been diverted at Polgolla through a tunnel to Bowatenne and from there to Kalawewa. But, in fact, that is only a very small portion of the Mahaweli Development Project.

The Mahaweli Development Project is the largest development project ever undertaken in Sri Lanka. There is no possibility for another such project even in the future. Through this scheme, 650 000 acres of hitherto uncultivated land, and 250 000 acres of land under cultivation now, in the districts of Anuradhapura, Kurunegale, Polonnaruwa, Badulla, Amparai, Trincomalee, Vavuniya, Mannar and Matale will be supplied with water. In addition to the development of land there will be large scale generation of hydro-electric power.

An Accelerated Programme

It was planned to complete the Mahaweli Project in 30 years. Already 7 years have passed and only a very small section of the total project has been completed. If the work goes on at this speed, it is probable that the completion of the whole project will take over 60 years. On this account, the Government has embarked on this accelerated scheme under which 340 000 acres of land will be developed.

You will realize that if this project is speedily completed, there will be avenues opened for the solution of our food problems and employment problems. Under this accelerated scheme large reservoirs will be set up at Victoria, Kotmale, Randenigala, Maduru Oya and Moragahakanda. The water of these reservoirs will be used for the development of 3-1/2 lakhs of acres of land.

Settlements of the Mahaweli

The Mahaweli Settlements have been planned rather differently from the earlier settlements. There is a difference between the Mahaweli Settlements and those at Minneriya and Parakrama Samudra. In the earlier settlements the land that had easy access to water was used for paddy fields and the higher land for those that had no irrigation facilities. Therefore, the houses of the settlers were situated along the banks of the channel. As a result, they were too far away from the paddy land. As the houses were scattered far and wide there was little chance of friendship and co-operation among the settlers. Furthermore, they had to travel long distances to buy the things they needed. Necessary steps have been taken to avoid these shortcomings.

Hamlets

These consist of 100 - 125 families. Each family receives half an acre as a homestead. In the settlement is a "center" and more often than not a Co-operative store. There is at least one Co-operative for every two hamlets. When land is distributed to the settlers for farming purposes, they are never more than 1-1/2 miles away from the homestead.

Villages

Four or five hamlets together comprise a village. Arrangements have been made for the village "center" to provide to a great extent the essential needs of the settlers: a sub post office, a branch of a Co-operative Society, a preparatory school, a dispensary, an Agricultural Training Center. Besides this, space has been marked out for many shops and boutiques, and there will also be a playground and a community center. It has been planned so that as need arises it will be possible to meet those demands.

The Town

Four of five villages will form a town. It can be called a sort of "service center". The "Town Center" will have many facilities, i.e. banks, a post office, a police station, a hospital or dispensary, a Maha Vidyalaya and space for many shops and boutiques, and a cinema for the entertainment of the people. The offices and the living quarters of the administrative officers of each section of the Mahaweli Development Project will be situated in the "service center". These offices are specially for the benefit of the settlers.

Selection of Allottees for Settlements

These families will be chosen by Land Kachcheries. When selecting farmers of the areas for receiving Mahaweli Land, the extent of land acquired by the Mahaweli Project, the position of the family, and the ability to farm will be given prior consideration. When selecting settlers from other districts outside the Mahaweli area, the lack of

ownership of any land will not be sufficient qualification. A good knowledge and experience in farming, good health, the amount of labour a family can offer, and the standard of education will be considered prime qualifications. A system of marking based on these has been adopted for the selection of allottees.

Settlement of Farming Families

Those selected will be given transport facilities on a single occasion only, to convey their goods and belongings to the allotted site. On arrival, they will be shown the higher land allotment, where the allottee should put up a temporary hut as speedily as possible. It will be beneficial if the hut is at least 10' x 20'. Those who can afford it should construct larger temporary huts.

The Land Allotted to You

It is prohibited that you give over to another the land you have received. You must know that you cannot develop land if you have one foot in your birth place and the other in the new Mahaweli settlement. Furthermore, you should have it strongly inscribed in your memory that the Government has spent over Rs. 10,000 to develop one acre of land. You should treat the allotment as a national treasure and not as a personal endowment. No doubt you are aware that although many have the suitable requirements for receiving land, there isn't enough to distribute it to all. So you should realize that it is your duty to produce essential foodstuffs for your fellow men.

A Farm Allotment

Each recipient of land will receive 2-1/2 acres of farm land. These will be, as much as possible, around the settled hamlets. The Agricultural Division will give advise regarding the crops to be cultivated.

Aid for Allottees

(1) Aid for Mahaweli land allottees (financial and in kind) Rs.100/= will be paid by the Community Development Officer for the construction of temporary huts as soon as settlers come into occupation.

(2) Implements
Agricultural equipment to a value of Rs.100/= will be given to each farmer, by the Community Development Officer.

(3) Levelling of Land and Preparing Ridges
Rs.1,250/= will be paid for 2-1/2 acres at Rs.500/= per acre for lands that are not levelled by machinery, whereas Rs.750/= for 2-1/2 acres at Rs.300/= per acre will be paid for lands levelled by machines.

(4) Clearing Jungle Land
After the clearing of jungle, the lands will be shown to the allottees. But if by that time the jungle has overrun the land, the following payments will be made: Rs.250/= at Rs.100/= per acre for 2-1/2 acres.

(5) Laying of Ridges

Rs.700/= will be the maximum payment for main and additional ridges made by the Resident Engineer. The payment may vary according to the state of the land.

(6) Seed Materials

Seed paddy, other seeds and plants will be supplied for the first season, up to the value of Rs.290/=. This will be done by the Agricultural and Community Development Divisions. Coconut seedlings for planting in the home garden will be supplied under the coconut cultivation subsidiary scheme. It is essential to bear in mind that this must be planted in the months of October and November.

(7) World Food Aid

For a maximum period of 15 months after coming into occupation the following foodstuffs will be supplied under the World Food Organization scheme, to up to five members in each family.

Ration per person per month

Wheat Flour	19 lbs.	12 oz.
Other Cereals	01 lb.	10 oz.
Sugar		10 oz.
Dry Fish or Tinned Fish	01 lb.	04 oz.

These will be given only if settlers are in occupation.

Institutions That Help You

The Management and Control of the Mahaweli Project Area will be in the hands of a Resident Project Manager. The H area office is now situated in the Galnewa township center. In the future it will be in Thambuttegama, the center of the H area. After settlement is over the management will be handed over to the Resident Project Manager by the Settlement Division.

- Community Development
- Agriculture
- Water Management

These branches will be under the Resident Manager. It is essential that you should at least come to know, the Assistant Development Officer and Assistant Community Development Officer for Community Development matters, the Agricultural Extension Workers for agricultural activities, the Water Works Engineer and his Assistant for matters pertaining to water, and the Land Officers for land matters. This will enable you to carry out your work speedily.

Problems of Farmers (if any)

Allottees may have to face various problems. It is important to know which officers you should approach for a solution. As the settlement of farmers is first undertaken by the Settlement Division, it is inevitable that all problems should be submitted to the Chief Settlement and Land Officers. But if they can be submitted to the relevant divisions directly, the problems will be dealt with earlier and more easily.

Land Problems

Questions regarding boundaries, land disputes, nomination of a successor for ownership, unsuitability of land, etc. should be submitted to the Land Officer. If you are not satisfied, they should be submitted to the Chief Settlement Officer. If you are not satisfied with his decision the problems can be submitted to the Deputy General Manager (Settlements) stationed at the Head Office.

(1) Problems regarding Aid
These should be submitted to the Assistant Development Officer of the Block and later to the Community Development Officer.

(2) Water Problems of Farm Lands
These should be submitted to the Resident Water Management Engineer or his assistants.

(3) Agricultural Problems
Problems regarding seed materials, diseases caused by pests and insects to plants, etc. should be submitted to the Agricultural Extension Officer.

(4) Problems regarding Health and World Food Aid, etc. should be submitted to the Community Development Officer.

(5) Farm Loans
Problems should be submitted to the Community Development Officer.

What is expected of the Allottees by the Mahaweli Development Board and by the Country:

Water Management

All farm land allotted is not for paddy cultivation alone. Usually, all farm land is cultivated as paddy land during the Maha season. During the Yala season other subsidiary food crops are cultivated. Water must be carefully used. It must be stressed that if land owners waste water, it is a crime against the nation. Using water carefully is a prime duty. When you fulfil this duty you have done a great service towards furthering the success of the Mahaweli Project.

Production

The Mahaweli Development Board expects that the 2-1/2 acres of land of an allottee will bring in at least Rs.900/=. This is not at all difficult, as is shown by the harvests gathered by the families settled so far.

As subsidiary and other essential food crops are grown in the Yala season, this amount can be exceeded. If you spent the money earned on essentials, and save as much as possible, you will ensure prosperity for your future and the country. As you cultivate with courage and increase your income you will be easily able to build yourself a house and obtain electricity for it generated by the Mahaweli Project.

Your New Life and the Society

The farming families are settled in such a way that they can live together harmoniously. We should adopt the traditional systems of Aththam and Kaiya and work together

exchanging and sharing labour. This will ease our difficulties. We can develop the hamlets, the village center and the townships by joining together for work that is for the common good. It is an essential factor that we must always keep in mind that we work in unity and as a brotherhood.

Handbooks have been given to all farmers giving details as to how one must protect and safeguard the land. It also instructs you how to buy the land allotted and how to record aid given, etc.

It is the earnest wish and hope of the Mahaweli Board that you would make good use of and benefit from the Mahaweli waters which flow from the Sri Pada mountain, and are sanctified by the Sacred Tooth relic as it passes Senkadagalle.

May you restore the ancient glory of Raja Rata and make Sri Lanka again the granary of the East. May you work with heart and might to fulfil this magnificent hope.

APPENDIX IV
A DAY IN THE LIFE...

APPENDIX IV

A DAY IN THE LIFE ....

How much does the Sri Lanka rural family require to sustain itself through the day? What are its basic needs and what amount of money does it take to satisfy these needs? What could be considered the present day poverty line?

To answer these questions a typical rural family budget was put together, based on a day in the life of such a family. The family consists of five persons

- Father - Age 36
- Mother - Age 29
- Son - Age 9
- Daughter - Age 7
- Son - Age 4

1 - The June 1980 unit prices of the items consumed by this family are as follows.

		Rupees	Cents
Tea	1 lb	6	.00
Sugar	1 lb	6	.00
Lakspray	1 lb	14	.00
Rice	1 lb	2	.00
Meat	1 lb	2	.00
Tank fish	1 lb	6	.00
Dry fish	1 lb	12	.00
Dry chillies	1 lb	14	.00
Kerosene	1 gal	15	.00
Soap	1 bar	2	.00
Coconut	1	1	.50
Vegetable	1 lb	3	.00
Pulses	1 lb	5	.00
Root crop	1 lb	2	.50
Cloth	1 yd	20	.00
Bread	1 lb	2	.00

2 - The daily food consumption pattern has been estimated to resemble something like this.

		Rupees	Cents
6:00 a.m. bed tea	- tea		.20
	- sugar		.60
7:00 a.m. breakfast	- bread	2	.00
	- curry (pulses)	1	.40

		Rupees	Cents
10:00 a.m. tea	- tea		.20
	- sugar		.60
12:30 p.m. lunch	- rice	3	.00
	- fish	3	.00
	- vegetable curry	1	.50
	- coconut and condiments	1	.50
3:00 p.m. tea	- tea		.20
	- sugar		.60
6:00 p.m. tea	- tea		.20
	- sugar		.60
8:00 p.m. dinner	- rice	3	.00
	- fish	3	.00
	- vegetable curry	1	.50
	- coconut and condiments	1	.60
	- root crop curry		.80
	- milk (lakspray)	2	.00
	Total food/day	27	.60

3 - Other daily essentials include

	Rupees	Cents
Fire wood		.75
Kerosene	1	.50
Soap (for clothes and bodies)		.70
Total other	2	.95

4 - As for clothing, the following is thought to represent a minimum.

		Rupees
Son age 9	- 1 cloth/3 months at Rs 50	200
Daughter age 7	- 1 cloth/3 months at Rs 40	160
Son age 5	- 1 cloth/3 months at Rs 30	120
Father	- 1 cloth/6 months at Rs 125	250
Mother	- 1 cloth/6 months at Rs 100	200
	Total/year	930
	Total/day	2.55

5 - The final essential concerns education. While instruction is free, school supplies are not. The following estimates are provided.

		Rupees
Son age 9	- Rs 15/month for 9 months	135
Daughter age 7	- Rs 10/month for 9 months	90
	Total/year	225
	Total/calendar day	62 cents

6 - Adding the above categories, the total daily cost is

	Rupees
Food	27.60
Other	2.95
Clothes	2.55
Education	.62
Total	33.72

7 - On a yearly basis this works out to Rs 12307.80.

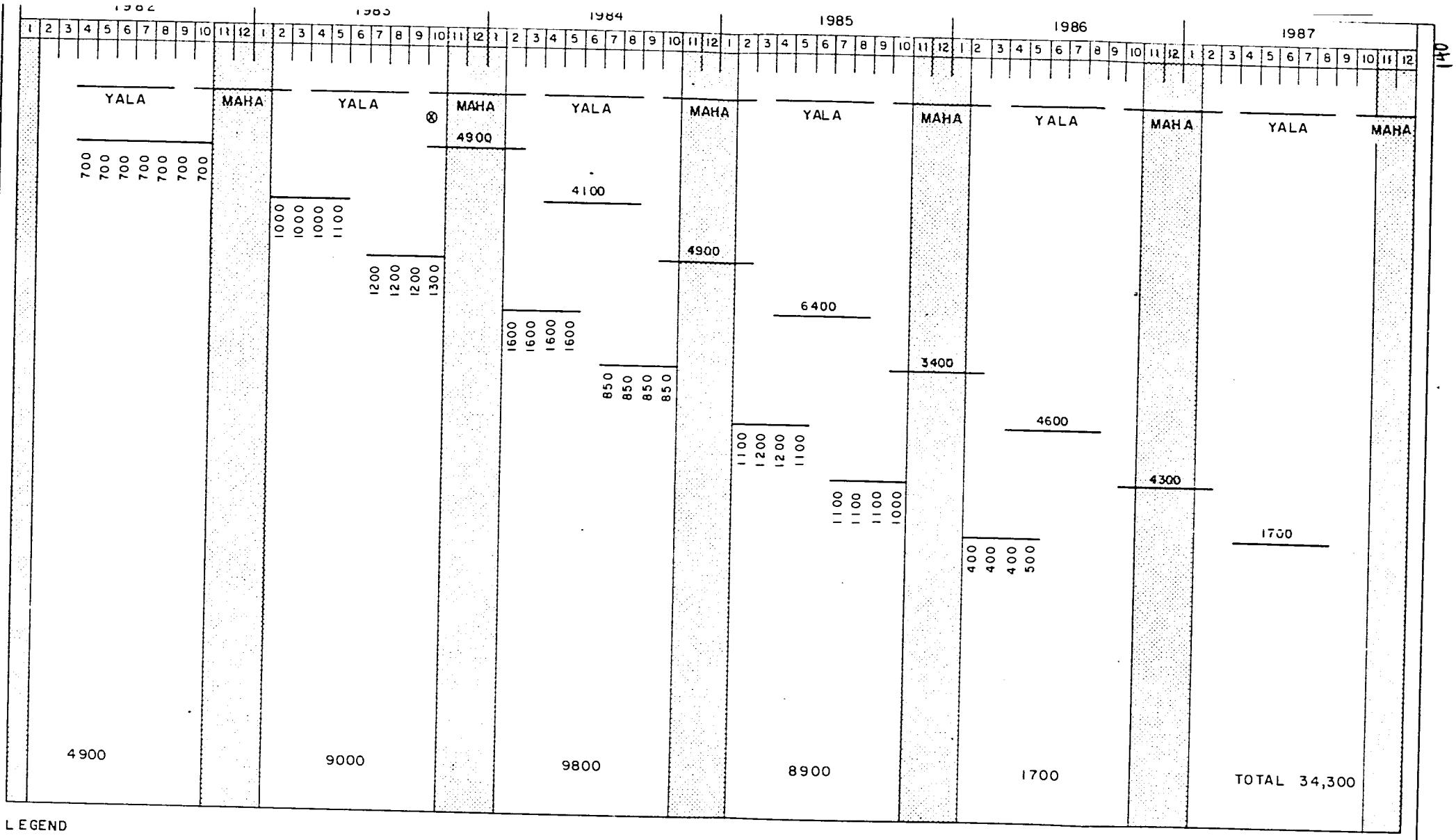
8 - It should be noted that all other expenditure categories are excluded from the "basic requirements" calculation, such as other foods, housing, furniture, medical, transportation, recreation, cultural and personal.

