

Table 9 FINANCIAL CONSTRUCTION COST OF PROPOSED PROJECT WORK

(Unit : Rs. Million)

Description	Unit	Q'ty	Amount		
			F.C.	L.C.	Total
1 Direct Cost					
(1) Rehabilitation and Upgrading Works	ha	2,900	157	108	265
(2) Irrigaion Extension Works					
1) Irrigation canal & facilities	km	362	604	367	970
2) Drain & facilities	km	106	142	73	215
3) On-farm	ha	6,380	172	89	261
4) O/M Equipment			25	0	25
5) Miscellaneous			28	16	43
Sub-total			969	545	1,514
(3) Rural Infrastructure Work					
1) Landpreparation	ha	1,200	7	4	11
2) Education facility (schools)	nos	28	46	38	84
3) Health & medical care	nos	12	14	11	25
4) Post office	nos	4	2	1	3
5) Rural water supply	nos	23	99	58	157
6) Main road	km	31	113	76	189
7) Rural roads	km	111	31	26	57
8) Bridge on the Walawe river	nos	1	81	27	108
9) Electrification	nos	4	111	60	171
10) Telecommunication	nos	4	62	33	95
11) Administrative office	nos	22	28	23	51
12) Development center	nos	1	58	25	83
13) Starter facilities for settler	nos	5,340	5	16	21
14) Agro extension facility	nos	6	11	15	26
15) Miscellaneous			22	14	36
Sub-total			690	427	1,117
(4) Environmental Mitigative Actions and Monitorings					
			0	10	10
Total of direct cost			1,816	1,090	2,906
2 Engineering Services					
			345	0	345
3 Administration					
			0	220	220
4 Physical contingency					
			323	197	520
5 Total of Items 1, 2, 3 and 4					
			2,484	1,507	3,991
6 Price Escalation					
			470	1,022	1,492
Grand Total			2,954	2,529	5,483

Table 10 ANNUAL DISBURSEMENT SCHEDULE

(Unit : Rs. million)

Item	Total Project Cost			1993			1994			1995		
	F.C	L.C	Total	F.C	L.C	Total	F.C	L.C	Total	F.C	L.C	Total
1 Base cost	2,484	1,507	3,991	14	9	23	88	32	120	282	164	446
2 Price contingency	470	1,022	1,492	1	1	2	7	8	15	34	64	98
Total	2,954	2,529	5,483	15	10	25	95	40	135	316	228	544

Item	1996			1997			1998		
	F.C	L.C	Total	F.C	L.C	Total	F.C	L.C	Total
1 Base cost	738	427	1,165	802	506	1,308	560	369	929
2 Price contingency	120	236	356	166	370	536	142	344	486
Total	858	663	1,521	968	876	1,844	702	713	1,415

Note:

Price escalation rate : F/C; 3.8 % /year L/C; 11.6 % /year

Table 11 IRRIGATION BENEFIT AT FULL DEVELOPMENT STAGE

Item	Old Area			Extension Area			Total Increase
	With Project Condition	Without Project Condition	Increase	With Project Condition	Without Project Condition	Increase	
Irrigated Area (ha)							
Paddy	2,220	2,540	-320	2,320	80	2,240	1,920
Big Onion	240		240	390		390	630
Vegetables	260	310	-50	240		240	190
Banana	400	50	350	210		210	560
Sugarcane	820		820	2,180		2,180	3,000
Total	3,940	2,900	1,040	5,340	80	5,260	6,300
Production (ton)							
Paddy	24,420	21,844	2,576	25,520	264	25,256	27,832
Big Onion	5,760		5,760	9,360		9,360	15,120
Vegetables	13,000	12,400	600	12,000		12,000	12,600
Banana	6,800	750	6,050	3,570		3,570	9,620
Sugarcane	93,480		93,480	248,520		248,520	342,000
Production Value (Rs. 1,000)							
Paddy	103,896	85,852	18,044	108,576	1,016	107,560	125,604
Big Onion	57,600		57,600	93,600		93,600	151,200
Vegetables	29,172	16,182	12,990	26,928		26,928	39,918
Banana	60,688	6,616	54,072	31,861		31,861	85,933
Sugarcane	60,086		60,086	159,740		159,740	219,825
Total	311,442	108,650	202,792	420,705	1,016	419,689	622,480
Irrigation Benefit (Rs. 1,000)							
Paddy	105,672	87,376	18,296	110,432	944	109,488	127,784
Big Onion	54,336		54,336	88,296		88,296	142,632
Vegetables	25,220	11,408	13,812	23,280		23,280	37,092
Banana	51,200	5,494	45,706	26,880		26,880	72,586
Sugarcane	82,984		82,984	220,616		220,616	303,600
Total	319,412	104,278	215,134	469,504	944	468,560	683,694

Table 12 PROJECT COST AND BENEFIT FLOW

(Unit: Rs.1,000)

No	Year	Costs			Total (C)	Gross Benefit (B)	Balance (B-C)
		Capital	O&M	Replacement			
1	1993	20,904	0		20,904	0	-20,904
2	1994	112,261	0		112,261	0	-112,261
3	1995	404,732	0		404,732	-139,480	-544,212
4	1996	1,058,290	0		1,058,290	116,190	-942,100
5	1997	1,181,486	8,085		1,189,571	325,569	-864,002
6	1998	836,746	12,128		848,874	532,785	-316,088
7	1999		16,170		16,170	607,655	591,485
8	2000		16,170		16,170	651,136	634,966
9	2001		16,170		16,170	674,375	658,205
10	2002		16,170		16,170	683,694	667,524
11	2003		16,170		16,170	683,694	667,524
12	2004		16,170		16,170	683,694	667,524
13	2005		16,170		16,170	683,694	667,524
14	2006		16,170		16,170	683,694	667,524
15	2007		16,170		16,170	683,694	667,524
16	2008		16,170		16,170	683,694	667,524
17	2009		16,170		16,170	683,694	667,524
18	2010		16,170		16,170	683,694	667,524
19	2011		16,170		16,170	683,694	667,524
20	2012		16,170		16,170	683,694	667,524
21	2013		16,170		16,170	683,694	667,524
22	2014		16,170		16,170	683,694	667,524
23	2015		16,170	15,716	31,886	683,694	651,808
24	2016		16,170	27,452	43,622	683,694	640,072
25	2017		16,170	19,761	35,931	683,694	647,763
26	2018		16,170	9,559	25,729	683,694	657,965
27	2019		16,170		16,170	683,694	667,524
28	2020		16,170		16,170	683,694	667,524
29	2021		16,170		16,170	683,694	667,524
30	2022		16,170		16,170	683,694	667,524
31	2023		16,170		16,170	683,694	667,524
32	2024		16,170		16,170	683,694	667,524
33	2025		16,170		16,170	683,694	667,524
34	2026		16,170		16,170	683,694	667,524
35	2027		16,170		16,170	683,694	667,524
36	2028		16,170		16,170	683,694	667,524
37	2029		16,170		16,170	683,694	667,524
38	2030		16,170		16,170	683,694	667,524
39	2031		16,170		16,170	683,694	667,524
40	2032		16,170		16,170	683,694	667,524
41	2033		16,170		16,170	683,694	667,524
42	2034		16,170		16,170	683,694	667,524
43	2035		16,170	15,716	31,886	683,694	651,808
44	2036		16,170	27,452	43,622	683,694	640,072
45	2037		16,170	19,761	35,931	683,694	647,763
46	2038		16,170	9,559	25,729	683,694	657,965
47	2039		16,170		16,170	683,694	667,524
48	2040		16,170		16,170	683,694	667,524
49	2041		16,170		16,170	683,694	667,524
50	2042		16,170		16,170	683,694	667,524

NPV(10%) = 2,454,617 4,220,334 1,765,717

Sensitivity data:

ITEM	ITEM (%)	Cost up (%)	Benefit Down (%)		
			-10	0	10
Cost	0	-10	20.9%	19.1%	17.3%
UP		-5	19.9%	18.1%	16.4%
Benefit	0	0	18.9%	17.3%	15.6%
DOWN		5	18.1%	16.5%	14.9%
		10	17.3%	15.8%	14.2%
EIRR	17.3%	15	16.6%	15.1%	13.6%

B-C = 1,765,717

B/C = 1.72

Table 13 GENERATION OF NEW EMPLOYMENT

Item	Employment (persons)	No. of Family	Population (persons)
1. Farm Labour			
1) Full- Time	12,760	6,380	34,452
2) 2Part Time	3,850	2,020	10,908
2. Sevanagala Sugar Corporation			
1) Factory worker	280	200	1,080
2) Miscellaneous	180	100	540
3. Hamlet Village Center and Area Center (town)			
1) Marchant etc.			
2) Processing and Cooperation	1,720 290	900 200	4,860 1,080
4. Publick and PrivateOffice			
1) MEA	60	60	324
2) Post, Bank and other offices	160	140	756
5. School, Hospital and other publick centers	1,050	1,000	5,400
Total	20,350	11,000	59,400
Old Area	3,300	1,800	9,700
Ext. Area	17,050	9,200	49,700

