Change in Unit Yields (Maha/Yala)

Unit: ton/ha

Crop	Future	
	Without-Project	With-Project
Paddy		
(Kantalai system)	4.4	6.0
(Other major irrigation systems)	5.0	6.0
(Minor irrigation system)	3.2	6.0
Chillie	1.5	1.9
Onion	10.0	15.0
Pulses	1.0	1.5
Vegetables	10.0	12.0
Sweet potatoes	10.0	12.0
Sugar cane	39.0	85.0

At the full development stage of the project, the following crop production will be anticipated annually.

Crops	Planted Area (ha)	Yield (ton/ha)	Production (ton)
Paddy	99,000	6.0	594,000
Onion	2,900	15.0	43,500
Chillies	3,100	1.9	5,890
Sugar cane	7,200	85.0	612,000
Pulses	1,700	1.5	2,550
Vegetables	3,000	12.0	36,000
Sweet potatoes	300	12.0	3,600

E.2.5 Marketing Prospects

As stated in sub-section 2.3, proposed cropping pattern and farming practices, the proposed crop production program was based on the demand/supply balance study and would not cause problems in marketability of the products if smooth, efficient marketing channels and profitability of croppings will be assured.

(1) Paddy

When the project will reach the full development stage in 2000, the supply of the paddy in the country is estimated at 4.18 million tons based on the emprical formula prepared by A.G.W Nanayakkara (Progress in paddy cultivation and production in Sri Lanka and forecast for the future), 1987, which was made taking the recent high

agricultural development trends in Mahaweli area into consideration including the present projects.

While the demand of paddy in 2000 in the country is estimated at 4.21 million tons, based upon the following formula,

$$113\ kg^{(1)} \times 20{,}295{,}000^{(2)} \times (1 + 0.033^{(3)} \times 0.26^{(4)})^{(2000-1985)} / 0.68^{(5)}$$

Remarks: (1) per capita consumption in 1985,
(2) population in 2000,
(3) income growth rate,
(4) income elasticity of demand,
(5) recovery rate.

So the demand and supply of paddy including paddy produced in this project will be almost balanced in 2000 (Tables E.2.1 and E.2.2).

(2) Chillie

The demand of chillie in the country is estimated at 77.6×10^3 tons in the year of 2000. On the other hand supply of chillie in the country including chillie produced in this project area is expected to become 77.6×10^3 tons. The prospective marketable amounts shared by this project is assumed to be 7.7%, taking account of the targetted share of production in Polonnaruwa district which is formulated by the Ministry of Agricultural Development and Research. The prospective marketable amount of chillie is estimated at 6×10^3 tons.

(3) Sugar Cane

As far as sugar is concerned, Sri Lanka has imported a large quantity of sugar. The imported quantity of sugar ranges from 263×10^3 tons to 388×10^3 tons in the recent 5 years and averages 326×10^3 tons. The project will be expected to produce 612×10^3 tons of sugarcane or 52×10^3 tons of sugar at the full development stage which is equivalent to 16% of the average imported quantity. This fact suggests that sugar produced by this project will be easily substituted with the imported sugar.

(4) Onion

The demand and supply of onion in the country is estimated at 172.5×10^3 tons and 83×10^3 tons respectively in the year of 2000. It is assumed that the prospective marketable amounts shared by this project is 44.8×10^3 tons which is equivalent to 50% of difference between demand and supply in the year of 2000.

(5) Pluses, Vegetables, Sweet Potatoes

The prospective marketable demand of vegetables, pulses and sweet potatoes will be demand for self-consumption of the local people in and around the project area.

The prospective demand in the year of 2000 is estimated at 2,540 tons for pulses, 35,850 tons for vegetables and 4,500 tons for sweet potatoes.

E.2.6 Typical Crop and Farm Budgets

Typical crop budgets made based upon the recommended cropping practices are prepared for in without-project and in with-project conditions for the financial and economic evaluation of the projects. For the internationally traded goods, i.e., paddy, sugar cane, fertilizers, economic prices are derived from the World Bank projected prices for the year 2000 (Table E.2.4). For non-traded goods, a standard conversion factor of 0.85 are used referring to the studies made in ANNEX-L. For the economic evaluation of labour cost, 30% discount is applied (ANNEX-M). Details of the typical crop budgets are shown in Tables E.2.5 to E-2.13.

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

Future Economic and Financial Prices of Agricultural Commodities

Items	Unit	Prices	
		Financial	Economic
Paddy	Rs./ton	4,400.0	5,500.0
Sugar cane	Rs./ton	500.0	389.0
Onion	Rs./kg	8.3	7.1
Chillies	Rs./kg	31.1	26.0
Pulses (greeen gram)	Rs./kg	14.0	12.0
Vegetables (long beans)	Rs./kg	4.3	3.7
Urea	Rs./ton	2,990.0	7,638.0
TSP	Rs./ton	2,990.0	7,607.0
MP	Rs./ton	2,890.0	4,984.0

Based upon the typical crop budgets and proposed cropping pattern agricultural benefit by the project in the full development stage of the project is calculated at Rs. 1,042 million for financial point of view and at Rs. 1,145 million for an economic point of view (Table E.2.14).

Anticipated agricultural benefit for the typical farm household (1.1 ha holding size) by the Project is estimated at Rs. 33,130/year (Table E.2.15).

TABLES

Table E.1.1 PRESENT CROPPED AREA IN THE PROJECT AREAS

Unit: ha

	Maha (Oct. - Mar.)				Yala (Apr. - Sept.)			
	1984/85	1985/86	1986/87	Average	1985	1986	1987	Average
1. System G								
Paddy	2,940	3,470	3,810	3,410	1,200	1,010	2,620	1,610
Other field crops	140	90	210	150	430	560	870	620
Sub-total	3,080	3,560	4,020	3,560	1,630	1,570	3,490	2,230
2. Giritale								
Paddy	3,000	2,500	3,000	2,830	2,500	3,000	3,040	2,850
Other field crops	-	200	-	70	200	-	-	70
Sub-total	3,000	2,700	3,000	2,900	2,700	3,000	3,040	2,910
3. Minneriya								
Paddy	8,900	6,900	8,900	8,230	6,900	8,900	8,900	8,230
Other field crops	-	400	-	130	400	-	-	130
Sub-total	8,900	7,300	8,900	8,360	7,300	8,900	8,900	8,360
4. Kaudulla								
Paddy	4,900	4,500	4,500	4,630	730	4,500	1,370	2,200
Other field crops	-	-	-	-	-	-	-	-
Sub-total	4,900	4,500	4,500	4,630	730	4,500	1,370	2,200
5. Parakrama Samudra								
Paddy	10,100	10,100	10,100	10,100	10,100	9,510	10,120	9,910
Other field crops	-	-	-	-	-	200	-	70
Sub-total	10,100	10,100	10,100	10,100	10,100	9,710	10,120	9,980
6. Kantalai *1								
Paddy	6,700	6,280	2,020	5,000	5,600	-	-	1,870
Other field crops (Sugarcane)	2,360	2,090	510	1,650	2,360	2,090	510	1,650
Sub-total	9,060	8,370	2,530	6,650	7,960	2,090	510	3,520
Total								
Paddy	36,540	33,750	32,330	34,200	27,030	26,920	26,050	26,670
Other field crops	2,500	2,780	720	2,000	1,030	2,850	1,380	1,750
(of which sugarcane)	(2,360)	(2,090)	(510)	(1,650)	(2,360)	(2,090)	(510)	(1,650)
Total	39,040	36,530	33,050	36,200	28,060	29,770	27,430	28,420

Note: *1 Including Vendarasan and Kulam. The Kantalai tank was breached in 1986.
source: Water Management Secretariat, MASL, 1988.

Table E.1.2 PRODUCTION COST OF IRRIGATED PADDY

Items	1985/86 Maha				1986 Yala			
	Price	Quantity (kg/ha)	Cost		Price	Quantity kg/ha	Cost	
1. Materials								
Seeds	RS. 4.45 kg	102	454		Rs. 4.32 kg	105.00	462	
Fertilizers			1,499				1,278	
VI (4-30-12)		174				143.26		
Urea (46-0-0)		149				143.26		
TOM (30-0-20)		134				133.38		
Agrochemicals			259	(2,112)			967	2,707
2. Draught/Machinery Power								
1st plough by tractor			909				841	
2nd plough by tractor			822				843	
Puddling by buffaloes			213				227	
Threshing by tractor			434				434	
Winnowing by fan			176				126	
Transport to stores			180				104	
3. Labour		(man-day)		2,734				2,575
Nursery preparation	37 (Rs/man-day)	8.4	311					
Nursery fertilization	38	0.4	15					
Nursery pest control	38	0.2	8					
Land preparation	35	5.4	189		40 (Rs/man-day)	2.9	116	
1st plough by handtractor	50	2.2	110		52	1.5	78	
2nd plough by handtractor	38	1.7	65		53	1.5	80	
Puddlng with buffaloes	37	4.0	148		43	3.9	168	
Bund plastering	40	13.9	556		42	16.4	689	
Broadcasting of seed	-	-	-		40	1.6	64	
Transplanting by contract	-	-	2,190		-	-	-	
Fertilizer	38	3.2	122		40	2.9	116	
Pest control	49	1.0	49		51	1.2	61	
Irrigation	38	13.4	509		38	11.4	433	
Weed control by weedicides	-	-	-		52	1.2	61	
Bird scaring	38	11.6	41		34	7.9	269	
Harvesting by contract	-	-	1,274		-	-	1,464	
Threshing by 4W tractors	39	14.0	546		46	11.2	515	
Winnowing by fan	39	5.5	215		42	4.7	197	
Transport of produce to stores	39	2.5	98		44	1.9	84	
TOTAL		87.4		(6,846)		70.2		4,396
				11,692				9,678
Excluding family labour cost				9,336				7874

Table E.1.3 PRODUCTION COST OF IRRIGATED GREEN GRAM
(1986, Yala, Polonnaruwa)

	Item		Price		Quantity	Amount (Rs/ha)	
1.	Materials						
	Seeds		Rs. 27.56/kg		20 kg/ha	551	
	Fertilizer						
	V1		Rs. 3/kg		63 kg/ha	189	
	Urea		Rs. 3/kg		83 kg/ha	249	
	TOM		Rs. 3/kg		22 kg/ha	66	
	Chillie Fertilizer		Rs. 3/kg		34 kg/ha	102	
	Agrochemical					1,706	
							2,918
2.	Draught/Machinery Power						
	1st plough with buffaloes					319	
							319
3.	Labour						
	General land preparation	43	(Rs/day)	7.9	(man-day/ha)	340	
	1st plough with buffaloes	50		5.1		255	
	Preparation of beds and ridges	41		23.5		964	
	Seeding	42		19.1		802	
	Fertilizer application	44		10.9		480	
	Weeding and Earthing up	40		47.9		1,916	
	Pest control	49		14.3		701	
	Gravity Irrigation	35		20.3		711	
	Havesting	43		60.8		2,614	
	Manual threshing	46		11.2		515	
	Winnowing/drying	43		8.1		348	
				229.1			9,646
4.	Total						12,883
	Excluding family labour cost						5533

Table E.1.4 PRODUCTION COST OF IRRIGATED CHILLI, 1986 YALA SEASON

	Item	Price	Quantity	Amount (Rs/ha)	
1.	Materials				
	Seeds	179.31 Rs/kg	1.85 kg/ha	332	
	Fertilizer			2,649	
	Agrochemical			3,721	
					6,702
2.	Draught/Machinery Power				
	1st plough by buffaloes			340	
	Harrowing with buffaloes			346	
					686
3.	Labour	Rs/man-day	Man-days		
	Nursery preparation	42	19.0	798	
	Nursery fertilizer	42	1.2	50	
	Nursery pest control	40	0.9	36	
	General land prepartion	42	9.5	399	
	1st plough by buffaloes	49	5.4	265	
	Harrowing by buffaloes	40	6.3	252	
	Preparation of beds	41	35.4	1,451	
	Transplanting	42	32.4	1,361	
	Fertilizer application	42	35.6	1,495	
	Weed control manually	41	54.1	2,218	
	Earthing up and loosening soil	42	37.5	1,575	
	Pest control	47	25.2	1,184	
	Gravity irrigation	42	27.9	1,172	
	Watching	42	92.2	3,872	
	Harvesting & transport to threshing flour	42	96.7	4,061	
	Processing (drying)	41	21.6	886	
			500.9		21,075
	Total				28,463

Table E.1.5 PRODUCTION COST OF IRRIGATED SUGAR CANE (Sugar Corporation Cane), 1988

	Item	Price	Quantity	Amount (Rs/ha)
1.	Materials			
	Seeds	Rs. 300/ton	12.4 kg/ha	3,720
	Fertilizer			
	Urea	Rs. 3.0/kg	212 kg/ha	636
	TSP	Rs. 3.0/kg	94 kg/ha	282
	MP	Rs. 3.0/kg	101 kg/ha	303
	Agrochemical (Karmex)	Rs. 337/kg	3.9 kg/ha	1,314
2.	Labour/Machinery Power, etc.			
	Planting			40
	Harvesting			1,848
	Others			34,184
	Total			42,327

Source: Sugar Corporation, Kantale estate, 1988

Table E.1.6 PRODUCTION COST OF IRRIGATED SUGAR CANE, 1988
(Allottees' Sugar Cane)

	Item	Price	Quantity	Amount (Rs/ha)	
1.	Materials				
	Seed cane	Rs. 300/ton	12.4 ton/ha	3,720.00	
	Fertilizer				
	Urea (46-0-0)	Rs. 3.00/kg	212 kg/ha	636.00	
	TSP (0-46-0)	Rs. 3.00/kg	94.19 kg/ha	282.57	
	MP (0-0-60)	Rs. 300/kg	100.92 kg/ha	302.76	
	Agrochemical (Karmex)	Rs. 337/kg	3.92 kg/ha	1,321.04	
					6,262.37
2.	Labour/Machinery Power, etc.				
	Land preparation			2,376.10	
	Seed cane harvesting			1,370.85	
	Planting/Trash raking			1,127.76	
	Fertilizer application			2,141.52	
	Harbicites application			481.80	
	Irrigation			2,558.55	
	Earthing up			767.67	
	Harvesting & transport of cane			7,740.69	
					18,564.94
3	Total			24,827.31	

Source: Sri Lanka Sugar Corporation, 1988

Table E.1.7 PADDY PRODUCTION IN MAJOR TANKS IN THE PROJECT AREA

Main Tanks		Maha			Yala		
		1984/85	1985/86	1986/87	1985	1986	1987
Polonnaruwa	Planted Area (ha)	29,840	27,470	30,310	21,430	26,920	26,050
	Yields (ton/ha)	5.0	4.9	5.0	4.4	3.9	3.8
	Production (ton)	149,200	134,603	151,550	94,292	104,988	98,990
Trincomalee (Kantale)	Planted Area (ha)	6,700	6,280	2,020	5,600	-	-
	Yields (ton/ha)	3.8	4.0	3.2	3.9	3.8	-
	Production (ton)	25,460	25,120	6,464	21,840	-	-
Total Production (tons)		174,660	159,723	158,014	116,132	104,988	98,990
Average (tons)			(164,132)			(106,703)	

Remarks: Paddy production in 1986, 1987 Yala in Kantalai tank system was disrupted by the breakage of a dike of Kantalai tank.

Table E.1.8 LIVESTOCK POPULATION (1982)

Item	Sri Lanka	Trincomalee	Polonnaruwa	Total
Buffalo	879,200	18,405	60,800	79,205
Cattle	1,698,600	50,830	81,140	131,970
Goat	511,600	9,850	10,112	19,962
Swine	75,100	200	508	708
Sheep	28,000	-	-	-
Chicken	-	36,180	102,358	138,538

Source: Census of Agriculture, 1982, Polonnaruwa, Trincomalee districts.

Table E.2.1 FOOD DEMAND IN 2000 YEAR

Name of food	Per capita consumption in 1985 (kg/per/annum) (1)	Per capita consumption including waste, feed and other use in 1985 (2) (kg/per/annum)	Income elasticity for demand (2)	Income growth rate (3)	Per capita consumption including waste, feed and other use in 2000 (4) (kg/per/annum)	Population in 2000 (5) (thousand)	Demand in 2000 (1,000tons) (6)
National Level							
Paddy	113 (7)	124.2 (7)	0.26	0.033	207.57 (7)	20,295	4213.0
Chillies		3.02	0.48	0.033	3.82	20,295	77.6
Onion	4.03	6.72	0.48	0.033	8.50	20,295	172.5
Pulse	3.91	4.25	0.48	0.033	5.30	20,295	107.6
Project Level							
Paddy	113	124.2	0.26	0.033	207.57 (7)	479	99.4
Chillies		3.02	0.48	0.033	3.82	479	1.8
Onion	4.03	6.72	0.48	0.033	8.50	479	4.1
Pulse	3.91	4.25	0.48	0.033	5.30	479	2.5
Vegetables		59.13	0.48	0.033	74.84	479	35.9
Sweet potato	5.19	7.41	0.48	0.033	9.39	479	4.5

(1) Data source; Food balance sheet for 1985, Dep. of Census and Statistics
(2) Data source; Report on consumer finances and socio economic survey (1981/82), CBC 1984
(3) Income growth rate is estimated as average growth rate of GDP per capita during the period from 1982 to 1986.
(4) Per capita consumption in 2000 is estimated on the basis of the following formula.

$$P = Q*(1+I*G)N$$

where; P = per capita consumption in 2000
Q = per capita consumption in 1985
I = income elasticity
G = income growth rate
N = 15 years

(5) Details are shown in Annex A for national level and in Annex D for project level.
(6) Food demand is estimated multiplying population by per capita consumption in 2000.
(7) This value is indicated by milled rice.
(8) This value is indicated by paddy. Milling rate is 68%.

Table E.2.2 SUPPLY OF AGRICULTURAL PRODUCT IN 2000 YEAR

Name of Crop	Production (Ton)		
	1986	Average (1)	2000
Paddy	2,590,000	-	4,180,000 (2)
Chillies	45,400	45,000	77,600 (3)
Onion	78,900	83,000	83,000 (4)
Pulse	57,400	70,700	70,700 (4)

(1) Average value for 6 years from 1981 to 1986

(2) This value is estimated on the basis of the following formula which is shown in NEW MONOGRAPH SERIES No. 1 prepared by Dep. of Census and Statistics in 1987.

$Y=28.29(x-69)x(x-69) + 878(x-69) + 18,984$ (for Yala season)
$Y=39(x-69)x(x-69) + 1923(x-69) + 38,668$ (for Maha season)

where; Y = production, x = year

(3) According to past trend, linear regression curve is formulated as follows:

$Y = (7.11 \times -14,080) \times 1,000$ ($r=0.92$)

where; Y = production, x = year

On the basis of the formula, production of chillies is estimated at 140,000 tons. However, demand in 2000 year is forcasted at 77,600 tons and production of chillies will be restricted by 77,600 tons.

(4) According to the past trend analysis for the period from 1981 to 1986, there is no relation between production and past year. So prospective production in 2000 is considered as average production amounts from 1981 to 1986.

Table E.2.3 PROPOSED CROPPING AREAS

Crops	Targetted Production	Targetted Yield	Targetted Area	Remarks
Chillies	5,996 ton	1.9 ton/ha	3,100 ha	Demand in 2000 in Sri Lanka is allocated according to the share of polonnaruwa, 10%, in 1987/88 targetted production aimed by the Ministry of Agricultural Development and Research.
Onion	44,750 ton	15 ton/ha	2,900 ha	A half of the balance between demand and supply in 2000 in Sri Lanka is assumed to be shared by the project.
Pulses	2,605 ton	1.5 ton/ha	1,700 ha	Regional self-sufficient
Vegetables	35,850 ton	12 ton/ha	3,000 ha	Regional self-sufficient
Sweet potatoes	4,500 ton	12 ton/ha	300 ha	Regional self-sufficent
Paddy	-	-	99,000 ha	55,000 ha in Maha and about 44,100 ha in Yala(remaining idle area in Yala)
Sugar cane	-	-	4,200 ha	Sugar Corporation's Expansion Plan (new area)

Table E.2.4 ECONOMIC FARM GATE PRICE OF AGRICULTURAL COMMODITIES

		Paddy	Sugar Cane	Urea	TSP	MP
1.	Projected 2000 world market price valued at 1988 value (1)	$298/ton	$339/ton	$245/ton	$210/ton	$126/ton
2.	Quality adjustment (x0.90) (2)	$268/ton	-	-	-	-
3.	Ocean freight to Colombo (including unloading cost)	$20/ton	$46/ton	-	$34/ton	$32/ton
4.	Import price	$288/ton	$385/ton	$245/ton /9	$244/ton	$158/ton
5.	Converted to Rupees (1$=Rs30.5)	Rs8,784	Rs11,743/ton	Rs7,473/ton	Rs7,442/ton	Rs4,819/ton
6.	Loading cost to trucks (3)	Rs25/ton	Rs25/ton	Rs25/ton	Rs25/ton	Rs25/ton
7.	Inland transportation and costs	Rs140/ton	Rs140/ton	Rs140/ton	Rs140/ton	Rs140/ton
	(Polonnaruwa-Colombo) (4)	Rs5,861/ton	Rs984/ton /6	-	-	-
8.	Conversion to farm produce equivalent	Rs360/ton /5	Rs595/ton /7	-	-	-
9.	Processing cost	Rs5,501/ton	Rs389/ton	Rs7,638	Rs7,607/ton	Rs4,984/ton
10.	Mill (farm) gate price			(Rs16.6/kg.N)	(Rs16.5/kg.P2O5)	(Rs8.3/kg.K2O)

Remarks: /1 World Bank projected prices are based for
. rice on FOB Bangkok milled 5% broken
. Sugar on FOB, greater Caribbean ports
. urea on FOB Europe
. TSP on FOB US Gulf
. MO on FOB Vancouver

/2 IRRI-6, Pakistan variety, same quality as of the domestic varieties, was valued at $245/ton in Jan. 25, 1988, FOB Karachi. Price of Thai 5% broken rice in 1988 was estimated at $260 by World Bank. Adjustment ratio is 245/260 = 0.9

/3 Port Authority, 1988

/4 National Fertilizer Secretariate, 1988

/5 Paddy Marketing Board, 1988

/6 X0.085, Sugar Corporation, 1988

/7 Acres Mahaweli Water Resources Management Project Report, 19% inflated.

/8 Balances between World Bank prices for 1987 and C&F price at Colombo in 1987 are nil for urea, $34/ton for TSP and $32/ton for MP.

/9 CIF Colombo price of urea is almost the same as of FOB Europe price, e.g. $115/ton (Colombo) vs $117/ton (Europe) in 1987.

Table E.2.5 IRRIGATED PADDY CROP BUDGET (WITH-PROJECT)

	Item	Prices		Quantity	Amount	
		Financial	Economic		Financial	Economic
I.	Gross Income					
	Paddy	4.4	5.5 (Rs/kg)	6 ton/ha	26,400	33,000
II.	Production Cost					
	1. Materials					
	Seed	4.2	5.5	107 kg/ha	449	589
	Fertilizer					
	N	6.5	16.6	120 kg/ha	780	1,992
	P2O5	6.5	16.5	80 kg/ha	520	1,320
	K2O	4.8	8.3	80 kg/ha	384	664
	Agrochemicals				298	253
	2. Draught/Machinery Power				3,144	2,672
	3. Labour				7,873	5,511
	Total				13,448	13,001
III.	Net Benefit				12,956	19,999
	Excluding family labour costs				(15,664)	

Remarks: Labour costs are increased by 15% from 1985/86 Maha cost in Polonnaruwa, and are valued at 70% of the current cost.
Costs of agrochemicals and draught/machinery power are also increased by 15% from 1985/86 Yala cost in Polonnaruwa, and are valued at 85% of the current cost using the standard conversion factor of 0.85.
Fertilizer applications are based on fertilizer trials by FAO Fertilizer Program in Sri Lanka.

Table E.2.6 IRRIGATED PADDY CROP BUDGET (WITHOUT-PROJECT)

Item	Prices		Quantity	Amount	
	Financial	Economic		Financial	Economic
	(Rs/kg)			(Rs/ha)	
I. Gross Income					
Paddy (Kantale)	4.4	5.5	4.4 ton/ha	19,360	24,200
(Minor Irrigation)	4.4	5.5	3.2 ton/ha	14,080	17,600
(Other)	4.4	5.5	5.0 ton/ha	22,000	27,500
II. Production Cost					
1. Materials					
Seed	4.2	5.5	102 kg/ha	428	561
Fertilizer					
N	6.5	16.6	116 kg/ha	754	1,926
P2O5	6.5	16.5	52 kg/ha	338	858
K2O	4.8	8.3	48 kg/ha	230	398
Agrochemicals				298	253
2. Draught/Machinery Power				3,144	2,672
3. Labour				7,873	5,511
Total				13,065	12,179
III. Net Benefit (Kantale)				6,295	12,021
(Minor Irrigation)				1,015	5,421
(Other)				8,935	15,321

Remarks: Labour costs are increased by 15% from 1985/86 Maha cost and 11% from 1986 Yala cost in Polonnaruwa, and are value at 70% of the current cost.
Costs of agrochemicals and draught/machinery power are also increased by 15% from 1985/86 Maha cost and 11% from 1986 Yala cost in Polonnaruwa and are valued at 85% of the current cost using the standard conversion factor of 0.85.