9 - The rural family would be able to supply some of the basic items by growing them. Typically, a family could provide in kind: rice, vegetables, pulses, root crops and fire wood. It is estimated that items in kind account for some 35 percent of the total budget, or Rs 4300. This leaves an annual family cash requirement of about Rs 8000.

10 - This cash requirement can be satisfied through employment (one or more members of the family working for others; at a daily rate of RS 16 this would require a total of 500 person-days); through agricultural self-employment (this would require a gross margin of Rs 8000, being the difference between selling price and cost of production, exclusive of labor); through trading surplus homestead crops; or through a combination of some or all of these.

11 - As a supplement, the family would likely receive food stamps valued at Rs 100/month (2 adults at Rs 15, 1 child at Rs 20 and 2 children at Rs 25) or Rs 1200/annum. Presently about 50 percent of all Sri Lankan families receive food stamps.

FIGURES



LEGEND

4900 — NEW PADDY PRODUCTION (HECTARES)

SETTLEMENT PERIOD

800 — SETTLERS PER MONTH

NON-SETTLEMENT PERIOD DUE TO TERRAIN CONDITIONS

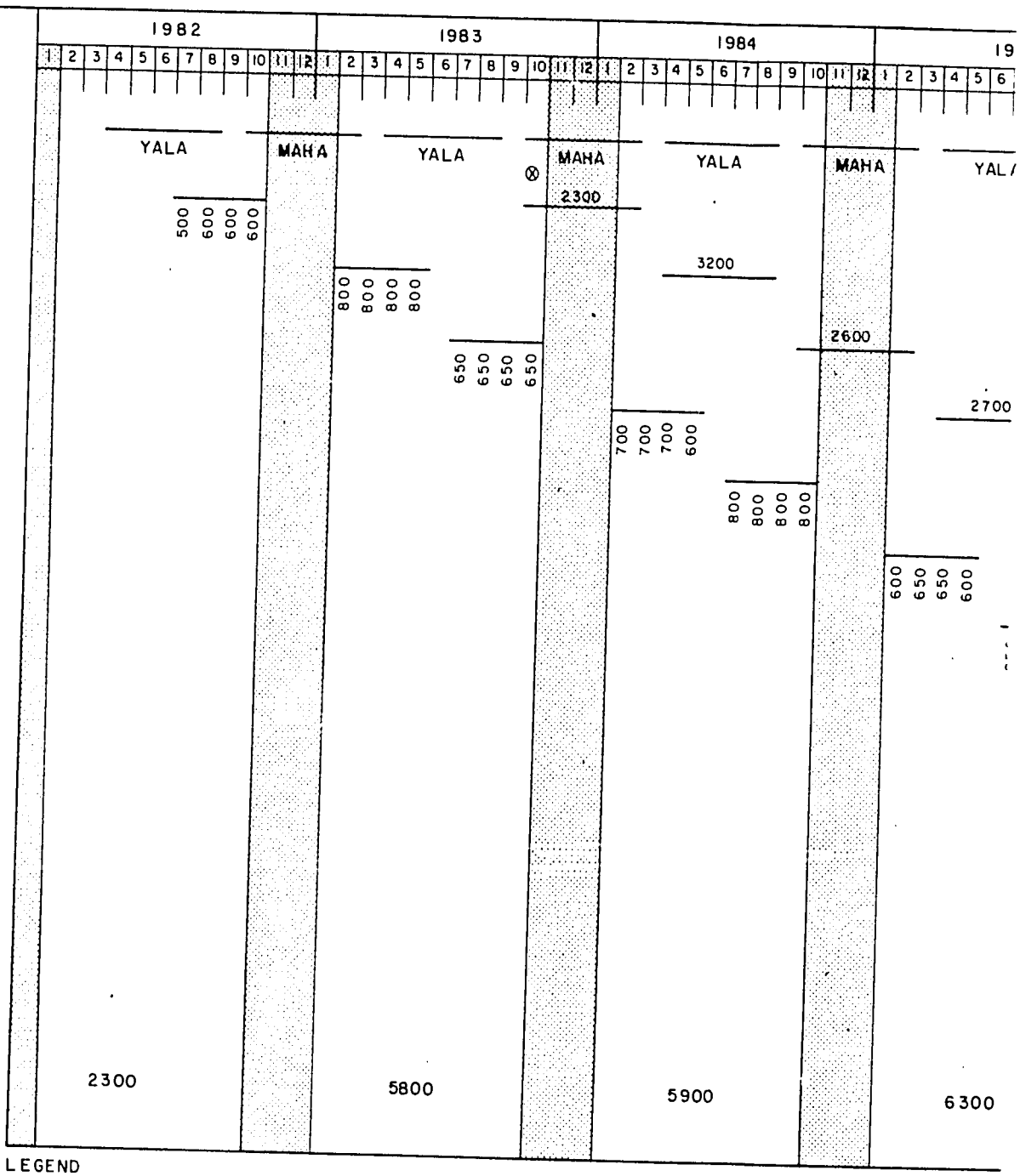
⊗ FIRST IRRIGATION WATER AVAILABLE

MINISTRY OF MAHAWELI DEVELOPMENT
MADURU OYA PROJECT FEASIBILITY STUDY

RATE OF SETTLEMENT – SCENARIO A

FIG I-1

ACRES



LEGEND

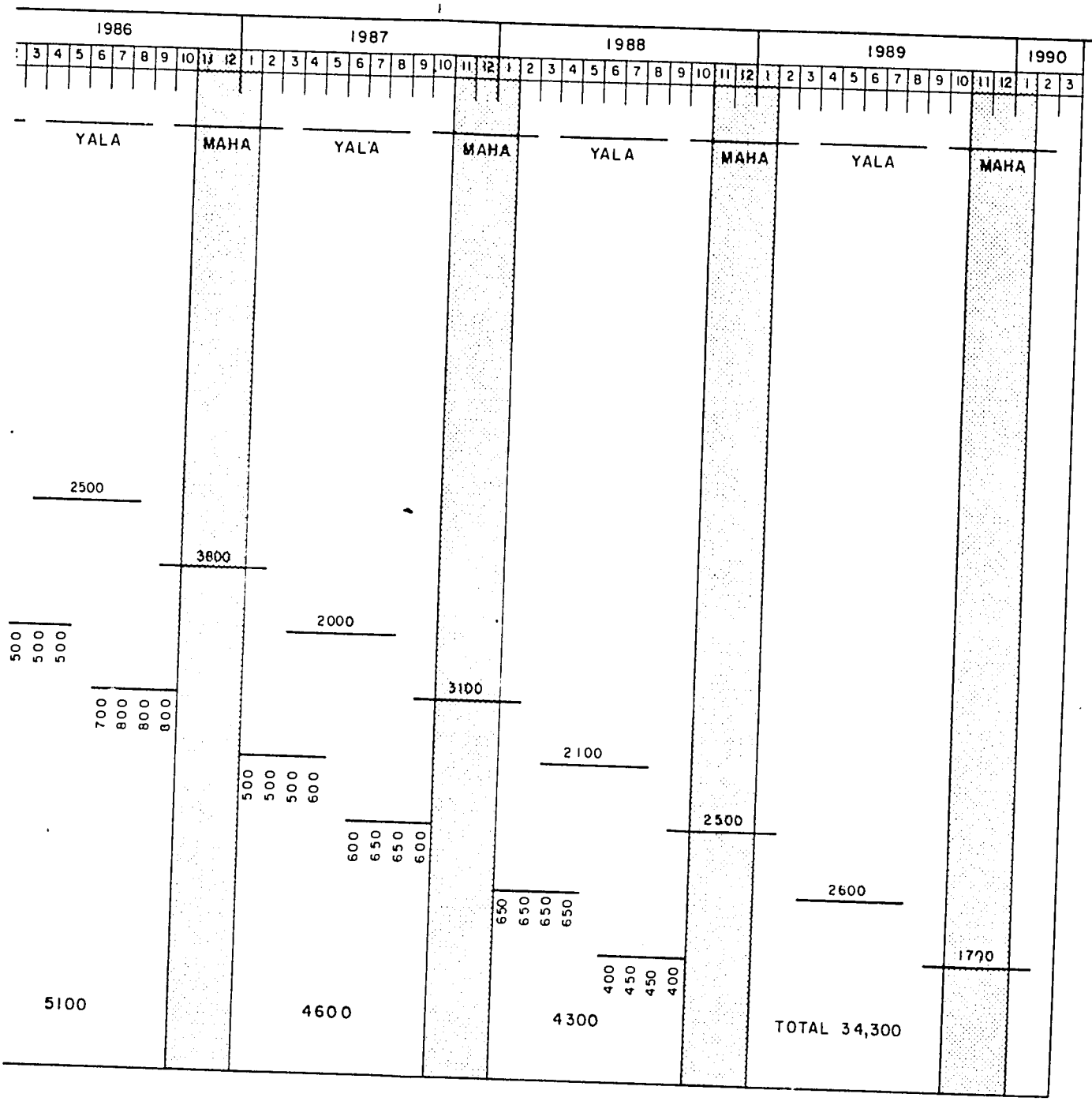
4900 — NEW PADDY PRODUCTION (HECTARES)

SETTLEMENT PERIOD

800 — SETTLERS PER MONTH

NON-SETTLEMENT PERIOD DUE TO TERRAIN CONDITIONS

⊗ FIRST IRRIGATION WATER AVAILABLE



MINISTRY OF MAHAWELI DEVELOPMENT
MADURU OYA PROJECT FEASIBILITY STUDY

RATE OF SETTLEMENT – SCENARIO B

FIG I-2

ACTS

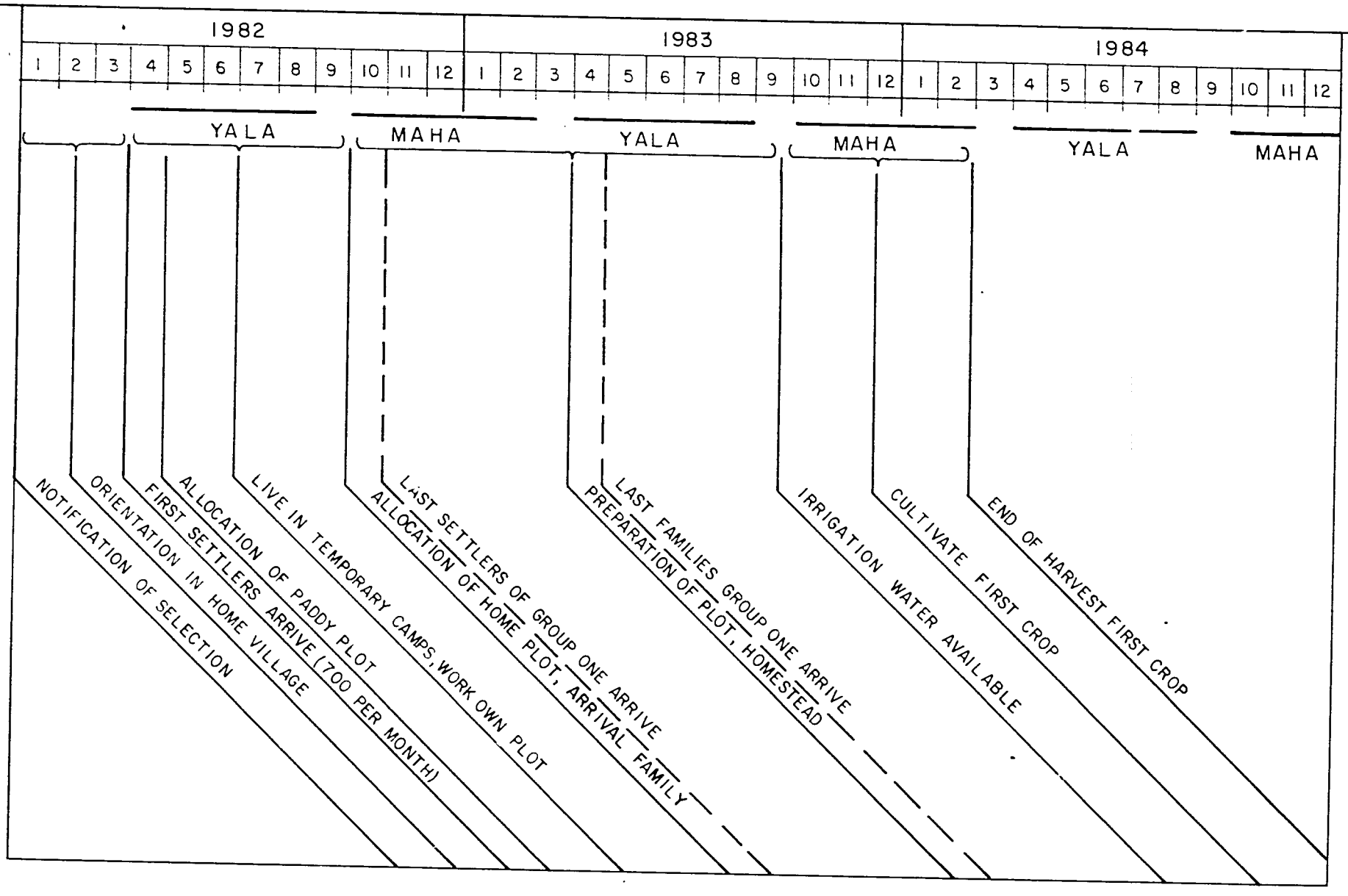


FIG. I-3

MINISTRY OF MAHAWELI DEVELOPMENT
MADURU OYA PROJECT FEASIBILITY STUDY

FIRST GROUP OF PADDY SETTLERS - SCENARIO A

ACRES

143

SCENARIO A

	1984		1985		1986		1987		1988		1989		1990	
	M	Y	M	Y	M	Y	M	Y	M	Y	M	Y	M	Y
SECTOR 1			400		600									
SECTOR 2				400		600								
SECTOR 3						200		300						
TOTAL			800		200								TOTAL 1000	

SCENARIO B

	1984		1985		1986		1987		1988		1989		1990	
	M	Y	M	Y	M	Y	M	Y	M	Y	M	Y	M	Y
SECTOR 1							400		600					
SECTOR 2									400		600			
SECTOR 3											200		300	
TOTAL							400		400		200		TOTAL 1000	

LEGEND

600 FIRST SEASON OF AGRICULTURAL PRODUCTION (ha FOR CROP PRODUCTION)

400 PERIOD OF SETTLEMENT (No OF SETTLERS)

NOTE

ASSUMES EACH SETTLER RECEIVES 1.5 ha OF IRRIGATED UPLANDS FOR CROP PRODUCTION PLUS 0.3 ha OF IRRIGATED UPLANDS FOR HOMESTEAD