FIGURES

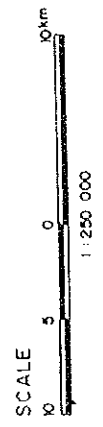
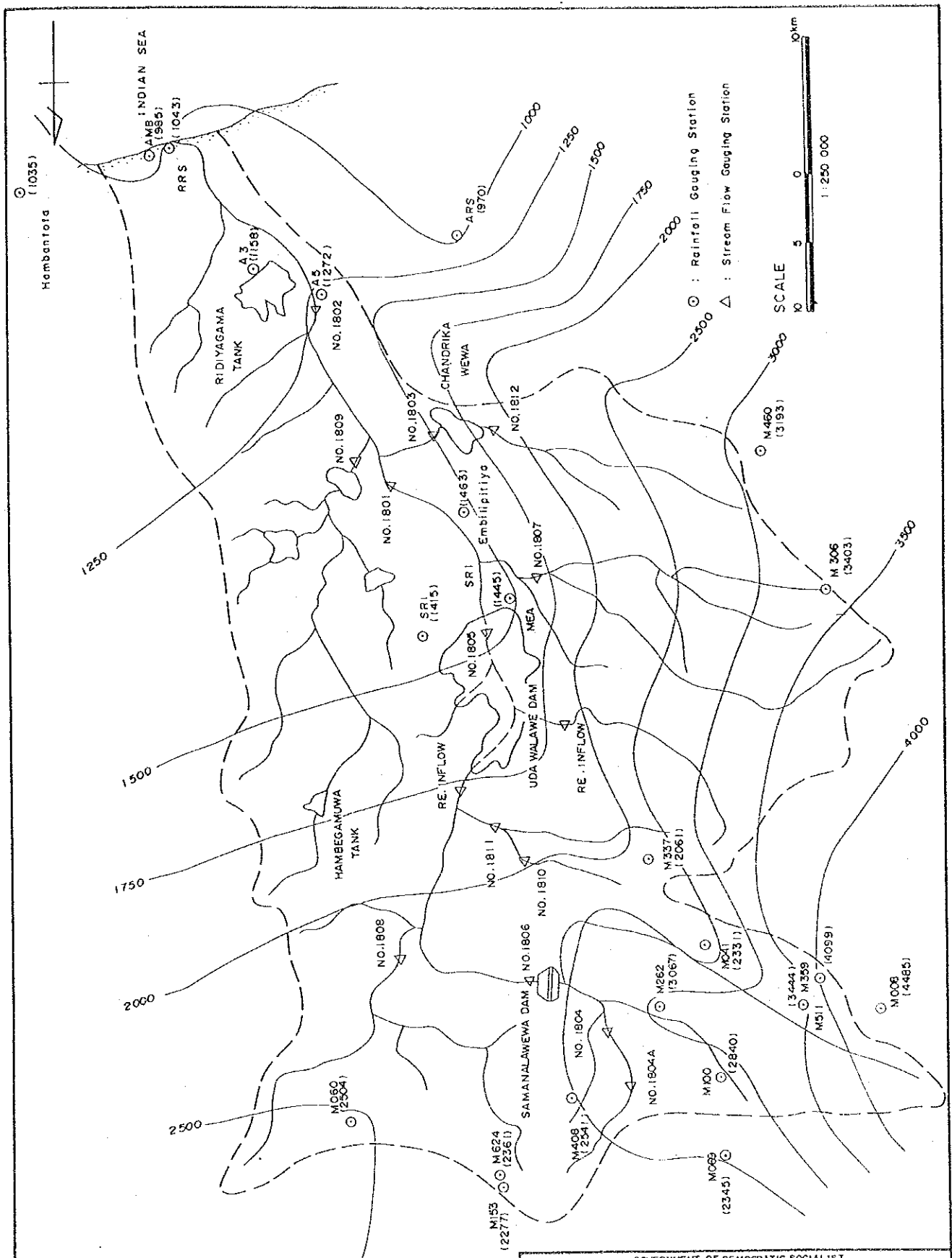