Table E.2.7 IRRIGATED BOMBAY ONION CROP BUDGET FOR ECONOMIC EVALUATION (WITH-PROJECT)

Item	Prices		Quantity	Amounts	
	Financial	Economic		Financial	Economic
	(Rs/kg)			(Rs/ha)	
I. Gross Income					
B. Onion	8.3	7.1	15 ton/ha	124,500	106,500
II. Production Cost					
1. Materials					
Seed	1,300	1,105	8.5 kg/ha	11,050	9,393
Fertilizer					
N	6.5	16.6	104 kg/ha	676	1,726
P2O5	6.5	16.5	108 kg/ha	702	1,782
K2O	4.8	8.3	92 kg/ha	441	764
Agrochemicals				1,868	1,588
2. Draught/Machinery Power				2,678	2,276
3. Labour				24,759	17,363
Total				42,174	34,892
III. Net Benefit				82,326	71,608
Excluding family labour cost				100,600	

Remarks: Labour costs are increased by 11% from 1986 Yala costs for B. onion in Kalawewa and are valued at 70% of the current cost.
Costs of the seeds agro-chemicals and draught/machiner power are increased by 11% from the 1986 Yala cost for B. onion in Kalawewa and are valued at 85% of the current cost using the standard conversion factor of 0.85.

Table E.2.8 IRRIGATED CHILLIE CROP BUDGET

Item	Prices		Quantity	Amounts		
	Financial	Economic		Financial	Economic	
	(Rs/kg)			(Rs/ha)		
I. Gross Income						
Dried Chllie	31	26	1.9 ton/ha	58,900	49,400	(with-project)
	31	26	1.5 ton/ha	46,500	39,000	(without-project)
II. Production Cost						
1. Materials						
Seed	199	169	1.85 kg/ha	368	313	
Fertilizer						
N	6.5	16.6	150	975	2,490	
P2O5	6.5	16.5	100	650	1,650	
K2O	4.8	8.3	100	480	830	
Agrochemicals				4,131	3,511	
2. Draught/Machinery Power				761	647	
3. Labour				23,393	16,375	
Total				(30,758)	(25,816)	
III. Net Benefit				28,142	23,584	(with-project)
				(43,144)*		
				15,742	13,184	(without-project)

*: excluding family labour cost

Table E.2.9 IRRIGATED GREEN GRAM CROP BUDGET (WITHOUT-PROJECT)

	Item	Prices		Quantity	Amounts	
		Financial	Economic		Financial	Economic
		(Rs/kg)			(Rs/ha)	
I.	Gross Income					
	Green gram	14	12	1.0 ton/ha	14,000	12,000
II.	Production Cost					
	1. Materials					
	Seed	26	26	20 kg/ha	520	520
	Fertilizer					
	N	6.5	16.6	52 kg/ha	338	863
	P2O5	6.5	16.5	23 kg/ha	150	380
	K2O	4.3	8.3	14 kg/ha	60	116
	Agrochemicals				1,955	1,662
	2. Draught/Machinery Power				354	301
	3. Labour				10,707	7,495
	Total				14,084	11,337
III.	Net Benefit				-84	663
	Excluding family labour cost				8,075	

Remarks: Labour costs are increased by 11% from 1986 Yala costs in Polonnaruwa and are valued at 70% of the current cost. Costs (prices) of the product, seeds, agrochemicals, draught/machinery power are also increased by 11% from 1986 Yala costs (prices) in Polonnaruwa and are valued at 85% of the current costs (prices) using the standard conversion factor of 0.85.

Table E.2.10 IRRIGATED GREEN GRAM CROP BUDGET (WITH-PROJECT)

	Item	Prices		Quantity	Amounts	
		Financial	Economic		Financial	Economic
		(Rs/kg)			(Rs/ha)	
I.	Gross Income					
	Green gram	14	12	1.5 ton/ha	21,000	18,000
II.	Production Cost					
	1. Materials					
	Seed	26	26	20 kg/ha	520	520
	Fertilizer					
	N	6.5	16.6	25 kg/ha	163	415
	P2O5	6.5	16.5	60 kg/ha	390	990
	K2O	4.8	8.3	60 kg/ha	288	498
	Agrohemicals				1,955	1,662
	2. Draught/Machinery Power				354	301
	3. Labour				10,707	7,495
	Total				14,377	11,881
III.	Net Benefit				6,623	6,119
	Excluding family labour cost				(14,782)	

Remarks: Labour costs are increased by 11% from 1986 Yala costs in Polonnaura and are valued at 70% of the current cost. Costs (prices) of the produce, seeds, agrochemicals, draught/machinery power are also increased by 11% from 1986 Yala costs (prices) in Polonnaruwa and are valued at 85% of the current costs (prices) using the standard conversion factor of 0.85.

Table E.2.11 IRRIGATED LONG BEANS CROP BUDGET (WITH-PROJECT)

Item	Prices		Quantity	Amounts	
	Financial	Economic		Financial	Economic
	(Rs/kg)			(Rs/ha)	
I. Gross Income					
	4.3	3.7	8.0 ton/ha	34,400	29,600
II. Production Cost					
1. Materials					
Seed	79	67	41 kg/ha	3,239	2,747
Fertilizer					
N	6.5	16.6	28 kg/ha	182	465
P2O5	6.5	16.5	199 kg/ha	1,294	3,284
K2O	4.3	8.3	74 kg/ha	318	614
Agrochemicals (Karmex)				623	530
2. Labour				16,995	11,897
3. Draught/Machinery Power				-	-
				22,651	19,537
III. Net Benefit				11,749	10,063
(excluding family labour cost)				(22,956)	

Table E.2.12 IRRIGATED SUGAR CANE CROP BUDGET (WITH-PROJECT)

	Item	Prices		Quantity	Amounts	
		Financial	Economic		Financial	Economic
		(Rs/kg)			(Rs/ha)	
I.	Gross Income					
	Cane	500	389	85 ton/ha	42,500	33,065
II.	Production Cost					
	1. Materials					
	Seed cane	300	255	12.4 ton/ha	3,720	3,162
	Fertilizer					
	N	6.5	16.6	98 kg/ha	637	1,627
	P2O5	6.5	16.5	43 kg/ha	280	710
	K2O	4.3	8.3	60 kg/ha	258	498
	Agrochemicals (Karmex)				1,116	949
	2. Labour/Machinery Power				18,565	15,780
	Total				24,576	22,726
III.	Net Benefit				17,924	10,339

Remarks: The standard conversion factor of 0.85 is applied for the estimation of economic prices of seed cane, agrochemical and labour/machinery power.

Table E.2.13 IRRIGATED SUGAR CANE CROP BUDGET FOR ECONOMIC EVALUATION (WITHOUT-PROJECT)

	Item	Prices		Quantity	Amounts	
		Financial	Economic		Financial	Economic
		(Rs/kg)			(Rs/ha)	
I.	Gross Income					
	Cane	500	389	39 ton/ha	19,500	15,171
II.	Production Cost					
	1. Materials					
	Seed cane	300	255	12.4 ton/ha	3,720	3,162
	Fertilizer					
	N	6.5	16.6	98 kg/ha	637	1,627
	P2O5	6.5	16.5	43 kg/ha	280	710
	K2O	4.3	8.3	60 kg/ha	258	498
	Agrochemicals (Karmex)				1,116	949
	2. Labour/Machinery Power, Others				43,801	30,661
	Total				49,812	37,607
III.	Net Benefit				-30,312	-22,436

Remarks: The standard conversion factor of 0.85 is applied for the estimation of economic costs of seed cane, agrochemical and labour/machinery power & others.

Table E.2.14 AGRICULTURAL BENEFIT OF THE PROJECT IN THE FULL DEVELOPMENT STAGE

	Planted Area	Unit Benefit		Benefit	
		Financial	Economic	Financial	Economic
	(ha)	(Rs/ha)	(Rs/ha)	(million Rs)	(million Rs)
I. With-project					
Paddy	99,000	12,956	19,999	1,283	1,980
Onion	2,900	82,326	71,608	238	208
Chillie	3,100	28,142	23,584	87	73
Sugar Cane (new area)	4,200	17,924	10,339	75	43
Vegetables (long bean)	3,000 /1	11,749	10,063	35	30
Pulses/sweet potato (green gran)	2,000 /2	6,623	6,119	13	12
				1,731	2,346
II. Without-project					
Paddy					
Minor irrigation system	300	1,015	5,421	-	2
Kantale system	14,800	6,295	12,021	93	178
Other major systems	66,950	8,935	15,321	596	1,021
Upland crops (green gram)	450 /3	-84	663	-	-
				689	1,201
III. Agricultural benefits				1,042	1,145

Remarks: /1 Vegetables are represented by the dominant vegetables, i.e. long bean.
/2 Pulses/sweet potatoes are represented by the dominant crop, i.e. green gram
/3 Actual average cropped area between 1984/85 Maha and 1987 Yala in the Project area.

Table E.2.15 NET FARM INCOME AND CAPACITY TO PAY OF TYPICAL FARMERS

	Yield (ton/ha)	Unit Price (Rs/ton)	Gross Income per ha (Rs/ha)	Production Cost per ha (Rs/ha)	Net Farm Income per ha (Rs/ha)	Planted Area (ha)	Net Farm Income (Rs)	Living Expense (Rs)	Capacity to Pay (Rs)
(A) A Typical Existing Farmer									
I. With-Project Condition									
Paddy	6.0	4,400	26,400	13,448	12,952	1.98	25,650		
Onion	15.0	8,300	124,500	42,174	82,326	0.058	4,770		
Chillie	1.9	31,000	58,900	30,758	28,142	0.062	1,740		
Pulses	1.5	14,000	21,000	14,377	6,623	0.04	270		
Vegetables	8.0	4,300	34,400	22,651	11,749	0.06	700		
Total						2.2	33,130	16,920	16,210
II. Without-Project Condition									
Paddy	5.0	4,400	22,000	13,065	8,935	1.98	17,690		
Upland Crops	1.0	14,000	14,000	14,084	-84	0.012	-1		
Total						1.992	17,689	16,920	769
III. Incremental Farm Income							15,441		
(B) A New Settler									
I. With-Project Condition									
Paddy	6.0	4,400	26,400	13,448	12,952	1.80	23,310		
Onion	15.0	8,300	124,500	42,174	82,326	0.053	4,360		
Chillie	1.9	31,000	58,900	30,758	28,142	0.056	1,580		
Pulses	1.5	14,000	21,000	14,377	6,623	0.036	240		
Vegetables	8.0	4,300	34,400	22,651	11,749	0.055	650		
Total						2.0	30,140	16,920	13,220

Remark: Average farm holding size; 1.1 ha for typial existing farmer and 1.0 ha for the new settler.
In without-project case, marjor irrigation systems excluding Kantalai are represented.

FIGURES

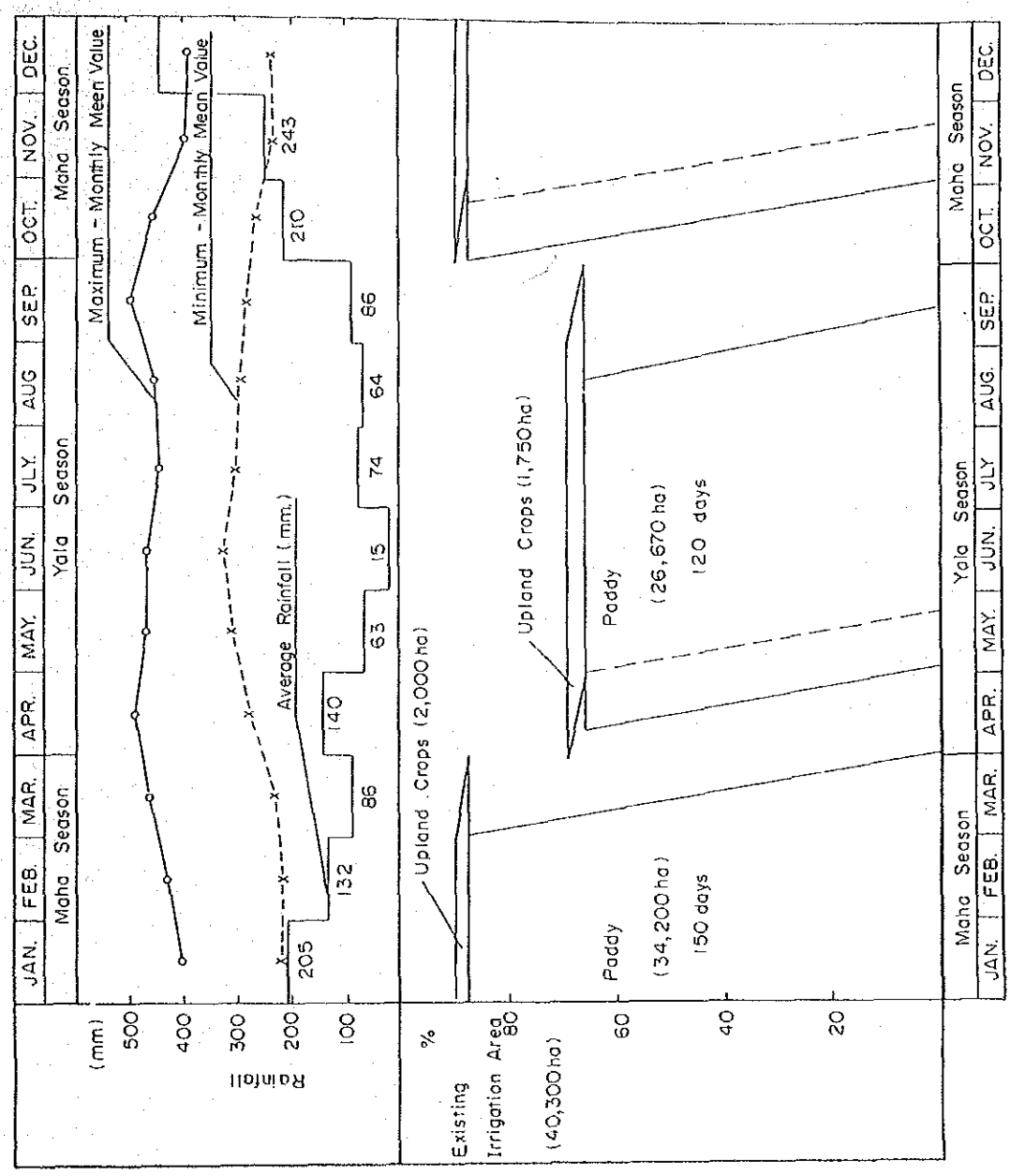

Fig. E.1-1 Present Cropping Pattern

GOVERNMENT OF DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF MAHAWELI DEVELOPMENT
THE STUDY ON EXTENSION OF THE MORAGAHAKANDA AGRICULTURAL DEVELOPMENT PROJECT
JAPAN INTERNATIONAL COOPERATION AGENCY

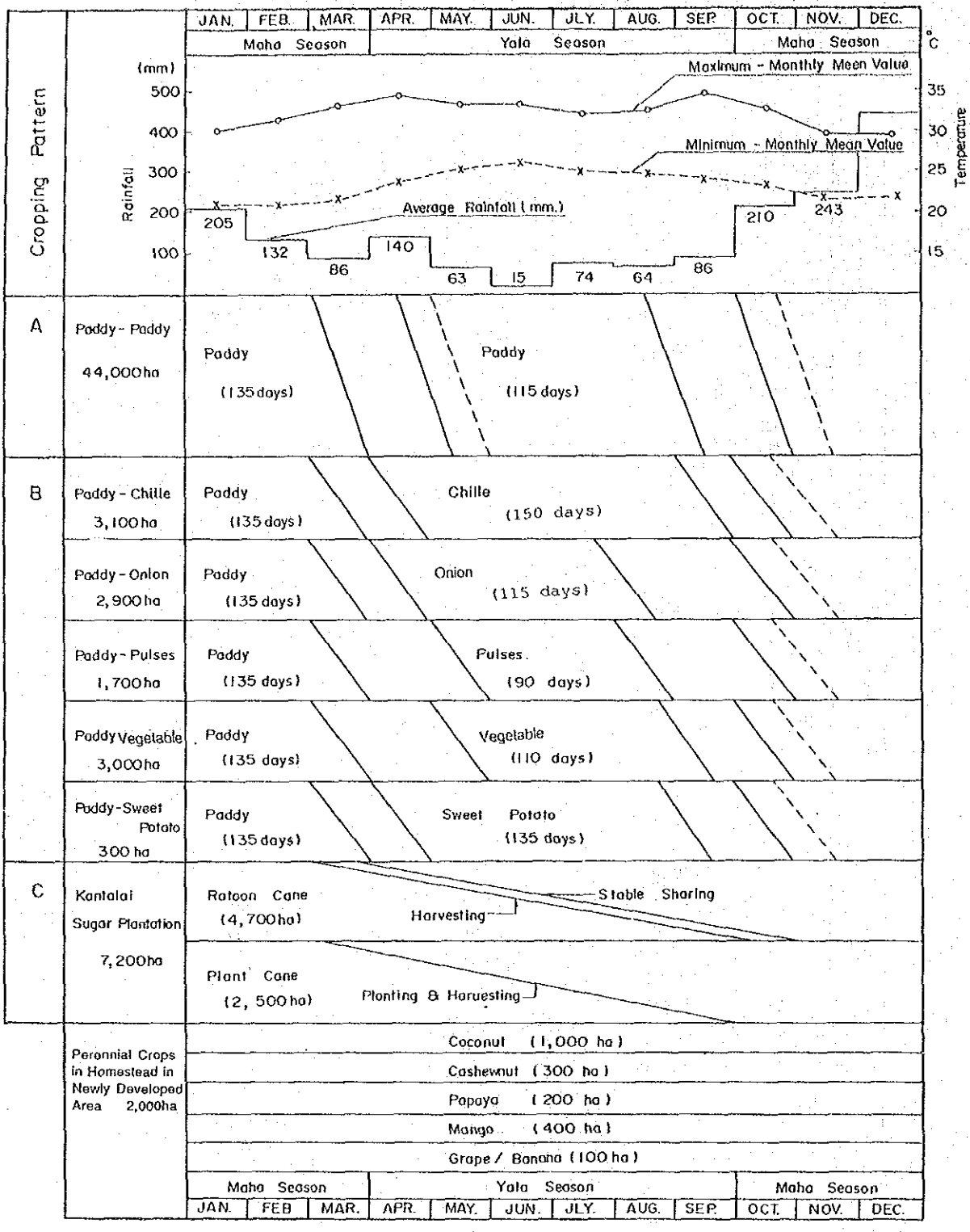

Fig. E. 2-1 Proposed Cropping Pattern

GOVERNMENT OF DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF MAHAWELI DEVELOPMENT
THE STUDY ON EXTENSION OF THE MORAGAHAKANDA AGRICULTURAL DEVELOPMENT PROJECT
JAPAN INTERNATIONAL COOPERATION AGENCY

ANNEX - F

IRRIGATION AND DRAINAGE

ANNEX - F

IRRIGATION AND DRAINAGE

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ANNEX-F IRRIGATION AND DRAINAGE

F.1 EXISTING IRRIGATION AND DRAINAGE SYSTEM

F.1.1 General

This ANNEX was recompiled on the basis of the Feasibility Report prepared in 1979, and presents the principal features of irrigation and drainage plan. Since about ten years have passed after completion of the said report, the present conditions of irrigation and drainage system was mainly reviewed. However, due to the limitation of time and the Scope of Work, the frameworks formulated in the previous Feasibility Study were kept unchanged. There might be a certain possibility to reduce irrigation areas due to the environmental aspect, while there might be a certain possibility to increase irrigable areas based on the results of detailed soil surveys carried out in part of the project area. These possibilities shall be subject to the future study.

F.1.2 Existing Irrigation System

There are two existing intake weirs at Elahera and Angamedilla on the Amban Ganga. Intake water at the Elahera anicut is supplied to the existing fields of 34,000 ha (84,000 acres) in Systems G and D1 through the Elahera-Minneriya canal. The canal links four existing tanks; Minneriya, Giritale, Kaudulla and Kantalai. Water diverted at the Angemedilla anicut is once impounded at the Parakrama Samudra tank and regulated water is distributed to the existing field of 10,100 ha (25,000 acres) in System D2. These anicuits, canals and tanks have ancient origins. All systems in the project area lie in the administrative districts of Polonnaruwa and Trincomalee. Systems D1 and D2 are operated and maintained by the ID, and System G by the MEA.

Existing fields include fields so-called as "under specification" and "under unauthorized". Fields under specification were originally planned to irrigate under the schemes or the projects. On the other hand, fields under unauthorized were expanded after completion of the projects or scheme, and are facing the shortage of irrigation water during the Yala season. As presented in Table F.1.1, there are 7,600 ha (18,700 acres) of fields under unauthorized, out of 44,100 ha (108,900 acres) of all the existing fields.

System G includes the Old Elahera Colony settled in 1947, having 1,900 ha (4,800 acres) of existing fields. The existing paddy fields are irrigated by water directly fed from the Elahera-Minneriya canal. In 1979, the rehabilitation of the Old Colony scheme was commenced and completed in 1986. New land development in the area of 4,100 ha (10,000 acres) located between the Old Colony scheme and the Amban Ganga was commenced in 1979 and will be completed in 1988.

In Systems D1 and D2 located in Polonnaruwa and Trincomalee Districts, there are five tanks having ancient origins. Major features of respective tanks are presented in Table F.1.3.

The Minneriya tank was originally constructed in about A.D. 3rd Century and the tank capacity was increased to 137 MCM (110,000 acre-feet) to serve 7,300 ha (18,000 acres) during 1950's. The Giritale tank was also constructed in A.D. 7th Century, and in 1950's the tank capacity was enlarged to 25 MCM (18,800 acre-feet) to serve 3,000 ha. The Parakrama Samudra tank originally constructed in A.D. 12th Century was restored during 1940's and the tank capacity was increased to 135 MCM (110,000 acre-feet) to serve 10,000 ha (25,000 acres). The Kaudulla tank has an ancient origin and restored in 1950's. The tank capacity was increased to 128 MCM (104,000 acre-feet) to serve 5,300 ha (13,000 acres). The kantalai tank was originally constructed in about 7th Century. The tank capacity is 161 MCM (199,000 acre-feet) to serve 9,000 ha (22,300 acres). At present, all these tanks and irrigation and drainage facilities were operated and maintained by the ID.

Fig. F.1-1 shows the existing irrigation sysems in respective systems or schemes.

After completion of the Pologolla-Bowatenna complex, irrigation conditions in Systems G, D1 and D2 have been remarkably improved as seen in Figs. F.1-2 and F.1-3. However, in progress of the development in Systems H, IH, MH and G, the project area is suffering from shortage of water during the Yala season. Such a phenomenon is attributable to a lack of water management facilities, the deterioration of irrigation structures in the downstream, and an excessive intake of water in the upper streams under undiscriplinary water management practices.

Higher cropping intensity in System D2 (Parakrama Samudra Scheme) is backed up by better irrigability than others, since System D2 has another stable water source in the Kalu Ganga and can be rationally controlled by a single tanks of Parakrama Samudra (see Fig. F.1-1).

Under such conditions, in Polonnaruwa District, the Irrigation System Management Project (ISMP) has been undertaken by the GOSL under the USAID's assistance since 1986. The ISMP aims at improvements in water management and the operation and maintenance (O&M) of the existing irrigation systems in order to achieve increased agricultural production, and thereby increased incomes for small farmers and general improvements in rural standards of living. The project is on-going and has 6 main objectives; (1) farmers' organization development, (2) O&M improvement, (3) financial management improvement, (4) monitoring, evaluation and feedback, (5) training capacity enhancement, and (6) research. The project will be completed in 1991. Unit rehabilitation costs in Polonnaruwa District was estimated at about 166 US$/ha (1,820 Rs./acre) in 1986 price level, which is 30% of the total unit costs of ISMP.

In the Kantalai tank system, rehabilitation of storage tank and feeder canals is on-going with assistance of the IBRD, and will be completed in 1990. The rehabilitation of the system includes restoration of the Kantalai (breached in 1986) and Van Ela tanks and improvement of Minneriya-Kantalai and Van Ela feeder canals to incrase capacity.