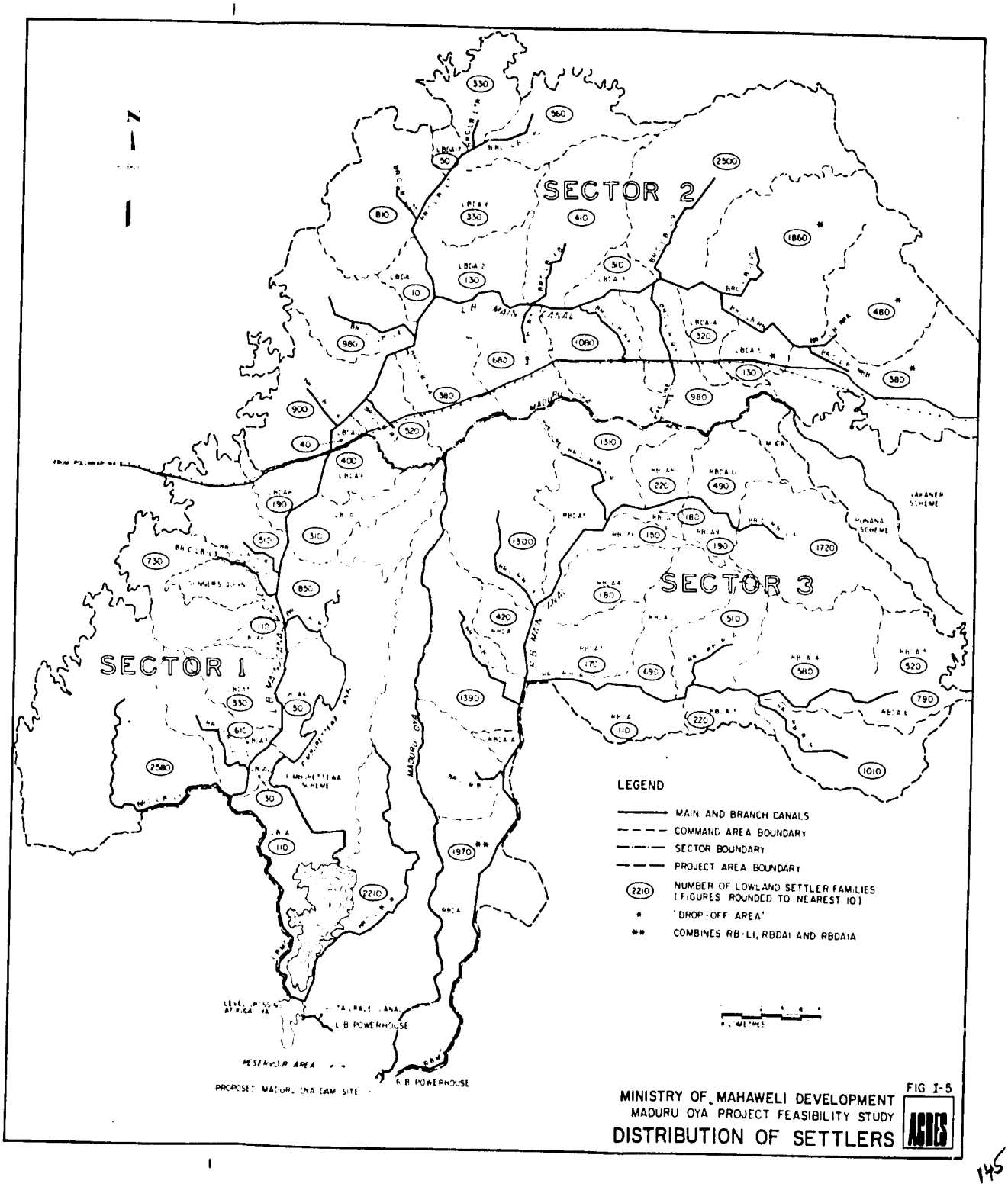
FIG. I-4

MINISTRY OF MAHAWELI DEVELOPMENT
MADURU OYA PROJECT FEASIBILITY STUDY

SETTLEMENT OF UPLANDS

ACRES

144



MINISTRY OF MAHAWELI DEVELOPMENT
MADURU OYA PROJECT FEASIBILITY STUDY
DISTRIBUTION OF SETTLERS

FIG I-5

ACRES

145

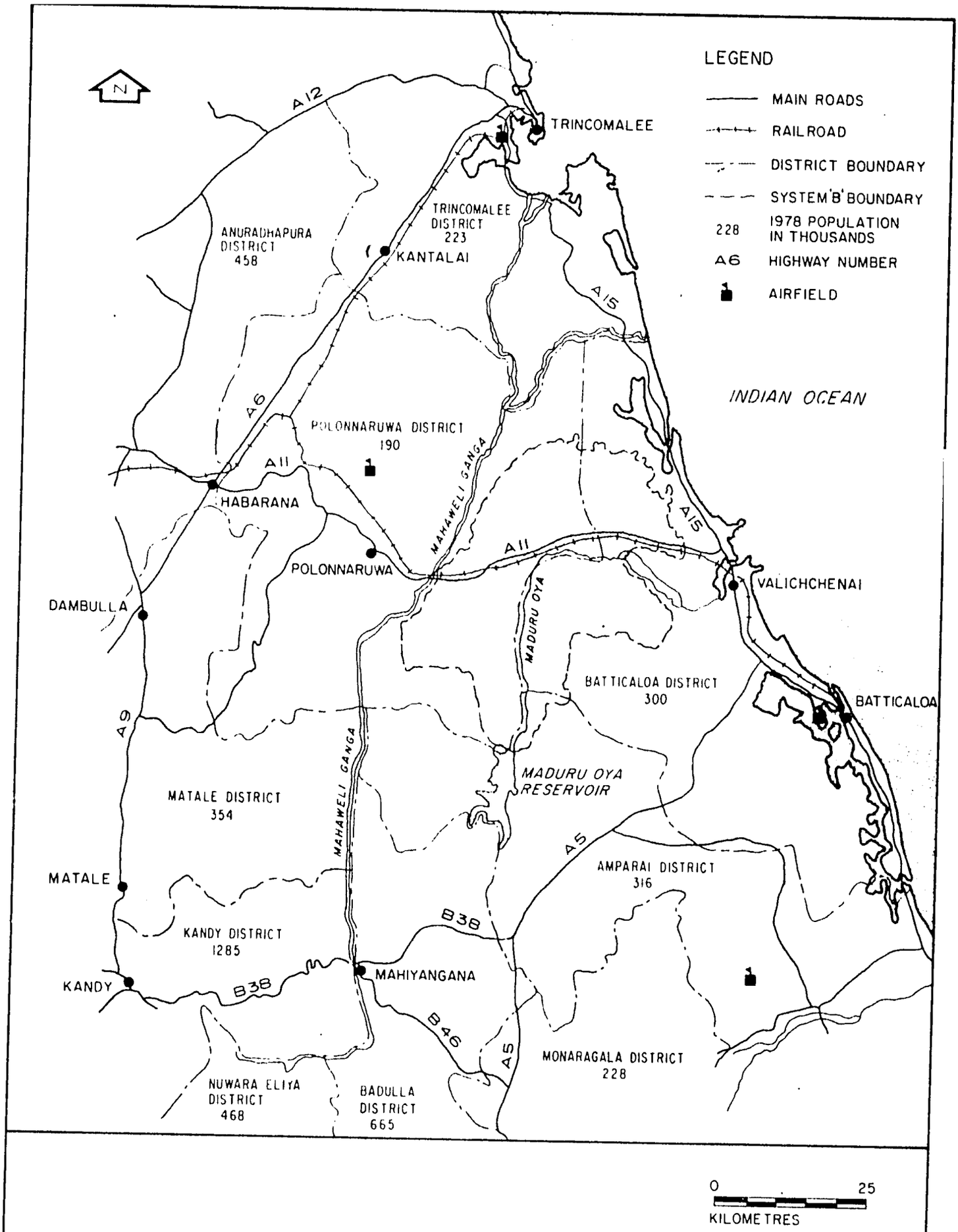


FIG. I-6

MINISTRY OF MAHAWELI DEVELOPMENT
MADURU OYA PROJECT FEASIBILITY STUDY

REGIONAL CONTEXT

ACRES

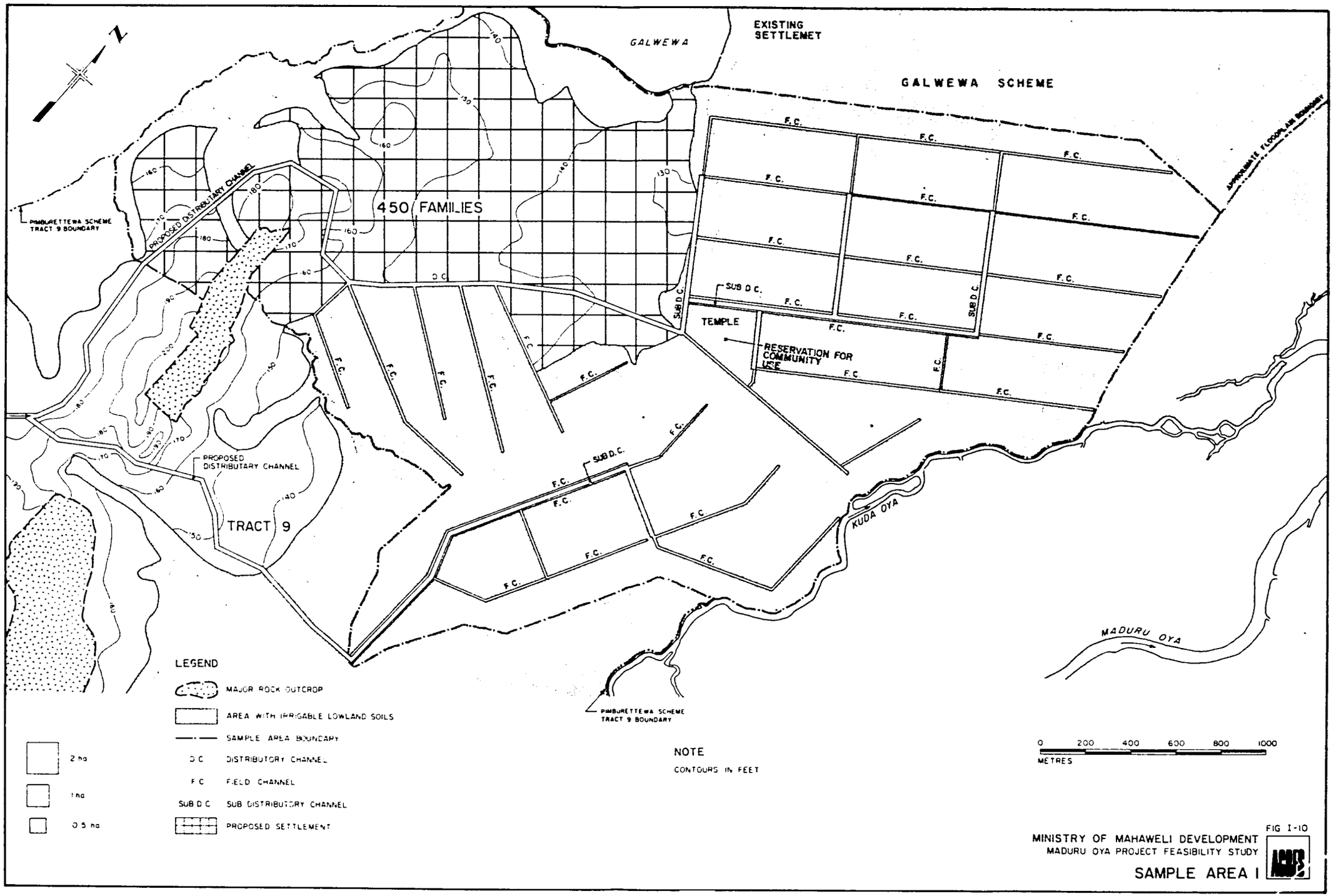


FIG I-10

MINISTRY OF MAHAWELI DEVELOPMENT
MADURU OYA PROJECT FEASIBILITY STUDY

SAMPLE AREA I

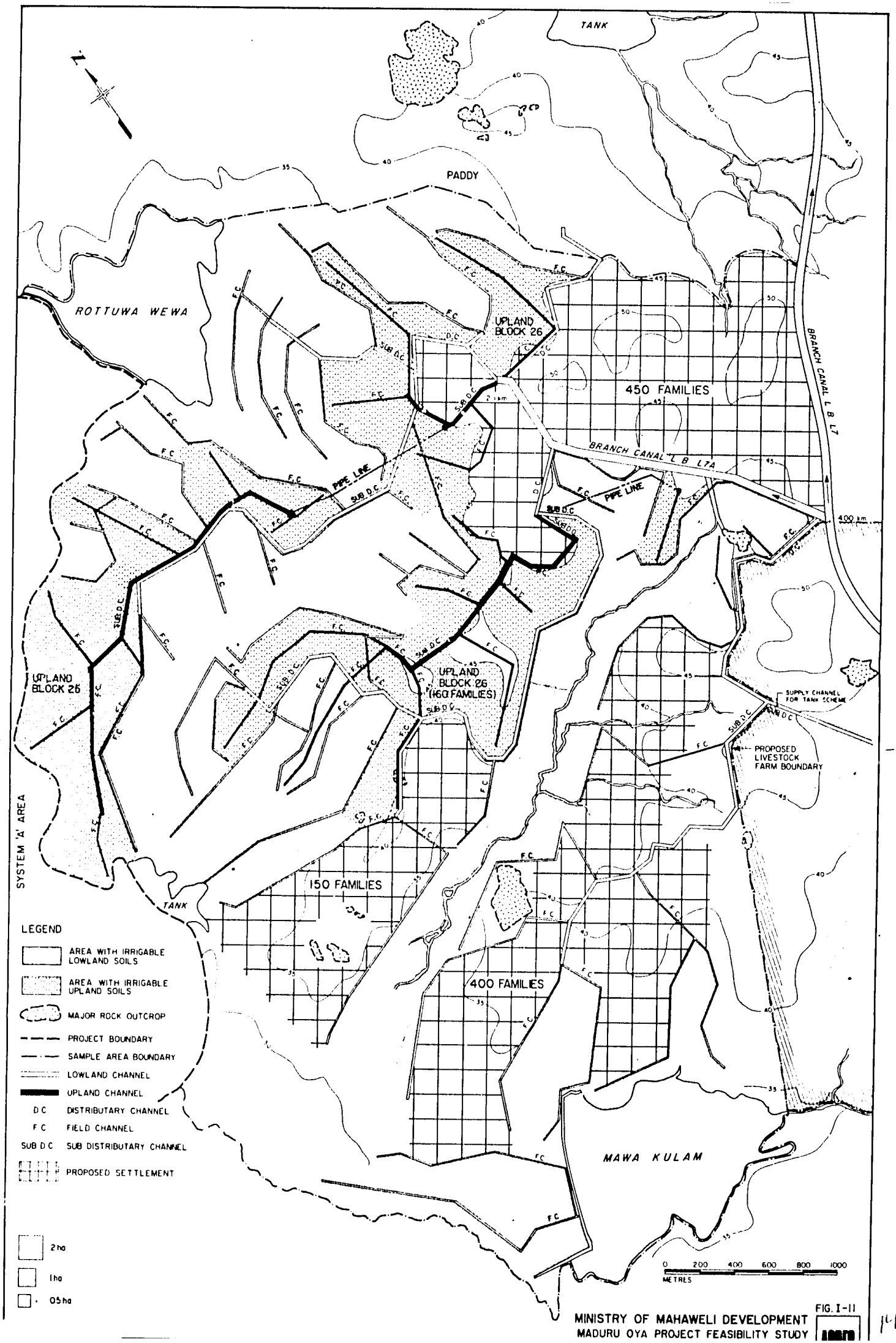
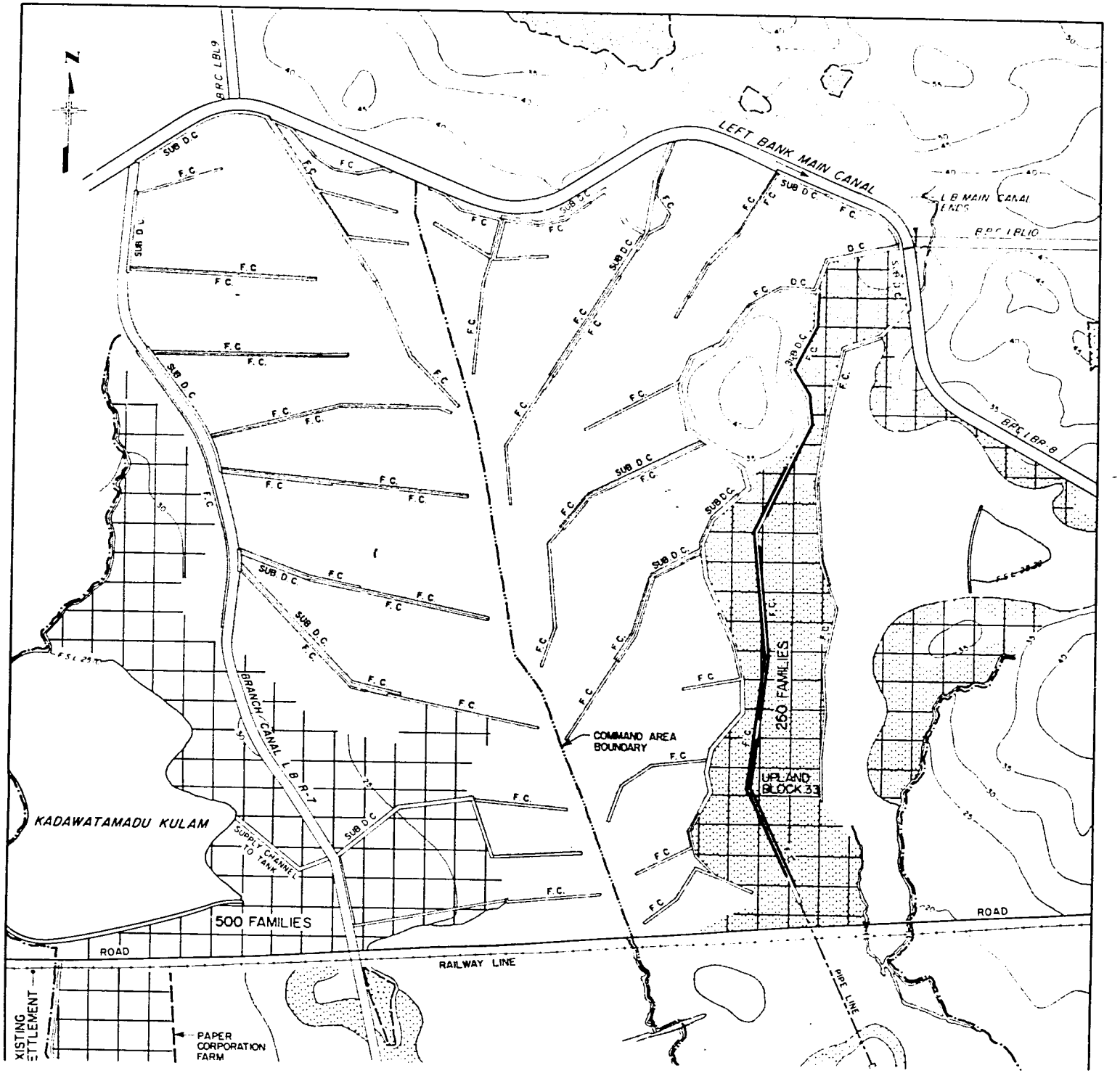
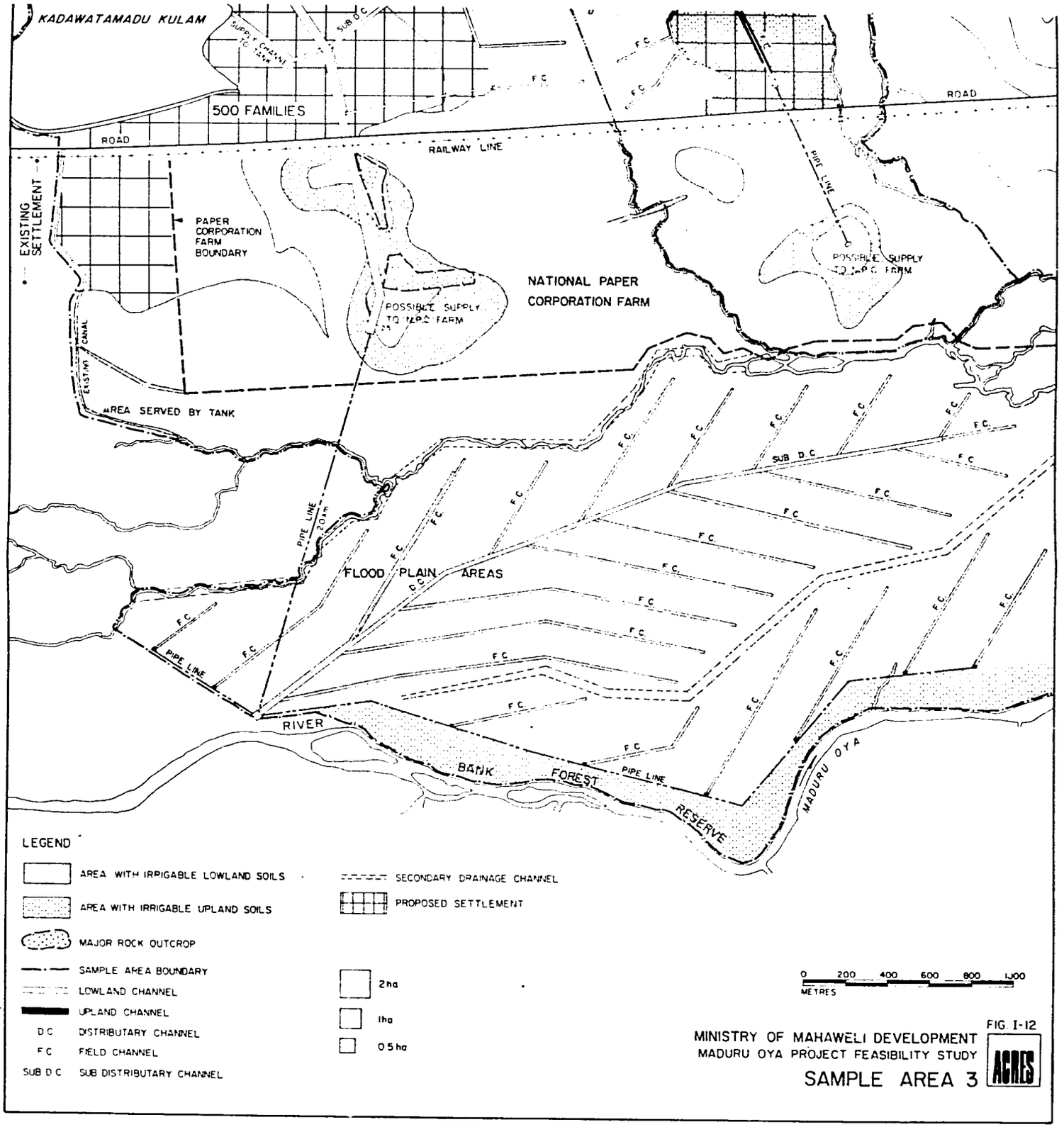


FIG. I-11

MINISTRY OF MAHAWELI DEVELOPMENT
MADURU OYA PROJECT FEASIBILITY STUDY


N
LEFT BANK MAIN CANAL
L.B. MAIN CANAL ENDS
BRC LBL9
BPC LBL10
BPC LBP-8
SUB D.C.
F.C.
D.C.
BRANCH CANAL L.B.R.7
SUPPLY CHANNEL TO TANK
KADAWATAMADU KULAM
500 FAMILIES
250 FAMILIES
UPLAND BLOCK 33
COMMAND AREA BOUNDARY
ROAD
RAILWAY LINE
PIPE LINE
PAPER CORPORATION FARM
EXISTING SETTLEMENT