Figure 1 ISOHYETAL AND RAINFALL STATIONS

GOVERNMENT OF DEMOCRATIC SOCIALIST
 REPUBLIC OF SRI LANKA
 MINISTRY OF LANDS, IRRIGATION AND MAHAWELE DEVELOPMENT

THE FEASIBILITY STUDY ON
 WALAWE IRRIGATION UPGRADING AND
 EXTENSION PROJECT

JAPAN INTERNATIONAL COOPERATION AGENCY

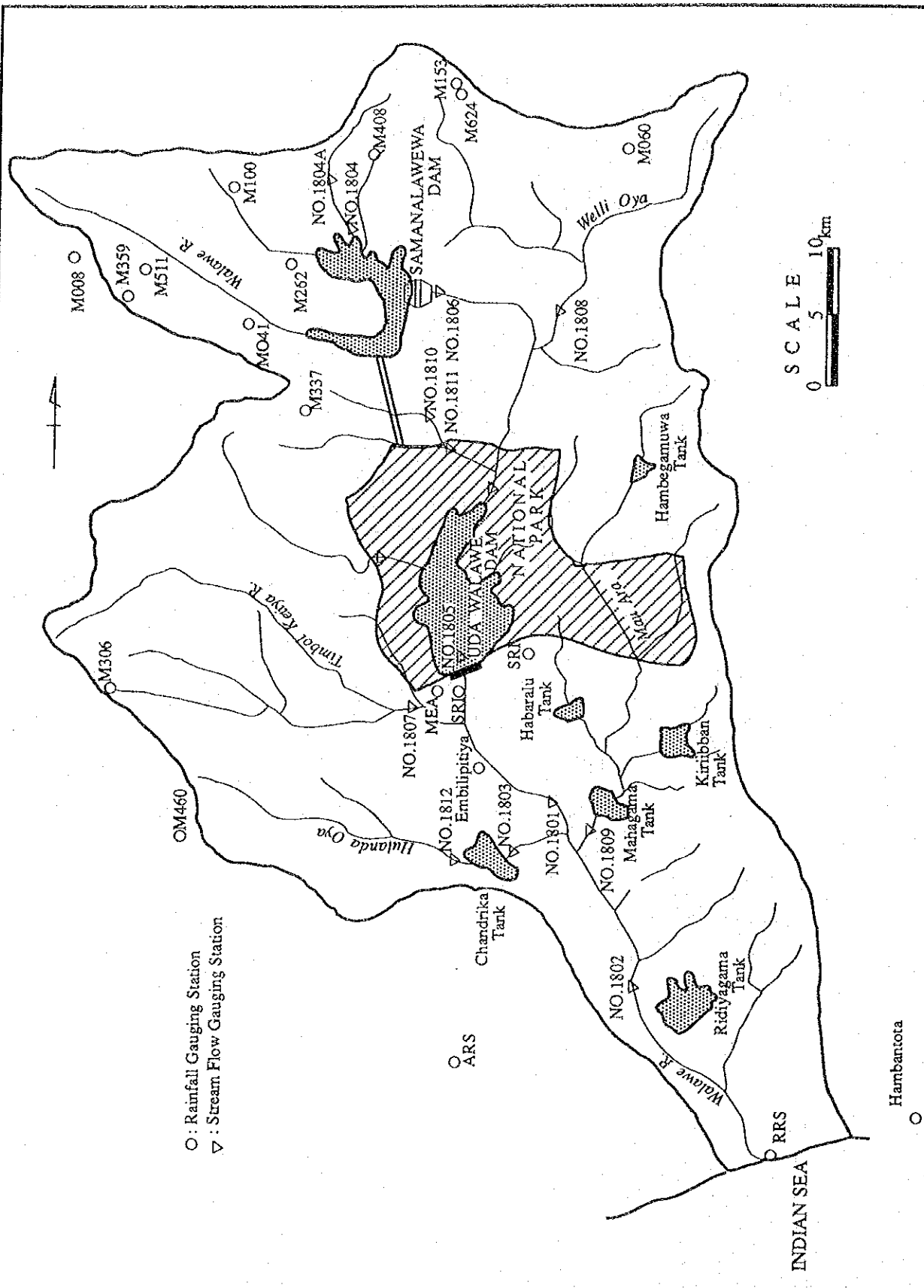


Figure 2 HYDROLOGICAL MAP OF THE WALAWE RIVER BASIN

GOVERNMENT OF DEMOCRATIC SOCIALIST
 REPUBLIC OF SRI LANKA
 MINISTRY OF LANDS, IRRIGATION AND MAHAWELE DEVELOPMENT

**THE FEASIBILITY STUDY ON
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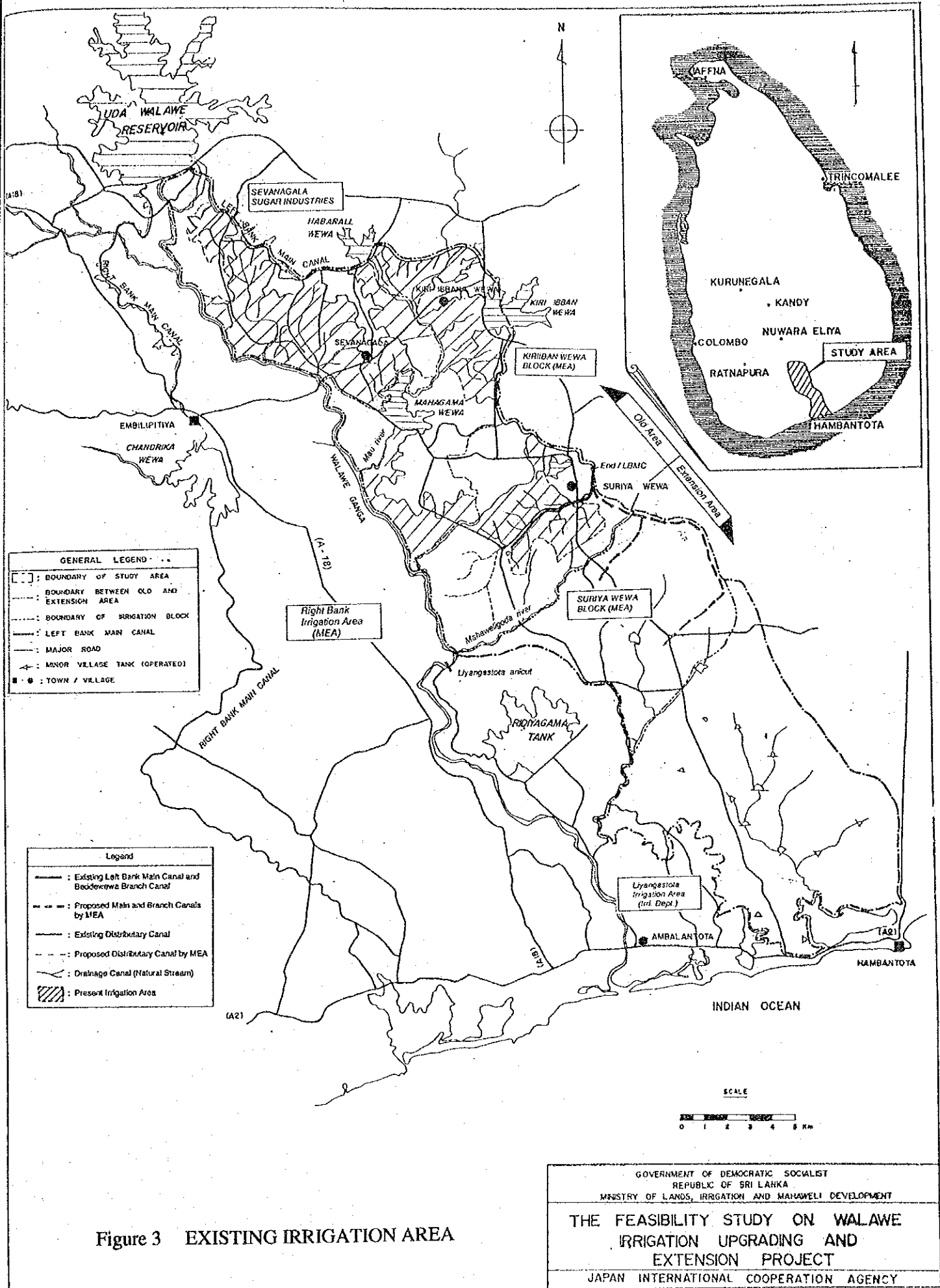
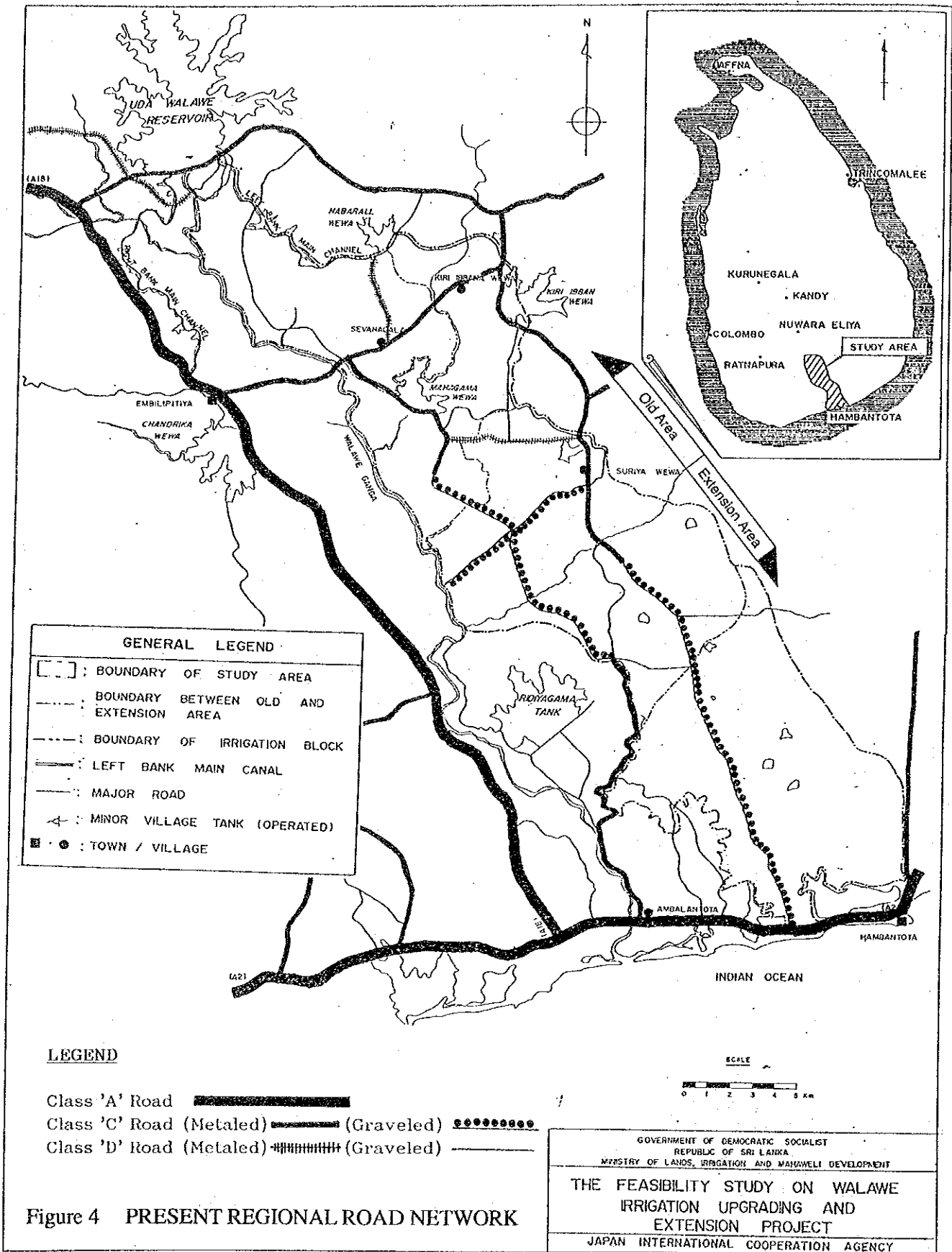
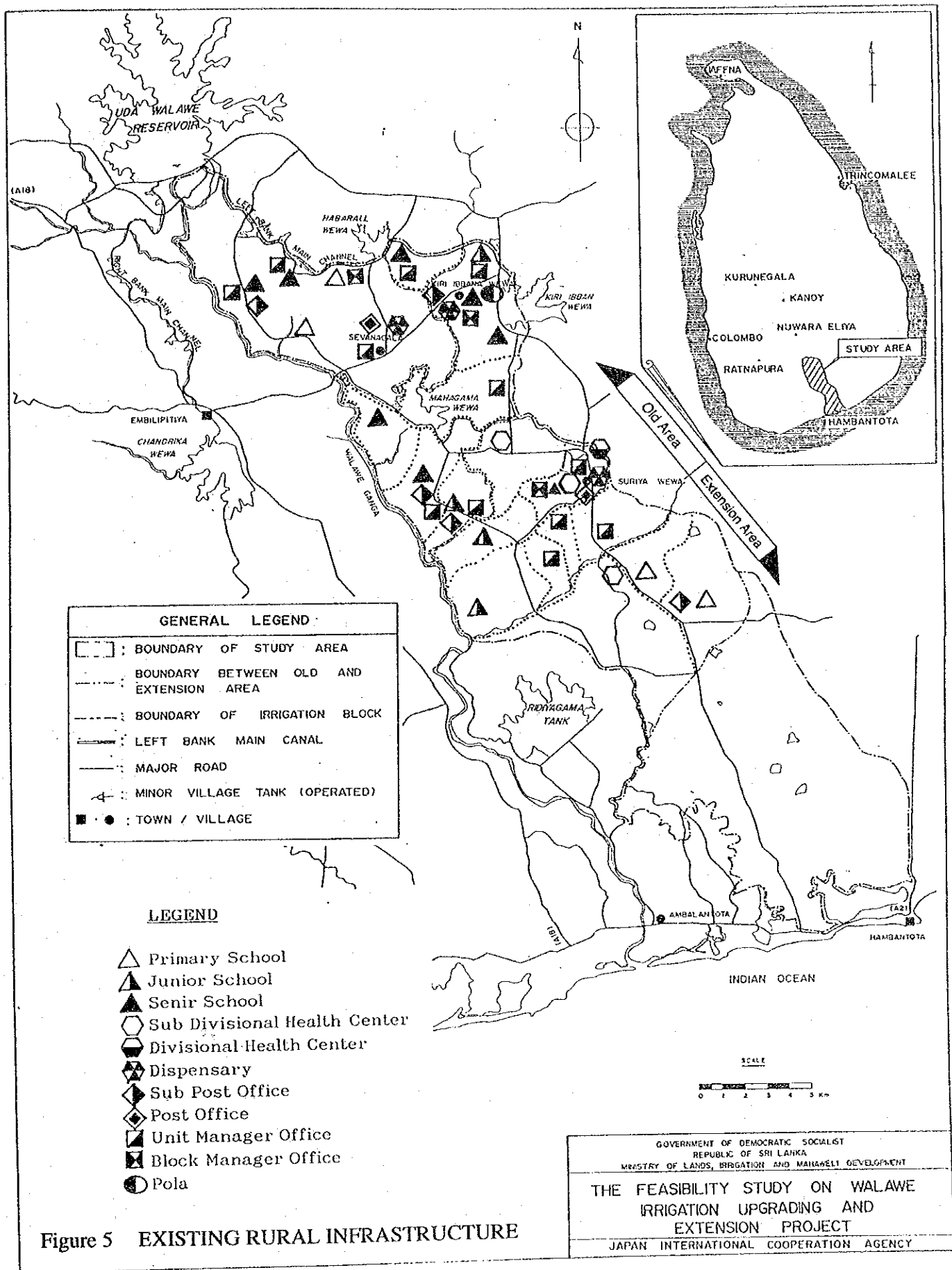
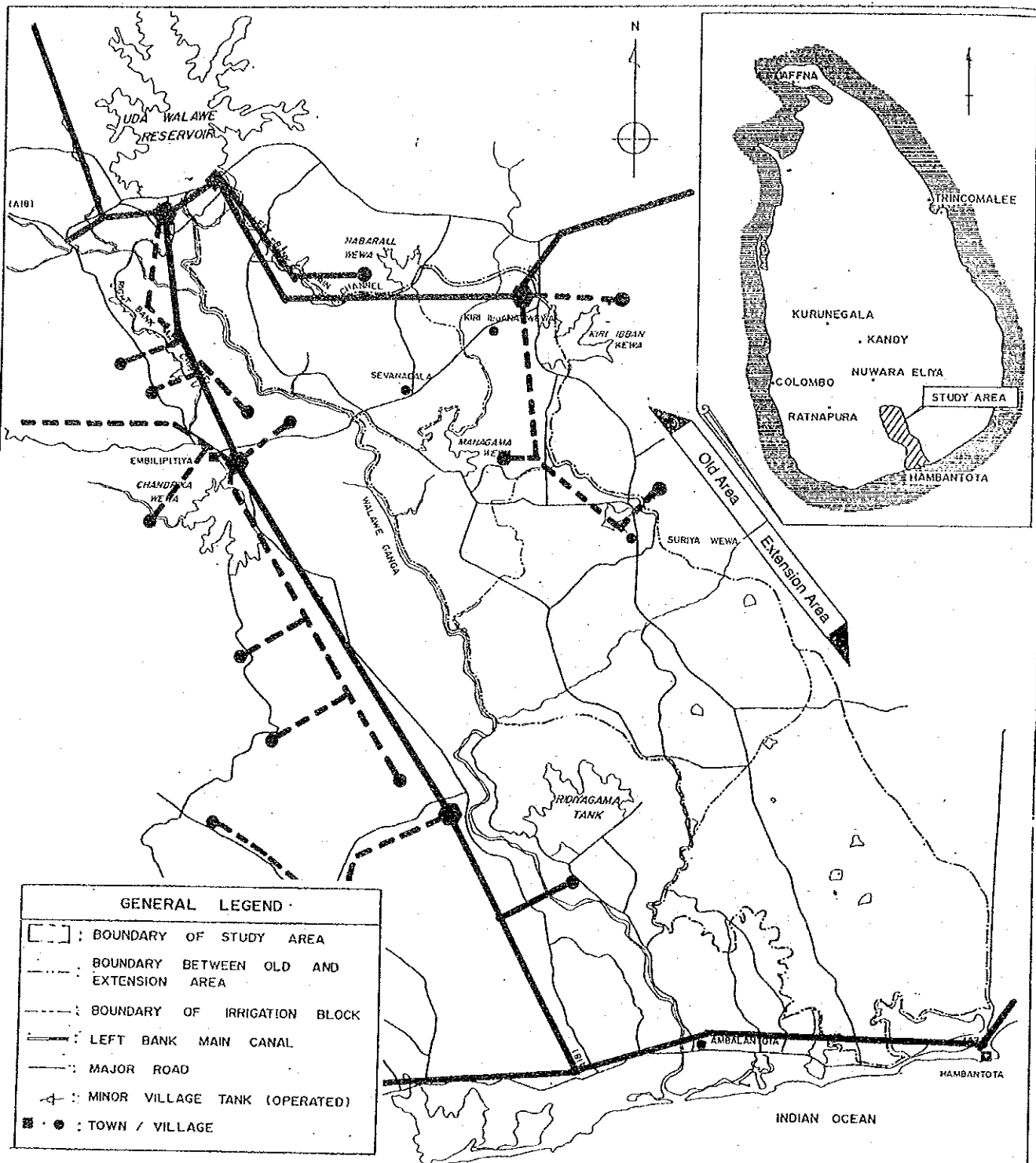