F.1.3 Drainage System

At present, natural streams and rivers so-called Oya and Ganga are major drainage channels in the project area. The drainage water collected through these finally joins the Mahaweli Ganga. Lowland areas along the Mahaweli Ganga are repeatedly inundated during the Maha season, due to flat and low lands as well as low river discharge capacity. Without flood dikes along the Mahaweli Ganga in this region, the river would spread over several kilometers on both sides every Maha season.

In System A/D area, an embankment along the Mahaweli Ganga is provided, however the lower parts are poorly drained and assuming marshy conditions due to topographic conditions being nearer to the river mouth. In the project area, no artificial improvement for the streams and rivers has been provided for the drainage purposes. The rivers are meandering with low flow capacity and often widely flooding over existing paddy fields along their courses during the Maha season.

F.1.4 Existing Irrigation Facilities

Existing irrigation facilities mainly consist of anicuts (diversion weirs), tanks, minor lift irrigation facilities, link and irrigation canal facilities, etc.

There are two existing anicuts at Elahera and Angamedilla on the Amban Ganga. Intake water at Elahera anicut is supplied to the existing fields of 34,000 ha (84,000 acres) in Systems G and D1. The Elahera anicut is of a fixed concrete weirs on the Amban Ganga on the Kuda Ganga, having the crest lengths of 178 m and 32 m respectively and the crest at El. 138.8 m. An intake structure with two numbers of fixed wheel gates is provided on the left bank of the Kuda Ganga with design intake capacity of 56.6 m^3/sec (2,000 cusec). The Angamedilla anicut is located at about 27 km downstream of the Elahera anicut and intake water is led to the Parakrama Samdra tank in System D2. Length, crest elevation and design intake discharge of the anicut are 27.5 m, 69.1 m and 28.3 m^3/sec (1,000 cusec) respectively. Principal features of two anicuts are presented in Table F.1.5.

In the project area, there are five major tanks with active storage capacity of 563 MCM in total, serving the existing fields of 44,100 ha (108,900 acres) as shown in Tables F.1.3 and F.1.4. In addition to these five tanks, there are numerous minor tanks which are of much smaller scale in storage capacities and irrigation area, and are used as supplemental tanks to the major tanks. List of minor tanks is presented in Table F.1.5.

There were small scale pump irrigation areas of about 450 ha (1,100 acres) as of 1978. These are listed in Table F.1.6.

F.2 IRRIGATION AND DRAINAGE PLAN

F.2.1 Irrigable Area

Land in the project area is classified into the agricultural land and non-agricultural land (villages, roads, rivers, etc.) Of 117,900 ha of land in the project area, 44,100 ha have been used as existing fields, 4,200 ha for expansion area of the Sugar Corporation, and 13,900 ha have been identified as new irrigable areas based on the results of soil classification discussed in ANNEX-F as well as available topographic maps with different scales as shown below:

System	Scale					Contours
D1	1 inch	=	4	chains	(1/3,168)	2 feet
	1 inch	=	12	chains	(1/9,504) in part	2 feet
D2	1 inch	=	1/2	mile	(1/31,680)	20 feet
A/D	1 inch	=	1/2	mile	(1/31,680)	20 feet
	10 cm	=	1	km	(1/10,000)	5 m

New irrigable areas in Systems D1, D2, and A/D are estimated to be 9,100 ha (22,400 ac), 2,200 ha (5,400 ac) and 2,700 ha (6,600 ac), respectively. The tank-wise existing and new expansion areas are summarized in Table F.1.1 and soil classification in respective systems is given in Table F.2.1.

The existing irrigation area was considered to include acreage under authorized cultivation area and unauthorized one, because unauthorized fields are under cultivation and largely dependent on the rainfall conditions.

The followings were the comments made in the previous Feasibility Study:

(1) System D1

The newly irrigable area corresponds to that covered by Stages III and IV of the Kaudulla Scheme. The Kaudula Scheme was originally estimated to cover 11,300 ha (28,000 ac), but had been revised to 9,000 ha (22,400 ac) by the previous study in 1978 (Stage III - 11,500 ac and Stage IV = 10,900 ac). According to the I.D plan (January 1979), the cultivation area in System D1 was estimated at 70 per cent of the total, i.e., Stage III 13,715 ac plus Stage IV 13,985 ac = 27,700 ac, which might seem to be an over-estimation.

(2) System D2

The newly reclaimable area is spreading in the downstream of the existng Parakrama Samudra Tank. It is a lowland encircled by the Mahaweli Ganga and the Periya Aru, habitually inundated during the Maha season. It was originally

estimated at 3,700 ha (9,100 ac), but as a result of the previous survey in 1978, it had been identified as net irrigable area of 2,200 ha (5,400 ac) out of the gross area of 4,800 ha (12,000 ac). This irrigable acreage might be subject to change after the Kandukadu anicut be completed.

(3) System A/D

This area was previously included in System A, to be made irrigable by the Kandukadu anicut, but had been put in System A/D from priority and topographic points-of-view. This area is located in lowland and liable to the flood influences of the Mahaweli Ganga like System D2, area but is now protected by embankment. It was originally planned to irrigate 3,700 ha (9,100 ac) but irrigability had been reduced to 2,700 ha (6,600 ac) as a result of the previous survey in 1978.

F.2.2 Irrigation Water Requirement

F.2.2.1 Consumptive Use of Water

The consumptive use of water is the sum of the volumes of water used by crop growth in a given area in the transpiration or building of plant tissue, and that evaporated from adjacent soil or intercepted precipitation on the area in any specified time. In the case of rice cultivation where a water level is maintained above the ground surface, evaporation from the water surface will be substituted for evaporation from soil surface. Practically the consumptive use of water for paddy is obtained by multiplying the class-A pan evaporation or potential evapotranspiration by the crop coefficient (kc).

(1) Evapotranspiration

Monthly Reference Evapotranspirations (ETo) were calculated by adopting the Modified Penman Method in reference to the meteorological data (1950-1977 records) obtained at Maha-Illuppallama where is located at the nearest meteorological station to the project area and shows the similar claimatic features (see ANNEX-B).

Monthly evapotranspiration was calculated as follows:

Unit: inch

Month	J	F	M	A	M	J	J	A	S	O	N	D	Total
ETo	4.7	5.0	6.2	5.9	6.4	6.9	7.5	7.6	7.5	6.2	4.3	4.5	72.7

(2) Crop Coefficients (kc)

The crop coefficients (kc) of paddy and upland crops are presented in Table F.2.2.

(3) Consumptive Use of Water

The consumptive use of water was calculated by the following formula:

$$Cu = ETo \times kc$$

where, Cu : Consumpting use of water
kc : Crop factor
ETo : Reference Evapotranspiration

The results of consumptive use of water for each cropping pattern (see ANNEX-B and Fig. F.2-1) are calculated and presented in Table F.2.3.

F.2.2.2 Effective Rainfall

The effective rainfalls vary with natural features, especially rainfall intensity, rainfall, permeability of soils, kind of crops, growing period of crops, condition of farm management. Generally little rainfall is not effective.

In the calculation of the water requirements in the project area, effective rainfall was separately computed for lowland paddy and upland crops as follows:

(1) For Paddy

The following formula was applied to paddy:

$$ER = (R - 1) \times 0.67$$

$ER = 9$ inches (228.6 mm) when $ER > 9$ inches

$ER = 0$ when $R < 1$ inch (25.4 mm)

where, ER : Eeffective rainfall (inch)
R : monthly rainfall (inch)

(2) For Upland Crops

The effective rainfall for upland crops vary with rainfall, soils, crops and etc. In this project, it was assumed that effective rainfall for upland crops was computed by using the S.C.S. Method adopted by U.S.D.A. (United States, Department of Agriculture's Soil Conservation Service Method) as follows:

$$ER = R \times Ratio$$

where, ER : monthly effective rainfall
R : monthly rainfall

The monthly effective rainfalls were calculated by applying following ratio adopted by Irrigation and Drainage Paper No. 25, Effective Rainfall, F.A.O:

Unit: %

Crops	J	F	M	A	M	J	J	A	S	O	N	D
Upland crops												
- New land	-	-	-	65	75	80	70	75	65	-	-	-
- System G	-	50	65	65	75	80	70	-	-	-	-	-
Sugarcane	60	65	70	65	65	80	70	75	80	65	40	30

Since there are four (4) rainfall stations in the project area and rainfall data were available for 28 years (1950-1977), the four major stations were considered to represent the rainfall in each system or tank respectively as shown below (see ANNEX-B):

Rainfall Station	System	Tank or System
1. Polonnaruwa	D2	Parakrama Samudra
2. Hingurakgoda	D1	Kaudulla
	D1	Minneriya
	D1	Giritale
3. Kantalai	D1	Kantalai (Paddy and Upland)
	D1	Kantalai (Sugarcane)
4. Elahera (Bakamuna)	G	System G

Effective rainfalls of paddy and upland crops at each rainfall station were calculated by adopting the preceding equations, and are presented in Tables F.2.4 (1/2-2/2) and F.2.5 (1/3-3/3).

F.2.2.3 Irrigation Efficiency and Losses

(1) Water requirements for pudding and land preparation

Water requirements for pudding were determined at 7 inches (177.8 mm) per crop of paddy, while those for land preparation of upland crops at 1.5 inches (38.1 mm).

(2) Percolation

Percolation was assumed to be 6 inches (152.4 mm) per month under the project.

(3) Irrigation efficiency

(3) Irrigation efficiency

Irrigation efficiency, which was used in estimating irrigation requirement for upland crops, was assumed to be 50%.

(4) Conveyance and diversion losses

The losses due to conveyance and diversion was combinedly estimated at 30% of the diversion requirement.

(5) Conveyance loss at Yoda Ela

The conveyance loss from Elahera and Amgamedilla headworks to each of the tanks was estimated at 0.3% per mile for the water balance study as recommended by UNDP/FAO.

Field requirements for respective cropping patterns were calculated based on the condition and assumptions described in the above and the preceding Sub-sections, and are presented in Table F.2.3. In this updating the feasibility study, kinds of upland crops and pattern were slightly modified, however cropping area of upland was kept unchanges. As seen in the previous study, even if cropping areas of upland and paddy were modified, the total requirements would vary within 1 to 2% of the total requirements. This variation was considered to be neglible small, and not to affect the formulation of the project facilities. Therefore, at this stage, field requirements for respective patterns estimated in the previous study were adopted, however shall be subject to the future study in Phase II, and/or detailed design stage.

F.2.2.4 Tank-wise Diversion Requirements

The tank-wise diversion requirements were computed on the following conditions;

(a) Existing Area and New land

Cropping Pattern A, 80%
Cropping Pattern B, 20%

(b) For Elahera region (System G), the cropping patterns used in the report on the Integrated Small Farmer Development Project had been adopted.

(c) For Kantalai tank, the diversion requirements had been determined by summing up the diversion requirements culculated for Kantalai farm managed by the Sugar Corporation and for paddy and upland.

The tank-wise diversion requirements and cropping area for each pattern are presented in Tables F.2.6 and F.2.7, and average monthly diversion requirement at respective tanks in Fig. F.2-2.

F.2.2.5 Design Discharge of Irrigation Facilities

Since no significant effective rainfall is available in July as shown in Tables F.2.4 and F.2.5, diversion water requirements were calculated to be 1,770 ac.ft/month per 1,000 ac under cropping pattern A and 1,312 ac.ft/month under cropping pattern B, culminating to a peak in July. Cropping rates under A and B are 80% and 20%, respectively. Design water requirements had been calculated at 1,678.0 ac.ft/month/1,000 ac or 54.1 ac.ft/day/1,000 ac or equivalent to 36.6 ac/cusec or 1.91 l/sec/ha.

Sri Lanka standard design duties are given below:

	Commanded area	Design duty
- Main canals	below 1,000 ac	40 ac/cusec
	1,000 - 5,000 ac	50 ac/cusec
	above 5,000 ac	60 ac/cusec
- Branch canals		40 ac/cusec
- Distributaries		35 ac/cusec
- Field canals		30 ac/cusec

Since the existing canals are regulated by the above standards by the ID, following design discharge had been decided to adopt in the study, however, shall be subject to the further study in the design stage:

- Main and branch canals : 40 ac/cusec
- D and F canals : 35 ac/cusec

F.3 DRAINAGE PLAN

F.3.1 General

The purpose of a drainage system is to remove the excess water from the ground surface or subsurface. Generally, open or subsurface drains or combination of open and subsurface drains are used as the means of drainage. The existing natural stream will be used as main drainage channels. When the existing natural stream section is unable to drain the design flood discharge without any harm to the irrigation system and/or area, it would be necessary to enlarge the natural drainage sections, and to provide flood protection dike, in order to make smooth drainage by improvement of river trace or short cuts.

Seven tributaries were selected as main drainage channels in the project area, which mostly drain into the flood plain of the Mahaweli Ganga. The selected tributaries and their lengths in the newly reclaimed lands are shown in the following table and the proposed drainage system is illustrated in Fig. F.3-1:

River or Stream	System	Length (miles)
Kalu Ganga	D-1	11.5
Thimbri Ela	D-1	7.5
Ambagaha Oya	D-1	8.4
Periya Aru	D-2	11.2
Sinna Ganga	D-2	9.0
Uppu Aru	A/D	4.8
Karappankadawela Aru	A/D	4.4

F.3.2 Design Flood Discharge

According to "Mahaweli Ganga Irrigation and Hydro-power Survey" by UNDP/FAO, 5-year frequency would be enough as the basis of design of drainage facilities in Sri Lanka. It was also decided that 5-year frequency flood was adopted as the design discharge of facilities in the previous Feasibility Study.

Main drainage channel will be provided to draw off a flood with 5-year frequency, as stated above. The flood discharge were calculated by adopting the formula given below, which is prevailing in Sri Lanka:

$$Q = C \times A \times Rt$$

$$t = (11.9 \times L^3/H)^{0.385}$$

where, Q: flood discharge in cusec,
A: catchment area in acres
L: max. length of channel in miles
H: max. difference in elevation in feet
Rt: Rainfall intensity in inches within duration t hours
t: time of concentration in hours (tarvel time from the farthest point in the catchment to a certain point, and
C: Coefficient of runoff
Assumption L = 1.5 A (A in sq.miles)

Since the rainfall intensity in Aruradhapura was established and used as design criteria of drainage plan by the ID, the rainfall intensity in Anuradhapura as shown in Fig. F.3-1 was adopted for the project. The runoff coefficient was fixed based on the ID criteria as follows:

Classification of Area	Runoff Coefficient
Jungle area	0.2
Paddy field	0.3
Cropped land	0.4

The flood discharges/design discharges for each drainage channel was culculated and are summarized in Table F.3.1.

F.4 HYDRAULIC STRUCTURE DESIGN

F.4.1 Irrigation Plan

On the basis of the irrigation plan for both the existing and the new lands as shown in Fig. F.4-1, the existing main and branch canals will be improved and new main and branch canals be constructed as follows:

		length (miles)
(1)	Improvement of Erahela-Minneriya Yoda Ela	
	(6 - 19.5 miles)	13.5
(2)	Improvement of Existing Canals	
	System D1	10.18
	System D2	20.49
		30.67
(3)	Construction of New Canals	
	System D1	26.0
	System D2	12.45
	System A/D	14.75
		53.20

(4) New Kalu Ganga Tank

- Catchment area		6,500 acs (26.3 km^2)
- Capacity		21,600 ac-ft (26.7 MCM)
- F.W.L.		190 ft MSL
- H.F.L.		193.5 ft MSL
- Area at FSL		1,700 ac
- Bund		
Length		2.41 miles (3.88 km)
Top level		200 ft MSL
Top width		20 ft
Height		2 ft to 45 ft
Slopes	U/S	1 on 2.5
	D/S	1 on 2.0
- Spillway		Clear overfall 160 ft
- Sluice		Tower sluice

F.4.2 Irrigation Canals

(1) General

The irrigation canals in the proposed irrigation area consist of newly constructed canals and existing irrigation canals to be improved to increase the flow capacities. The existing canals to be improved are the Main canal and the Branch canal No. 1 in System D1 and the D1-Main canal, the D1-North and D1-East canals in System D2.

(2) Type of Canal

In principal, irrigation canals were designed as unlined earth canals. However, in the case of improvement of existing canals of the Main canal and the Branch canal No. 1 in the system D1, thin concrete lining were designed in order to increase the flow capacities of the canals without large scale widening and to use the related structures of the canals without reconstruction or repairing.

(3) Design Discharge and Canal Net Work

The irrigation diagrams for respective Systems are presented in Figs. F.4-1 to F.4-3. Depending on the discharges and canal gradient, typical canal sections were determined as shown in Tables F.4.1 and F.4.2.

(4) Canal Section

The canal sections were determined based mainly upon the design standards of the Mahaweli Ganga Irrigatin and Hydro-power Survey carried out by UNDP/FAO.

a) Velocity and Water Depth

Velocities and ratios of bed width to water depth (B/H) usually range from 1.0 to 3.5 fps and from 2:1 to 8:1, respectively, depending upon discharges. The permissible velocity was determined 2.7 fps and the water depth was designed less than 5 ft.

Lined canals permit higher velocities than un-lined canals. The maximum velocity for the thin-concrete lined canals was determined to be 5 fps.

b) Freeboard

Freeboard of canal will normally be governed by discharge, velocity, flooding, wind action, etc. The minimum freeboard of respective canals were decided as follows:

Earth canal

Q > 1,500 cfs	3 ft. 0 in.
Q > 1,000 cfs	2 ft. 6 ins.
Q > 500 cfs	2 ft. 0 in.
Q > 100 cfs	1 ft. 6 ins.
Q > 10 cfs	1 ft. 3 ins.
Q > 2 cfs	1 ft. 0 in.

Open flume and aqueduct 2 ft. 0 in.

Concrete lined canal

Freeboard of concrete lined canal was decided to be about 1 ft and total freeboard was kept as same as the earth canal described in the above.

c) Side Slope

Inside slopes of 1:1.5 (vertical to horizontal) and 1:1.0 were determined for the unlined canals and for the thin-concrete lined canals, respectively, under ordinary conditions.

d) Bank Top-width and Berm

Since there are no major roads in new expansion area, the canal banks will be also used as operation and maintenance roads as well as agricultural roads communication link for the development of the area. The banks have been classified three types according to their traffic density and road requirements.

On the opposite bank, 4 ft. wide bank has been provided. The typical widths of banks/roadways are as follows:

Type of bank/road	I	II	III
Road class	II	III	IV
Width of bank (ft)	30	16	12
Width of gravel pavement (ft)	8	8	8
Thickness of gravel (ins)	6	6	6
Width of opposite bank (ft)	4	4	4

Where the berm is to be needed, half the water depth plus two feet (0.5d + 2 ft) wide berm has been provided.

(5) Hydraulic Formula

The Manning formula was adopted for all canal designs. The formula is as follows:

(5) Hydraulic Formula

The Manning formula was adopted for all canal designs. The formula is as follows:

$V = (1.486 \times R^{2/3} \times S^{1/2})/n$

$Q = A \times V$

where, V : velocity of water in fps.
S : slope of energy gradient
R : hydraulic radius in feet
n : coefficient of roughness
Q : discharge of canal in cfs, and
A : cross-sectional area of water in sq.ft.

The meaning roughness coefficient roughness 'n' used in the design was as follows:

Canal Type	'n' value
Concrete lining	0.015
Concrete block lining	0.017
Earth canal	0.0225
Existing earth canal	0.030 - 0.040
Natural stream	0.040

Energy gradient of the canals may range from 0.0002 (1/5,000) to 0.00045 (1/2,200) depending on topographical conditions.

(6) Stanard Cross Section

As for the standard cross section, 34 types were designed for the main and branch canals, depending on the discharges. The numbers of proposed standard cross sections in the three irrigation systems are as follows:

System		Nos. of Type
System A/D	improved canal	4
	new canal	5
Sytem D2	improved canal	10
	new canal	10
Sytem A/D	new canal	5

The standardized cross sections are tabulated in Table F.4.3, and are illustrated in Fig. F.4-3.

F.4.3 Related Structures

Structures necessary for the project consist of crossing structures, turnouts, division structures, checks, water measurement devices, drop structures, spillways, wasteways and so on. All the related structures along the proposed canals are listed in Table F.4.5.

Design consideration for these related structures are as follows:

(1) Crossing Structures

The proposed irrigation canals would inevitably cross at some places over or under the tributaries, drainage channels and roads. Aqueducts, bridges and cross drainage structures were designed for those crossings.

a) Aqueducts

An aqueduct will be provided for the canal to cross the existing tributaries or drainage channels. The design velocity in an aqueduct was decided 1.5 times of that in the upper and lower canals. An aqueduct would be also used as a road bridge. A reinforced concrete aqueduct with rectangular shape was designed, considering the required scale of aqueduct, durability and economical aspect. A wasteway was provided with manual-operated slide gate(s) at the just upstream of the aqueduct so that could evacuate a part and/or whole of canal water. The typical design of aqueduct is shown in DRAWINGS.

b) Cross drainage structures

The drainage water is conveyed across the proposed canal by undercrossings or is dropped in the canal by drainage inlets. Single or multi-barrel pre-cast circular concrete conduit(s) was adopted for the undercrossing. At places where the drainage canal is higher than the proposed canal, drainage inlets into the canal were provided for small catchments with discharge less than 10 cusecs. Those drainage structures are illustrated in DRAWINGS.

c) Bridges

Since existing condition of road network in the project area is very poor, the proposed irrigation canals would cross few existing roads. In order to connect separated fields by the canals and to link villages and to also serve for operation and maintenance, however, bridges will be provided at an interval of half a mile along the canal in this Project. Proposed concrete slab bridges are shown in DRAWINGS.

(2) Turnouts and Division Structures

Turnouts are used to divert water from a canal to canal(s). In accordance with the design discharge and the topographic condition where the turnout is located, the following three types of turnouts are adopted.

- $Q < 20$ cfs

  Type A : Slide gate + Single barrel concrete pipe + Measuring device (M.D.)

- $20 < Q < 130$

  Type B : Slide gates + Double barrel concrete pipes + M.D.

- $Q > 130$ cfs

  Type C : Slide gate + Concrete box conduit + M.D.

Water measuring devices will be provided at all turnouts. As a general rule, the Cipolletti weir was adopted as a measuring device because this type is the most common and the least cost. If an adequate water head loss is unavailable or the discharge is large, the broadcrested weir will be adopted. The standardized designs of the turnouts are shown in DRAWINGS.

Division structures combined with gated regulater(s) are used to divide the flow from a supply canal among two or more canals. Typical division structures are designed as shown in DRAWINGS.

(3) Checks

Checks are provided in maintaining a certain water level in the upper stream of the canal. Two types of checks in this Project were designed. One is a combined type of the fixed overflow weir and manually operated slide gate(s), and the another was designed to have a flumed section and combined with a drop structure. Both types of checks are illustrated in DRAWINGS.

(4) Water Measuring Devices

Water measuring devices will be provided at the intake site and at each turnout. Cipolletti weir type was adopted as the device in view points of economical aspects and easiness of operation and maintenance. In case that an adequate water head is unavailable or the discharge is large, the broad-crested weir will be adopted. These devices are used in combination with other canals structures.

(5) Drop Structures

Drop structures are used to dissipate energy. After considering the required drop height, the topographical condition and other factor, vertical drop type was adopted for this Project. Check structures are often combined with the drops to prevent

racing and scouring upstream of the structure. Typical design of vertical drops is shown in DRAWINGS.

(6) Spillways and Wasteways

In order to automatically eliminate excess flow due to floods or to misoperation of gates, spillways will be provided at the beginning or in adequate location along the more important canal system. Spillways are usually combined with wasteways which consist of manually operated slide gates to remove the entire water in the canal in cases desilting. The side channel overflow spillway combined with the wasteway was adopted and typical design is shown in DRAWINGS.

(7) Washing and Bathing Places

Since irrigation water is normally used as domestic water by settlers and farmers in every existing and on-going projects, washing and bathing places will be provided along the canal at places roughly two for every three miles, in order to protect the canal. The typical design is shown in DRAWINGS.

F.4.4 Downstream Development

(1) Downstream Development

Downstream development program will be prepared for every distributary unit to be irrigated by distributary canal. The downstream system consists of distributary canal (D-canal), and field canal (F-canal) which will respectively cover D-canal units (20-300 ha) and F-canal units (10-20 ha). Typical canal layout for downstream development is shown in Fig. F.4-5. The following table shows the total required canal length:

Unit: km

Item	D1	D2	A/D	Total
1. Irrigation canals	630	150	180	970
2. Drainage canals	540	130	150	830
3. Farm road	450	10	130	690

(2) Inspection Road

For the proper operation and maintenance of the project facilities, well arranged inspection road are vital importance. Since these roads will also be used as village and farm roads after proejct implementation, the arrangement of inspection roads was made considering the existing and planned roads. Inspection roads along the existing main canal, and the existing and new branch canal are 9 m wide with 3.6 m wide gravel metalling, and 5 m or 3.7 m wide with 2.5 m gravel metalling,

respectively. In addition to the above, village connection roads are provided under the proejct. The major features of the project facilities are summarized in Table F.4.7.