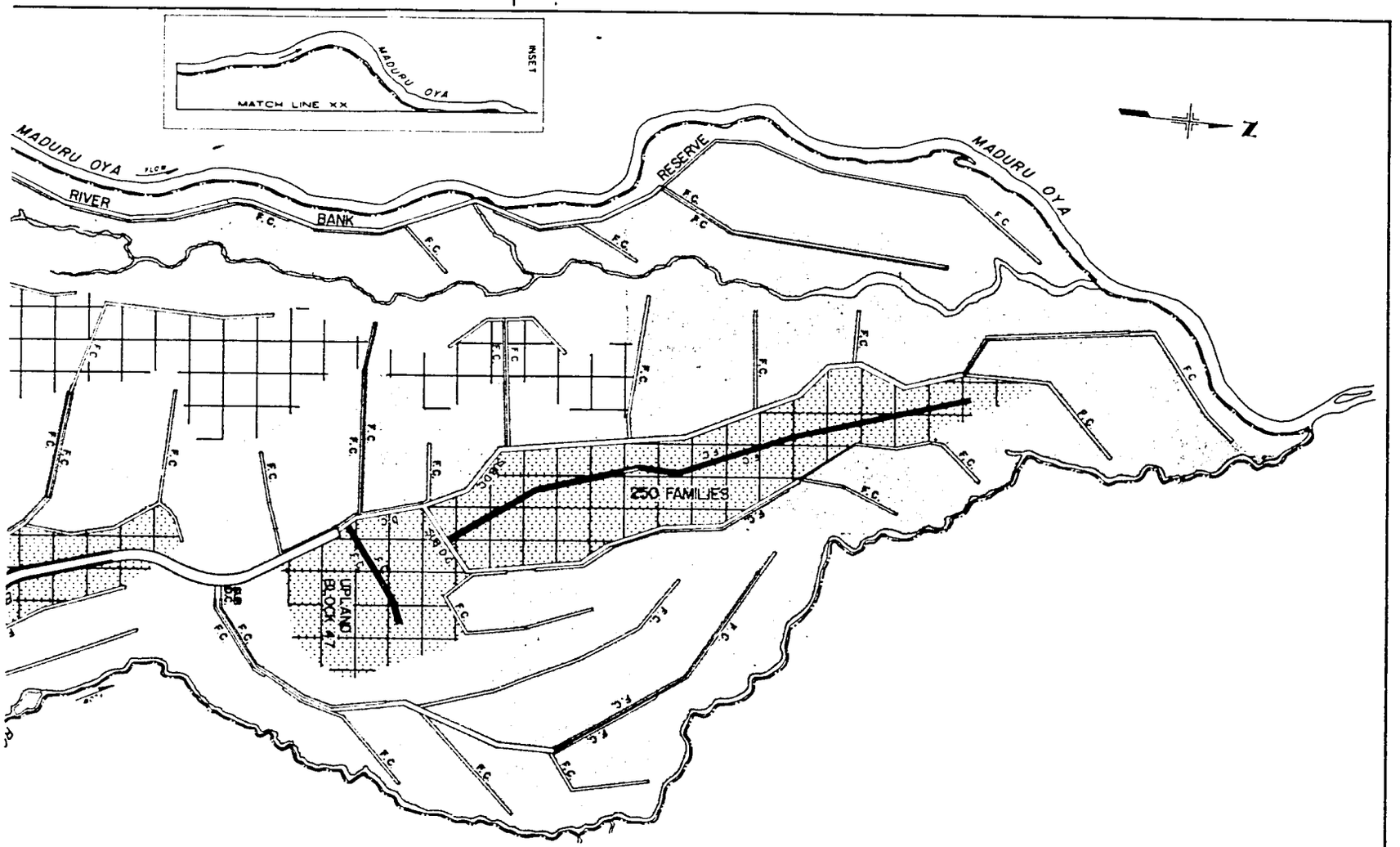


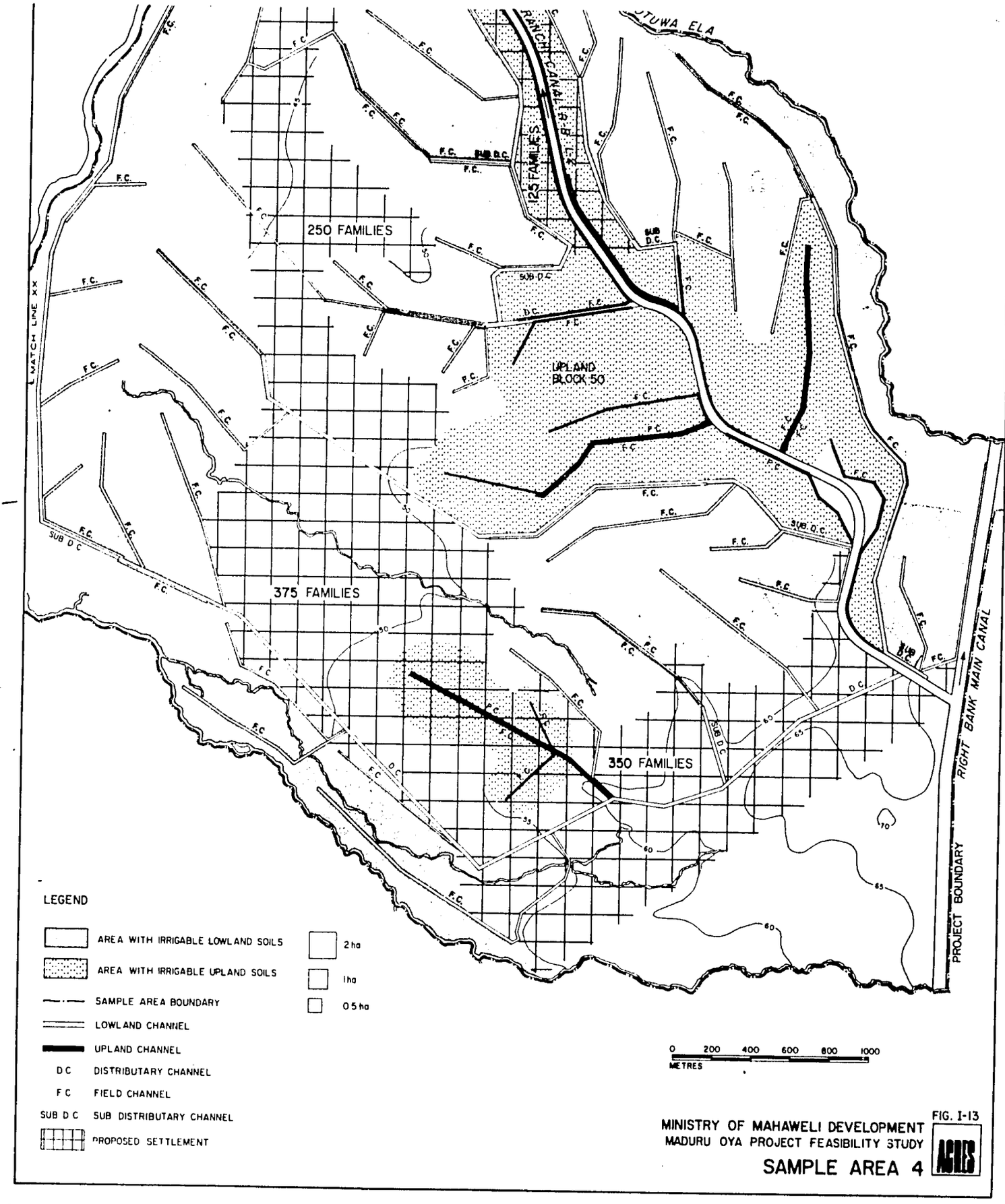
MINISTRY OF MAHAWELI DEVELOPMENT
MADURU OYA PROJECT FEASIBILITY STUDY

SAMPLE AREA 3

FIG. I-12

ACRES


INSET
MADURU OYA
MATCH LINE XX
MADURU OYA
RIVER
BANK
RESERVE
MADURU OYA
N
F.C.
250 FAMILIES
UPLAND BLOCK 47

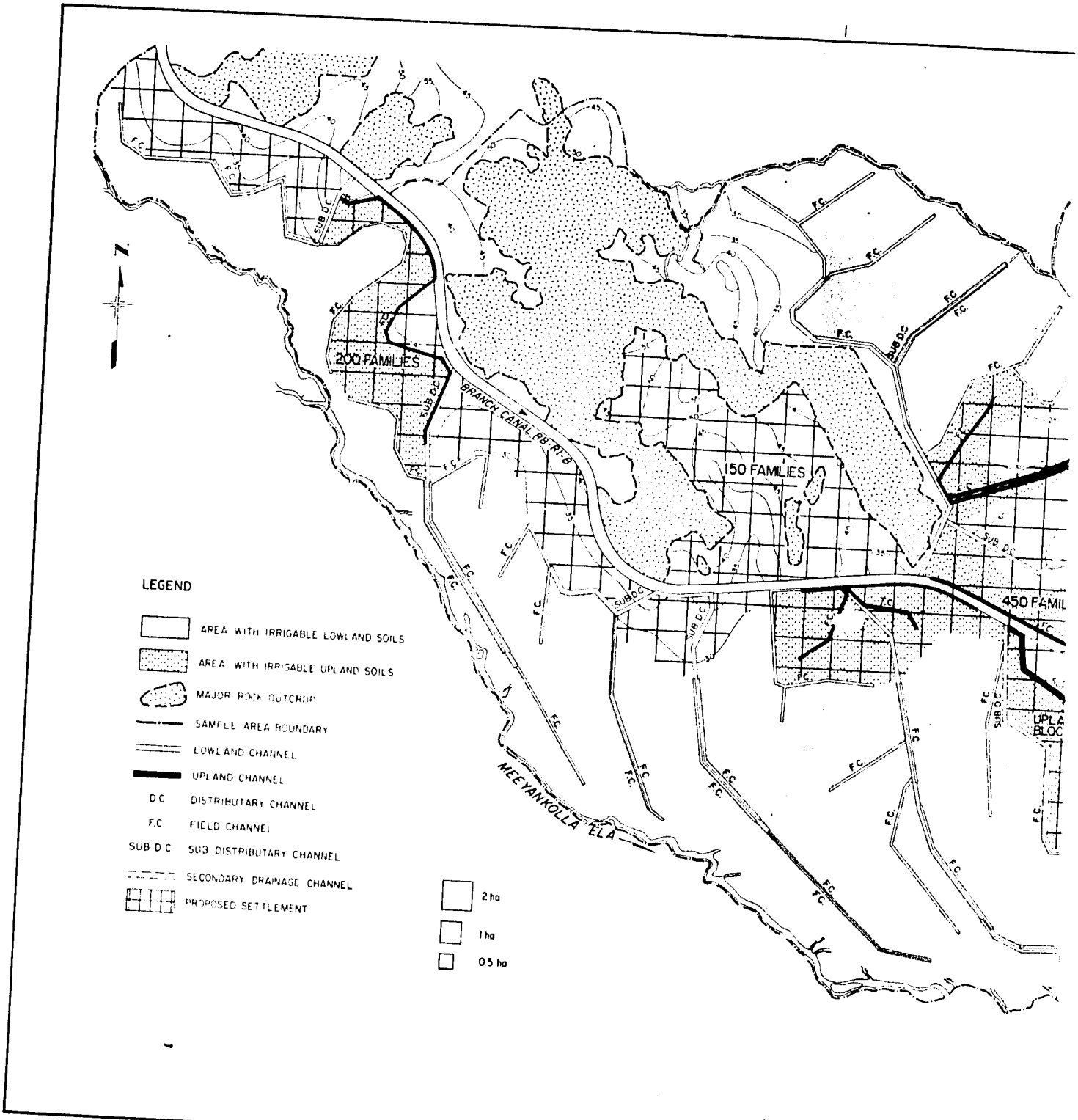


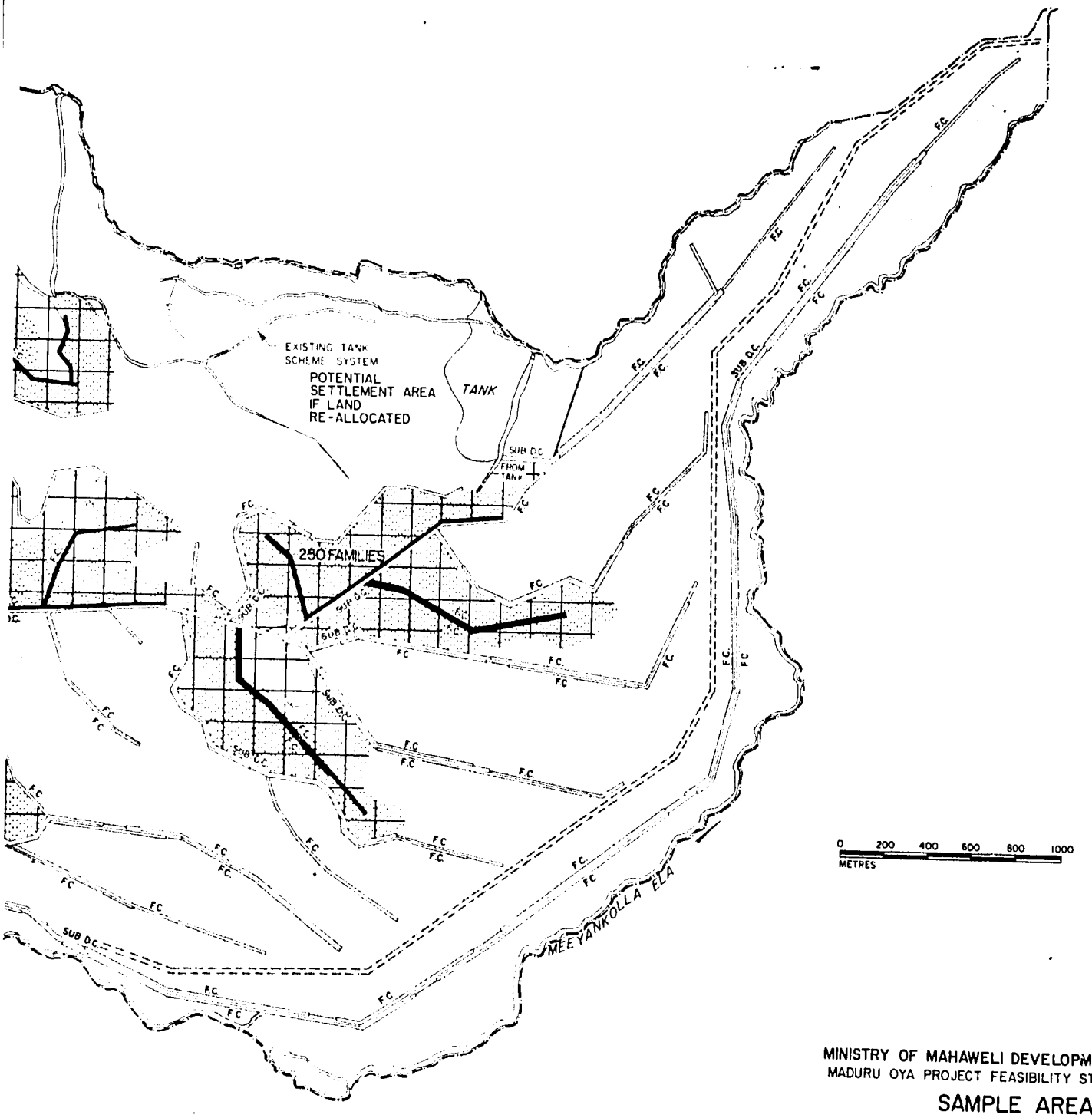
MINISTRY OF MAHAWELI DEVELOPMENT
MADURU OYA PROJECT FEASIBILITY STUDY

SAMPLE AREA 4

FIG. I-13

ACES


200 FAMILIES
150 FAMILIES