Figure 3 EXISTING IRRIGATION AREA







GENERAL LEGEND

- : BOUNDARY OF STUDY AREA
- : BOUNDARY BETWEEN OLD AND EXTENSION AREA
- : BOUNDARY OF IRRIGATION BLOCK
- : LEFT BANK MAIN CANAL
- : MAJOR ROAD
- : MINOR VILLAGE TANK (OPERATED)
- : TOWN / VILLAGE

LEGEND

- 33 kv Transmission Line
- 11 kv Transmission Line
- Primary Station
- Sub Station

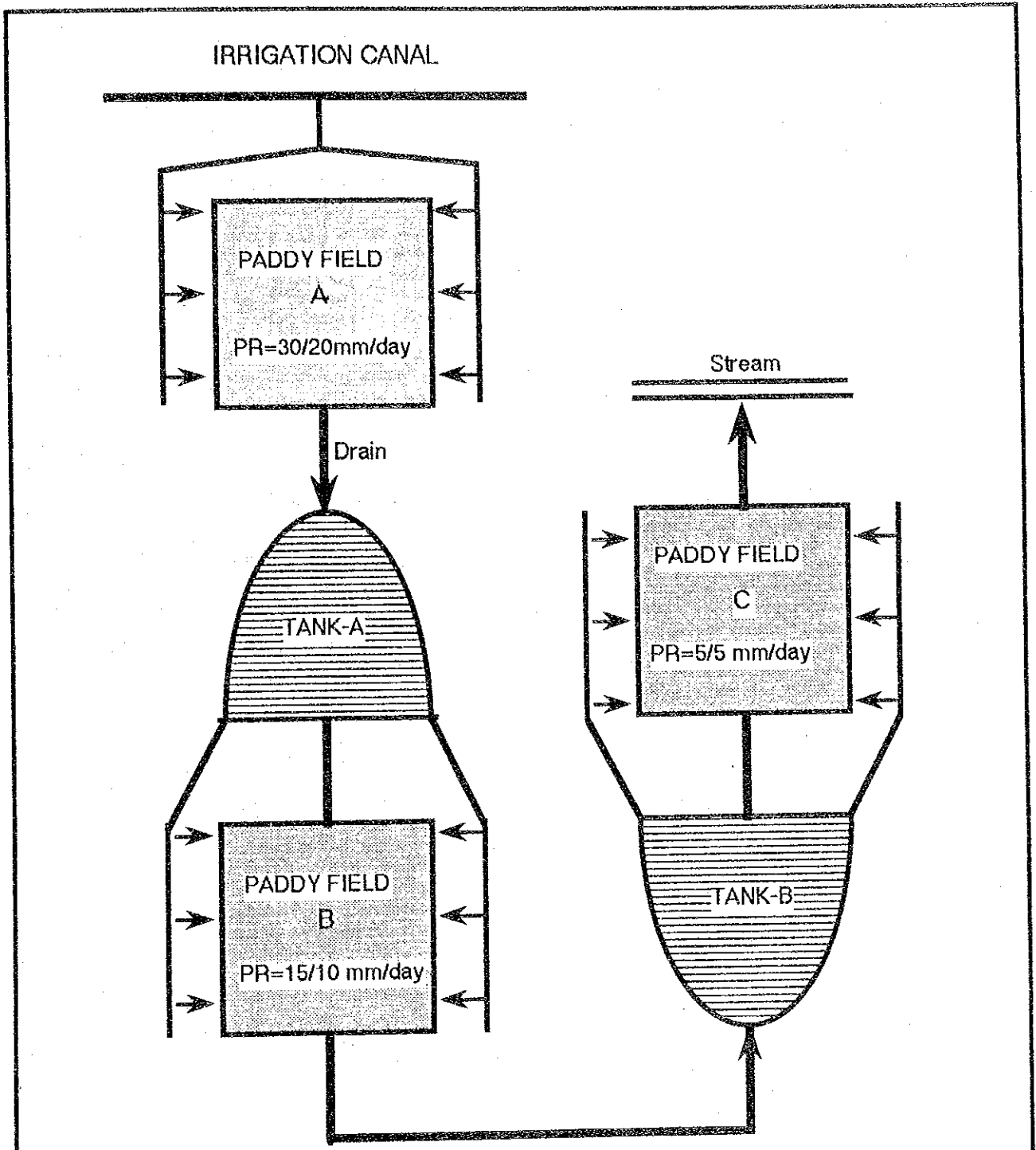


GOVERNMENT OF DEMOCRATIC SOCIALIST
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**THE FEASIBILITY STUDY ON WALAWE
 IRRIGATION UPGRADING AND
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JAPAN INTERNATIONAL COOPERATION AGENCY