(3) Land Reclamation

The total areas to be reclaimed are around 17,400 ha which are covered with common jungle in Systems D1 and D2, and medium jungle in System A/D. For the reclamation of the shrub land, the jungle clearing and uprooting works will be made and followed by burning. Finally the rough levelling works will be carried out under the scope of the project. The final levelling and construction of ditches and border ridge will be executed by the farmers themselves.

F.4.5 Drainage

The section proposed for the drainage channel was designed to drain out 2/5 of 5-year frequency flood through the flow area excavated below the ground level, and 3/5 of 5-year flood through the flow area above ground level and formed by embankments on the both sides. The bank top-width and berm width shall be provided at least 12 ft and 10 ft, respectively. Freeboard in the main drainage channel was decided to be 3 ft. On the outside of the embankments, drainage ditches will be provided.

The Manning formula was adopted for the canal design, and roughness coefficient (n) was decided to be 0.040 duly in consideration of future conditions of drainage canal. Standard cross sections are tabulated in Table F.4.6, and are illustrated in Fig. F.4-3.

TABLES

Table F.1.1 EXISTING AND NEW IRRIGATION AREAS

Unit: Acres

System	Scheme	District	Under Specification	Under Unauthorized	Other Land	New Land	Total
G	Elahera	P	14,800 *2	-	-	-	14,800
D1	Minneriya *3	P	16,800	6,200	-	-	23,000
	Giritale	P	6,200	1,300	-	-	7,500
	Kaudulla	P	10,500	2,500	-	22,400	35,400
	Kantalai *4	T	22,300 *5	3,300	-		36,100
D2	Parakrama Samudra	P	19,600	5,400	10,500*6	5,400	30,400
A/D	Kantalai	T	-	-	-	6,600	6,600
	Total		90,200 (36,500 ha)	18,700 (7,600 ha)	10,500 (4,200 ha)	34,400 (13,900 ha)	153,800 (62,200 ha)

Note: *1 P means Polonnaruwa and T means Trincomallee.
*2 Including on-going project of 10,000 acres to be completed in 1988.
*3 Including Paravipanchankulam and Galamura schemes.
*4 Including Kahambiliya and Wan Ela schemes.
*5 Including existing sugarcane fields of 7,400 acres (3,000 ha) for Sugar Corporation.
*6 Expansion area of 10,500 acres (4,200 ha) for Sugar Corporation.

Table F.1.2 MAJOR FEATURES OF EXISTING ANICUTS

Item	Unit	Elahera Anicut		Angamedilla Anicut
		Amban Ganga	Kuda Ganga	
Catchment Area	Sq. Mile			540.0
Length	ft	585.3	105 - 3'	90.0
Crest Level	MSL (ft)	455.5	455.5	226.4
Scour Gate		-	Fixed Wheel Gate 2 Nos 10'x5'	Hand wind 1 Nos 5'x4'
Sill Level	MSL (ft)	-	437.1	216.5
Crest Level of divided wall	MSL (ft)	-	442.1	226.91
Head Sluice			Fixed Wheel Gate	R.C with Gates
No. of Opening			2 Nos 11'x8'	2 Nos 10'x4'-6"
Level	MSL (ft)	-	439.1	219.2
F.S.L.	MSL (ft)	-	447.1	223.73
H.F.L.	MSL (ft)			230.67
Design Discharge	Cusec		- Normal 1,500 Overload 2,000	1,000

Table F.1.3 BASIC FEATURES OF EXISTING TANKS

Description	Unit	Kaudulla	Minneriya	Kantalai	Giritale	Parakrama Samudra
Catchment Area	km2	83	385*2	588*3	24	73
Capacity	MCM	128.3	136.9	160.6	25.3	135.1
Dead Storage	MCM	4.9	0.0	0.0	0.0	18.5
Active Storage	MCM	123.4	136.9	160.6	25.3	116.6
Area at F.S.L.	km2	25.9	25.5	28.7	3.2	25.7
H.W.L.	m	73.2	93.7	59.3	92.2	59.1
L.W.L.	m	64.0	82.1 '(89.9) *4	42.8	79.0	51.8
Existing Irrigable area *5	ha	4,250	6,800	9,030	2,510	7,930
Dam Length	km	9.2	2.8	3.7	0.5	14.7
Top elevation	m	76.8	97.1	63.4	97.2	61.0
Top width	m	-	7.6	13.7	9.1	3.7

Note: *1 Including Vendarasan Kulam Tank
*2 Including catachment area along Elahera Minneriya Yoda Ela, 145 km2
*3 Including catchment area of Gal Oya 215 km2 and Aluth Oya 73 km2
*4 Still elevation of gates to Kantalai and Kaudulla Tank
*5 Irrigation area under specification

Table F.1.4 DETAILS OF EXISTING MAJOR TANKS

Item	Unit	Kaudulla	Minneriya	Kantalai		Giritale	Parakrama Samudra	Vendarasan Kulam	Paravipanchan Kulam
		D1	D1	D1		D1	D2	D1	D1
ient area	Mile2	32.0	92.6	Kantalai	77.1	9.4	28.0	4.3	5.5
				Gal OYA	83.0				
				Aluth OYA	28.0				
				Total	188.1				
pacity	AC-ft	104,000	110,000		110,000	18,800	110,000	20,200	4,500
storage	AC-ft	4,500	4,000		4,000	-	15,000	-	-
it F.S.L.	AC	6,100	6,300		5,950	760	6,275	1,100	225
( )	(M.S.L)	(242.0)	(307.42)		(194.5)	(302.0)	(194.0)	(180.0)	(135.0)
at Sill	AC	550	200						
tion area	AC	10,500	13,500		20,800	6,200	19,600	Kantalai area	Kantalai area
(outside spec)	(M.S.L)	(13,000)	(18,000)		(23,900)	(7,500)	(25,000)		
d (Dam)		mile ft	mile ft	mile	ft	ft	mile ft	ft	ft
Length	Mile-ft	5 3,900	1 3,900	2	1,584	1,700	8 2,320	3,800	1,430
Top Level	M.S.L.	252.0	318.65	208.0 to 202.0		310.0 to 319.0	200.0	185.0	146.5
Top Width	ft	25.0	25.0	45.0		30.0	12.0	12.0	12.0
Slopes	on	U/S 1 on 3.0 D/S 1 on 2.5	U/S 1 on 2 D/S 1 on 3	U/S 1 on 3.75-2.0 D/S 1 on 3.0-2.0		U/S 1 on 2.0 D/S 1 on 2.0	U/S 1 on 3.0-2.75 D/S 1 on 2.5-2.0	U/S 1 on 2.5 D/S 1 on 2.5	U/S 1 on 3.0 D/S 1 on 2.5
pill		Radial Gate 12 Nos 12/20'x12.6' (262') H.F.L 246.8 MSL Crest L 240 MSL	L.B No.1 (Kantalai) Radial G 2 Nos/16'x8' Slide G 2 Nos/16'x5' Sill L 294.9 MSL L.B No.2 (Kaudulla) Radial G 7 Nos/20'x12'-6" Crest L 307.4 MSL Sill L 294.9 MSL	Radial G 10 Nos 10/15'x8' H.F.L 201.5 MSL Crest L 194.5 MSL Sill L 186.5 MSL		Clear Overfall with Ogee Sets Length 125' Crest L 302.0 MSL H.F.L 304.0 MSL	Natural Spill Length 440' Crest L 195.0 MSL Radial G Length 100' No.10/ Crest L 194.0 MSL	Casuseway Cum Length 50' Crest L 180.0 MSL H.F.L 183.0 MSL	Chate Type Length 120' Crest L 135.0 MSL H.F.L 141.15 MSL
uice		Low Level (R.B) Type R.C. Tower Opening 4'ø Cast Iyon Sill L 210.0' MSL Height Level (L.B) Type R.C. Tower Opening 3/3'-9"x5'0 Sill L 215.0	Low (R.B) Masonary 2/4'-9"x3.0' 269.32 MSL 4'-7"x3.0' 279.73 MSL Jayanthi (R.B) R.C.C 3/2'-8"x4' 275.0 MSL Height (L.B)Raja Ela R.C.C 1/3'x2'-6" 278.34 MSL	L.B 2/2'x 4' Sill L 152.6 MSL Max.Q 570 cusec Area 10,640 ac R.B (old) 2/2 1 /4'x4' 2'x2 1 /2' Sill L 153.4 MSL Max.Q 440 cusec Area RB1(P) 1,515 ac Area RB2(S) 7,427 ac R.B (Montana) 2/4' x 2 1 /2' Sill L 155.74 MSL Max.Q 614 cusec Link Sluice 4/3 1 /2ø Sill L 175.0 MSL Q 820 cusec Area 1,287 ac		L.B Tower Sluice 1/2'-6"x1'-6" U/S 259.35 MSL R.B Tower Sluice 2/4'-0"x32" U/S 264.75 MSL	D1 R.C. Tower (H.P) 4/42"ø H.P Sill U/S 169.0 MSL D/S 168.23 MSL Q 350 cusec D2 R.C. Tower (culvert) 1/4'-3"x4.0' Sill U/S 170.0 MSL D/S 169.62 MSL Q 115 cusec D3 R.C. Tower 1/36"ø H.P Sill U/S 170.0 D/S 169.17 Q 35 cusec	Sill E 140.5 MSL 1/3' 0ø	Sill E 110.0 MSL

Table F.1.5 LIST OF MINOR TANKS

System of Scheme		Name of Minor Tanks	Capacity (ac-ft)	Caltivable Area (acs)
D1	Kaudulla	Ambagaswewa	2,102.5	1,188
	Giritale	Ilukwewa		30
		Gallida	516	177
		Paluwewa	159	50
		Baddepanwiwla	270	70
		Divalamkadawala	313	100
		Pahalasiyambalawewa	110	36
		Wewalawewa	138	40
		Deegannawewa	240	80
		Nikawewa	306	102
		Wijerajawewa	225	75
		Ihalasiyambalawewa	129	33
		Madaymalawewa	300	100
D2	Parakrama Samudra	Kalahagala		30
		Kadawala Wewa	100.0	300
		Amaulunda		108
		Aluth Wewa	150	60
		Kirinatidamanawewa	500	99
		Uradikulamwewa		30

Table F.1.6 LIST OF LIFT IRRIGATION SCHEMES

Name		Pump St No.	No./Dia. of Pump	No. of Fore Bay	Acreage under Each Fore Bay	Total Acrege
1. Kaudulla						
Stage 1	TR 5	1	1/6" dia.	1	32	32
	TR 5	2	1/7" dia.	1	52	52
					Sub-total	84
2. Minneriya						
Stage 3	LB7	3	1/6" dia.	1	22	
	LB9	3	1/6" dia.	1	27	49
3. Giritale						
	LB	6	1/4" dia.	1	27	
RB Tract	5	7	1/6' dia.	3	(30.75)	
					(35.25)	
					16.50)	82.5
	3	7	1/6" dia.	1	45	45
					Sub-total	127.5
4. G. System						
Konduru	Stage II	8	1/4" dia.	1	30)	
Wewa			2/8" dia.	2	90)	
					80)	200
	Stage I	9	1/6" dia.	1	66)	
			1/6" dia.	2	32)	
					62)	158
Bakamuna	Stage III	10	1/6" dia.	1	72	72
	State II	11	1/8" dia.	1	104	104
	State I	11	1/6" dia.		60	60
					Sub-total	594
5. Minneriya Oya						
Sunga Wila	•	12	1/6" dia.	2	67	
			1/6" dia.		18	85
6. Parakrama Samudra						
D1 Kalinga Ela					0.8)	
Unit I		13	1/6" dia.	2	26)	
II		13	1/4" dia.	1	32)	
III		14	1/6" dia.	1	26)	92
D2 LB4		15	1/6" dia.	1	48	48
D3		16	1/3" dia.	1	19	
					Sub-total	159
Total						1,098.5
					=	1,000 ac

(Source: Feasibility study on the Moragahakanda Agricultural development Project, JICA, 1979; Polonnaruwa C.I.E. Ofice)

Table F.2.1 SOIL CLASSIFICATION AND IRRIGABLE AREA

Main Soil Unit	A/D		D1		D2		Total	
	Gross	Irrigable	Gross	Irrigable	Gross	Irrigable	Gross	Irrigable
1. Alluvial Soil								
- Well to moderately well drained soil	0	0	0	0	3,650	1,400	3,650	1,400
- Imperfectly to poorly drained soil	3,760	1,200	1,090	1,000	10,550	4,000	15,400	6,200
2. Low Humic Gley Soil	1,260	)	13,790	)	0	)	15,050	)
		)		)		)		)
3. Reddish Brown Earth		) 5,400		) 21,400		) 0		) 26,400
- Imperfectly drained	5,215	)	16,520	)	0	) 0	21,735	)
- Well drained	5,510	0	13,100	0	130	0	18,740	0
- Shallow/rocky phase	0	0	2,130	0	0	0	2,130	0
4. Solonets	0	0	2,620	0	0	0	2,620	0
5. Rock Knob Plain	2,165	0	250	0	370	0	2,785	0
6. Erosion Reminants	0	0	980	0	0	0	980	0
Total	17,910 (7,200 ha)	6,600 (2,700 ha)	50,480 (20,400 ha)	22,400 (9,000 ha)	14,700 (59,500 ha)	5,400 (2,200 ha)	83,090 (33,600 ha)	34,000 (13,900 ha)

Table F.2.2 CROP COEFFICIENT

Crop and Crop Factor	Initial Stage	Crop Development Stage	Mid Stage	Late Stage
Lowland Rice				
(135 days)	30 days	40 days	45 days	20 days
Crop factor	1.00	1.15	1.20	0.90
Lowland Rice				
(115 days)	30 days	30 days	30 days	25 days
Crop factor	1.00	1.15	1.20	0.90
Lowland Rice				
(90 days)	20 days	25 days	30 days	15 days
Crop factor	1.00	1.15	1.20	0.90
Green Gram				
(75 days)	15 days	20 days	25 days	15 days
Crop factor	0.50	0.80	1.05	0.70
Chillies				
(150 days)	25 days	25 days	75 days	25 days
Crop factor	0.65	0.85	1.00	0.90
Ground Nuts				
(110 days)	20 days	30 days	40 days	20 days
Crop factor	0.65	0.80	1.00	0.80
Soya Bean				
(105 days)	15 days	20 days	50 days	20 days
Crop factor	0.65	0.85	1.05	0.75
Cowpea				
(90 days)	15 days	25 days	35 days	15 days
Crop factor	0.70	0.90	1.10	1.00
Pulses				
(95 days)	15 days	30 days	35 days	15 days
Crop factor	0.50	0.80	1.05	0.50
Cotton				
(165 days)	25 days	45 days	55 days	40 days
Crop factor	0.65	0.90	1.05	0.90

Table F.2.3 CROP WATER REQUIREMENTS

Unit: Inch

Croping Pattern	Crops	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1. Newland, System D & A/D														
C/P: A	Lowland Rice: Maha	11.55	11.65	5.91						0.88	6.80	9.96	11.09	57.84
	Lowland Rice: Yala				3.50	9.76	13.73	14.85	12.01	1.58				55.43
	Sub-Total	11.55	11.65	5.91	3.50	9.76	13.73	14.85	12.01	2.46	6.80	9.96	11.09	113.27
C/P: B	Lowland Rice: Maha	8.09	8.16	4.14						0.62	4.76	6.97	7.76	40.50
	Lowland Rice: Maha	3.45	3.50	1.89							0.26	1.97	3.10	14.17
	Chillies				3.07	3.77	4.83	5.25	5.00	1.21				23.13
	Pulses				3.44	4.57	3.77							11.78
	Soyabean				2.81	3.73	4.39	2.70						11.63
	Vegetable (1)								3.61	4.83	1.09			9.53
	Vegetable (2)							3.06	4.19	1.13				8.38
	Sub-total	11.54	11.66	6.03	9.32	12.07	12.99	11.01	12.80	7.79	6.11	8.94	10.86	121.12
2. System G														
C/P: A	Lowland Rice: Maha	10.15	3.55						2.34	8.56	12.09	10.90	11.30	58.95
	Lowland Rice: Yala	0.58	4.98	10.68	12.73	13.36	8.69	1.10						52.12
	Green Manure Crop						1.56	8.76	12.00	4.33				26.98
	Sub-total	10.73	8.53	10.68	12.73	13.36	10.25	9.86	14.34	12.89	12.09	10.90	11.30	138.05
C/P: B	Lowland Rice: Maha	10.15	3.55						2.34	8.56	12.09	10.90	11.36	58.95
	Chillies		2.63	3.65	4.13	4.48	4.78	3.73						23.40
	Pulses				3.44	4.57	3.77							11.78
	Oil Crops			2.91	3.43	4.07	2.48							12.99
	Sub-total (inches)	10.15	6.18	6.56	11.00	13.12	11.03	3.73	2.34	8.56	12.09	10.90	11.36	107.02
3. System D														
C/P: C	Sugarcane	9.40	9.30	10.66	9.56	10.12	10.90	12.46	13.68	14.70	12.64	8.94	9.36	131.72

Note: Crop water requirement of upland crops include farm application lossess.

Table F.2.4(1/2) MONTHLY EFFECTIVE RAINFALL FOR PADDY

* MONTHLY EFFECTIVE RAINFALL AT BAKANUHA (ELAHERA) ===== SYSTEM G =====
* UNIT : INCH < LOWLAND PADDY >

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL TOTAL	MAHA OCT-MAR	YALA APR-SEP
1950	3.60	2.84	2.89	0.19	0.59	0.00	0.00	0.00	0.00	1.31	3.44	4.92	19.79	19.01	0.78
1951	9.00	3.11	2.75	2.60	2.86	0.00	0.00	1.44	2.49	3.51	9.00	7.12	43.89	34.51	9.39
1952	9.00	3.82	0.00	4.90	2.23	0.00	0.00	0.00	3.13	1.94	4.27	8.94	38.23	27.97	10.26
1953	7.24	1.86	1.02	9.00	0.00	0.00	0.53	2.11	0.49	7.73	8.45	8.80	47.23	35.09	12.13
1954	9.00	2.85	7.42	5.02	0.00	0.00	0.00	1.46	0.00	4.88	3.24	9.00	42.89	36.41	6.48
1955	9.00	2.35	0.62	4.82	0.28	0.00	0.00	0.01	2.39	0.09	1.84	4.36	25.75	18.25	7.50
1956	4.30	1.32	1.68	1.72	0.00	0.00	0.00	0.00	0.00	0.62	9.00	9.00	27.65	25.93	1.72
1957	5.11	8.30	0.00	0.25	1.02	0.00	0.00	0.00	1.36	9.00	9.00	9.00	43.05	40.42	2.63
1958	3.91	2.35	5.18	2.67	1.84	0.00	0.00	0.00	0.00	0.80	3.02	7.77	27.54	23.02	4.52
1959	1.52	0.02	0.00	2.83	1.70	1.14	0.00	0.00	0.00	4.01	9.00	8.72	28.94	23.27	5.67
1960	6.75	9.00	0.00	9.00	0.00	0.00	1.16	0.00	0.00	1.61	9.00	4.74	41.27	31.11	10.16
1961	6.01	4.27	4.74	1.83	0.00	0.00	0.00	0.00	0.00	3.56	9.00	9.00	38.43	36.60	1.83
1962	8.85	0.29	0.00	6.53	1.84	0.00	0.00	0.39	0.00	4.48	4.54	6.57	33.50	24.74	8.76
1963	9.00	5.12	1.18	9.00	0.01	0.00	0.00	0.00	0.00	2.69	9.00	9.00	45.02	36.00	9.02
1964	6.73	2.44	0.34	4.27	1.45	0.00	3.97	0.00	0.35	6.91	2.24	4.96	33.65	23.62	10.04
1965	2.57	6.62	2.71	6.30	3.14	0.00	0.00	2.49	0.00	6.75	9.00	9.00	48.58	36.65	11.93
1966	9.00	0.00	3.16	2.28	0.00	0.00	0.00	0.00	0.84	8.29	6.91	5.72	36.20	33.08	3.12
1967	0.00	2.48	0.48	3.34	0.00	0.00	0.00	0.00	0.00	9.00	9.00	4.42	28.73	25.39	3.34
1968	3.46	0.00	5.94	0.98	0.00	0.00	0.00	0.00	0.00	5.28	7.36	4.96	27.97	26.99	0.98
1969	5.29	1.73	0.00	3.25	0.00	0.00	0.00	4.40	0.00	5.73	2.92	9.00	32.32	24.67	7.65
1970	9.00	9.00	2.12	2.54	0.00	0.00	0.00	0.00	0.68	2.53	6.94	7.83	40.64	37.43	3.22
1971	5.89	4.21	2.73	5.00	0.14	0.00	0.00	4.09	0.00	0.90	2.96	9.00	34.93	25.69	9.23
1972	0.07	0.00	0.67	4.26	2.18	0.00	0.00	0.00	2.26	9.00	9.00	7.10	34.55	25.86	8.70
1973	0.00	1.86	0.00	0.13	0.00	0.00	0.00	0.00	0.23	4.12	7.76	9.00	23.11	22.75	0.36
1974	0.00	2.00	0.00	2.73	0.00	0.00	0.00	0.23	2.81	0.15	0.00	8.95	16.88	11.10	5.78
1975	2.48	1.35	4.13	1.61	0.54	0.00	2.00	0.00	0.00	0.00	6.60	7.08	25.77	21.63	4.14
1976	3.21	0.59	0.00	2.28	0.00	0.00	0.00	0.00	0.00	3.31	7.70	8.30	25.39	23.11	2.28
1977	2.66	0.00	0.27	0.00	0.44	0.00	0.30	0.07	1.06	6.37	7.77	7.45	26.38	24.52	1.87
MEAN	5.10	2.85	1.79	3.55	0.72	0.04	0.28	0.60	0.65	4.09	6.36	7.49	33.51	27.67	5.84

* MONTHLY EFFECTIVE RAINFALL AT HINGURAKGODA
* MINNERIYA TANK, GIRITALE TANK, KAUDULLA TANK
* UNIT : INCH < LOWLAND PADDY >