450 FAMIL
BRANCH CANAL PB RT 8
MEEYANKOLLA ELA
SUB D.C.
F.C.
N
LEGEND
AREA WITH IRRIGABLE LOWLAND SOILS
AREA WITH IRRIGABLE UPLAND SOILS
MAJOR ROCK OUTCROP
SAMPLE AREA BOUNDARY
LOWLAND CHANNEL
UPLAND CHANNEL
D.C. DISTRIBUTARY CHANNEL
F.C. FIELD CHANNEL
SUB D.C. SUB DISTRIBUTARY CHANNEL
SECONDARY DRAINAGE CHANNEL
PROPOSED SETTLEMENT
2 ha
1 ha
0.5 ha

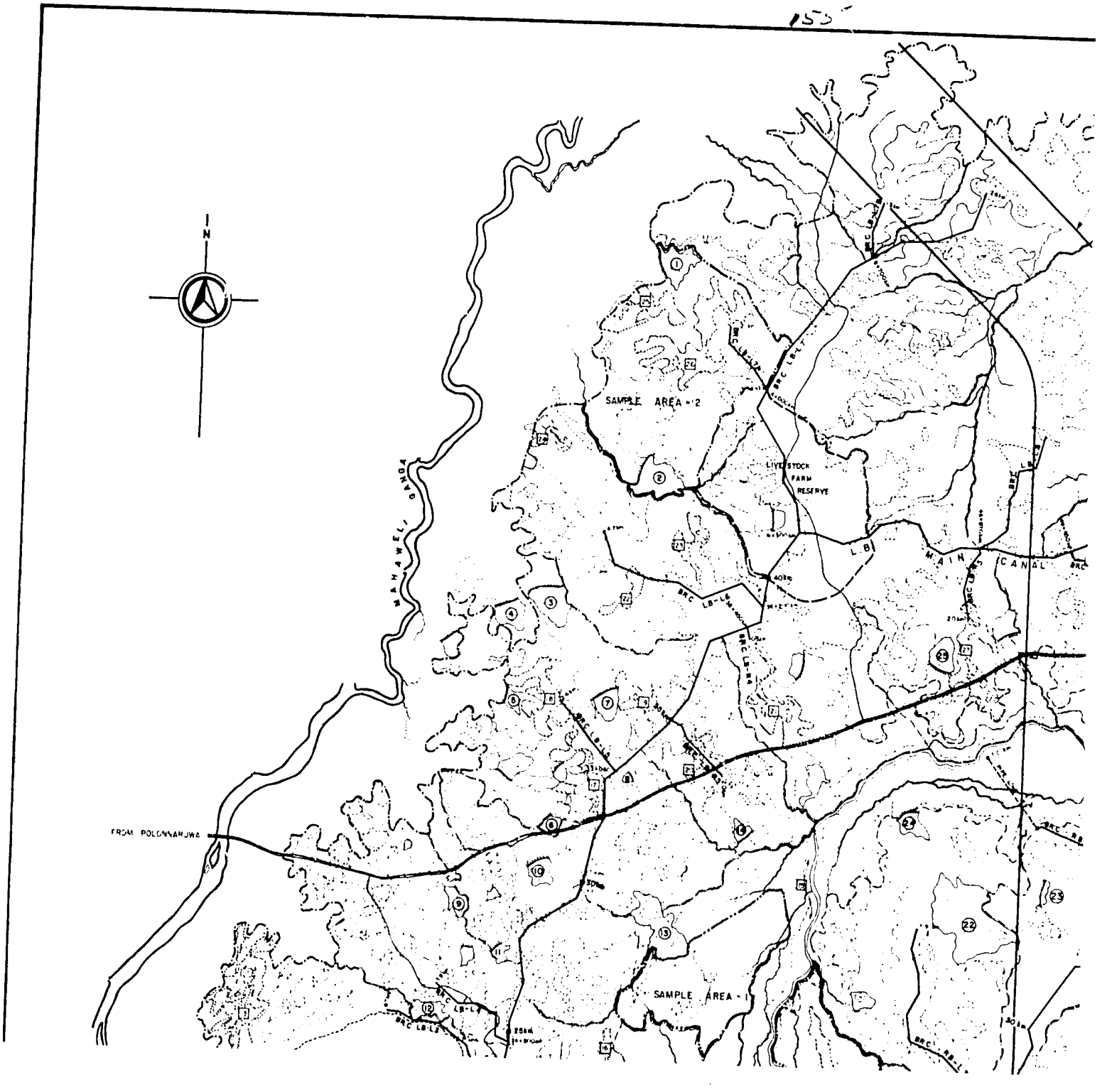


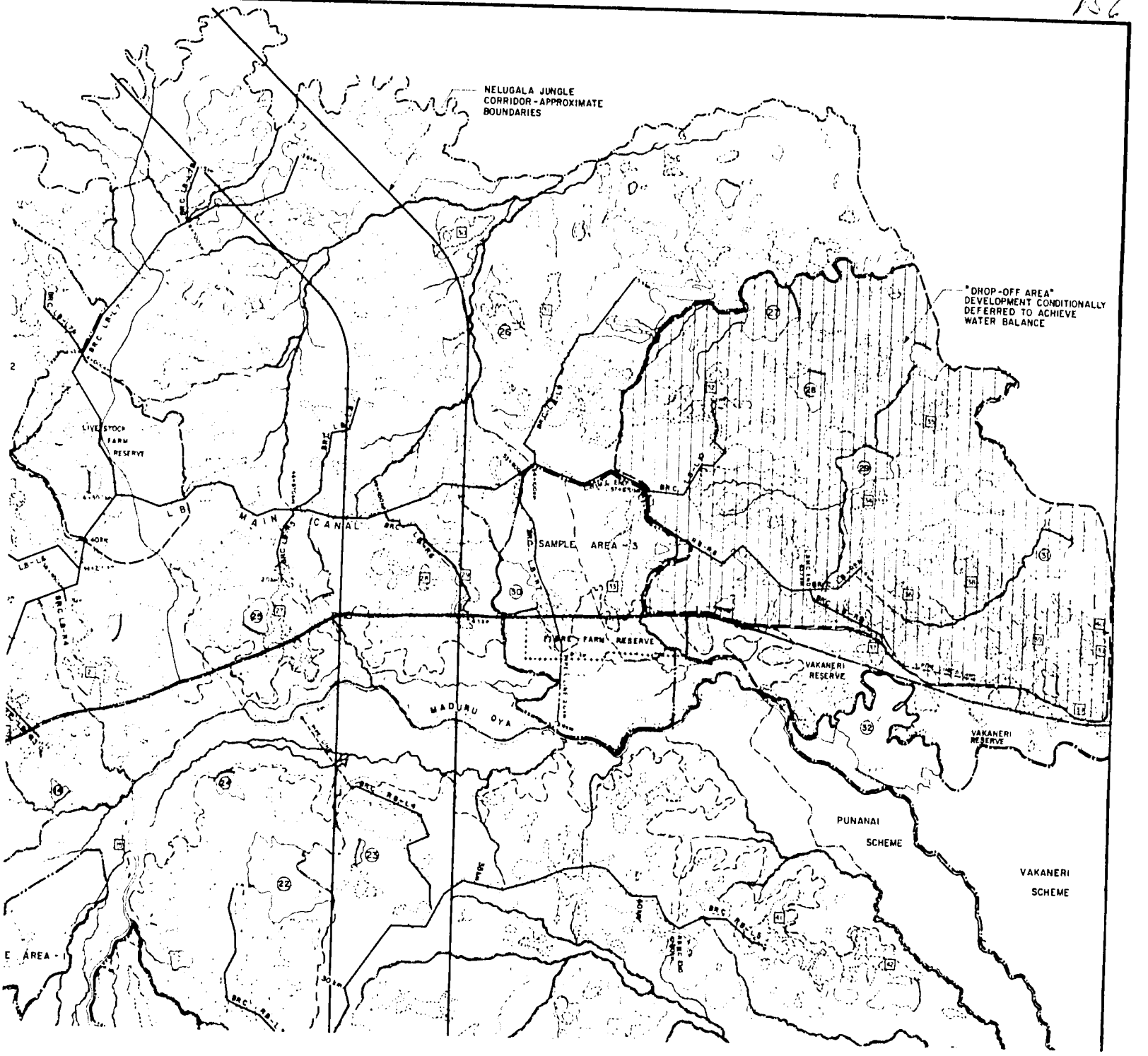
MINISTRY OF MAHAWELI DEVELOPMENT
MADURU OYA PROJECT FEASIBILITY STUDY
SAMPLE AREA 5