Figure 6 PRESENT ELECTRICITY SUPPLY NETWORK



PR : Percolation Rate of Paddy Field
 30/20 : PR=30 mm/day during the land preparation period
 and PR=20 mm/day during the growing period.

Figure 7 SCHEMATIC DIAGRAM OF TANK CASCADE SYSTEM

GOVERNMENT OF DEMOCRATIC SOCIALIST
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**THE FEASIBILITY STUDY ON
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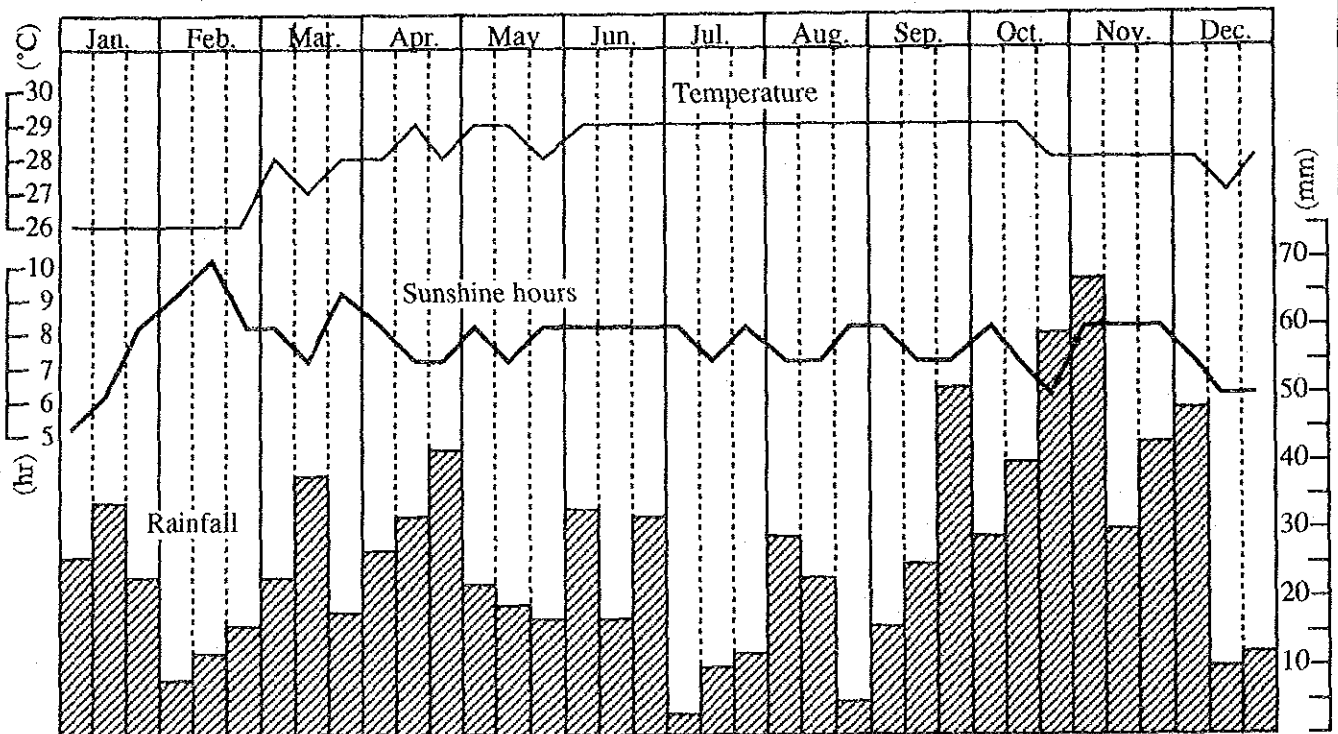
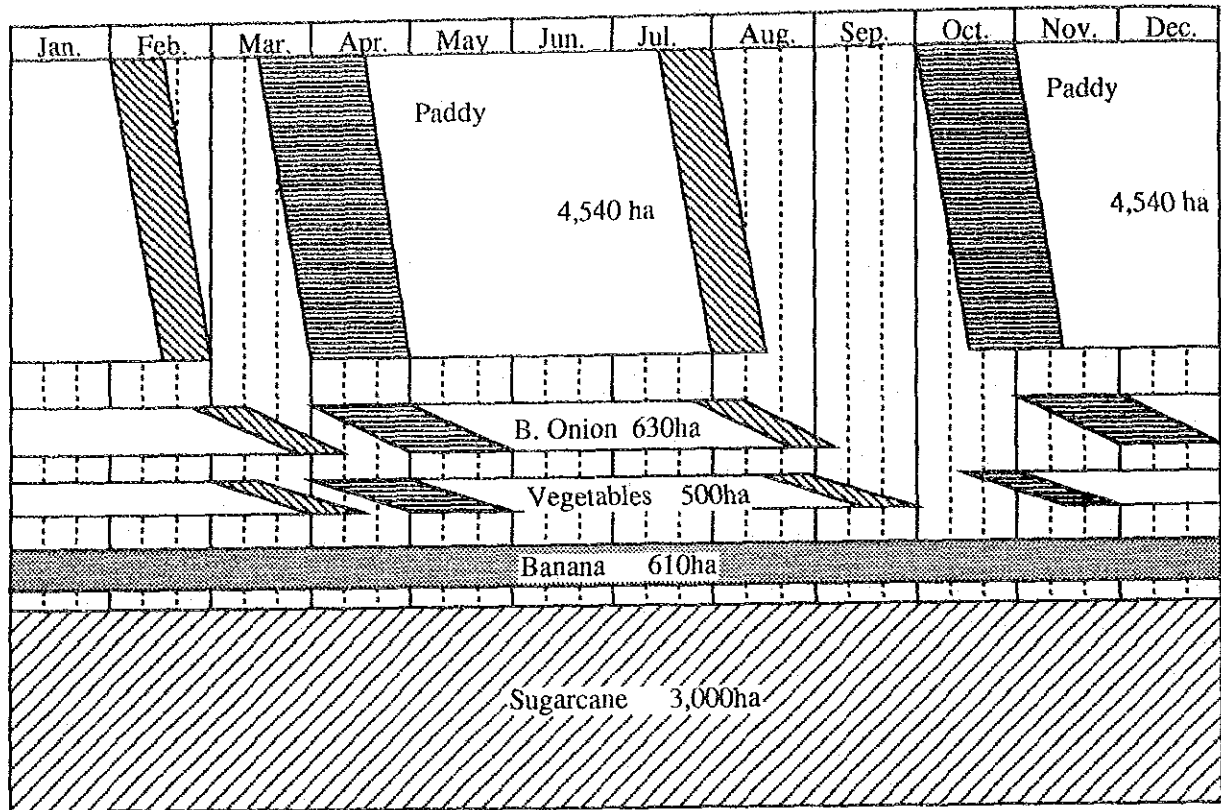