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL TOTAL	MAHA OCT-MAR	YALA APR-SEP
1950	2.81	1.81	3.67	0.00	2.69	0.00	0.00	1.92	0.57	1.77	4.53	3.73	23.50	18.32	5.18
1951	9.00	2.12	0.32	3.14	3.34	0.00	0.00	0.17	1.82	1.65	9.00	4.15	34.72	26.25	8.47
1952	9.00	0.80	0.03	2.26	1.76	0.00	0.14	0.00	3.00	2.87	3.67	4.11	27.64	20.48	7.16
1953	5.75	0.59	0.00	6.16	0.00	0.00	5.49	1.19	1.18	7.48	4.42	9.00	41.26	27.25	14.01
1954	6.53	0.23	3.88	4.11	0.00	0.00	1.65	0.23	0.00	4.21	3.67	9.00	33.51	27.52	5.99
1955	6.38	2.61	0.72	4.35	0.62	0.00	0.00	1.76	2.04	1.11	3.50	4.00	27.09	18.33	8.76
1956	3.62	0.54	0.00	1.35	0.00	1.21	0.00	0.06	0.00	5.61	6.88	6.36	25.63	23.01	2.62
1957	2.19	6.06	0.00	0.70	2.30	0.00	1.15	0.30	0.62	4.40	9.00	9.00	35.73	30.66	5.07
1958	5.54	2.32	2.34	1.02	1.13	0.00	0.00	3.47	0.64	2.57	4.97	4.88	28.88	22.63	6.26
1959	3.94	0.00	0.00	2.32	2.33	0.72	0.00	0.00	0.65	6.91	8.53	6.37	31.78	25.75	6.02
1960	6.75	9.00	0.90	4.78	5.32	0.00	3.58	0.11	3.22	4.14	9.00	2.08	48.88	31.88	17.00
1961	9.00	5.05	3.44	2.63	0.94	0.00	0.00	0.00	0.14	6.02	7.42	9.00	43.66	39.95	3.71
1962	4.52	1.28	1.74	2.04	0.70	0.00	0.00	1.78	2.76	3.01	5.13	4.87	27.83	20.55	7.28
1963	9.00	4.48	4.18	2.52	0.00	0.00	1.60	0.00	3.05	2.53	9.00	9.00	45.37	38.20	7.17
1964	3.05	2.87	2.62	0.22	2.34	0.00	2.05	0.00	0.82	4.03	2.46	2.85	23.31	17.88	5.43
1965	1.79	4.09	0.00	5.03	5.27	0.00	0.00	2.53	0.00	9.00	9.00	9.00	45.71	32.89	12.82
1966	3.89	0.00	3.40	2.97	0.00	0.00	0.00	0.76	3.47	9.00	9.00	5.00	37.49	30.30	7.20
1967	0.23	1.77	1.68	1.13	0.49	0.00	0.00	0.00	1.28	8.44	9.00	9.00	33.02	30.12	2.90
1968	3.24	0.00	3.01	0.97	0.00	0.00	0.00	1.58	2.87	4.25	5.38	4.94	26.26	20.83	5.43
1969	1.56	1.00	0.00	3.52	0.00	0.00	2.06	0.92	3.56	8.01	6.74	9.00	36.37	26.32	10.06
1970	2.56	5.27	0.75	4.28	1.54	0.44	0.00	2.38	0.60	0.91	6.85	8.08	33.67	24.43	9.24
1971	5.22	1.80	0.55	5.29	2.49	0.00	0.29	0.90	0.00	1.68	2.83	9.00	30.03	21.07	8.96
1972	1.29	0.00	0.00	2.64	2.95	0.00	0.00	0.00	9.00	7.55	9.00	7.47	39.92	25.32	14.60
1973	0.00	0.86	0.67	0.38	0.75	1.33	5.31	0.00	1.82	3.03	1.82	9.00	24.97	15.38	9.59
1974	0.00	0.84	0.00	2.04	3.73	0.00	0.00	0.00	1.57	0.00	2.38	9.00	19.56	12.22	7.34
1975	3.08	0.84	1.07	3.89	2.83	0.00	4.94	1.17	3.02	0.61	5.66	4.11	31.22	15.38	15.84
1976	0.18	0.00	0.00	3.56	0.00	0.00	0.29	0.60	0.10	1.66	7.75	9.00	23.14	18.59	4.55
1977	1.55	0.29	0.82	0.00	0.19	0.00	0.62	0.37	5.09	8.73	9.00	9.00	35.68	29.41	6.28
MEAN	3.99	2.02	1.28	2.62	1.56	0.13	1.04	0.79	1.89	4.33	6.27	6.79	32.71	24.68	8.03

Table F.2.4(2/2) MONTHLY EFFECTIVE RAINFALL FOR PADDY

* MONTHLY EFFECTIVE RAINFALL AT KANTALAI
* KANTALAI TANK
* UNIT : INCH < LOWLAND PADDY >

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL TOTAL	MAHA OCT-MAR	YALA APR-SEP
1950	1.19	1.46	0.30	0.00	3.92	0.00	0.00	2.18	1.05	2.75	6.41	6.51	25.77	18.62	7.16
1951	9.00	2.14	0.83	3.28	1.11	0.00	0.54	0.09	3.14	1.78	8.36	5.64	35.91	27.76	8.15
1952	9.00	0.20	0.00	3.16	1.19	0.00	0.43	0.00	1.11	0.09	5.53	3.81	24.52	18.63	5.89
1953	6.02	0.98	1.78	7.44	0.00	0.00	7.03	0.00	0.19	3.55	4.05	7.42	38.45	23.80	14.65
1954	7.83	0.74	2.12	2.65	0.00	0.00	0.87	1.85	0.70	4.32	3.32	9.00	33.41	27.34	6.07
1955	8.54	2.95	0.09	7.32	3.32	0.00	0.00	8.65	3.39	2.57	1.35	5.21	43.38	20.71	22.67
1956	3.27	0.65	0.00	2.02	0.00	1.20	1.11	1.19	2.30	6.33	9.00	4.69	31.76	23.95	7.81
1957	2.48	2.84	0.00	0.00	1.09	0.00	1.03	0.00	1.63	6.67	9.00	9.00	33.75	30.00	3.75
1958	1.98	1.17	2.79	2.18	0.00	0.00	0.43	3.80	1.38	3.58	3.06	4.71	25.07	17.29	7.79
1959	3.69	0.00	0.00	1.90	0.00	2.96	0.00	2.95	0.60	4.46	7.99	7.70	32.23	23.83	8.40
1960	5.45	6.86	0.01	4.23	0.81	0.00	4.21	0.00	0.96	2.68	9.00	2.36	36.58	26.36	10.22
1961	9.00	2.50	1.78	0.77	0.40	0.00	0.00	0.00	2.12	6.97	9.00	9.00	41.54	38.26	3.28
1962	6.06	0.80	0.12	2.08	2.00	0.00	0.00	0.25	1.45	2.81	4.65	7.82	28.05	22.26	5.79
1963	9.00	3.63	1.86	3.30	1.66	0.00	0.76	0.00	1.92	3.22	9.00	9.00	43.36	35.72	7.64
1964	2.30	0.18	3.30	0.58	0.00	0.00	2.79	2.57	0.00	5.23	2.84	3.41	23.20	17.26	5.94
1965	1.21	5.82	0.00	4.09	2.50	0.00	0.00	7.29	0.63	6.59	9.00	9.00	46.14	31.63	14.51
1966	5.90	0.58	1.45	3.05	0.00	0.00	0.00	4.92	2.29	9.00	9.00	5.50	41.71	31.44	10.26
1967	0.12	2.28	0.42	1.53	0.05	0.00	0.00	2.42	0.80	8.41	9.00	9.00	34.04	29.24	4.80
1968	3.24	0.00	3.01	2.22	0.00	0.00	0.00	1.58	2.87	2.37	9.00	8.94	33.25	26.57	6.68
1969	2.55	2.64	0.00	2.59	0.00	0.00	2.03	4.05	0.38	6.91	5.94	9.00	36.10	27.04	9.06
1970	3.89	3.87	0.80	2.89	1.88	0.00	0.00	1.10	1.84	2.14	8.74	5.44	32.57	24.87	7.70
1971	3.89	0.00	0.30	0.65	0.57	0.00	1.03	2.27	2.55	2.17	4.13	9.00	26.57	19.50	7.08
1972	0.14	0.33	0.00	0.50	0.98	0.46	0.42	0.00	5.02	7.47	5.93	6.75	28.00	20.62	7.38
1973	0.00	0.22	0.00	0.00	0.74	4.84	1.37	0.37	2.97	6.69	1.07	9.00	27.28	16.98	10.30
1974	0.00	0.61	0.00	2.45	2.45	0.00	1.21	0.29	2.08	0.00	2.35	8.79	20.22	11.75	8.48
1975	0.84	0.07	0.66	0.04	1.68	0.00	1.84	1.79	0.57	1.51	5.57	4.30	18.87	12.96	5.92
1976	0.00	0.00	0.00	1.03	0.00	0.34	1.42	1.36	1.70	2.85	6.44	9.00	24.13	18.30	5.84
1977	0.52	2.85	1.12	0.56	0.56	0.00	0.02	0.37	5.09	8.94	7.97	7.47	35.48	28.88	6.60
MEAN	3.83	1.66	0.81	2.23	0.96	0.35	1.02	1.83	1.81	4.36	6.31	7.02	32.19	23.98	8.21

* MONTHLY EFFECTIVE RAINFALL AT POLONNARUWA
* PARAKRAMA SAMUDRA TANK
* UNIT : INCH < LOWLAND PADDY >

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL TOTAL	MAHA OCT-MAR	YALA APR-SEP
1950	2.87	0.68	3.79	0.00	0.96	0.00	0.00	1.50	0.00	2.43	3.86	4.04	20.13	17.67	2.46
1951	9.00	2.20	1.32	2.89	0.00	0.00	0.79	0.42	3.23	0.97	9.00	6.32	36.15	28.82	7.33
1952	9.00	2.69	0.56	2.85	1.89	0.00	0.72	0.00	2.11	4.05	4.23	5.32	33.43	25.86	7.57
1953	5.24	1.69	1.26	4.99	0.00	1.28	3.85	0.28	2.84	6.34	5.79	9.00	42.57	29.32	13.25
1954	7.16	1.90	4.91	2.30	0.00	0.00	1.73	1.04	0.00	4.60	4.19	9.00	36.84	31.77	5.07
1955	6.21	2.12	0.15	2.70	0.50	0.00	0.00	2.87	3.93	3.67	2.04	3.22	27.40	17.40	10.00
1956	2.64	1.01	0.90	2.10	0.00	2.26	0.00	0.78	0.00	5.24	7.56	7.26	29.75	24.62	5.14
1957	2.30	7.65	0.00	1.21	2.69	0.00	1.49	0.00	0.00	4.03	9.00	9.00	37.38	32.00	5.38
1958	4.40	1.74	2.06	1.47	0.92	0.00	0.00	3.54	0.15	4.92	5.31	9.00	33.53	27.44	6.09
1959	6.40	0.00	0.00	1.88	0.10	0.00	0.00	0.12	0.00	9.00	8.26	6.14	31.90	29.80	2.10
1960	6.58	9.00	1.57	7.42	3.66	0.00	3.03	0.00	0.32	2.00	6.31	2.73	42.63	28.19	14.43
1961	9.00	6.18	2.06	2.38	3.04	0.00	0.00	0.00	0.00	3.14	8.53	9.00	43.35	37.93	5.42
1962	4.80	1.06	1.23	1.86	1.34	0.00	0.00	0.05	2.68	3.79	4.75	5.19	26.74	20.82	5.92
1963	9.00	6.12	2.01	5.05	0.37	0.00	0.59	0.00	2.87	4.29	9.00	9.00	48.31	39.44	8.88
1964	3.62	5.15	6.07	1.42	0.34	0.00	2.06	0.56	1.25	1.63	3.21	3.42	28.74	23.10	5.63
1965	2.11	9.00	0.00	4.13	3.52	0.00	0.00	3.34	0.00	5.70	9.00	9.00	45.80	34.82	10.98
1966	5.71	0.00	3.59	5.65	0.00	0.00	0.00	2.49	0.70	9.00	9.00	6.08	42.23	33.39	8.84
1967	1.06	2.58	0.72	1.64	0.00	0.00	0.00	0.00	0.00	6.18	9.00	9.00	30.20	28.56	1.64
1968	2.87	0.00	2.55	1.93	0.00	0.00	0.00	0.00	0.19	4.33	7.61	4.95	24.42	22.30	2.12
1969	2.26	0.44	0.07	6.48	0.00	0.00	1.88	1.63	0.23	6.45	2.21	9.00	30.66	20.44	10.22
1970	4.07	7.32	0.00	4.52	2.96	1.84	0.00	2.06	0.27	5.13	9.00	7.95	45.12	33.47	11.65
1971	3.98	2.01	3.56	3.77	0.13	0.00	3.26	6.79	0.00	4.61	4.08	9.00	41.18	27.25	13.94
1972	0.39	0.00	0.00	2.97	2.82	0.00	0.00	0.00	9.00	9.00	9.00	9.00	42.20	27.40	14.80
1973	0.00	2.41	0.50	0.30	1.68	1.07	8.51	0.51	9.00	4.18	9.00	9.00	46.18	25.10	21.07
1974	0.00	0.79	0.20	3.15	1.06	0.00	0.00	0.00	3.32	0.00	4.38	5.57	18.47	10.95	7.52
1975	3.24	3.92	4.71	4.38	2.30	0.00	9.00	1.88	0.00	4.87	6.86	9.00	50.18	32.60	17.57
1976	5.40	0.00	0.00	0.88	0.00	0.51	0.00	1.41	2.11	2.66	9.00	9.00	30.98	26.07	4.91
1977	3.39	0.64	3.16	4.36	2.53	0.00	3.71	1.53	3.41	6.22	9.00	9.00	46.96	31.42	15.54
MEAN	4.38	2.80	1.68	3.02	1.17	0.25	1.45	1.17	1.70	4.59	6.72	7.26	36.19	27.43	8.77

Table F.2.5(1/3) EFFECTIVE RAINFALL FOR UPLAND CROPS

* MONTHLY EFFECTIVE RAINFALL AT DAKAMUNA (ELAHERA) ===== SYSTEM G =====
* UNIT : INCH < UPLAND CROPS >

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL TOTAL	MAHA OCT-MAR	YALA APR-SEP
1950	0.00	2.62	3.46	0.84	1.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.33	6.08	2.25
1951	0.00	2.82	3.32	3.17	3.95	0.27	0.33	0.00	0.00	0.00	0.00	0.00	13.87	6.14	7.73
1952	0.00	3.35	0.62	5.41	3.25	0.00	0.51	0.00	0.00	0.00	0.00	0.00	13.13	3.97	9.17
1953	0.00	1.89	1.64	9.74	0.00	0.05	1.25	0.00	0.00	0.00	0.00	0.00	14.56	3.52	11.04
1954	0.00	2.63	7.85	5.52	0.00	0.00	0.69	0.00	0.00	0.00	0.00	0.00	16.69	10.48	6.21
1955	0.00	2.25	1.25	5.33	1.07	0.00	0.13	0.00	0.00	0.00	0.00	0.00	10.03	3.50	6.52
1956	0.00	1.49	2.28	2.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.09	3.77	2.32
1957	0.00	6.70	0.00	0.89	1.89	0.00	0.42	0.00	0.00	0.00	0.00	0.00	9.90	6.70	3.20
1958	0.00	2.25	5.67	3.24	2.81	0.00	0.06	0.00	0.00	0.00	0.00	0.00	14.04	7.92	6.11
1959	0.00	0.52	0.29	3.40	2.66	2.16	0.18	0.00	0.00	0.00	0.00	0.00	9.20	0.81	8.39
1960	0.00	11.78	0.09	10.24	0.51	0.00	1.91	0.00	0.00	0.00	0.00	0.00	24.52	11.87	12.66
1961	0.00	3.69	5.25	2.42	0.68	0.10	0.03	0.00	0.00	0.00	0.00	0.00	12.17	8.94	3.22
1962	0.00	0.72	0.61	6.98	2.81	0.00	0.03	0.00	0.00	0.00	0.00	0.00	11.15	1.33	9.82
1963	0.00	4.32	1.79	9.91	0.77	0.02	0.20	0.00	0.00	0.00	0.00	0.00	17.01	6.11	10.89
1964	0.00	2.32	0.98	4.79	2.37	0.00	4.85	0.00	0.00	0.00	0.00	0.00	15.31	3.30	12.01
1965	0.00	5.44	3.28	6.77	4.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.75	8.72	11.03
1966	0.00	0.41	3.72	2.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.99	4.13	2.86
1967	0.00	2.35	1.12	3.89	0.29	0.77	0.00	0.00	0.00	0.00	0.00	0.00	8.41	3.47	4.94
1968	0.00	0.00	6.42	1.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.01	6.42	1.60
1969	0.00	1.79	0.41	3.80	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.07	2.20	3.87
1970	0.00	11.81	2.71	3.11	0.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.27	14.52	3.75
1971	0.00	3.65	3.30	5.50	0.91	0.12	0.00	0.00	0.00	0.00	0.00	0.00	13.47	6.94	6.53
1972	0.00	0.00	1.30	4.78	3.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.27	1.30	7.97
1973	0.00	1.89	0.03	0.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.69	1.92	0.77
1974	0.00	2.00	0.00	3.30	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.45	2.00	3.45
1975	0.00	1.51	4.65	2.21	1.35	0.20	2.79	0.00	0.00	0.00	0.00	0.00	12.71	6.16	6.55
1976	0.00	0.94	0.27	2.87	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.00	4.29	1.21	3.08
1977	0.00	0.22	0.91	0.53	1.25	0.00	1.02	0.00	0.00	0.00	0.00	0.00	3.92	1.13	2.79
MEAN	0.00	2.90	2.26	4.15	1.30	0.13	0.52	0.00	0.00	0.00	0.00	0.00	11.26	5.16	6.10

* MONTHLY EFFECTIVE RAINFALL AT HINGURAKGODA
* MINNERIYA TANK, GIRITALE TANK, KAUDULLA TANK
* UNIT : INCH < UPLAND CROPS >

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL TOTAL	MAHA OCT-MAR	YALA APR-SEP
1950	0.00	0.00	0.00	0.48	3.77	0.00	0.15	2.90	1.20	0.00	0.00	0.00	8.50	0.00	8.50
1951	0.00	0.00	0.00	3.69	4.49	0.18	0.22	0.94	2.42	0.00	0.00	0.00	11.95	0.00	11.95
1952	0.00	0.00	0.00	2.85	2.72	0.02	0.85	0.00	3.56	0.00	0.00	0.00	9.99	0.00	9.99
1953	0.00	0.00	0.00	6.62	0.05	0.05	6.43	2.08	1.79	0.00	0.00	0.00	17.03	0.00	17.03
1954	0.00	0.00	0.00	4.64	0.04	0.00	2.42	1.01	0.00	0.00	0.00	0.00	8.11	0.00	8.11
1955	0.00	0.00	0.00	4.87	1.45	0.00	0.03	2.72	2.63	0.00	0.00	0.00	11.69	0.00	11.69
1956	0.00	0.00	0.00	1.96	0.04	2.25	0.02	0.82	0.02	0.00	0.00	0.00	5.10	0.00	5.10
1957	0.00	0.00	0.00	1.33	3.32	0.13	1.90	1.09	1.25	0.00	0.00	0.00	9.02	0.00	9.02
1958	0.00	0.00	0.00	1.64	2.02	0.02	0.30	4.64	1.27	0.00	0.00	0.00	9.88	0.00	9.88
1959	0.00	0.00	0.00	2.91	3.36	1.66	0.09	0.39	1.28	0.00	0.00	0.00	9.68	0.00	9.68
1960	0.00	0.00	0.00	5.28	6.71	0.08	4.44	0.87	3.77	0.00	0.00	0.00	21.15	0.00	21.15
1961	0.00	0.00	0.00	3.20	1.81	0.33	0.19	0.04	0.79	0.00	0.00	0.00	6.35	0.00	6.35
1962	0.00	0.00	0.00	2.63	1.53	0.00	0.00	2.75	3.33	0.00	0.00	0.00	10.23	0.00	10.23
1963	0.00	0.00	0.00	3.09	0.48	0.00	2.37	0.62	3.61	0.00	0.00	0.00	10.18	0.00	10.18
1964	0.00	0.00	0.00	0.86	3.37	0.00	2.84	0.47	1.45	0.00	0.00	0.00	8.99	0.00	8.99
1965	0.00	0.00	0.00	5.53	6.65	0.00	0.27	3.58	0.00	0.00	0.00	0.00	16.02	0.00	16.02
1966	0.00	0.00	0.00	3.53	0.06	0.02	0.11	1.60	4.02	0.00	0.00	0.00	9.33	0.00	9.33
1967	0.00	0.00	0.00	1.75	1.30	0.15	0.04	0.30	1.89	0.00	0.00	0.00	5.43	0.00	5.43
1968	0.00	0.00	0.00	1.59	0.35	0.00	0.00	2.52	3.44	0.00	0.00	0.00	7.90	0.00	7.90
1969	0.00	0.00	0.00	4.06	0.48	0.00	2.85	1.78	4.11	0.00	0.00	0.00	13.28	0.00	13.28
1970	0.00	0.00	0.00	4.80	2.48	1.32	0.01	3.41	1.24	0.00	0.00	0.00	13.26	0.00	13.26
1971	0.00	0.00	0.00	5.78	3.53	0.38	1.00	1.76	0.65	0.00	0.00	0.00	13.09	0.00	13.09
1972	0.00	0.00	0.00	3.21	4.06	0.00	0.00	0.01	9.44	0.00	0.00	0.00	16.72	0.00	16.72
1973	0.00	0.00	0.00	1.01	1.59	2.39	6.25	0.38	2.42	0.00	0.00	0.00	14.04	0.00	14.04
1974	0.00	0.00	0.00	2.63	4.92	0.00	0.00	0.10	2.18	0.00	0.00	0.00	9.83	0.00	9.83
1975	0.00	0.00	0.00	4.42	3.92	0.00	5.87	2.06	3.58	0.00	0.00	0.00	19.83	0.00	19.83
1976	0.00	0.00	0.00	4.10	0.47	0.00	1.00	1.43	0.75	0.00	0.00	0.00	7.74	0.00	7.74
1977	0.00	0.00	0.00	0.55	0.97	0.00	1.35	1.16	5.59	0.00	0.00	0.00	9.62	0.00	9.62
MEAN	0.00	0.00	0.00	3.18	2.35	0.32	1.47	1.48	2.42	0.00	0.00	0.00	11.21	0.00	11.21

Table F.2.5(2/3) EFFECTIVE RAINFALL FOR UPLAND CROPS

* MONTHLY EFFECTIVE RAINFALL AT KANTALAI
* KANTALAI TANK
* UNIT : INCH < SUGAR CANE >

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL TOTAL	MAHA OCT-MAR	YALA APR-SEP
1950	1.67	2.07	1.02	0.39	4.45	0.00	0.00	3.20	2.06	3.32	4.23	3.21	25.60	15.51	10.09
1951	11.27	2.73	1.57	3.84	1.72	0.00	1.26	0.85	4.54	2.37	5.39	2.83	38.37	26.16	12.21
1952	9.97	0.85	0.04	3.72	1.80	0.00	1.15	0.00	2.13	0.74	3.70	2.00	26.09	17.29	8.79
1953	5.99	1.60	2.56	7.87	0.00	0.33	8.04	0.68	1.02	4.10	2.82	3.62	38.62	20.68	17.94
1954	7.61	1.37	2.92	3.22	0.40	0.00	1.61	2.82	1.63	4.84	2.38	7.49	36.29	26.61	9.68
1955	8.25	3.52	0.79	7.75	3.87	0.00	0.35	10.43	4.85	3.14	1.21	2.63	46.78	19.54	27.25
1956	3.53	1.28	0.11	2.61	0.08	2.23	1.86	2.08	3.54	6.79	6.16	2.40	32.66	20.26	12.40
1957	2.82	3.41	0.04	0.20	1.70	0.06	1.78	0.66	2.75	7.12	8.06	11.39	40.00	32.84	7.16
1958	2.38	1.79	3.61	2.76	0.30	0.00	1.15	5.00	2.45	4.12	2.22	2.41	28.19	16.53	11.66
1959	3.90	0.42	0.15	2.49	0.27	4.34	0.00	4.05	1.51	4.97	5.17	3.75	31.03	18.37	12.66
1960	5.48	7.31	0.71	4.76	1.44	0.00	5.10	0.00	1.95	3.25	7.17	1.36	38.51	25.27	13.24
1961	9.71	3.07	2.56	1.40	1.03	0.13	0.41	0.06	3.33	7.41	6.96	6.76	42.83	36.47	6.36
1962	6.02	1.42	0.83	2.67	2.59	0.00	0.49	1.04	2.54	3.38	3.18	3.80	27.95	18.63	9.32
1963	8.66	4.17	2.64	3.85	2.26	0.00	1.50	0.74	3.09	3.78	10.48	5.92	47.09	35.65	11.45
1964	2.66	0.83	4.14	1.21	0.26	0.00	3.62	3.63	0.28	5.72	2.10	1.83	26.27	17.28	9.00
1965	1.69	6.30	0.65	4.62	3.07	0.19	0.00	8.91	1.55	7.04	6.33	8.38	48.74	30.39	18.35
1966	5.89	1.21	2.22	3.61	0.00	0.00	0.20	6.26	3.54	10.56	6.56	2.76	42.80	29.20	13.60
1967	0.71	2.86	1.14	2.13	0.70	0.00	0.00	3.46	1.76	8.81	7.68	5.54	34.79	26.74	8.05
1968	3.50	0.07	3.84	2.81	0.65	0.08	0.00	2.52	4.23	2.94	6.01	4.31	30.97	20.68	10.29
1969	2.88	3.21	0.00	3.17	0.55	0.00	2.82	5.29	1.26	7.35	3.95	6.11	36.58	23.50	13.08
1970	4.08	4.40	1.53	3.45	2.47	0.33	0.02	1.98	2.99	2.72	5.62	2.74	32.34	21.09	11.24
1971	4.09	0.34	1.02	1.28	1.20	0.02	1.78	3.29	3.85	2.76	2.86	7.52	30.02	18.59	11.43
1972	0.73	0.97	0.55	1.14	1.60	1.34	1.14	0.00	6.79	7.90	3.94	3.32	29.42	17.40	12.01
1973	0.45	0.86	0.20	0.16	1.37	6.58	2.14	1.16	4.35	7.14	1.04	6.10	31.55	15.79	15.76
1974	0.00	1.24	0.06	3.02	3.02	0.00	1.96	1.08	3.29	0.62	1.80	4.24	20.32	7.95	12.37
1975	1.36	0.72	1.39	0.69	2.28	0.00	2.62	2.75	1.48	2.11	3.73	2.23	21.35	11.53	9.82
1976	0.51	0.08	0.05	1.64	0.00	1.20	2.18	2.27	2.82	3.42	4.24	4.68	23.11	12.98	10.13
1977	1.06	3.42	1.87	1.19	1.20	0.07	0.72	1.16	6.88	9.33	5.16	3.65	35.70	24.48	11.22
MEAN	4.17	2.20	1.36	2.77	1.44	0.60	1.57	2.69	2.95	4.92	4.65	4.39	33.71	21.69	12.02