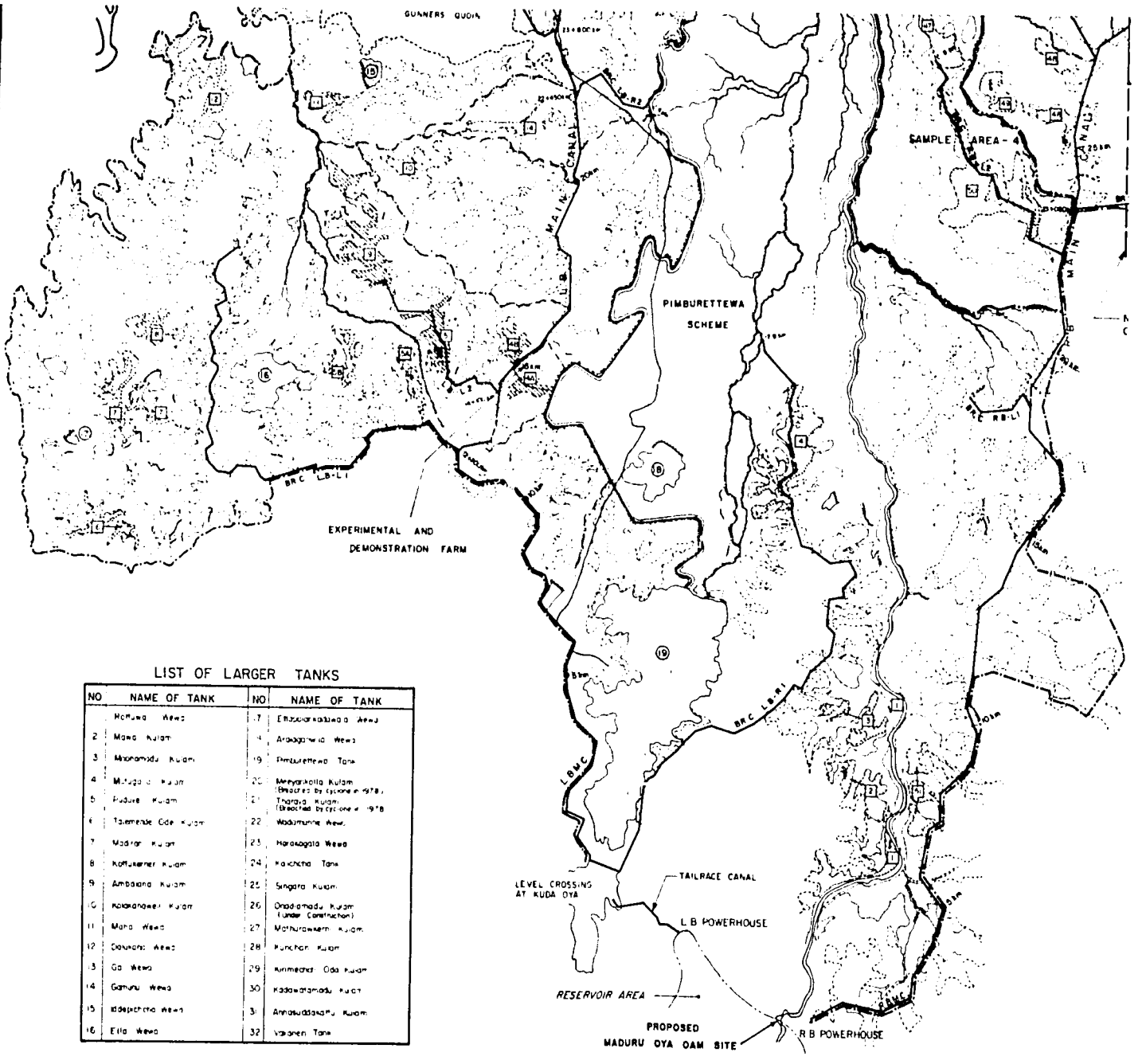
FIG. I-14

ACHIS

154


N
SAMPLE AREA - 2
LIVESTOCK FARM RESERVE
MAIN CANAL
MAHAWELI GANGA
FROM POLONNARUWA
SAMPLE AREA - 1


NELUGALA JUNGLE CORRIDOR - APPROXIMATE BOUNDARIES
"DROP-OFF AREA" DEVELOPMENT CONDITIONALLY DEFERRED TO ACHIEVE WATER BALANCE
LIVESTOCK FARM RESERVE
MAIN CANAL
SAMPLE AREA - 3
FARM RESERVE
VAKANERI RESERVE
MADURU OYA
PUNANAI SCHEME
VAKANERI SCHEME
AREA - 1



LIST OF LARGER TANKS

NO	NAME OF TANK	NO	NAME OF TANK
	Hathwa Wewa	17	Ehalapitiyakadawala Wewa
2	Mawa Kulam	18	Ardaggahawela Wewa
3	Maranamadu Kulam	19	Pimburettewa Tank
4	Mahagalla Kulam	20	Meeyankotta Kulam (Breached by cyclone in 1978)
5	Padure Kulam	21	Thandala Kulam (Breached by cyclone in 1978)
6	Talemadale Ode Kulam	22	Wadumunne Wewa
7	Madiran Kulam	23	Haradagala Wewa
8	Kottukanner Kulam	24	Kalichcha Tank
9	Ambalana Kulam	25	Singara Kulam
10	Kalakandaweli Kulam	26	Onadamadu Kulam (Under Construction)
11	Mahu Wewa	27	Mathurawatte Kulam
12	Dewahan Wewa	28	Kunchan Kulam
13	Ga Wewa	29	Kummedad Oda Kulam
14	Gamunu Wewa	30	Kadawatamadu Kulam
15	Iddapitchchi Wewa	31	Annasuddanamadu Kulam
16	Ella Wewa	32	Vadanen Tank

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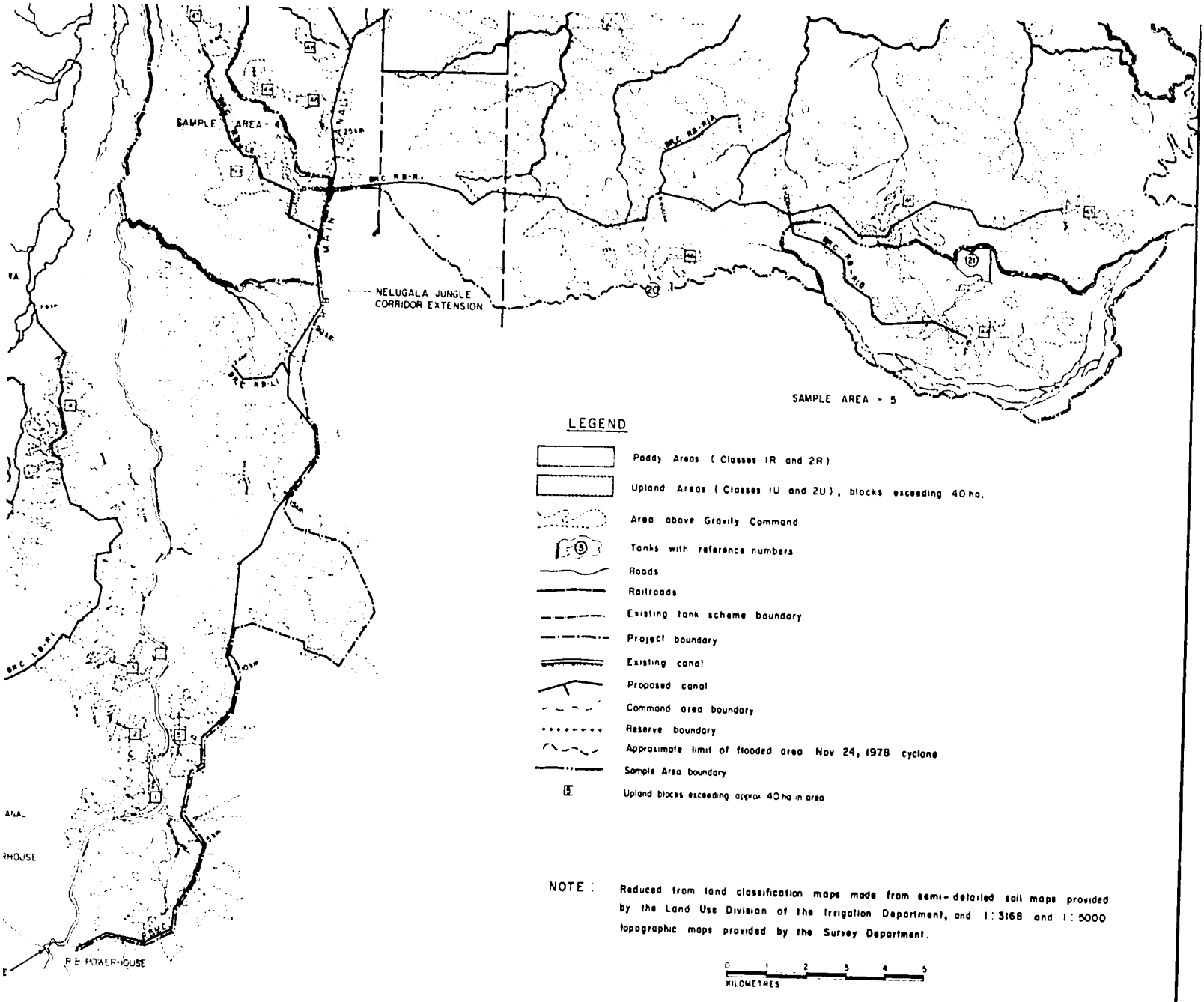
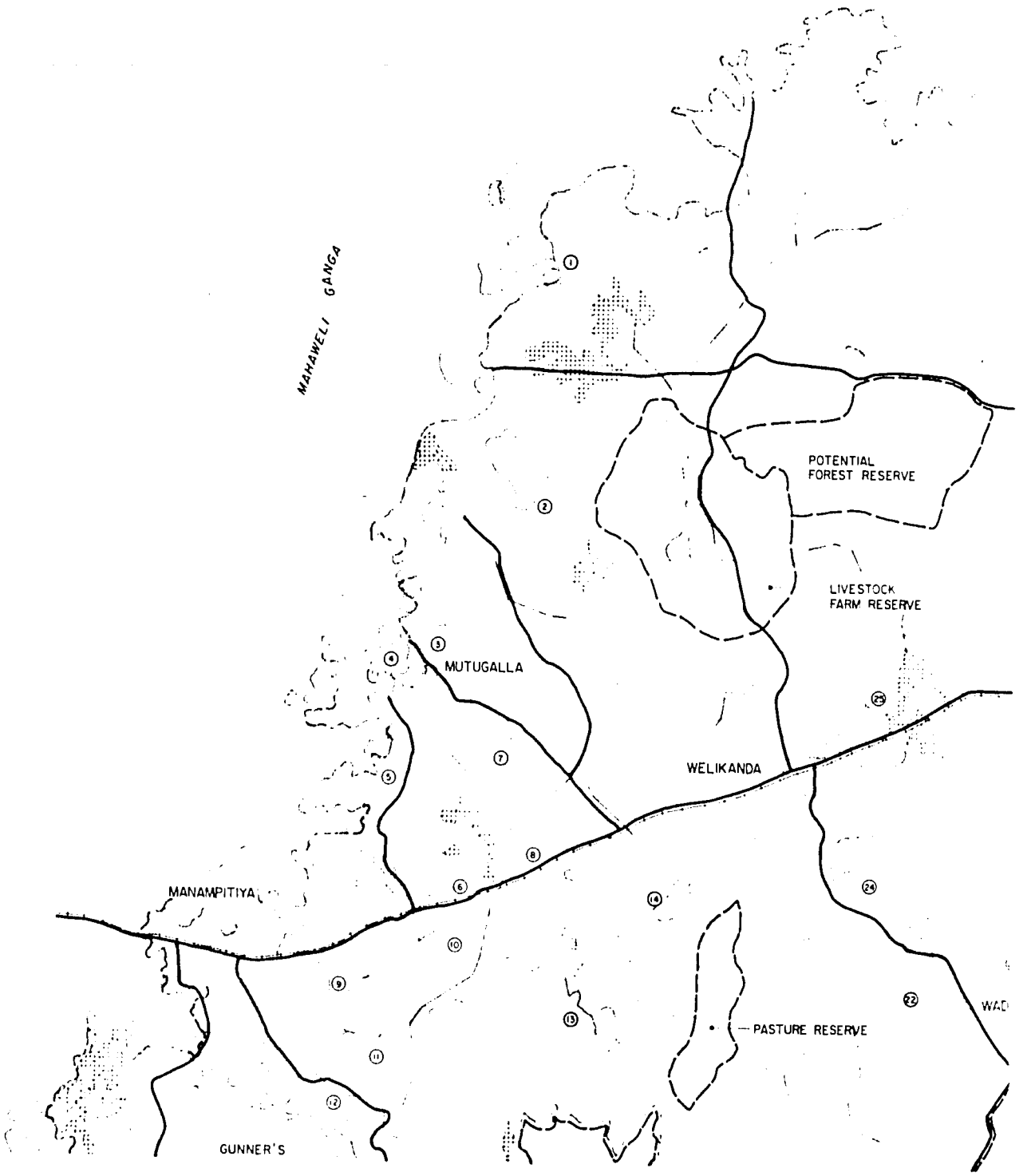