Figure 8 PROPOSED CROPPING PATTERN

GOVERNMENT OF DEMOCRATIC SOCIALIST
 REPUBLIC OF SRI LANKA
 MINISTRY OF LANDS, IRRIGATION AND MAHAWELE DEVELOPMENT

THE FEASIBILITY STUDY ON
 WALAWE IRRIGATION UPGRADING AND
 EXTENSION PROJECT

JAPAN INTERNATIONAL COOPERATION AGENCY

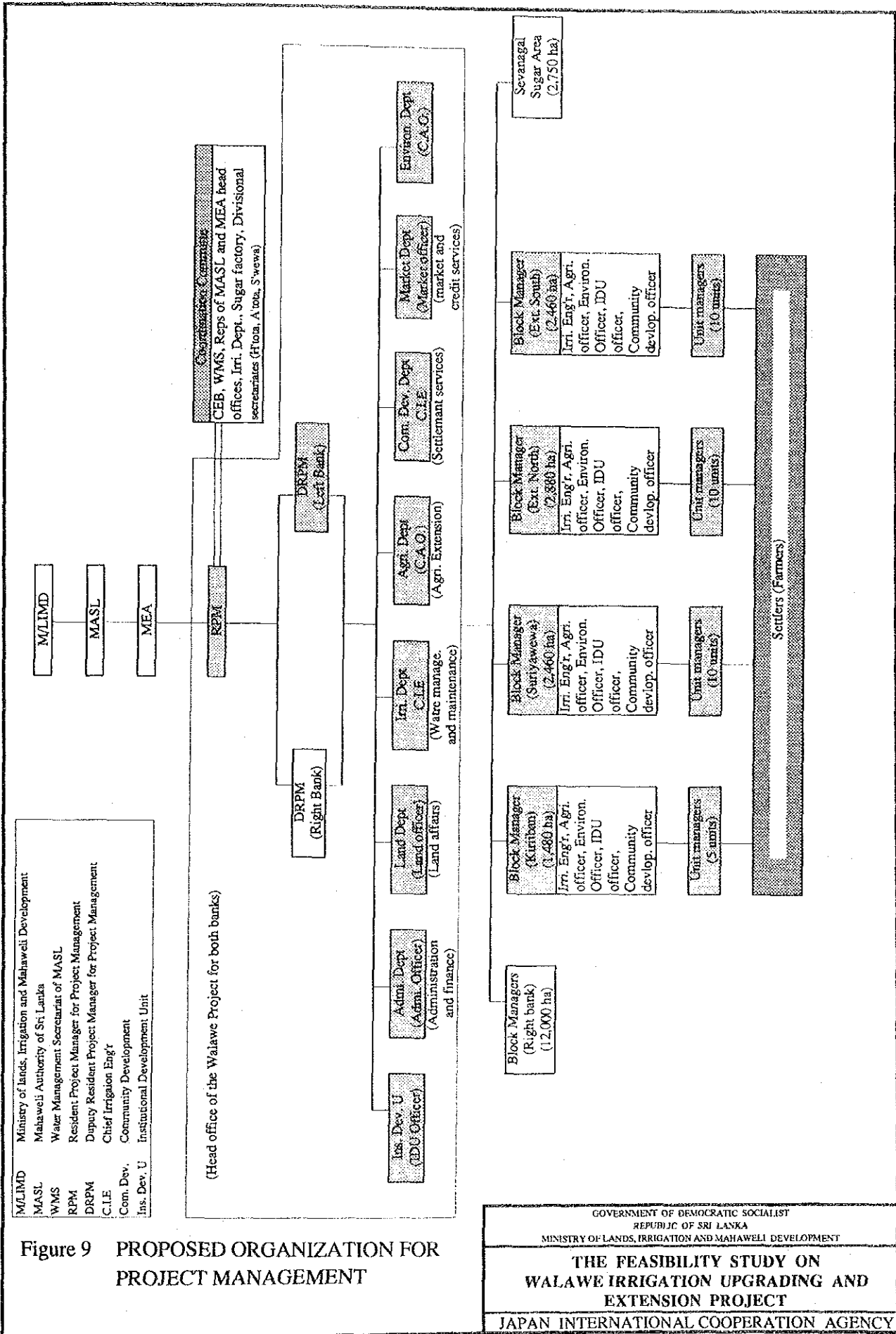


Figure 9 PROPOSED ORGANIZATION FOR PROJECT MANAGEMENT

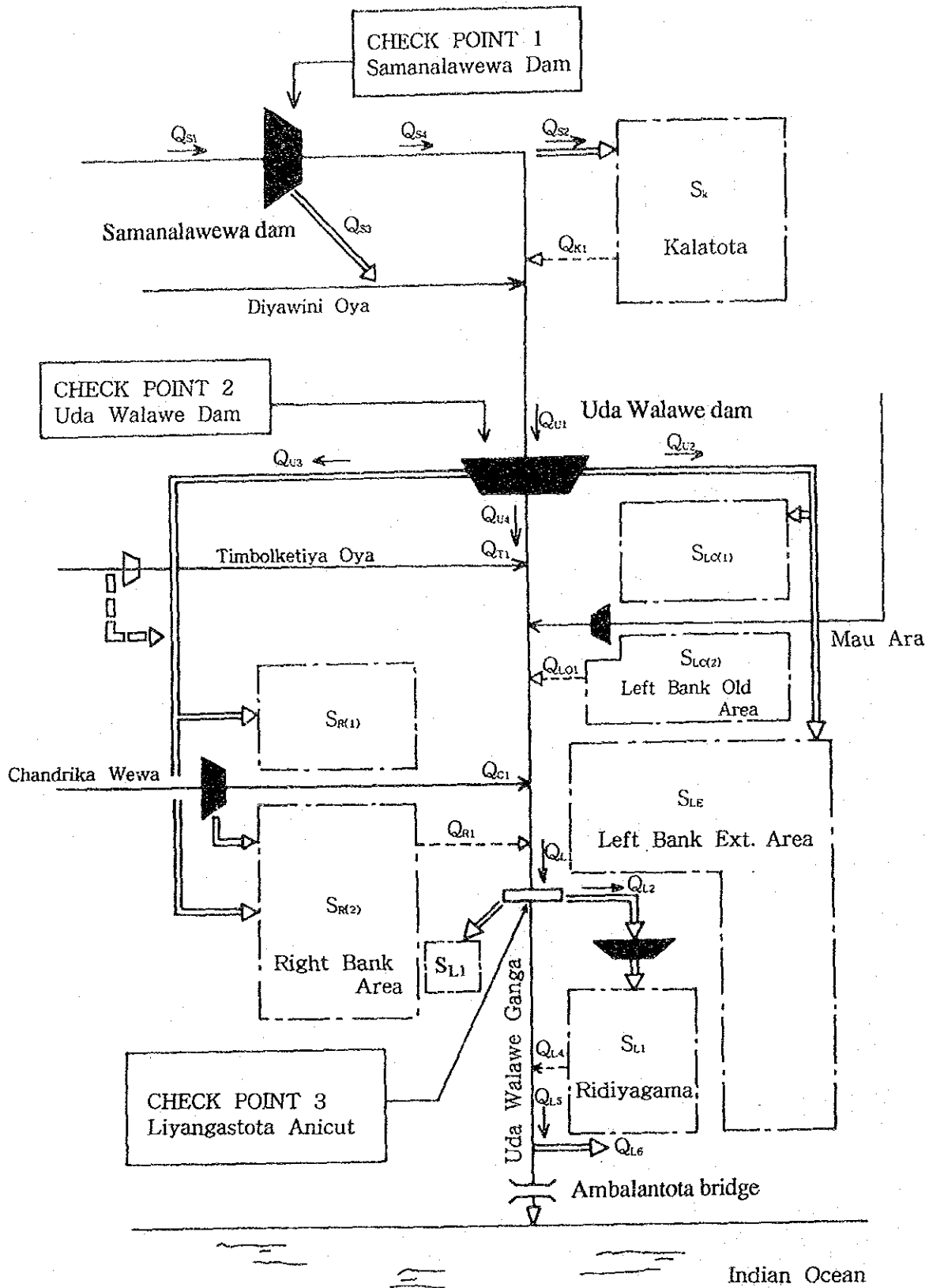


Figure 10 SCHEMATIC DIAGRAM OF THE UDA WALAWE RIVER BASIN

GOVERNMENT OF DEMOCRATIC SOCIALIST
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THE FEASIBILITY STUDY ON
 WALAWE IRRIGATION UPGRADING AND
 EXTENTION PROJECT

JAPAN INTERNATIONAL COOPERATION AGENCY

Description	Unit	Qty	1993 (1)	1994 (2)	1995 (3)	1996 (4)	1997 (5)	1998 (6)	1999 (7)
1 Budget Arrangement									
2 Detailed Design									
3 Construction Works									
(1) Pre-construction arrangement									
1) Tendering									
2) Land acquisition									
(2) Rehabilitation and upgrading works in Old area	ha	2,900							
(3) Construction works for Extension area									
1) Extension area I (Suriyawewa block)	ha	1,040							
2) Extension area II (North)	ha	2,880							
3) Extension area III (South)	ha	2,460							
(4) Extension work of sugar factory	ha	3,000							
4 Project Administration and O&M works									
(1) Project Administration for D/D and construction									
(2) Settlement administration									
(3) O&M works									
5 Engineering Services									
6 Development Area under the Project (extent by the end of year)									
(1) Old Area	ha	2,900				1,420	1,480	0	
(2) Extension area I (Suriyawewa block)	ha	1,040				1,040	0	0	
(3) Extension area II (North)	ha	2,880				880	1,000	1,000	
(4) Extension area III (South)	ha	2,460				0	1,300	1,160	
Total	ha	9,280				3,340	3,780	2,160	
(cumulative area)	(ha)					(3,340)	(7,120)	(9,280)	
7 Development Area by Crop (cumulative area)									
(1) Paddy	ha	4,540				1,530	3,590	4,540	4,540
(2) Sugar cane	ha	3,000				1,150	2,140	3,000	3,000
(3) Other upland crops	ha	1,740				660	1,390	1,740	1,740
Total	ha	9,280				3,340	7,120	9,280	9,280