* MONTHLY EFFECTIVE RAINFALL AT KANTALAI
* KANTALAI TANK
* UNIT : INCH < UPLAND CROPS >

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL TOTAL	MAHA OCT-MAR	YALA APR-SEP
1950	0.00	0.00	0.00	0.39	5.14	0.00	0.00	3.20	1.67	0.00	0.00	0.00	10.39	0.00	10.39
1951	0.00	0.00	0.00	3.84	1.99	0.00	1.26	0.85	3.69	0.00	0.00	0.00	11.62	0.00	11.62
1952	0.00	0.00	0.00	3.72	2.08	0.00	1.15	0.00	1.73	0.00	0.00	0.00	8.67	0.00	8.67
1953	0.00	0.00	0.00	7.87	0.00	0.33	8.04	0.68	0.83	0.00	0.00	0.00	17.74	0.00	17.74
1954	0.00	0.00	0.00	3.22	0.46	0.00	1.61	2.82	1.33	0.00	0.00	0.00	9.44	0.00	9.44
1955	0.00	0.00	0.00	7.75	4.46	0.00	0.35	10.43	3.94	0.00	0.00	0.00	26.93	0.00	26.93
1956	0.00	0.00	0.00	2.61	0.09	2.23	1.86	2.08	2.88	0.00	0.00	0.00	11.75	0.00	11.75
1957	0.00	0.00	0.00	0.20	1.97	0.06	1.78	0.66	2.24	0.00	0.00	0.00	6.90	0.00	6.90
1958	0.00	0.00	0.00	2.76	0.35	0.00	1.15	5.00	1.99	0.00	0.00	0.00	11.25	0.00	11.25
1959	0.00	0.00	0.00	2.49	0.32	4.34	0.00	4.05	1.23	0.00	0.00	0.00	12.42	0.00	12.42
1960	0.00	0.00	0.00	4.76	1.66	0.00	5.10	0.00	1.59	0.00	0.00	0.00	13.10	0.00	13.10
1961	0.00	0.00	0.00	1.40	1.19	0.13	0.41	0.06	2.70	0.00	0.00	0.00	5.90	0.00	5.90
1962	0.00	0.00	0.00	2.67	2.99	0.00	0.49	1.04	2.06	0.00	0.00	0.00	9.24	0.00	9.24
1963	0.00	0.00	0.00	3.85	2.61	0.00	1.50	0.74	2.51	0.00	0.00	0.00	11.21	0.00	11.21
1964	0.00	0.00	0.00	1.21	0.30	0.00	3.62	3.63	0.23	0.00	0.00	0.00	8.99	0.00	8.99
1965	0.00	0.00	0.00	4.62	3.55	0.19	0.00	8.91	1.26	0.00	0.00	0.00	18.53	0.00	18.53
1966	0.00	0.00	0.00	3.61	0.00	0.00	0.20	6.26	2.87	0.00	0.00	0.00	12.94	0.00	12.94
1967	0.00	0.00	0.00	2.13	0.81	0.00	0.00	3.46	1.43	0.00	0.00	0.00	7.83	0.00	7.83
1968	0.00	0.00	0.00	2.81	0.75	0.08	0.00	2.52	3.44	0.00	0.00	0.00	9.60	0.00	9.60
1969	0.00	0.00	0.00	3.17	0.64	0.00	2.82	5.29	1.02	0.00	0.00	0.00	12.93	0.00	12.93
1970	0.00	0.00	0.00	3.45	2.85	0.33	0.02	1.98	2.43	0.00	0.00	0.00	11.06	0.00	11.06
1971	0.00	0.00	0.00	1.28	1.39	0.02	1.78	3.29	3.13	0.00	0.00	0.00	10.89	0.00	10.89
1972	0.00	0.00	0.00	1.14	1.85	1.34	1.14	0.00	5.52	0.00	0.00	0.00	10.99	0.00	10.99
1973	0.00	0.00	0.00	0.16	1.58	6.58	2.14	1.16	3.54	0.00	0.00	0.00	15.16	0.00	15.16
1974	0.00	0.00	0.00	3.02	3.49	0.00	1.96	1.08	2.67	0.00	0.00	0.00	12.22	0.00	12.22
1975	0.00	0.00	0.00	0.69	2.63	0.00	2.62	2.75	1.20	0.00	0.00	0.00	9.89	0.00	9.89
1976	0.00	0.00	0.00	1.64	0.00	1.20	2.18	2.27	2.29	0.00	0.00	0.00	9.60	0.00	9.60
1977	0.00	0.00	0.00	1.19	1.38	0.07	0.72	1.16	5.59	0.00	0.00	0.00	10.12	0.00	10.12
MEAN	0.00	0.00	0.00	2.77	1.66	0.60	1.57	2.69	2.39	0.00	0.00	0.00	11.69	0.00	11.69

Table F.2.5(3/3) EFFECTIVE RAINFALL FOR UPLAND CROPS

* MONTHLY EFFECTIVE RAINFALL AT POLONNARUWA
* PARAKRAMA SAMUDRA TANK
* UNIT : INCH < UPLAND CROPS >

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL TOTAL	MAHA OCT-MAR	YALA APR-SEP
1950	0.00	0.00	0.00	0.36	1.82	0.00	0.00	2.43	0.46	0.00	0.00	0.00	5.07	0.00	5.07
1951	0.00	0.00	0.00	3.45	0.41	0.00	1.53	1.22	3.78	0.00	0.00	0.00	10.39	0.00	10.39
1952	0.00	0.00	0.00	3.41	2.87	0.00	1.46	0.00	2.70	0.00	0.00	0.00	10.43	0.00	10.43
1953	0.00	0.00	0.00	5.49	0.00	2.33	4.73	1.07	3.41	0.00	0.00	0.00	17.02	0.00	17.02
1954	0.00	0.00	0.00	2.88	0.00	0.00	2.51	1.91	0.00	0.00	0.00	0.00	7.30	0.00	7.30
1955	0.00	0.00	0.00	3.27	1.31	0.00	0.00	3.96	4.46	0.00	0.00	0.00	13.00	0.00	13.00
1956	0.00	0.00	0.00	2.68	0.02	3.50	0.34	1.63	0.11	0.00	0.00	0.00	8.27	0.00	8.27
1957	0.00	0.00	0.00	1.82	3.76	0.07	2.25	0.53	0.38	0.00	0.00	0.00	8.81	0.00	8.81
1958	0.00	0.00	0.00	2.08	1.78	0.00	0.00	4.72	0.80	0.00	0.00	0.00	9.37	0.00	9.37
1959	0.00	0.00	0.00	2.47	0.86	0.68	0.00	0.89	0.44	0.00	0.00	0.00	5.34	0.00	5.34
1960	0.00	0.00	0.00	7.85	4.85	0.00	3.86	0.71	0.96	0.00	0.00	0.00	18.23	0.00	18.23
1961	0.00	0.00	0.00	2.96	4.16	0.22	0.00	0.00	0.23	0.00	0.00	0.00	7.56	0.00	7.56
1962	0.00	0.00	0.00	2.45	2.25	0.00	0.13	0.80	3.25	0.00	0.00	0.00	8.89	0.00	8.89
1963	0.00	0.00	0.00	5.55	1.16	0.06	1.32	0.15	3.43	0.00	0.00	0.00	11.67	0.00	11.67
1964	0.00	0.00	0.00	2.03	1.13	0.00	2.86	1.37	1.87	0.00	0.00	0.00	9.25	0.00	9.25
1965	0.00	0.00	0.00	4.65	4.69	0.68	0.00	4.49	0.01	0.00	0.00	0.00	14.52	0.00	14.52
1966	0.00	0.00	0.00	6.14	0.08	0.08	0.15	3.53	1.33	0.00	0.00	0.00	11.30	0.00	11.30
1967	0.00	0.00	0.00	2.24	0.32	0.00	0.00	0.02	0.38	0.00	0.00	0.00	2.97	0.00	2.97
1968	0.00	0.00	0.00	2.52	0.04	0.00	0.00	0.12	0.83	0.00	0.00	0.00	3.51	0.00	3.51
1969	0.00	0.00	0.00	6.94	0.00	0.00	2.66	2.58	0.88	0.00	0.00	0.00	13.05	0.00	13.05
1970	0.00	0.00	0.00	5.04	4.07	3.00	0.00	3.05	0.91	0.00	0.00	0.00	16.07	0.00	16.07
1971	0.00	0.00	0.00	4.30	0.89	0.00	4.10	8.35	0.07	0.00	0.00	0.00	17.71	0.00	17.71
1972	0.00	0.00	0.00	3.54	3.91	0.00	0.32	0.02	10.42	0.00	0.00	0.00	18.20	0.00	18.20
1973	0.00	0.00	0.00	0.94	2.63	2.08	9.59	1.32	9.78	0.00	0.00	0.00	26.34	0.00	26.34
1974	0.00	0.00	0.00	3.71	1.94	0.00	0.00	0.02	3.87	0.00	0.00	0.00	9.53	0.00	9.53
1975	0.00	0.00	0.00	4.90	3.33	0.00	14.00	2.86	0.00	0.00	0.00	0.00	25.09	0.00	25.09
1976	0.00	0.00	0.00	1.51	0.00	1.41	0.48	2.33	2.70	0.00	0.00	0.00	8.41	0.00	8.41
1977	0.00	0.00	0.00	4.88	3.59	0.15	4.57	2.47	3.96	0.00	0.00	0.00	19.62	0.00	19.62
MEAN	0.00	0.00	0.00	3.57	1.85	0.51	2.03	1.88	2.19	0.00	0.00	0.00	12.03	0.00	12.03

Table F.2.6 IRRIGATION AREA

	Existing Area			Newland		
	P-A	P-B	Total	P-A	P-B	Total
Parakrama Samudra	20,000	5,000	25,000	4,320	1,080	5,400
Minneriya Tank	18,400	4,600	23,000	-	-	-
Giritale Tank	6,000	1,500	7,500	-	-	-
Kaudulla Tank	10,880	2,720	13,600	17,920	4,480	22,400
Kantalai Tank	14,080	3,520	17,600	5,280	1,320	6,600
Kantalai (Sugar Coop.)			17,900			-
Elabera			14,800			-

Table F.2.7(1/5) TANK-WISE DIVERSION REQUIREMENTS

PARAKRAMA SAMUDRA TANK (Unit: ac.ft)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual Total	Remarks
1950	31,312	39,824	7,722	13,476	31,616	49,309	51,011	36,176	12,039	14,531	21,463	25,354	333,833	
51	9,120	34,352	16,781	3,465	36,358	49,309	46,634	41,040	0	19,699	2,675	17,145	276,578	
52	9,120	32,528	19,517	3,670	27,482	49,309	46,756	44,080	2,250	8,756	19,943	20,794	284,205	
53	22,800	36,176	16,842	0	36,966	44,992	33,014	41,770	243	1,459	14,470	7,418	256,150	
54	15,808	35,264	3,708	6,323	36,966	49,309	42,256	38,365	12,707	6,627	20,247	7,418	274,998	
55	19,456	34,656	21,037	4,438	33,622	49,309	51,011	25,797	0	9,971	27,847	24,394	301,538	
56	32,224	38,608	18,301	6,992	36,905	40,235	50,524	39,520	12,525	4,621	8,026	13,801	302,286	
57	33,440	14,592	21,402	10,700	24,781	49,187	43,351	43,290	12,160	8,756	2,675	7,418	271,752	
58	25,840	35,872	14,045	9,546	31,677	49,309	51,011	26,995	10,944	5,411	15,990	7,418	284,058	
59	18,544	42,256	21,402	7,783	35,446	48,336	51,011	42,499	12,039	0	5,350	17,754	302,420	
60	17,936	9,728	15,868	0	19,456	49,309	36,662	43,047	10,093	16,051	12,343	30,218	260,711	
61	9,120	19,760	14,045	5,655	22,192	49,005	51,011	44,080	12,343	12,039	4,438	7,418	251,106	
62	24,320	38,304	17,085	8,086	29,792	49,309	50,828	42,864	486	9,667	18,118	21,158	310,017	
63	9,120	20,064	14,105	0	34,291	49,187	47,424	43,837	243	7,843	2,675	7,418	236,207	
64	28,819	23,4	0	9,910	34,352	49,309	40,796	40,371	5,898	17,510	23,590	27,542	301,565	
65	34,048	9,728	21,402	0	19,943	48,336	51,011	27,847	12,707	3,188	2,675	7,418	238,808	
66	21,219	42,256	8,573	0	36,845	49,187	50,848	31,616	8,390	0	2,675	18,058	269,667	
67	38,000	32,832	18,908	8,876	36,480	49,309	51,011	44,020	12,160	1,702	2,675	6,318	302,291	
68	31,312	42,256	12,282	7,727	36,905	49,309	51,011	43,898	10,883	7,539	7,783	22,010	322,915	
69	33,744	40,736	21,341	0	36,966	49,309	41,830	35,690	10,761	973	27,238	7,418	306,006	
70	27,056	15,808	21,402	0	22,557	39,580	51,011	33,805	10,457	4,864	2,675	11,126	240,689	
71	27,360	34,960	8,573	547	35,446	49,309	35,568	15,078	12,586	6,627	20,550	7,418	254,022	
72	40,432	42,256	21,402	3,101	23,287	49,309	50,585	44,020	0	0	2,675	7,418	284,485	
73	41,952	33,440	19,578	14,653	28,272	43,107	18,483	40,675	0	8,147	2,675	7,418	258,400	
74	41,952	39,277	20,733	2,371	31,251	49,309	51,011	44,020	0	23,347	19,334	19,881	342,486	
75	30,096	27,968	4,378	0	25,536	49,309	17,024	34,534	12,707	5,716	10,518	7,418	225,204	
76	22,192	42,256	21,402	12,099	36,966	45,783	50,342	36,541	2,250	13,619	2,675	7,418	293,543	
77	24,788	39,824	10,093	0	24,441	49,066	33,684	36,115	0	1,702	2,675	7,418	229,806	
Mean	25,755	32,109	15,426	4,979	32,259	48,034	44,526	37,914	6,671	7,870	10,953	13,550	279,134	

MINNERIYA TANK (Unit: ac.ft)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual Total	Remarks
1950	23,920	26,910	6,256	12,328	17,940	37,306	38,456	25,898	6,854	12,834	14,398	20,102	243,202	
51	6,900	26,220	15,456	1,794	15,686	37,076	38,364	31,924	2,760	13,064	2,024	8,952	200,220	
52	6,900	29,670	16,146	4,738	21,114	37,260	37,306	33,350	46	9,844	16,698	18,952	232,024	
53	15,870	30,360	16,192	0	27,922	37,260	20,608	28,474	4,738	0	14,628	5,612	201,664	
54	13,800	31,280	5,612	0	27,922	37,246	32,246	31,694	9,614	6,164	16,698	5,612	217,948	
55	14,260	24,840	14,306	0	25,070	37,306	38,594	26,496	1,978	14,674	17,158	19,228	233,910	
56	21,804	30,360	16,192	7,728	27,922	32,062	38,594	32,246	9,568	2,576	7,958	12,788	239,798	
57	25,714	15,410	16,192	9,706	19,366	37,168	33,948	31,602	6,624	5,658	2,024	5,612	209,024	
58	16,514	25,530	9,936	8,832	23,368	37,260	38,272	20,700	6,578	10,534	13,018	16,882	227,424	
59	20,930	31,970	16,192	4,508	19,320	33,810	38,502	32,890	6,578	0	3,358	12,742	220,800	
60	13,110	7,360	13,846	0	9,752	37,214	25,806	32,200	0	6,348	2,024	24,518	172,178	
61	6,900	18,170	6,762	3,450	23,966	36,938	38,410	33,304	8,464	1,656	6,348	5,612	189,980	
62	19,320	28,520	11,546	5,336	24,794	37,306	38,594	27,048	276	9,384	12,742	16,882	231,748	
63	6,900	19,596	4,876	3,910	27,416	37,306	32,522	32,660	0	10,764	2,024	5,612	183,586	
64	23,230	24,150	9,062	11,316	19,136	37,306	31,050	32,798	5,842	6,624	19,918	22,402	242,834	
65	26,680	20,700	16,192	0	9,936	37,260	38,318	23,874	9,614	0	2,024	5,612	190,210	
66	20,930	31,970	6,946	2,346	27,876	37,260	38,502	29,900	0	0	2,024	16,652	214,406	
67	31,050	27,140	11,592	8,326	25,438	37,122	38,548	32,982	4,416	0	2,024	5,612	224,250	
68	22,770	31,970	8,096	8,878	27,600	37,306	38,594	27,048	138	5,934	12,052	16,652	237,038	
69	27,370	29,210	16,192	644	27,416	37,306	30,866	29,348	0	0	8,188	5,612	212,152	
70	24,610	17,480	14,122	0	21,942	34,730	38,594	24,426	6,624	15,134	7,958	8,142	213,762	
71	17,250	26,956	14,766	0	18,768	36,892	36,938	29,394	8,878	13,064	18,998	5,612	227,516	
72	28,060	31,970	16,192	3,450	17,066	37,306	38,594	33,304	0	0	2,024	9,752	217,718	
73	31,740	29,670	14,352	10,810	24,564	31,740	20,976	32,936	2,760	9,384	21,758	5,612	236,302	
74	31,740	29,673	16,192	5,336	14,490	37,306	38,594	33,212	3,588	17,664	20,148	5,612	253,555	
75	23,230	29,670	13,386	276	17,618	37,306	21,712	28,520	322	16,054	11,178	5,612	204,884	
76	31,050	31,970	16,192	598	27,464	37,306	36,938	30,498	8,556	13,064	5,428	5,612	244,676	
77	27,370	31,050	14,076	12,236	26,542	37,306	35,834	31,326	0	0	2,024	5,612	223,376	
Mean	19,734	26,421	12,745	4,520	22,051	36,642	34,796	30,002	4,101	7,158	9,530	10,629	219,507	

Table F.2.7(2/5) TANK-WISE DIVERSION REQUIREMENTS

GIRITALE TANK

(Unit: ac.ft)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual Total	Remarks
1950	7,800	8,775	2,040	4,020	5,850	12,165	12,540	8,445	2,235	4,185	4,695	6,555	79,305	
51	2,250	8,550	5,040	585	5,115	12,090	12,510	10,410	900	4,260	660	6,180	68,550	
52	2,250	9,675	5,265	1,545	6,885	12,150	12,165	10,875	15	3,210	5,445	6,180	75,660	
53	5,175	9,900	5,280	0	9,105	12,150	6,720	9,285	1,545	0	4,770	1,830	65,760	
53	4,500	10,200	1,830	0	9,105	12,165	10,515	10,335	3,135	2,010	5,445	1,830	71,070	
55	4,650	8,100	4,665	0	8,175	12,165	12,585	8,640	645	4,785	5,595	6,270	76,275	
56	7,110	9,900	5,280	2,520	9,105	10,455	12,585	10,515	3,120	840	2,595	4,170	78,195	
57	8,385	5,025	5,280	3,165	6,315	12,120	11,070	10,305	2,160	1,845	660	1,830	68,160	
58	5,385	8,325	3,240	2,880	7,620	12,150	12,480	6,750	2,145	3,435	4,245	5,505	74,160	
59	6,825	10,425	5,280	1,470	6,300	11,025	12,555	10,725	2,145	0	1,095	4,155	72,000	
60	4,275	2,400	4,515	0	3,180	12,135	8,415	10,500	0	2,070	660	7,995	56,145	
61	2,250	5,925	2,205	1,125	7,815	12,045	12,525	10,860	2,760	540	2,070	1,830	61,950	
62	6,300	9,300	3,765	1,740	8,085	12,165	12,585	8,820	90	3,060	4,155	5,505	75,570	
63	2,250	6,390	1,590	1,275	8,940	12,165	10,605	10,650	0	3,510	660	1,830	59,865	
64	7,575	7,875	2,955	3,690	6,240	12,165	10,125	10,695	1,905	2,160	6,495	7,305	79,185	
65	8,700	6,750	5,280	0	3,240	12,150	12,495	7,785	3,135	0	660	1,830	62,025	
66	6,825	10,425	2,265	765	9,090	12,150	12,555	9,750	0	0	660	5,430	69,915	
67	10,125	8,850	3,780	2,715	8,295	12,105	12,570	10,755	1,440	0	660	1,830	73,125	
68	7,425	10,425	2,640	2,895	9,000	12,165	12,585	8,820	45	1,935	3,930	5,430	77,295	
69	8,925	9,525	5,280	210	8,940	12,165	10,065	9,570	0	0	2,670	1,830	69,180	
70	8,025	5,700	4,605	0	7,155	11,325	12,585	7,965	2,160	4,935	2,595	2,655	69,705	
71	5,625	8,790	4,815	0	6,120	12,030	12,045	9,585	2,895	4,260	6,195	1,830	74,190	
72	9,150	10,425	5,280	1,125	5,565	12,165	12,585	10,860	0	0	660	3,180	70,995	
73	10,350	9,675	4,680	3,525	8,010	10,350	6,840	10,740	900	3,060	7,095	1,830	77,055	
74	10,350	9,675	5,280	1,740	4,725	12,165	12,585	10,830	1,170	5,760	6,570	1,830	82,680	
75	7,575	9,675	4,365	90	5,745	12,165	7,080	9,300	105	5,235	3,645	1,830	66,810	
76	10,125	10,425	5,280	195	8,955	12,165	12,045	9,945	2,790	4,260	1,770	1,830	79,785	
77	8,925	10,125	4,590	3,990	8,655	12,165	11,685	10,215	0	0	660	1,830	14,040	
Mean	6,754	8,616	4,156	1,474	7,190	11,985	11,346	9,428	1,337	2,334	3,108	3,648	69,595	

KAUDULLA TANK

(Unit: ac.ft)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual Total	Remarks
1950	37,438	42,118	9,790	12,005	28,078	58,391	60,190	40,607	10,726	20,087	22,535	31,463	373,428	
51	10,800	41,048	24,190	2,824	24,550	58,031	60,046	49,967	4,318	20,447	3,167	29,663	329,051	
52	9,504	46,438	25,450	12,432	30,179	56,526	46,922	53,990	2,762	11,643	23,984	29,126	348,956	
53	24,838	47,518	25,701	0	48,540	56,526	0	39,907	12,432	0	20,743	8,245	284,450	
54	21,600	48,958	8,782	0	43,702	58,391	69,536	49,607	15,046	9,647	26,135	8,783	360,187	
55	22,318	38,878	22,569	0	39,238	56,779	52,163	35,377	6,320	19,203	24,705	29,736	347,286	
56	34,127	47,518	25,343	12,094	43,702	50,182	60,406	50,470	14,974	4,031	12,455	20,014	375,316	
57	40,246	24,118	25,343	15,190	30,311	58,174	53,134	52,917	10,366	8,854	3,167	8,783	330,603	
58	25,847	39,959	15,550	13,824	35,844	56,318	59,902	32,399	10,295	16,487	20,376	26,424	353,225	
59	32,759	50,039	25,365	7,056	30,239	52,920	60,262	51,479	10,295	0	5,255	19,942	345,611	
60	18,576	14,904	19,512	2,520	22,536	57,816	47,736	51,840	5,184	9,216	4,464	32,400	286,704	
61	14,688	31,680	12,024	6,336	37,944	58,389	60,408	24,708	8,496	4,320	11,880	12,312	283,185	
62	30,240	44,640	18,072	8,352	38,808	58,386	60,408	42,336	432	14,688	19,944	26,424	362,730	
63	10,800	30,672	7,632	6,120	42,912	58,392	50,904	51,120	0	16,848	3,168	8,784	287,352	
64	36,360	37,800	14,184	17,712	29,952	58,392	48,600	51,336	9,144	10,368	31,176	35,064	380,088	
65	41,760	32,400	25,344	0	15,552	58,392	59,976	37,368	15,048	0	3,168	8,784	297,792	
66	32,760	50,040	10,872	3,672	43,632	58,320	60,264	48,800	0	0	3,168	26,064	335,592	
67	48,600	42,480	18,144	13,032	39,816	58,104	60,336	51,624	6,912	0	3,168	8,784	351,000	
68	35,640	50,040	12,672	13,896	43,200	58,392	60,408	42,336	216	9,288	18,864	26,064	371,016	
69	42,840	45,720	25,344	1,008	42,912	58,392	48,312	45,936	0	0	12,816	8,784	332,064	
70	38,520	27,360	22,104	0	34,344	54,360	60,408	38,232	10,368	23,688	12,456	12,744	334,586	
71	27,000	42,192	23,112	0	29,376	57,744	57,816	46,008	13,896	20,448	29,736	8,784	356,112	
72	43,822	49,929	25,288	5,387	26,646	58,261	60,266	52,014	0	0	3,159	15,230	340,002	
73	49,570	46,337	22,417	16,890	38,362	49,562	32,741	51,438	4,314	14,652	33,978	8,764	369,025	
74	49,570	46,337	25,288	8,338	22,622	58,261	60,266	51,870	5,607	27,583	31,464	8,764	395,970	
75	36,279	46,337	20,906	432	27,510	58,261	33,890	44,537	504	25,069	17,455	8,764	319,944	
76	48,492	49,929	25,288	936	42,891	58,261	57,677	47,627	13,370	20,399	8,475	8,764	382,109	
77	42,745	48,492	21,983	19,118	41,453	58,261	55,952	48,921	0	0	3,159	8,764	348,848	
Mean	32,419	39,819	19,938	7,113	34,816	57,028	53,534	45,885	6,822	10,968	14,794	17,365	342,223	