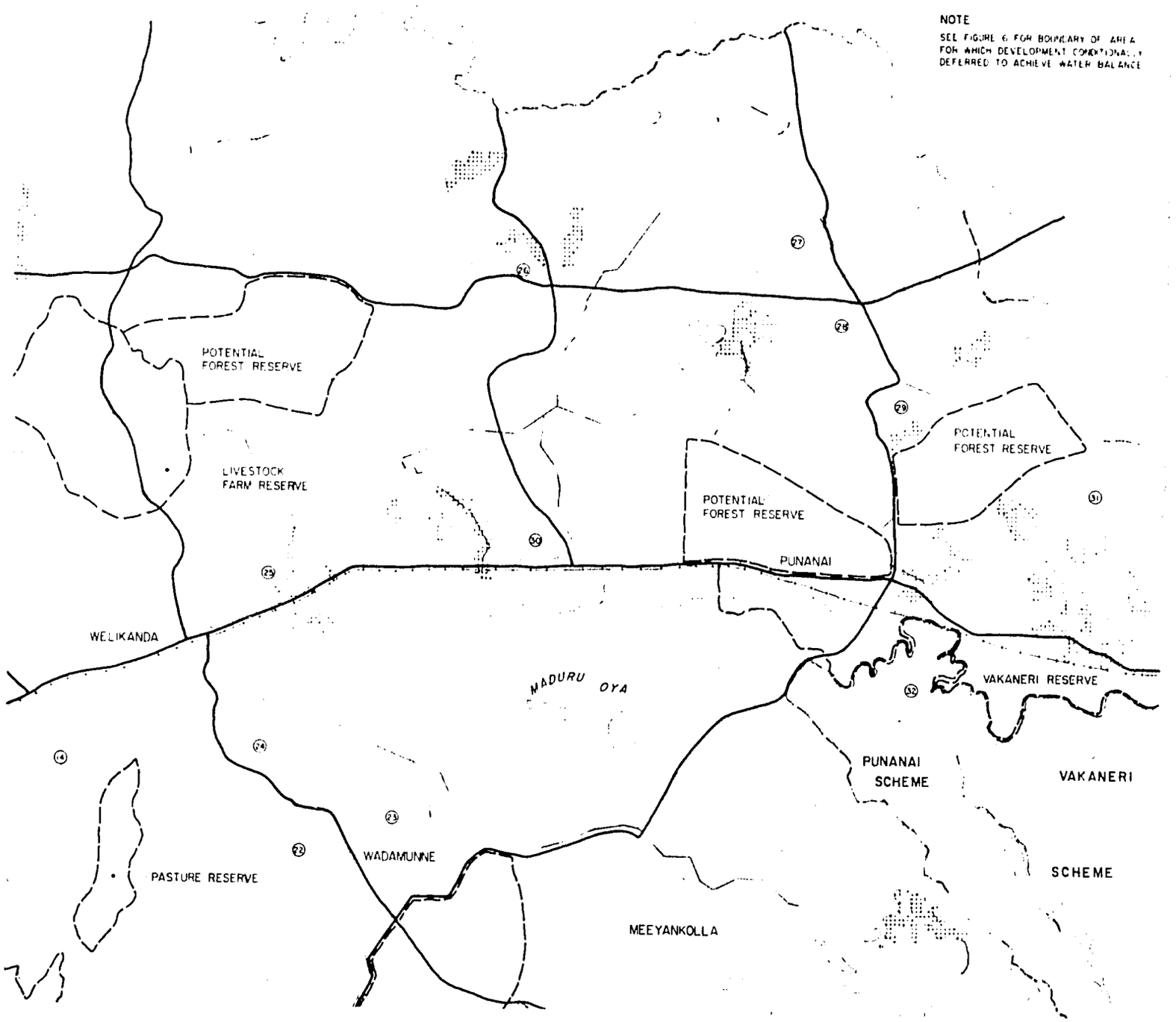
FIG. I-8

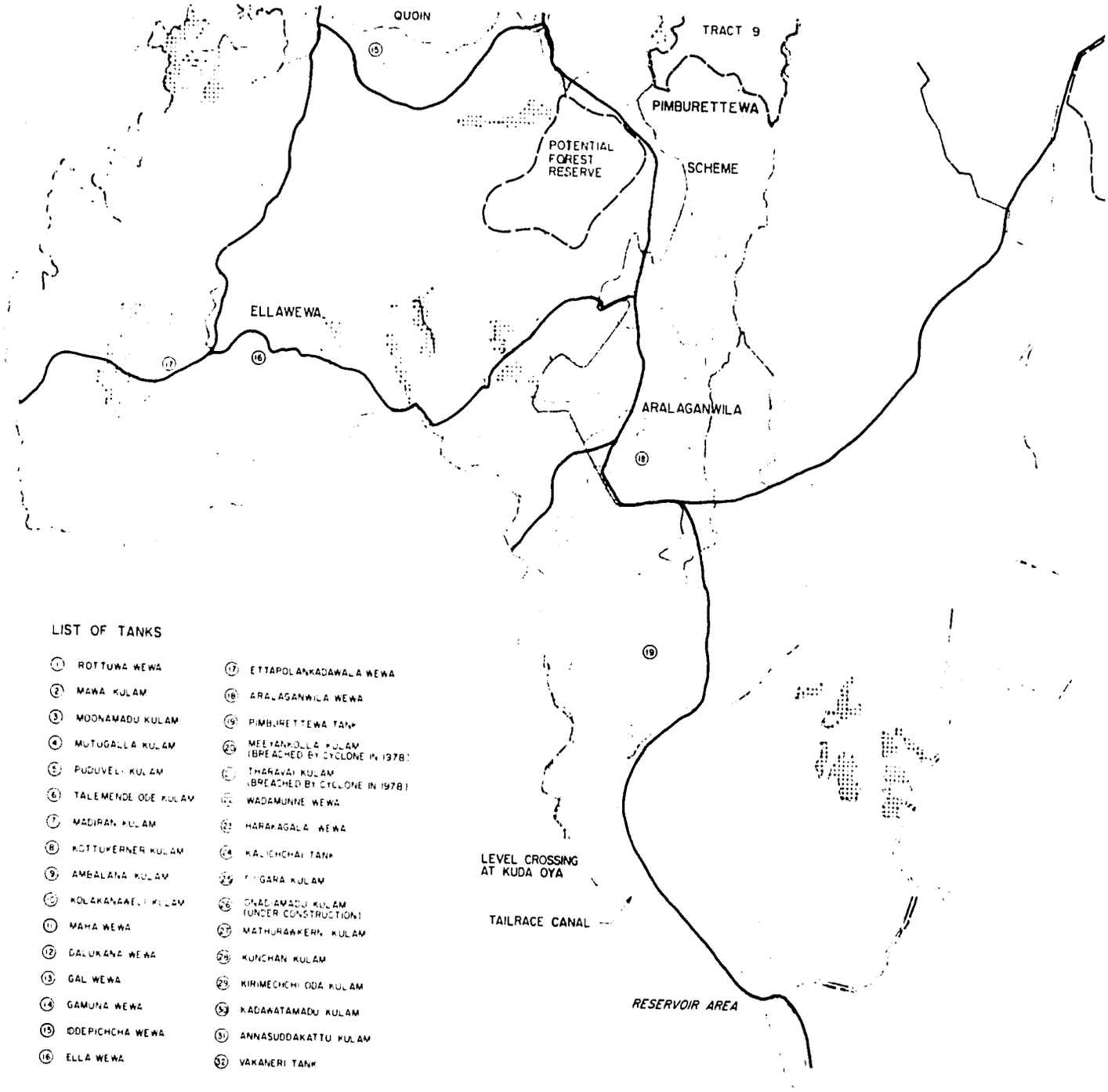
MINISTRY OF MAHAWELI DEVELOPMENT
MADURU OYA PROJECT FEASIBILITY STUDY

SYSTEM B – GENERAL MAP

ACRES


MAHAWELI GANGA
POTENTIAL FOREST RESERVE
LIVESTOCK FARM RESERVE
MUTUGALLA
WELIKANDA
MANAMPITIYA
PASTURE RESERVE
GUNNER'S
WAD


NOTE
SEE FIGURE 6 FOR BOUNDARY OF AREA FOR WHICH DEVELOPMENT CONDITIONALLY DEFERRED TO ACHIEVE WATER BALANCE
POTENTIAL FOREST RESERVE
LIVESTOCK FARM RESERVE
POTENTIAL FOREST RESERVE
POTENTIAL FOREST RESERVE
PUNANAI
WELIKANDA
MADURU OYA
VAKANERI RESERVE
PUNANAI SCHEME
VAKANERI
SCHEME
WADAMUNNE
PASTURE RESERVE
MEEYANKOLLA


QUOIN
TRACT 9
PIMBURETTEWA
POTENTIAL FOREST RESERVE
SCHEME
ELLAWEWA
ARALAGANWILA
LEVEL CROSSING AT KUDA OYA
TAILRACE CANAL
RESERVOIR AREA
LIST OF TANKS
1 ROTTUWA WEWA
2 MAWA KULAM
3 MOONAMADU KULAM
4 MUTUGALLA KULAM
5 PUDUVELI KULAM
6 TALEMENDE ODE KULAM
7 MADIRAN KULAM
8 KOTTUKERNER KULAM
9 AMBALANA KULAM
10 KOLAKANAAELI KULAM
11 MAHA WEWA
12 DALUKANA WEWA
13 GAL WEWA
14 GAMUNA WEWA
15 IDDEPICHCHA WEWA
16 ELLA WEWA
17 ETTAPOLANKADAWALA WEWA
18 ARALAGANWILA WEWA
19 PIMBURETTEWA TANK
20 MEEYANKOLLA KULAM (BREACHED BY CYCLONE IN 1978)
21 THARAVAI KULAM (BREACHED BY CYCLONE IN 1978)
22 WADAMUNNE WEWA
23 HARAKAGALA WEWA
24 KALICHCHAI TANK
25 KIGARA KULAM
26 DAADAMADU KULAM (UNDER CONSTRUCTION)
27 MATHURAWKERN KULAM
28 KUNCHAN KULAM
29 KIRIMECHCHI ODA KULAM
30 KADAWATAMADU KULAM
31 ANNASUDDAKATTU KULAM
32 VAKANERI TANK

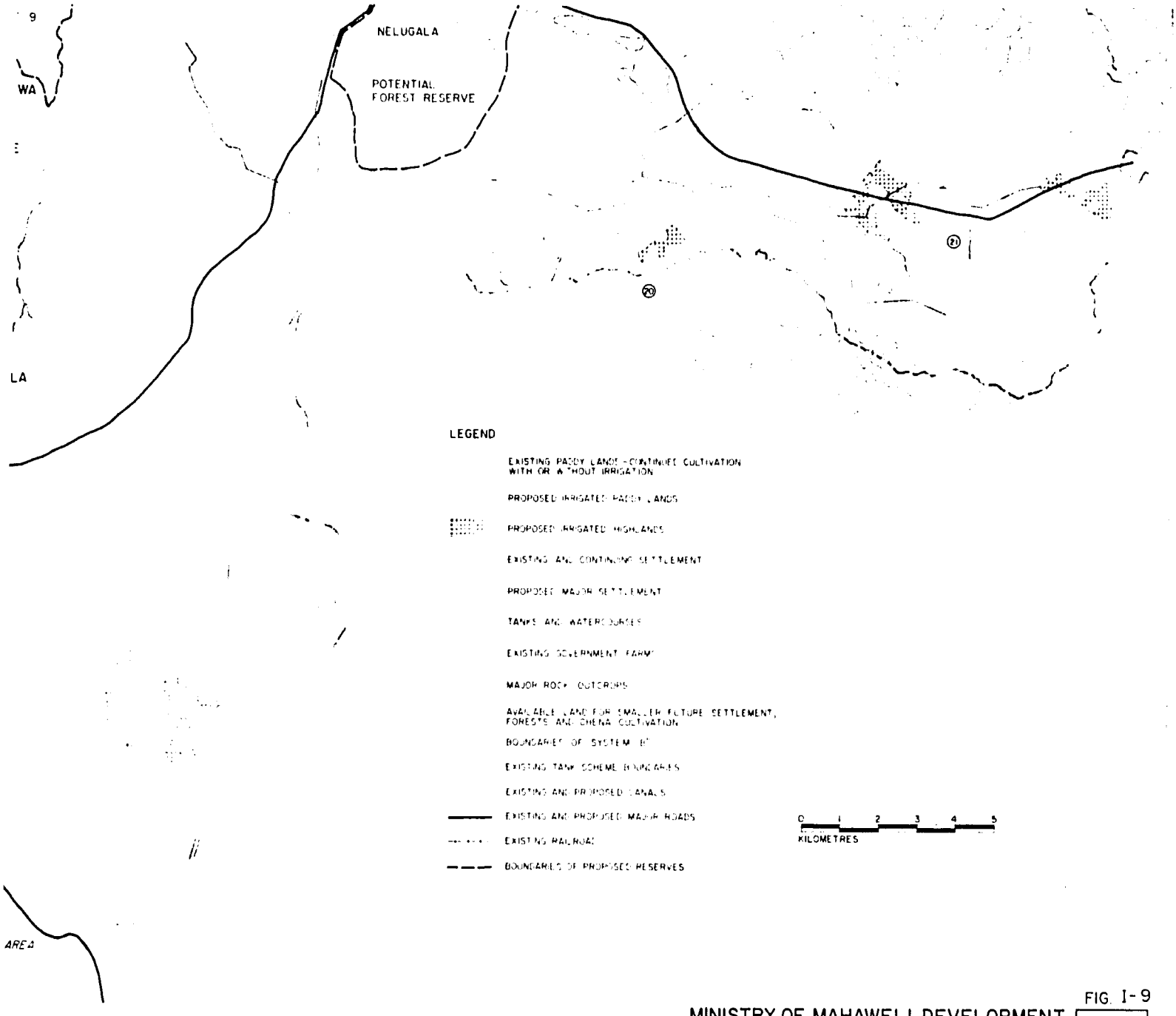
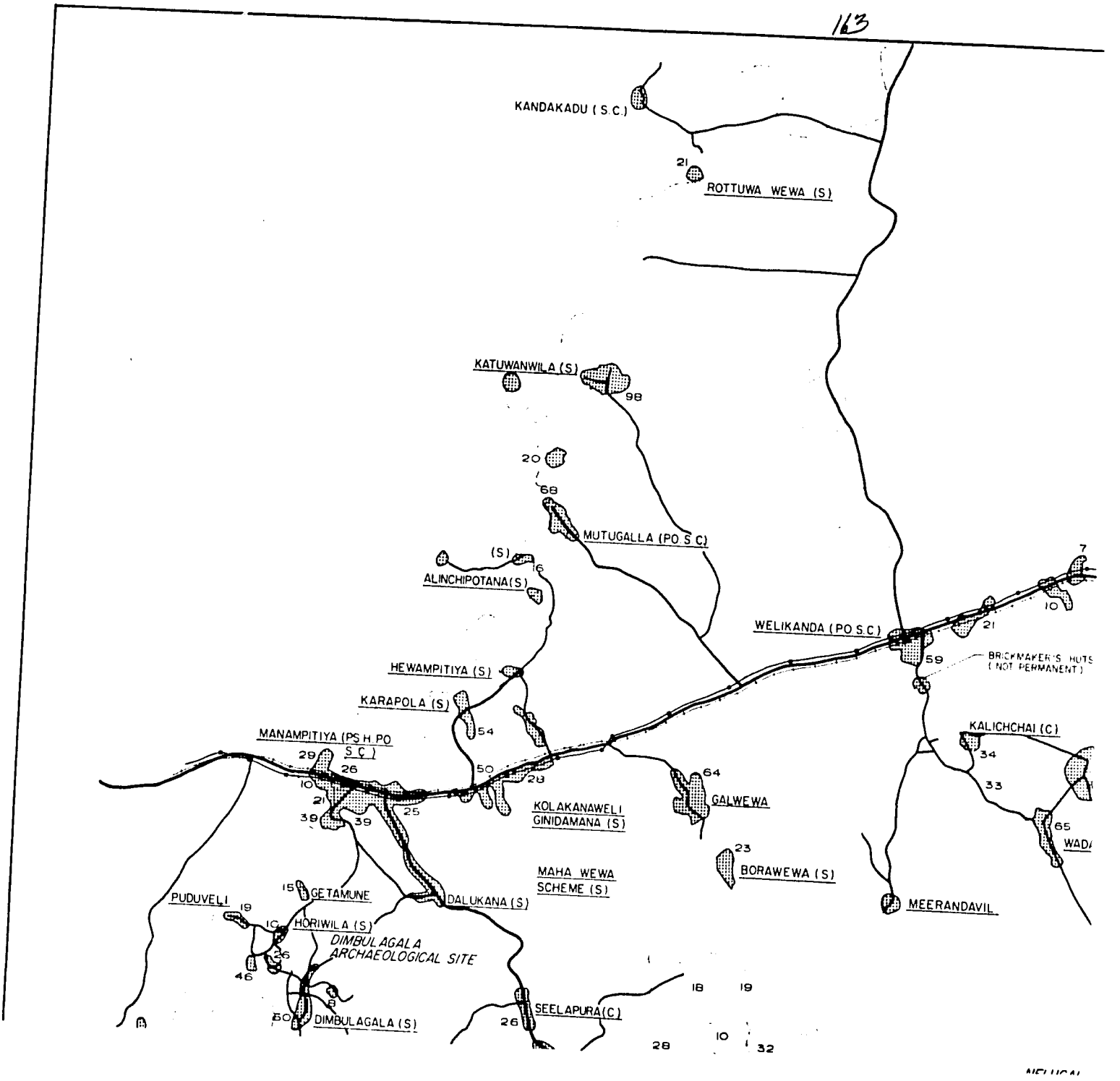