▬▬▬▬▬ Project Works

▨▨▨▨▨ Implemented by Sevanagala sugar factory

Note:

Extension work of Sugar factory is required to complete by end of 1998

Figure 11 PROPOSED IMPLEMENTATION
TIME SCHEDULE

GOVERNMENT OF DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA MINISTRY OF LANDS, IRRIGATION AND MAHAWELE DEVELOPMENT
THE FEASIBILITY STUDY ON WALAWE IRRIGATION UPGRADING AND EXTENSION PROJECT
JAPAN INTERNATIONAL COOPERATION AGENCY

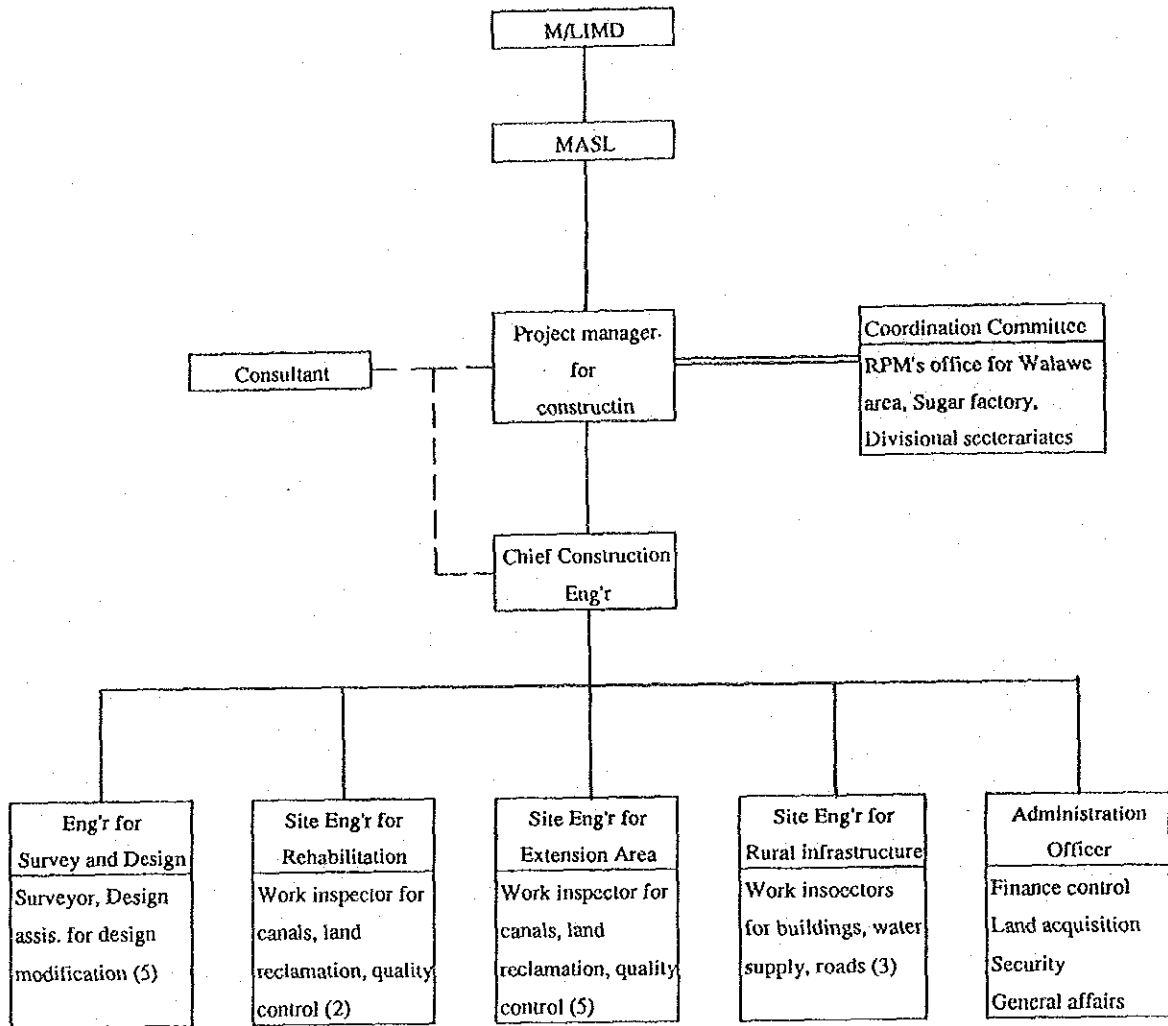


Figure 12 PROPOSED ORGANIZATION FOR CONSTRUCTION STAGE

GOVERNMENT OF DEMOCRATIC SOCIALIST
 REPUBLIC OF SRI LANKA
 MINISTRY OF LANDS, IRRIGATION AND MAHAWELEI DEVELOPMENT

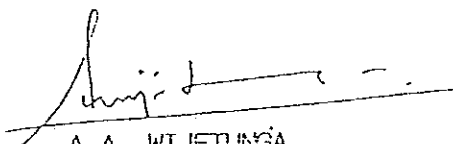
**THE FEASIBILITY STUDY ON
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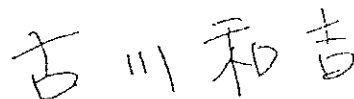
ATTACHMENT

SCOPE OF WORK
FOR
THE FEASIBILITY STUDY
ON
WALAWE IRRIGATION UPGRADING AND EXTENSION PROJECT
AGREED UPON BETWEEN
MINISTRY OF LANDS, IRRIGATION AND MAHAWELI DEVELOPMENT
AND
THE JAPAN INTERNATIONAL COOPERATION AGENCY

COLOMBO, 21ST NOVEMBER 1990



A.A. WIJETUNGA
SECRETARY,
MINISTRY OF LANDS, IRRIGATION
AND MAHAWELI DEVELOPMENT



KAZUYOSHI FURUKAWA
LEADER,
THE PRELIMINARY STUDY TEAM,
THE JAPAN INTERNATIONAL
COOPERATION AGENCY

I. INTRODUCTION

In response to the request of the Government of the Democratic Socialist Republic of Sri Lanka (hereinafter referred to as "the Government"), the Government of Japan has decided to undertake the feasibility study on Walawe Irrigation Upgrading and Extension Project (Left Bank) (hereinafter referred to as "the Study") in accordance with the relevant laws and regulations in force in Japan.

Accordingly, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of technical cooperation programmes of the Government of Japan, will undertake the Study in close cooperation with the authorities concerned of Sri Lanka.

The present document sets forth the Scope of Work with regard to the Study.

II. OBJECTIVES OF THE STUDY

The objectives of the Study are:

1. to formulate comprehensive agricultural water resources development programmes in Walawe Irrigation Upgrading and Extension Project (Left Bank) (approximately 30,000 ha.);

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2. to conduct a feasibility study on Extension of Walawe Left Bank (approximately 15,000 ha.);
3. to undertake on-the-job training of the Government's officials in the course of the study.

III. STUDY AREA

The study area is to cover Walawe Left Bank, 30,000 ha. (Location map attached in Annex 2).

IV. SCOPE OF THE STUDY

In order to achieve the above objectives, the Study will cover the following items.

PHASE I STUDY

1. Collection and analysis of the relevant existing data and information, and field survey including:
 - (1) Natural condition
 - a. Topography
 - b. Meteorology and hydrology
 - c. Geology and soil
 - d. Others

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(2) Agriculture

- a. Land use and tenure
- b. Cropping pattern, yield and Livestock
- c. Agro-economy and institution
- d. Others

(3) Agricultural infrastructure

- a. Irrigation and drainage
- b. Farm road
- c. Other rural infrastructure

(4) Socio-economic situation

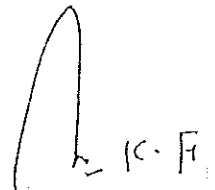
- a. Population, household and farmers
- b. Regional socio-economy and farm household economy
- c. Extension services
- d. Social and farmers organizations
- e. Agricultural credit
- f. Farmers' intension
- g. Marketing
- h. Others

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- (5) Other information related to the project
 - a. Administrative organizations related to the project
 - b. Environmental impact
 - c. Others
2. Formulation of an agricultural development plan of Walawe Left Bank (old area and extension)
3. Formulation of an irrigation and drainage plan of Walawe Left Bank (old area and extension).

PHASE II STUDY

1. Feasibility Study in the extension area of Walawe Left Bank. The Study covers the following items:
 - (1) Additional field survey, data collection and analysis including;
 - a. Hydrology and meteorology
 - b. Geology and soil classification
 - c. Land use and tenure
 - d. Cropping pattern, yield and Livestock
 - e. Irrigation and drainage
 - f. Inundation problem, flood damage
 - g. Water requirement for crop and domestic use
 - h. Regional socio-economy and farm household economy
 - i. Social and farmers organizations (inclusive of training)



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- j. Farm power
- k. Construction materials
- l. Environment
- m. Post Harvest Technology, Marketing and Agro-Industry
- n. Others

- (2) Formulation of an agricultural development programme.
- (3) Formulation of irrigation and drainage development programme
- (4) Preliminary design of the major structures of the Project
- (5) Formulation of Plan for Irrigation system management (inclusive of operation and maintenance plan for irrigation and drainage).
- (6) Verification of feasibility
 - a. Preparation of the implementation schedule
 - b. Estimation of the project costs and benefits
- (7) Recommendation

V. THE STUDY SCHEDULE

The Study will be carried out in accordance with the tentative schedule attached in Annex 1.