Table F.2.7(3/5) TANK-WISE DIVERSION REQUIREMENTS

KANTALAI TANK (PADDY AND UPLAND CROPS)

(Unit:ac.ft)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual Total	Remarks
1950	29,766	29,330	16,264	13,068	15,198	39,252	40,608	26,330	5,518	10,598	9,584	13,164	248,680	
51	7,260	27,346	14,810	1,548	24,586	39,252	37,994	33,880	0	13,504	4,016	15,584	219,780	
52	7,260	32,960	17,036	1,838	24,298	39,252	38,334	35,090	5,228	18,344	12,244	20,910	252,794	
53	15,972	30,734	11,954	0	29,428	38,864	18,004	34,266	8,664	8,422	16,360	10,502	233,170	
54	10,648	31,460	10,986	3,582	28,896	39,252	36,834	27,540	6,680	6,196	18,536	5,904	226,514	
55	8,712	25,168	16,794	0	16,698	39,252	40,222	7,744	0	11,084	24,296	16,794	206,764	
56	23,958	31,702	17,036	5,856	29,330	33,782	35,960	29,960	1,210	1,162	2,130	18,296	230,382	
57	26,136	25,410	17,036	13,262	24,634	29,156	36,252	34,314	3,484	388	2,130	5,904	228,106	
58	27,588	30,250	9,052	5,276	29,040	39,252	38,334	20,570	4,356	8,178	19,264	18,248	249,408	
59	22,748	33,638	17,036	6,194	29,040	27,248	40,608	23,618	6,970	5,758	4,984	9,584	227,426	
60	17,666	13,794	17,036	0	25,750	39,252	25,072	35,090	5,808	10,842	2,130	25,022	217,462	
61	7,260	26,378	11,954	10,164	27,250	39,106	40,124	34,992	1,790	0	2,130	5,904	207,052	
62	15,730	31,218	16,746	5,616	21,346	39,252	40,076	33,300	4,066	10,358	14,664	9,292	241,664	
63	7,260	23,232	11,712	1,308	22,748	39,252	37,170	34,218	2,420	9,340	2,130	5,904	196,694	
64	26,620	33,154	7,600	10,744	29,088	39,252	30,056	24,878	9,824	3,678	19,990	22,120	257,004	
65	29,766	16,746	17,036	48	19,700	39,010	40,608	10,842	6,922	580	2,130	5,904	189,292	
66	16,214	31,944	12,922	2,178	29,428	39,252	40,414	16,408	1,210	0	2,130	16,070	208,170	
67	32,912	27,104	15,826	7,550	28,508	39,252	40,608	27,394	2,468	10,260	2,130	6,098	240,110	
68	23,953	33,638	8,518	5,034	28,583	39,356	40,608	28,458	146	11,808	2,130	6,148	228,380	
69	25,894	25,894	17,036	3,872	28,702	39,252	32,718	19,698	7,938	0	11,034	5,904	217,942	
70	22,022	22,506	14,810	2,760	21,876	38,864	40,608	30,250	2,712	12,488	2,806	16,118	227,820	
71	22,022	33,638	16,264	10,502	26,668	39,204	36,252	26,040	532	12,294	16,310	5,904	245,630	
72	32,912	32,670	17,036	11,036	25,168	36,542	38,334	35,090	0	0	11,034	12,440	252,262	
73	33,396	31,375	17,036	13,310	25,846	20,522	35,042	32,960	48	194	25,012	5,904	240,705	
74	33,396	31,944	17,036	4,404	19,796	39,252	35,622	33,250	1,838	18,586	21,442	6,438	263,004	
75	30,926	33,396	15,294	12,536	22,506	39,252	33,348	27,830	7,210	14,228	12,004	19,458	267,988	
76	33,396	33,638	17,036	9,098	29,428	37,074	27,197	29,332	3,242	10,358	9,584	5,904	245,287	
77	31,702	20,420	13,892	10,794	26,668	39,156	39,786	32,960	0	0	5,226	10,260	230,864	
Mean	22,253	28596	14,743	6,128	25,365	37,738	36,314	28,082	3,582	7,452	9,915	11,632	231,798	

SYSTEM G (ELAHERA)

(Unit: ac.ft)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual Total	Remarks
1950	12,409	8,671	12,303	21,607	22,371	18,301	15,637	21,859	21,495	17,502	11,069	9,939	193,163	
51	728	8,135	12,570	17,148	18,044	18,316	15,699	19,319	17,104	13,622	2,808	3,487	146,980	
52	2,885	6,944	17,657	12,891	19,243	18,301	15,637	21,859	15,975	16,391	9,797	3,575	161,155	
53	5,989	10,560	15,773	5,512	23,494	18,316	14,753	18,138	20,631	13,146	3,620	3,783	153,715	
54	2,885	8,593	4,817	12,674	23,494	18,301	15,637	19,284	21,495	11,206	11,422	3,487	153,295	
55	2,885	9,132	16,507	13,038	22,960	18,316	15,637	21,841	17,281	19,654	13,891	10,927	182,069	
56	11,157	12,004	14,552	18,774	23,494	18,301	15,637	21,859	21,495	18,719	2,808	3,487	182,287	
57	9,214	340	17,657	21,495	21,546	18,316	15,637	21,859	19,096	4,566	2,808	3,487	156,021	
58	11,863	9,558	8,184	18,395	19,986	18,301	15,637	21,859	21,495	18,459	11,822	5,379	180,938	
59	15,944	14,331	17,657	16,723	20,250	16,110	15,637	21,859	21,495	12,741	2,808	3,487	179,042	
60	6,853	0	17,624	5,512	23,494	18,301	13,459	21,859	21,495	16,973	2,808	10,257	158,635	
61	8,159	6,295	8,891	18,572	23,494	18,316	15,637	21,859	21,495	13,534	2,808	3,487	162,547	
62	3,150	13,775	17,657	9,883	19,986	18,301	15,637	21,171	21,495	11,911	9,398	7,078	169,442	
63	2,885	5,839	15,474	5,512	23,474	18,316	15,637	21,859	21,495	15,068	2,808	3,487	151,054	
64	5,411	9,371	17,092	14,063	20,728	18,301	8,703	21,859	20,878	7,654	13,186	9,869	167,115	
65	14,226	2,822	12,646	10,302	17,504	18,316	15,637	17,510	21,495	7,908	2,808	3,487	144,661	
66	2,885	14,371	11,810	17,741	23,494	18,301	15,637	21,859	20,014	5,615	5,896	8,528	166,149	
67	18,758	9,289	16,771	15,780	23,494	18,316	15,637	21,859	21,495	4,566	2,808	10,821	179,594	
68	12,656	14,371	7,004	20,143	23,494	18,301	15,637	21,859	21,495	10,501	5,231	9,869	180,561	
69	9,430	10,829	17,657	15,947	23,494	18,301	15,637	14,688	21,495	9,707	11,986	3,487	172,658	
70	2,885	0	13,736	17,259	23,494	18,301	15,637	21,859	20,296	15,350	5,852	5,216	159,885	
71	8,370	6,384	12,613	12,709	23,224	18,301	15,637	15,146	21,495	18,225	11,916	0	164,020	
72	18,635	14,371	16,415	14,078	19,340	18,301	15,637	21,859	17,510	4,566	2,808	6,294	169,814	
73	18,758	10,826	17,657	21,719	23,494	18,301	15,637	21,859	21,089	12,546	4,640	3,487	190,013	
74	18,735	10,249	17,653	13,436	23,486	18,290	15,626	21,450	16,527	19,539	17,115	3,487	195,593	
75	14,375	11,594	10,015	20,206	22,448	18,305	11,878	21,838	21,495	19,809	6,354	6,516	184,833	
76	13,080	13,149	17,653	17,722	23,486	18,290	15,626	21,838	21,495	13,958	4,729	4,522	188,548	
77	14,061	14,356	17,159	21,955	22,643	18,305	15,062	21,734	19,617	8,572	4,625	6,066	184,155	
Mean	9,600	9,120	14,400	15,386	22,113	18,227	15,127	20,846	20,355	12,929	7,204	5,607	170,534	

Table F.2.7(4/5) TANK-WISE DIVERSION REQUIREMENTS

KAUDULLA TANK (FOR EXISTING AREA)

(Unit: ac.ft)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual Total	Remarks
1950	14,143	15,911	3,698	7,289	10,607	22,059	22,738	15,340	4,052	7,588	8,513	11,886	143,824	
51	4,080	15,513	9,138	1,060	9,274	21,923	22,684	18,876	1,631	7,724	1,196	11,206	124,305	
52	4,080	17,543	9,547	2,801	12,484	22,031	22,059	19,719	299	5,820	9,873	11,206	137,462	
53	9,383	17,951	9,574	0	16,509	22,031	12,185	16,836	2,801	0	8,648	3,318	119,236	
54	8,160	18,495	3,318	0	16,509	22,059	19,066	18,740	5,684	3,644	9,873	3,318	128,866	
55	8,431	14,687	8,458	0	14,823	22,059	22,820	15,666	1,169	8,676	10,145	11,369	138,303	
56	12,892	17,951	9,574	4,568	16,509	18,958	22,820	19,066	5,657	1,523	4,705	7,560	141,783	
57	15,204	9,111	9,574	5,738	11,451	21,977	20,073	22,140	3,916	3,345	1,196	3,318	127,043	
58	9,764	15,095	5,874	5,222	13,086	22,031	22,629	12,239	3,889	6,228	7,697	9,982	133,736	
59	12,375	18,903	9,574	2,665	11,423	19,992	22,765	19,447	3,889	0	1,985	7,533	130,551	
60	7,018	5,631	7,371	952	8,513	21,841	18,033	19,584	1,958	3,482	1,687	12,240	108,310	
61	5,549	11,968	4,542	2,394	14,334	22,059	22,821	18,060	3,209	1,632	4,488	4,651	115,707	
62	11,424	16,864	6,827	3,156	14,660	22,053	22,821	15,993	163	5,549	7,534	9,982	137,029	
63	4,080	11,587	2,883	2,312	16,211	22,059	19,230	19,312	0	6,365	1,197	3,318	108,554	
64	13,736	14,280	5,358	6,691	11,315	22,059	18,360	19,393	3,454	3,916	11,777	13,246	143,585	
65	15,776	12,240	9,574	0	5,875	22,059	22,658	14,116	5,685	0	1,197	3,318	112,498	
66	12,376	18,904	4,107	1,387	16,483	22,032	22,767	17,680	0	0	1,197	9,846	126,779	
67	18,360	16,048	6,854	4,923	15,042	21,950	22,794	19,502	2,611	0	1,197	3,318	132,599	
68	13,464	18,904	4,787	5,250	16,320	22,059	22,821	15,993	82	3,509	7,126	9,846	140,161	
69	16,184	17,272	9,574	381	16,211	22,059	18,252	17,354	0	0	4,841	3,318	125,446	
70	14,552	10,336	8,351	0	12,974	20,536	22,821	14,443	3,917	8,949	4,706	4,815	126,400	
71	10,200	15,940	8,731	0	11,098	21,814	21,841	17,381	5,249	7,725	11,234	3,318	134,531	
72	16,494	18,793	9,518	2,032	10,026	21,928	22,679	19,578	0	0	1,188	5,732	127,968	
73	18,658	17,441	8,437	6,362	14,439	18,650	12,312	19,361	1,626	5,513	12,788	3,298	138,885	
74	18,658	17,441	9,518	3,142	8,510	21,928	22,679	19,524	2,113	10,380	11,842	3,298	149,033	
75	13,655	17,441	7,869	163	10,351	21,928	12,744	16,761	190	9,434	6,569	3,298	120,403	
76	18,252	18,793	9,518	354	16,146	21,928	21,702	17,925	5,037	7,676	3,189	3,298	143,818	
77	16,089	18,252	8,274	7,202	15,603	21,928	21,053	18,412	0	0	1,188	3,298	131,299	
Mean	12,251	15,689	7,515	2,716	13,100	21,643	20,651	17,801	2,439	4,238	5,671	6,576	130,290	

KANTALAI TANK (FOR EXISTING AREA)

(Unit: Acft)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Total	Remarks
1950	21,648	21,331	11,828	9,504	11,053	28,547	29,533	19,149	4,013	7,708	6,970	9,574	180,858	
51	5,280	19,888	10,771	1,126	17,881	28,547	27,632	24,640	0	9,821	2,921	11,334	159,841	
52	5,280	23,971	12,390	1,337	17,671	28,547	27,879	25,520	3,802	13,341	8,905	15,207	183,850	
53	11,616	22,352	8,694	0	21,402	28,265	13,094	24,921	6,301	6,125	11,898	7,638	162,306	
54	7,744	22,880	7,990	2,605	21,015	28,547	26,788	20,029	4,858	4,506	13,481	4,294	164,737	
55	6,336	18,304	12,214	0	12,144	28,547	29,252	5,632	0	8,061	17,670	12,214	150,374	
56	17,424	23,056	12,390	4,259	21,331	24,569	26,153	21,789	880	845	1,549	13,306	167,551	
57	19,008	18,480	12,390	9,645	17,916	28,477	26,365	24,956	2,534	282	1,549	4,294	165,896	
58	20,064	22,000	6,583	3,837	21,120	28,547	27,879	14,960	3,168	5,948	14,010	13,271	181,387	
59	16,544	24,464	12,390	4,505	21,120	19,817	29,533	17,177	5,069	4,188	3,625	6,970	165,395	
60	12,848	10,032	12,390	0	18,727	28,547	18,234	25,520	4,224	7,885	1,549	18,198	158,154	
61	5,280	19,184	8,694	7,396	19,818	28,441	29,181	25,449	1,302	0	1,549	4,294	150,588	
62	11,440	22,704	12,179	4,084	15,524	28,547	29,146	24,218	2,957	7,533	10,665	6,758	175,755	
63	5,280	16,896	8,518	951	16,544	28,547	27,033	24,886	1,760	6,793	1,549	4,294	143,051	
64	19,360	24,112	5,527	7,814	21,155	28,547	21,859	18,093	7,145	2,675	14,538	16,087	186,912	
65	21,648	12,179	12,390	35	14,327	28,371	29,533	7,885	5,034	422	1,549	4,294	137,667	
66	11,792	23,232	9,398	1,584	21,402	28,547	29,392	11,933	880	0	1,549	11,687	151,396	
67	23,936	19,712	11,510	5,491	20,733	28,547	29,533	19,923	1,795	7,462	1,549	4,435	174,626	
68	17,424	24,464	6,195	3,661	20,768	28,677	29,533	20,697	106	8,588	1,549	4,471	166,133	
69	18,832	18,832	12,390	2,816	20,874	28,547	23,795	14,326	5,773	0	8,025	4,294	158,504	
70	15,016	16,368	10,771	2,007	15,910	28,265	29,533	22,000	1,972	9,082	2,041	11,722	164,687	
71	16,016	24,464	11,828	7,638	19,395	28,512	26,365	18,938	387	8,941	11,862	4,294	178,640	
72	23,936	23,760	12,390	8,026	18,304	26,576	27,879	25,520	0	0	8,025	9,047	183,463	
73	24,288	24,007	12,390	9,680	18,797	14,925	25,485	23,971	35	141	18,234	4,294	176,247	
74	24,288	23,232	12,390	3,203	14,397	28,547	25,907	24,182	1,337	13,517	15,594	4,682	191,276	
75	22,492	24,288	11,123	9,117	16,368	28,547	24,253	20,240	5,244	10,348	8,730	14,151	194,901	
76	24,288	24,464	12,390	6,617	21,402	26,963	25,309	21,332	2,358	7,533	6,970	4,294	183,920	
77	23,056	18,480	10,103	7,850	19,395	28,477	28,935	23,971	0	0	3,801	7,462	171,530	
Mean	16,149	20,969	10,722	4,457	18,446	27,448	26,607	20,423	2,605	5,419	7,211	8,460	168,916	

Table F.2.7(5/5) TANK-WISE DIVERSION REQUIREMENTS

(Unit: Acft)

PARAKRAMA SAMUDRA TANK(FOR EXISTING AREA)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Total	Remark
1950	25,750	32,750	6,350	10,550	26,000	40,550	41,950	29,750	9,900	11,950	17,650	20,850	274,000	
51	7,500	28,250	13,800	2,850	29,900	40,550	38,350	33,750	0	16,200	2,200	14,100	227,450	
52	7,500	26,750	16,050	3,100	22,600	40,550	38,450	36,250	1,850	7,200	16,400	17,100	233,800	
53	18,750	29,750	13,850	0	30,400	37,000	27,150	34,350	200	1,200	11,900	6,100	210,650	
54	13,000	29,000	3,050	5,200	30,400	40,550	34,750	31,550	10,450	5,450	16,650	6,100	226,150	
55	16,000	28,500	17,300	3,650	27,650	40,550	41,950	24,700	0	8,200	22,900	19,350	250,750	
56	26,500	31,750	15,050	5,750	30,350	33,550	41,550	32,500	10,300	3,800	6,600	11,350	249,050	
57	27,500	12,000	17,600	8,800	19,500	40,450	35,650	35,600	10,000	7,200	2,200	6,100	222,600	
58	21,250	29,500	11,550	7,850	26,050	40,550	41,950	22,200	9,000	4,450	13,150	6,100	233,600	
59	15,250	34,750	17,600	6,400	29,150	39,750	41,950	34,950	9,900	0	4,400	14,600	248,700	
60	14,750	8,000	13,050	0	16,000	40,550	30,150	35,400	8,300	13,200	10,150	24,850	214,400	
61	7,500	16,250	11,550	4,650	18,250	40,300	41,950	36,250	10,150	9,900	3,650	6,100	206,500	
62	20,000	31,500	14,050	6,650	24,500	40,550	41,800	35,250	400	7,950	14,900	17,400	254,950	
63	7,500	16,500	11,600	0	28,200	40,450	39,000	36,050	200	6,450	2,200	6,100	194,250	
64	23,700	19,300	0	8,150	28,250	40,550	33,550	33,200	4,850	14,400	19,400	22,650	248,000	
65	28,000	8,000	17,600	0	16,400	39,750	41,950	22,900	10,450	2,626	2,200	6,100	195,976	
66	17,450	34,750	7,050	0	30,300	40,450	41,800	26,000	6,900	0	2,200	14,850	221,750	
67	31,250	27,000	15,550	7,300	30,000	40,550	41,950	36,200	10,000	1,400	2,200	5,000	248,400	
68	25,750	34,750	10,100	6,355	30,350	40,550	41,950	36,100	8,950	6,200	6,400	18,100	265,555	
69	27,750	33,500	17,550	0	30,400	40,550	34,400	29,350	8,850	800	22,400	6,100	251,650	
70	22,250	13,000	17,600	0	18,550	32,550	41,950	27,800	8,600	4,000	2,200	9,150	197,650	
71	22,500	28,750	7,050	450	29,150	40,550	29,250	12,400	10,350	5,450	16,900	6,100	208,900	
72	33,250	34,750	17,600	2,550	19,150	40,550	41,600	36,200	0	0	2,200	6,100	233,950	
73	34,500	27,500	16,100	12,050	23,250	35,450	15,200	33,450	0	6,700	2,200	6,100	212,500	
74	34,500	32,300	17,050	1,950	25,700	40,550	41,950	36,200	0	19,200	15,900	16,350	281,650	
75	24,750	23,000	3,600	0	21,000	40,550	14,000	28,400	10,450	4,700	8,650	6,100	185,200	
76	18,250	34,750	17,600	9,950	30,400	37,650	41,400	30,050	1,850	11,200	2,200	6,100	241,400	
77	24,250	32,750	8,300	0	20,100	40,350	27,700	29,700	0	1,400	2,200	6,100	192,850	
Mean	21,318	26,405	12,686	4,079	25,427	39,517	36,616	31,304	5,782	6,472	9,007	11,111	229,724	

Table F.3.1 5-YEAR FREQUENCY FLOOD DISCHARGE FOR DRAINAGE SYSTEM

System	Drainage Channel	Reach of Channel	Length (miles)	Gradient (ft/ml)	Catchment Area (Acs)	Classification of Area		Run off Coefficient	Average Run off Coefficient	t (hr)	Rt (in)	Q (cfs)
D1	Kalu Ganga	Upper	7.7	23	16,780	Crop	10,080	0.4	0.36	3.7	1.2	7,250
						Paddy	6,700	0.3				
		Lower	10.4	19	30,820	Crop	22,700	0.4	0.37	5.1	0.9	10,260
						Paddy	8,120	0.3				
	Thimbri Ela	Upper	3.8	24	4,110	Crop	2,050	0.4	0.35	2.1	1.8	2,590
						Paddy	2,051	0.3				
		Lower	4.9	26	6,850	Crop	3,150	0.4	0.35	2.5	1.6	3,840
						Paddy	3,700	0.3				
	Ambagaha Oya	Upper	4.0	19	4,650	Crop	1,860	0.4	0.34	2.4	1.7	2,690
						Paddy	2,790	0.3				
		Lower	8.9	20	22,000	Crop	8,800	0.4	0.34	4.4	1.1	8,230
						Paddy	13,200	0.3				
D2	Periya Aru	Upper	7.9	8	17,800	Crop	8,900	0.4	0.35	5.7	0.8	4,980
						Paddy	8,900	0.3				
		Lower	12.5	5	44,300	Crop	18,200	0.4	0.34	9.8	0.5	7,530
						Paddy	26,100	0.3				
	Sinna Ganga	Entire	3.9	5	4,300	Crop	400	0.4	0.31	4.0	1.2	1,600
						Paddy	3,900	0.3				
A/D	Uppu Aru	Entire	6.7	15	12,920	Crop	8,400	0.4	0.37	4.0	1.2	5,740
						Paddy	4,520	0.3				
	Karoppankadowela Aru	Entire	8.2	13	19,030	Crop	9,500	0.4	0.35	4.9	0.8	5,330
						Paddy	9,530	0.3				

Note: Length is Max. Channel length assumed.