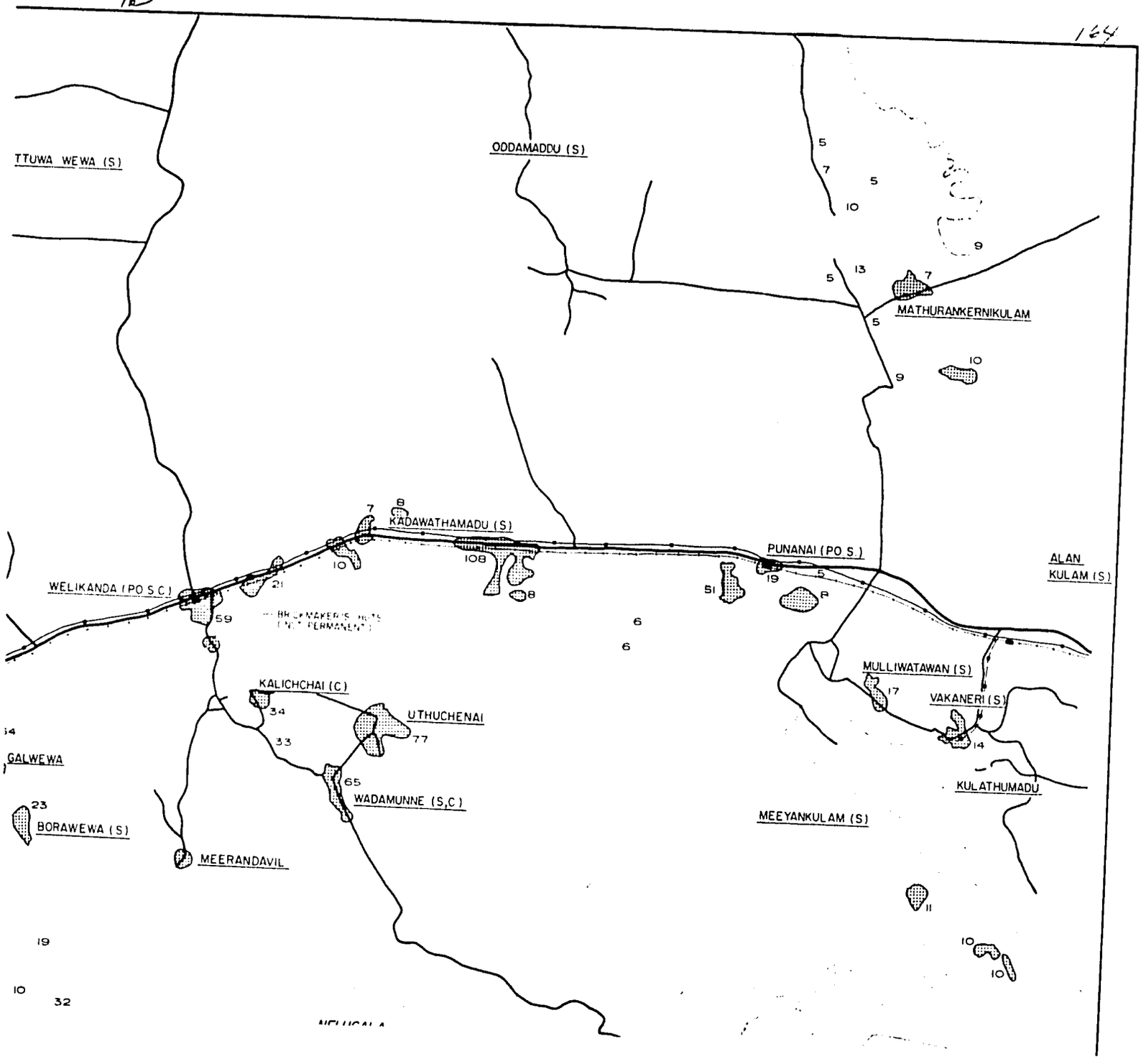
FIG. I-9

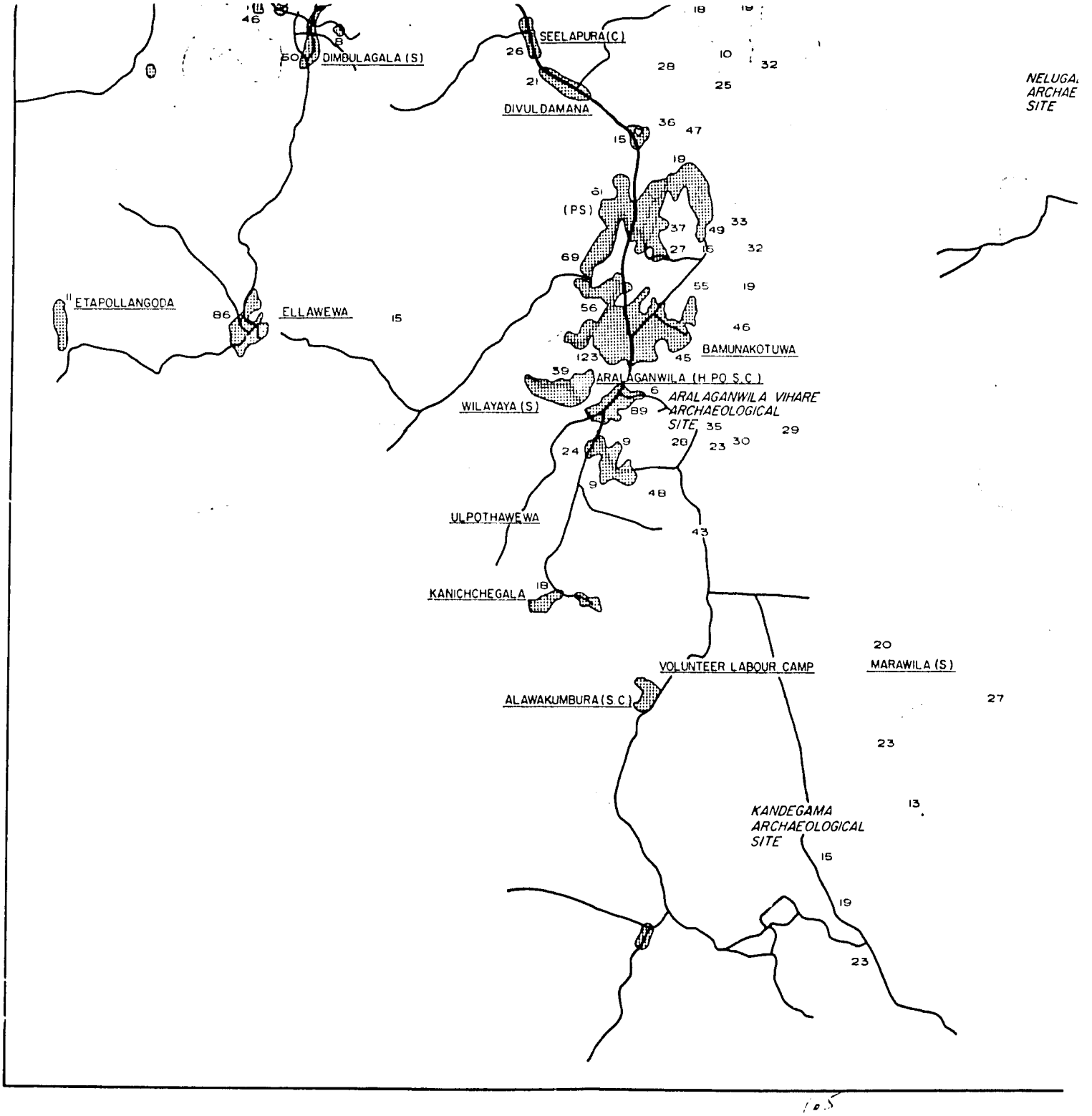
MINISTRY OF MAHAWELI DEVELOPMENT
MADURU OYA PROJECT FEASIBILITY STUDY

INDICATED FUTURE LAND USE

ACRES


KANDAKADU (S.C.)
21
ROTTUWA WEWA (S)
KATUWANWILA (S)
98
20
68
MUTUGALLA (PO S C)
(S)
6
ALINCHIPOTANA(S)
7
10
WELIKANDA (PO S.C)
21
59
BRICKMAKER'S HUTS
(NOT PERMANENT)
HEWAMPITIYA (S)
KARAPOLA (S)
54
MANAMPITIYA (PS H PO
S C)
29
26
10
21
39
39
25
50
28
KOLAKANAWELI
GINIDAMANA (S)
64
GALWEWA
KALICHCHAI (C)
34
33
65
WADA
23
BORAWEWA (S)
MAHA WEWA
SCHEME (S)
MEERANDAVIL
15
GETAMUNE
PUDUVELI
19
DALUKANA (S)
HORIWILA (S)
DIMBULAGALA
ARCHAEOLOGICAL SITE
26
46
8
60
DIMBULAGALA (S)
SEELAPURA(C)
26
18
19
28
10
32


TTUWA WEWA (S)
ODDAMADDU (S)
MATHURANKERNIKULAM
KADAWATHAMADU (S)
PUNANAI (PO S.)
ALAN KULAM (S)
WELIKANDA (PO S.C.)
KALICHCHAI (C)
UTHUCHENAI
MULLIWATAWAN (S)
VAKANERI (S)
GALWEWA
KULATHUMADU
WADAMUNNE (S,C)
BORAWEWA (S)
MEEYANKULAM (S)
MEERANDAVIL


DIMBULAGALA (S)
SEELAPURA (C)
DIVULDAMANA
(PS)
ETAPOLLANGODA
ELLAWEWA
BAMUNAKOTUWA
ARALAGANWILA (H PO S.C.)
ARALAGANWILA VIHARE ARCHAEOLOGICAL SITE
WILAYAYA (S)
ULPOTHAWEWA
KANICHCHEGALA
VOLUNTEER LABOUR CAMP
MARAWILA (S)
ALAWAKUMBURA (S.C.)
KANDEGAMA ARCHAEOLOGICAL SITE
NELUGA
ARCHAE
SITE

105

165

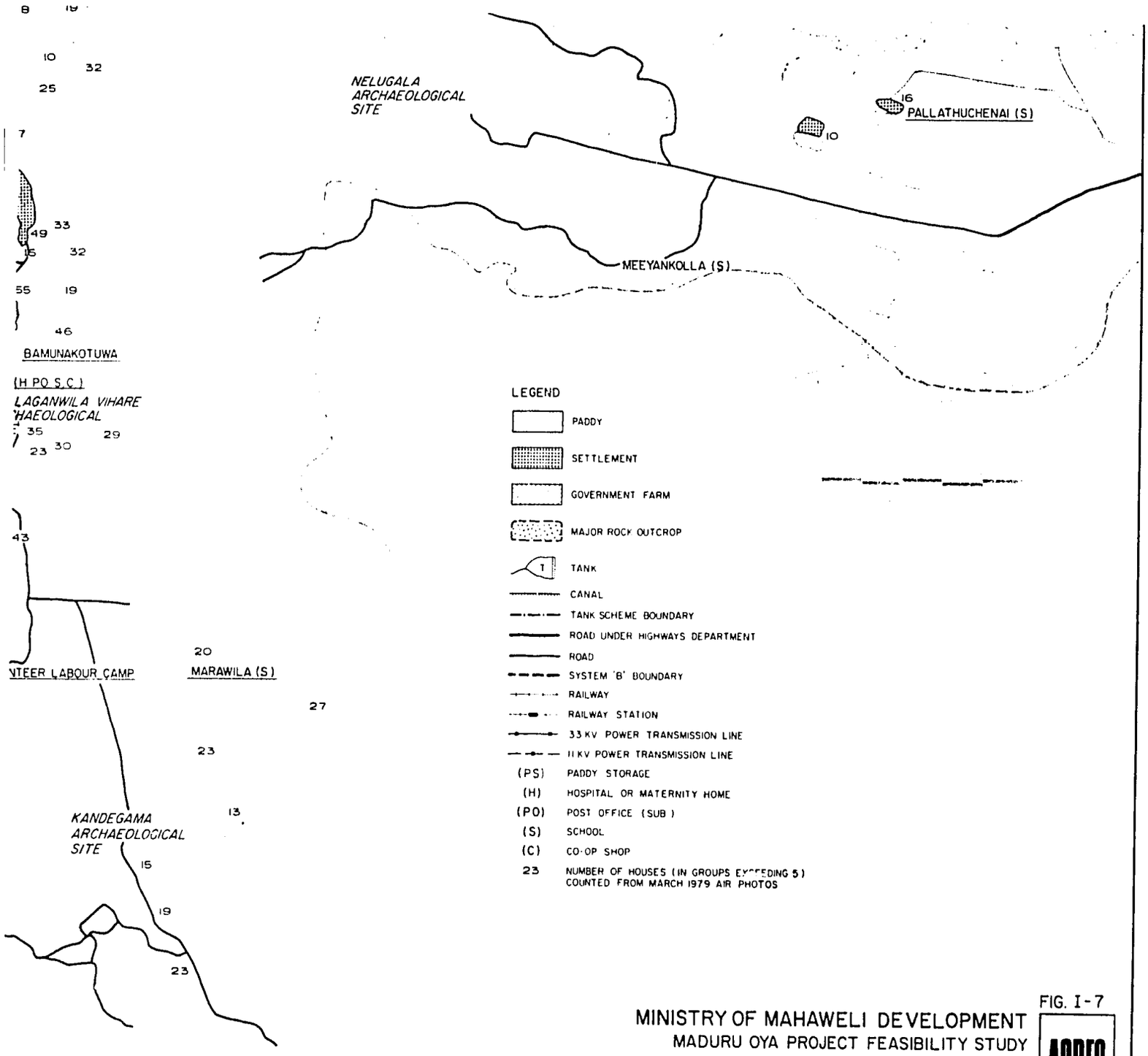


FIG. I-7

MINISTRY OF MAHAWELI DEVELOPMENT
MADURU OYA PROJECT FEASIBILITY STUDY

EXISTING INFRASTRUCTURE

ACRES