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VI. REPORTS

JICA will prepare and submit the following reports in English to the Government of Sri Lanka.

1. Inception Report

Thirty (30) copies at the commencement of the Phase I Study.

2. Progress Report (I)

Thirty (30) copies at the end of the field work of the Phase I Study.

3. Interim Report

Thirty (30) copies at the commencement of the Phase II Study.

4. Progress Report (II)

Thirty (30) copies at the end of the field work of the Phase II Study.

5. Draft Final Report

Thirty (30) copies within one (1) month after the end of the Phase II Study.

The Government of Sri Lanka shall provide its comments on the Draft Final Report within one (1) month after its reception.


6. Final Report

Fifty (50) copies within two (2) months after the receipt of the comments on the Draft Final Report.

VII. UNDERTAKING OF THE GOVERNMENT OF SRI LANKA

1. To facilitate smooth conduct of the Study, the Government of Sri Lanka shall take necessary measures;

- (1) to secure the safety of the Study Team,
- (2) to permit the members of the Japanese Study Team, to enter, leave and sojourn in Sri Lanka for the duration of their assignment therein, and exempt them from alien registration requirements and consular fees,
- (3) to exempt the members of the Japanese Study Team from taxes, duties, fees and other charges on equipment, machinery and other materials brought into Sri Lanka for the conduct of the Study,
- (4) to exempt the members of the Japanese Study Team from income tax and other charges of any kind imposed on or in connection with any emoluments or allowance paid to the members of the Japanese Study Team for their services in connection with the implementation of the Study,

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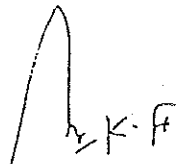
(5) to provide necessary facilities to the Japanese Study Team for remittances as well as utilization of the funds introduced into Sri Lanka from Japan in connection with the implementation of the Study,

(6) to secure permission for entry into private properties or restricted areas for the conduct of the Study, according to prevailing regulations of the Government of Sri Lanka,

(7) to secure permission to use all data and documents related to the Study including photographs in Japan,

(8) to provide medical services as needed. Its expenses will be chargeable on the members of the Japanese Study Team.

2. The Government of Sri Lanka will bear claims, if any arises, against the members of the Japanese Study Team resulting from, occurring in the course of, or otherwise connected with the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or willful misconduct on the part of the members of the Japanese Study Team.

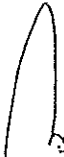


3. The Ministry of Lands, Irrigation and Mahaweli Development of Sri Lanka (hereinafter referred to as "the Ministry") shall act as counterpart agency to the Japanese Study Team and also as coordinating body to other relevant organizations for the smooth implementation of the Study.

4. The Ministry shall, at its own expense, provide the Japanese Study Team with the following, in cooperation with other agencies concerned, if necessary:
 - (1) Available data and information related to the Study
 - (2) Counterpart personnel
 - (3) Suitable office with necessary equipment and furniture
 - (4) Necessary number of vehicles with drivers
 - (5) Credentials or identification cards to the members of the Japanese Study Team
 - (6) Supplementary engineering survey
topographic survey

VIII. UNDERTAKING OF JICA

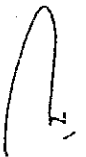
For the implementation of the Study, JICA shall take the following measures:

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1. To dispatch, at its own expense, the Study Team to Sri Lanka,
2. To pursue technology transfer to the Sri Lanka counterpart personnel in the course of the Study.

IX. OTHERS

JICA and Ministry of Lands, Irrigation and Mahaweli Development of Sri Lanka will consult with each other in respect of any matter that may arise from or in connection with the study.

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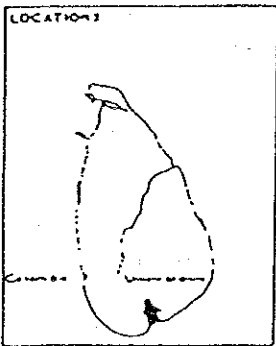
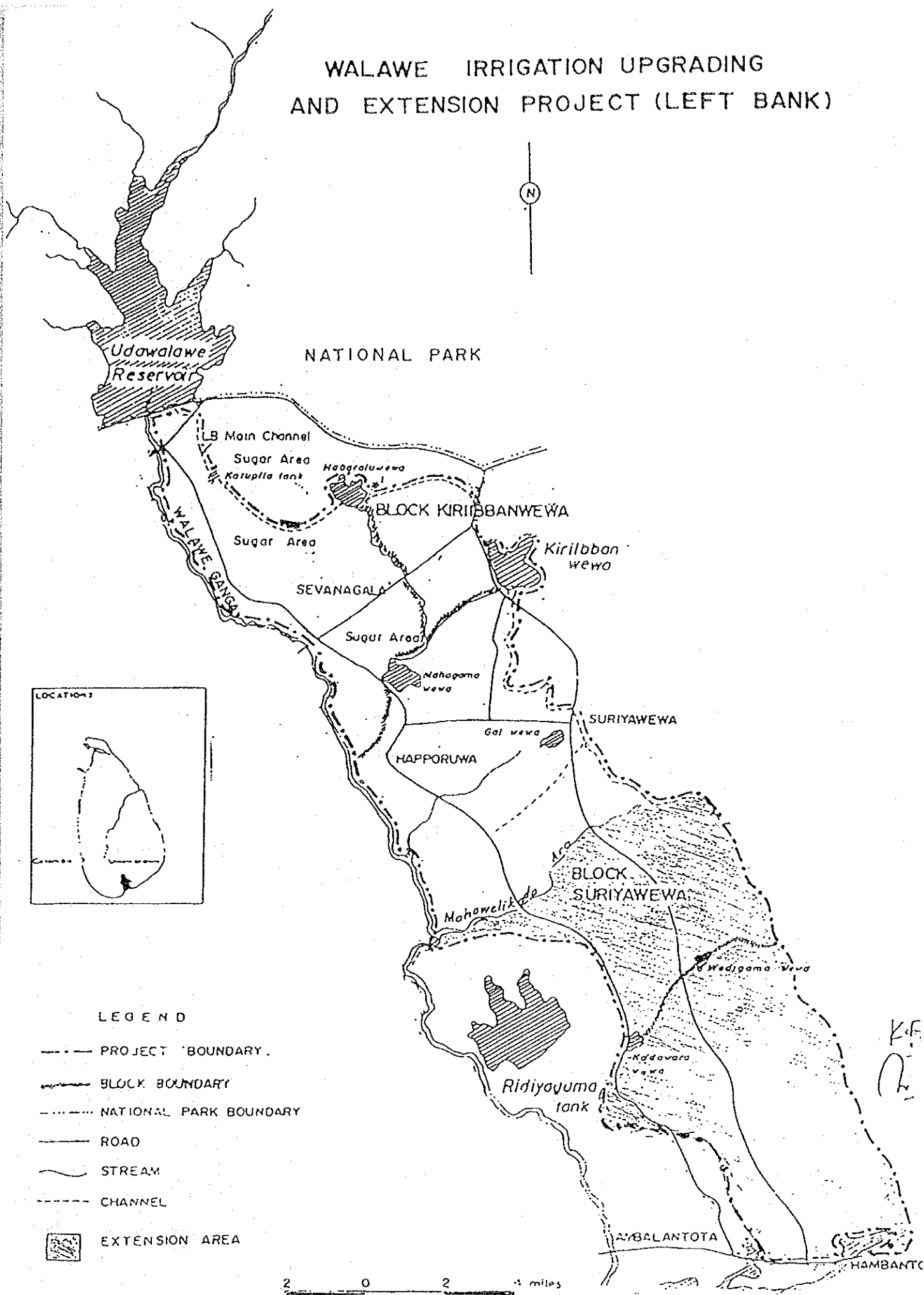
TENTATIVE SCHEDULE

Item	Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
WORK IN SRI LANKA		▬▬▬▬								▬▬▬▬▬▬							▬	○	
WORK IN JAPAN		□					▬▬▬▬▬▬						▬▬▬▬						
REPORTS		△		△					△			△				△			△
		INC/R		P/R (I)					INT/R			P/R (II)				DF/R			F/R

(Remarks) INC/R : Inception Report P/R : Progress Report
 INT/R : Interim Report DF/R : Draft Final Report
 F/R : Final Report
 ○ Comments on DF/R by SRI LANKA side

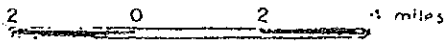
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WALAWE IRRIGATION UPGRADING AND EXTENSION PROJECT (LEFT BANK)



LEGEND

- PROJECT BOUNDARY.
- BLOCK BOUNDARY
- NATIONAL PARK BOUNDARY
- ROAD
- ~ STREAM
- CHANNEL
- EXTENSION AREA



JICA