Table F.4.1 EXISTING CHANNEL DATA IN SYSTEM D1

Canal Name	Reach Miles-Chain	Command Area Acs	Discharge cusec	Gradient %	Bed Width ft	FSD ft	Propile Type
(1) System D1 Main Chanal	0						
		16,000	266.7	0.3	20	4.4	M.C.
	4 - 2.5						
Branch Canal No. 1	0						
		5,482	137.3	0.3	14	3.6	
	1 - 36						1-1
		4,427	110.7	0.3	13	3.28	
	1 - 50						
		3,823	95.6	0.3	12	3.16	
	2 - 27						1-2
		3,257	81.4	0.3	11	3.03	
	3 - 47						
		2,900	72.5	0.4	14	2.5	
	4 - 30						
		883	23.9	0.4	14	2.3	1-3
	4 - 41						
		756	18.9	0.4	14	2.1	
	6 - 6.7						
(2) System D2 D1-Main	0						
		17,500	350.0	0.200	45.0	4.50	M.C.
	3 - 10						
D1-North	0						
		8,500	175.0	0.252	29.0	3.15	
	1 - 0						
		8,110	167.0	0.237	28.0	3.07	N-1
	1 - 45						
		7,770	160.0	0.238	27.6	3.05	
	2 - 28						
		7,530	155.0	0.238	27.4	3.05	
	3 - 0						
		7,530	155.0	0.240	26.6	3.00	N-2
	5 - 0						
		7,290	150.0	0.234	26.0	2.97	
	6 - 0						
		6,050	124.6	0.245	23.4	2.80	N-3
	6 - 28						
D1-North R.B.18	0						
		2,280	47.0	0.290	13.8	2.13	N-4
	4 - 26						
D1-East	0						
		9,000	184.0	0.250	30.0	3.20	
	1 - 0						E-1
		7,520	153.7	0.240	30.0	2.99	
	2 - 0						
		7,070	144.5	0.260	25.5	2.94	E-2
	3 - 0						
		4,730	96.0	0.260	20.0	2.65	E-3
	5 - 0						
		3,820	78.0	0.263	18.0	2.45	E-4
	5 - 15						
D1-East R.B.10	0						
		820	16.7	0.347			E-5
	1 - 15						

Table F.4.2 (1/4) SECTIONAL DISCHARGE AND TYPE & LENGTH OF CANAL (SYSTEM D1 (1))

Canal	Canal			Turnout		
Canal Type	Commanding Area acres	Discharge of Canal cusec	Canal Length miles	Turnout	Commanding Area acres	Offtake Discharge cusec
Main*	28,335	708	4.05			
				Exi.T.O.	453	11
				Exi. Dv. (D.S.)	10,570	264
1-1*	17,312	433	1.94			
				Exi.T.O.	1,055	27
				Exi.T.O.	604	15
1-2*	15,653	391	1.95			
				Exi.T.O.	566	14
				Exi.T.O.	357	9
1-3*	14,730	368	2.24			
				Exi.T.O.	2,017	50
				Exi.T.O.	127	3
1-4	11,830	296	1.50			
				T.O. 1-1	1,040	26
				T.O. 1-2	2,480	62
1-5	8,310	208	1.75			
				T.O. 1-3	1,490	37
				T.O. 1-4	R1,800	45
					L530	13
1-6	4,490	113	2.25			
				T.O. 1-5	70	2
				T.O. 1-6	1,050	26
				T.O. 1-7	L1,400	35
					R400	10
1-7	1,570	40	1.25			
				T.O. 1-8	300	8
				T.O. 1-9 (D.S.)	670	17
					600	15
2-1	10,570	264	3.25			
				T.O. 2-1	270	7
				T.O. 2-2	1,270	31
2-2	9,030	226	2.25			
				T.O. 2-3	220	6
				T.O. 2-4	480	12
				T.O. 2-5	R450	11
					L210	5
				T.O. 3 (D.S.)	4,390	110
2-3	3,280	82	2.00			
				T.O. 2-6	780	19
				T.O. 2-7	L310	8
					R230	6
2-4	1,960	49	2.25			
				T.O. 2-8	R100	3
					L80	2
				T.O. 2-9	L180	4
					R100	3
				T.O. 2-10	200	5

Note: * existing canal to be improved.

Table F.4.2 (2/4) SECTIONAL DISCHARGE AND TYPE & LENGTH OF CANAL (SYSTEM D1 (2))

Canal Type	Canal			Turnout		
	Commanding Area acres	Discharge of Canal cusec	Canal Length miles	Turnout	Commanding Area acres	Offtake Discharge cusec
2-5	1,300	32	2.25			
				T.O. 2-11	650	16
				T.O. 2-12 (D.S.)	270	7
					380	9
3-1	4,390	110	1.75			
				T.O. 3-1	L300	8
					R290	7
				T.O. 3-2	L120	3
					R70	2
				T.O. 3-3	L1,140	28
					R90	2
3-2	2,380	60	3.25			
				T.O. 3-4	R310	8
					L180	4
				T.O. 3-5	L150	4
					R40	1
				T.O. 3-6	L250	6
					R100	3
3-3	1,350	34	2.25			
				T.O. 3-7	L330	8
					R140	4
				T.O. 3-8 (D.S.)	140	4
					740	18
Total			36.18		28,335	708

Note: * existing canal to be improved.

Table F.4.2 (3/4) SECTIONAL DISCHARGE AND TYPE & LENGTH OF CANAL (SYSTEM D2 (1))

Canal Type	Canal			Turnout		
	Commanding Area acres	Discharge of Canal cusec	Canal Length miles	Turnout	Commanding Area acres	Offtake Discharge cusec
M.C.*	22,900	572	3.19			
				Exi.T.O.	10,400	260
N-1*	12,500	312	1.85			
				Exi.T.O.	970	24
N-2*	11,530	288	3.68			
				Exi.T.O.	1,480	37
N-3*	10,050	251	1.01			
				Exi.T.O.	3,770	94
N-4*	6,280	157	4.10			
				Exit.T.O.	2,280	57
N-5	4,000	100	1.45			
				T.O. N-1-1	170	4
				T.O. N-2 (D.S.)	1,850	46
N-6	1,980	50	1.70			
				T.O. N-1-2	390	10
N-7	1,120	28	1.60			
				T.O. N-1-3	470	12
				T.O. N-1-4 (D.S.)	730	18
					390	10
N-6-1	1,850	46	0.95			
				T.O. N-2-1	L400	10
					R310	8
N-6-2	1,140	28	1.27			
				T.O. N-2-2	290	7
N-6-3	450	11	1.48			
				T.O. N-2-3	400	10
				T.O. N-2-4 (D.S.)	160	4
					90	2
					200	5
E-1*	10,400	260	1.00			
				Exit.T.O.	1,480	37
E-2*	8,920	223	1.00			
				Exit.T.O.	2,790	70
E-3*	6,130	153	2.00			
				Exit.T.O.	910	23
E-4*	5,220	130	1.28			
				Exit.T.O.	3,000	75
E-5*	2,220	55	1.28			
				Exit.T.O.	820	20
E-6*	1,400	35	1.50			
				T.O. E-1	140	3
				T.O. E-2	220	6
E-7	1,040	26	1.50			
				T.O. E-3	300	7
				T.O. E-4	280	7
E-8	460	12	1.00			
				T.O. E-5 (D.S.)	200	5
					260	7
Total			32.84		22,900	572

Note: * existing canal to be improved.

Table F.4.2 (4/4) SECTIONAL DISCHARGE AND TYPE & LENGTH OF CANAL (SYSTEM A/D)

Canal Type	Canal: Commanding Area acres	Canal: Discharge of Canal cusec	Canal: Canal Length miles	Turnout: Turnout	Turnout: Commanding Area acres	Turnout: Offtake Discharge cusec
1	6,600	165	6.80			
				T.O. M-1	200	5
				T.O. M-2	150	4
				T.O. M-3	200	5
				T.O. M-4	250	6
				T.O. M-5	300	8
				T.O. 1	800	20
2	4,700	117	0.75			
				T.O. 2 (D.S.)	1,800	45
3	2,900	72	3.10			
				T.O. M-6	200	5
				T.O. M-7	250	6
				T.O. M-8	350	9
				T.O. M-9	400	10
4	1,700	42	1.75			
				T.O. M-10	300	7
				T.O. M-11	400	10
				T.O. M-12	R240	6
					L160	4
6-1	600	15	2.35			
				T.O. M-13	L120	3
					R100	3
				T.O. M-14 (D.S.)	100	2
					80	2
					200	5
1-1	800	20	3.00			
				T.O. 1-1	370	9
				T.O. 1-2 (D.S.)	200	5
					230	6
2-1	1,800	45	1.00			
				T.O. 2-1	300	8
				T.O. 2-2	R400	10
					L200	5
2-2	900	22	2.50			
				T.O. 2-3	R200	5
					L100	2
				T.O. 2-4	200	5
					200	5
					200	5
Total			21.25		6,600	165

Table F.4.3 (1/3) CANAL SECTIONS (SYSTEM D1)

Canal Type		Ac (ac)	Q (cfs)	S	n	b (ft)	Z	d (ft)	b/d	V (ft/sec.)	Fb (ft)	H (ft)	WB1 (ft)	WB2 (ft)	WG (ft)	L (mile)
Main Canal*		28,335	708	0.0003	0.015	20.0	1.0	6.08	3.3	4.511	3.17	9.25	4.0	30.0	12.0	4.05
1-1*	A	17,312	433	0.0003	0.015	14.0	1.0	5.50	2.5	4.052	2.50	8.0	4.0	16.0	8.0	19.40
	B	16,257	406	0.0003	0.015	14.0	1.0	5.33	2.6	3.988	2.67	8.0	4.0	16.0	8.0	
1-2*	A	15,653	391	0.0003	0.015	14.0	1.0	5.25	2.7	3.958	2.25	7.5	4.0	16.0	8.0	19.50
	B	15,087	377	0.0003	0.015	14.0	1.0	5.08	2.8	3.892	2.42	7.5	4.0	16.0	8.0	
A-3*	A	14,730	368	0.0004	0.015	14.0	1.0	4.67	3.0	4.307	2.33	7.0	4.0	16.0	8.0	2.24
	B	12,713	318	0.0004	0.015	14.0	1.0	4.25	3.3	4.104	2.75	7.0	4.0	16.0	8.0	
	C	12,586	315	0.0004	0.015	14.0	1.0	4.25	3.3	4.104	2.75	7.0	4.0	16.0	8.0	
1-4		11,830	296	0.00035	0.0225	18.0	1.5	4.5	4.0	2.713	1.5	6.0	4.0	16.0	8.0	1.5
1-5		8,310	208	0.00035	0.0225	15.0	1.5	4.0	3.8	2.487	1.5	5.5	4.0	16.0	8.0	1.75
1-6		4,490	113	0.0004	0.0225	9.0	1.5	3.5	2.6	2.306	1.5	5.0	4.0	16.0	8.0	2.25
1-7		1,570	40	0.00045	0.0225	5.0	1.5	2.5	2.0	1.885	1.25	3.75	4.0	16.0	8.0	1.25
2-1		10,570	264	0.00035	0.0225	16.0	1.5	4.5	3.6	2.670	1.5	6.0	4.0	16.0	8.0	3.25
2-2		9,030	226	0.00035	0.0225	15.0	1.5	4.25	3.5	2.568	1.5	5.75	4.0	16.0	8.0	2.25
2-3		3,280	92	0.0004	0.0225	7.0	1.5	3.25	2.2	2.140	1.25	4.5	4.0	12.0	8.0	2.00
2-4		1,960	49	0.0004	0.0225	6.5	1.5	2.75	2.4	1.940	1.25	4.0	4.0	12.0	8.0	2.25
2-5		1,300	32	0.00045	0.0225	4.5	1.5	2.25	2.0	1.757	1.25	3.5	4.0	12.0	8.0	2.25
3-1		4,390	110	0.0004	0.0225	8.5	1.5	3.5	2.4	2.287	1.5	5.0	4.0	16.0	8.0	1.75
3-2		2,380	60	0.0004	0.0225	7.0	1.5	2.75	2.5	1.961	1.25	4.0	4.0	12.0	8.0	3.25
3-3		1,350	34	0.00045	0.0225	5.0	1.5	2.25	2.2	1.784	1.25	3.5	4.0	12.0	8.0	2.25

* Existing canals to be improved.

Table F.4.3 (2/3) CANAL SECTIONS (SYSTEM D2)

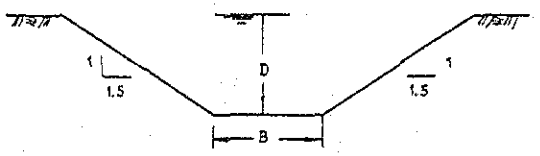
Canal Type	Ac (ac)	Q (cfs)	S	n	b (ft)	Z	d (ft)	b/d	V (ft/sec.)	Fb (ft)	H (ft)	WE1 (ft)	WB2 (ft)	WG (ft)	L (mile)
Main Canal*	22,900	572	0.00020	0.0225	45	1.5	4.75	9.5	2.348	2.0	6.75	4.0	16.0	8.0	3.19
N-1*	12,500	312	0.00025	0.0225	30	1.5	4.0	7.5	2.287	1.5	5.5	4.0	16.0	8.0	1.85
N-2*	11,530	288	0.00025	0.0225	27	1.5	4.0	6.8	2.261	1.5	5.5	4.0	16.0	8.0	3.68
N-3*	10,060	251	0.00025	0.0225	26	1.5	3.75	6.9	2.173	1.5	5.25	4.0	16.0	8.0	1.01
N-4*	6,280	157	0.00030	0.0225	16	1.5	3.5	4.6	2.162	1.5	5.0	4.0	16.0	8.0	4.10
E-1*	10,400	260	0.00025	0.0225	30	1.5	3.5	8.6	2.121	1.5	5.0	4.0	16.0	8.0	1.0
E-2*	8,920	223	0.00025	0.0225	26	1.5	3.5	7.4	2.090	1.5	5.0	4.0	16.0	8.0	1.0
E-3*	6,130	153	0.00026	0.0225	22	1.5	3.0	7.3	1.921	1.5	4.5	4.0	16.0	8.0	2.0
E-4*	5,220	130	0.000236	0.0225	19	1.5	3.0	6.3	1.901	1.5	4.5	4.0	16.0	8.0	1.28
E-5*	2,220	55	0.000347	0.0225	9	1.5	2.5	3.6	1.800	1.25	1.25	4.0	12.0	8.0	1.28
N-5	4,000	100	0.00040	0.0225	9	1.5	3.25	2.77	2.218	1.5	4.75	4.0	16.0	8.0	1.45
N-6	1,980	50	0.00040	0.0225	6	1.5	2.75	2.2	1.918	1.25	4.0	4.0	12.0	8.0	1.70
N-7	1,120	28	0.00045	0.0225	45	1.5	2.25	2.0	1.757	1.25	3.5	4.0	12.0	8.0	1.60
N6-1	1,850	46	0.00045	0.0225	6	1.5	2.5	2.4	1.935	1.25	3.75	4.0	12.0	8.0	0.95
N6-2	1,140	28	0.00045	0.0225	45	1.5	2.25	2.0	1.757	1.25	3.5	4.0	12.0	8.0	1.27
N6-3	450	11	0.00045	0.0225	35	1.5	1.5	2.3	1.371	1.25	2.75	4.0	12.0	8.0	1.48
E-6	1,400	35	0.00045	0.0225	45	1.5	2.5	1.8	1.857	1.25	3.75	4.0	12.0	8.0	1.5
E-7	1,040	26	0.00045	0.0225	40	1.5	2.25	1.8	1.728	1.25	3.5	4.0	12.0	8.0	1.5
E-8	460	12	0.00045	0.0225	35	1.5	1.5	2.3	1.371	1.25	2.75	4.0	12.0	8.0	1.0

* Existing canals to be improved.

Table F.4.3 (3/3) CANAL SECTIONS (SYSTEM A/D)

Canal Type	Ac (ac)	Q (cfs)	S	n	b (ft)	Z	d (ft)	b/d	V (ft/sec.)	Fb (ft)	H (ft)	WE1 (ft)	WB2 (ft)	WG (ft)	L (mile)
1	6,600	165	0.00033	0.0225	13.0	1.5	3.75	3.5	2.356	1.5	5.25	4.0	16.0	8.0	6.8
2	4,700	117	0.00040	0.0225	9.5	1.5	3.5	2.7	2.324	1.5	5.0	4.0	16.0	8.0	0.75
3	2,900	72	0.00040	0.0225	7.5	1.5	3.0	2.5	2.073	1.25	4.25	4.0	12.0	8.0	3.1
4	1,700	42	0.00045	0.0225	5.5	1.5	2.5	2.2	1.911	1.25	3.75	4.0	12.0	8.0	1.75
5	600	15	0.00045	0.0225	3.5	1.5	1.75	2.0	1.486	1.25	3.0	4.0	12.0	8.0	2.35
1-1	800	20	0.00045	0.0225	4.0	1.5	2.0	2.0	1.625	1.25	3.25	4.0	12.0	8.0	3.0
2-1	1,800	45	0.00045	0.0225	6.0	1.5	2.5	2.4	1.935	1.25	3.75	4.0	12.0	8.0	1.0
2-2	900	22	0.00045	0.0225	4.0	1.5	2.0	2.0	1.625	1.25	3.25	4.0	12.0	8.0	2.5

Table F.4.4 DISCHARGE OF EARTH CANALS



$A = (1.5D+B)D$

$Q = A \times V$

$V = \frac{1.486}{n} \times R^{\frac{2}{3}} \times S^{\frac{1}{2}}$

SIDE SLOPES 1 ON 1.5

DEPTH / BED WIDTH	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10	11	12	13	14	15	16	17	18	19	20
1·00	S=0.00045																								
1·25	7.0																								
1·50	10.5	12.0																							
1·75		16.0	17.5																						
2·00			22.5	25																					
2·25				31	34																				
2·50					41	44	47	47																	
2·75						55	56	56	60	64															
3·00							66	67	71	75	79	85	S=0.00040												
3·25									81	86	91	96	101	106											
3·50											104	110	116	122	128	129									
3·75													131	137	143	144	155	166							
4·00															160	162	173	184	195	208					
4·25																	192	204	217	231	245	260			
4·50																			240	256	272	288	304	322	
4·75																					300	318	336	354	372
5·00																							368	386	404

S=0.00035

Table F.4.5 LIST OF PROPOSED RELATED STRUCTURES

Canal Type	AQ.	C.D.	D.I.	BR.	T.O.	D.S.	C.G.	M.D.	DR.	S.W.	W.P.
(1) System D1											
*M.C.	-	-	-	4	-	-	-	1	-	-	2
*1-1	-	-	-	1	-	-	1	1	-	-	1
*1-2	-	-	-	2	-	-	-	-	-	-	1
*1-3	-	-	-	2	-	-	-	-	-	-	1
1-4	-	-	-	3	2	-	-	1	-	1	1
1-5	-	-	1	3	3	-	1	-	-	-	1
1-6	-	-	-	4	4	-	2	-	1	-	1
1-7	-	-	-	2	1	1	2	-	4	-	-
2-1	-	3	4	6	2	-	1	1	-	1	2
2-2	-	3	2	4	4	1	2	-	-	-	1
2-3	-	-	-	4	3	-	1	1	3	1	1
2-4	-	-	-	4	5	-	3	-	3	-	1
2-5	-	-	1	4	1	1	2	-	3	-	1
3-1	-	-	1	3	6	-	1	1	2	1	1
3-2	-	-	-	6	6	-	3	-	5	-	2
3-3	-	-	-	4	2	1	2	-	3	-	1
Sub-total	0	6	9	56	39	4	21	6	24	4	18
(2) System D2											
*M.C.	-	-	-	3	-	-	-	1	-	-	2
*N-1	-	-	-	1	-	-	1	1	-	-	1
*N-2	-	-	-	3	-	-	-	-	-	-	2
*N-3	-	-	-	1	-	-	-	-	-	-	-
*N-4	-	-	-	4	-	-	-	-	-	-	2
N-5	1	-	-	2	1	1	-	-	-	1	1
N-6	-	-	-	3	2	-	-	1	1	-	1
N-7	-	-	-	3	-	1	1	-	1	-	1
N-6-1	-	-	-	2	2	-	-	1	-	-	-
N-6-2	1	-	-	2	2	-	1	-	-	-	-
N-6-3	-	-	-	2	-	1	1	-	-	-	1
*E-1	-	-	-	3	-	-	1	1	-	-	1
*E-2	-	-	-	2	-	-	-	-	-	-	1
*E-3	-	-	-	2	-	-	-	-	-	-	1
*E-4	-	-	-	2	-	-	-	-	-	-	-
*E-5	-	-	-	2	-	-	-	-	-	-	-
E-6	1	-	-	3	2	-	-	-	-	1	1
E-7	-	-	-	3	2	-	2	-	-	-	1
E-8	-	-	-	2	-	1	-	1	-	-	-
Sub-total	3	0	0	45	11	4	7	6	2	2	16
(3) System A/D											
1	5	1	1	13	6	-	2	1	-	1	4
2	-	-	-	1	-	1	1	-	-	-	-
3	1	1	2	6	4	-	3	1	2	1	2
4	-	1	-	3	4	-	3	-	1	-	1
5	-	-	-	4	2	1	2	-	-	-	1
1-1	-	1	-	6	1	1	1	-	1	-	2
2-1	-	1	1	2	3	-	1	1	1	-	-
2-2	-	1	1	5	2	1	-	-	1	-	1
Sub-total	6	6	5	40	22	4	13	3	6	2	11

Notes: AQ. = Aqueduct, C.D. = Cross Drain, D.I. = Drainage Inlet
BR. = Bridge, T.O = Turnout, D.S. = Division Structure
C.G. = Check Gate, M.D. = Water Measuring Divice, DR. = Drop
S.W. = Spillway & Wasteway, W.P. = Washing & Bathing Place

Table F.4.6 STANDARD CROSS SECTION FOR MAIN DRAINAGE CHANNELS

Drainage Channel	Q (cfs)	2/5•Q (cfs)	S	n	b1 or b2 (ft)	Z	d1 or d2 (ft)	V1 or V2 (ft/sec.)	Q1 or Q2 (cfs)	Q (cfs)	W (ft)	R (ft)	H (ft)	L (miles)
Kalu Ganga (Upper)	7,250	2,900	0.00273	0.04	40.0	2.5	8.0	6.25	3,000	7,280	80.0	162.5	6.5	5.9
					40.0		8.0	8.49	6,452					
					25.0		3.5	4.03	828					
Kalu anga (Lower)	10,260	4,100	0.00105	0.04	65.0	2.5	10.0	4.64	4,178	10,476	115.0	205.0	8.0	5.6
					65.0		10.0	6.45	9,518					
					25.0		5.0	3.06	958					
Thimbri Ela (Upper)	2,590	1,040	0.00307	0.04	20.0	2.5	6.0	5.20	1,092	2,590	50.0	97.5	5.5	3.6
					20.0		6.0	7.10	212					
					10.0		2.5	3.23	2,378					
Thimbri Ela (Lower)	3,840	1,540	0.00151	0.04	35.0	2.5	7.0	4.25	1,563	3,935	70.0	122.5	6.5	3.9
					35.0		7.0	5.98	3,661					
					10.0		3.5	2.72	274					
Ambagaha Oya (Upper)	2,690	1,080	0.00155	0.04	35.0	2.5	6.0	3.96	1,188	2,728	65.0	132.0	5.5	4.1
					35.0		6.0	5.29	2,445					
					20.0		2.5	2.45	283					
Ambagaha Oya (Lower)	8,230	3,590	0.00145	0.04	60.0	2.5	8.5	4.94	3,413	8,322	1025.0	197.6	7.0	4.3
					60.0		8.5	6.74	7,420					
					30.0		4.0	3.22	902					
Periya Aru (Upper)	4,980	1,990	0.00077	0.04	40.0	2.5	9.0	3.54	1,990	5,033	85.0	180.0	7.0	4.9
					40.0		9.0	4.85	4,376					
					30.0		4.0	2.35	657					
Periya Aru (Lower)	7,530	3,010	0.00045	0.04	75.0	2.5	10.0	3.09	3,089	7,678	125.0	225.0	8.0	6.3
					75.0		10.0	4.27	6,938					
					30.0		5.0	2.04	740					
Sinna Ganga	1,600	640	0.00042	0.04	40.0	2.5	6.0	2.09	691	1,680	70.0	120.0	6.0	9.0
					40.0		6.0	2.91	1,571					
					10.0		3.0	1.32	109					
Uppu Aru	5,740	2,300	0.00040	0.04	75.0	2.5	9.0	2.75	2,410	5,762	120.0	197.5	7.5	4.8
					75.0		9.0	3.78	5,360					
					20.0		4.5	1.74	402					
Karappankada Wela Aru	5,330	2,130	0.00043	0.04	65.0	2.5	9.0	2.80	2,207	5,393	110.0	187.5	7.5	4.4
					65.0		9.0	3.88	4,976					
					20.0		4.0	1.81	417					

Table F.4.7 MAJOR IRRIGATION AND DRAINAGE WORKS

Items	System			
	D1	D2	A/D	Others
A. Improvement of Existing Facilities				
1. Elahera Anicut	-	-	-	-
2. Angamedilla Anicut	- Rehabilitation		-	-
3. Elahera-Minneriya Canal	-	-	-	21.6 km
4. Main and branch canal	16.3 km	33.0 km	-	-
5. Improvement on farm facilities	28,000 ha	10,100 ha	-	-
B. New Construction Works				
1. Branch canals	41.8 km	19.9 km	23.6 km	-
2. Minor branch canal	8.1 km	22.9 km	-	-
3. Major drainage canal	44.1 km	32.5 km	14.8 km	-
4. Related structures	190 Nos.	95 Nos.	118 Nos.	-
5. Downstream development	9,100 ha	2,200 ha	2,600 ha	-
6. Inspection road	45 km	33 km	15 km	-
7. Connecting road	24 km	5 km	2 km	-
8. Downstream Development				
- Jungle clearing	11,400 ha	2,700 ha	3,300 ha	-
- Rough levelling	9,100 ha	2,200 ha	2,600 ha	-
- D and F canals	637 km	154 km	182 km	-
- Drainage channels	546 km	132 km	156 km	-
- On-farm road	455 km	110 km	130 km	-

FIGURES

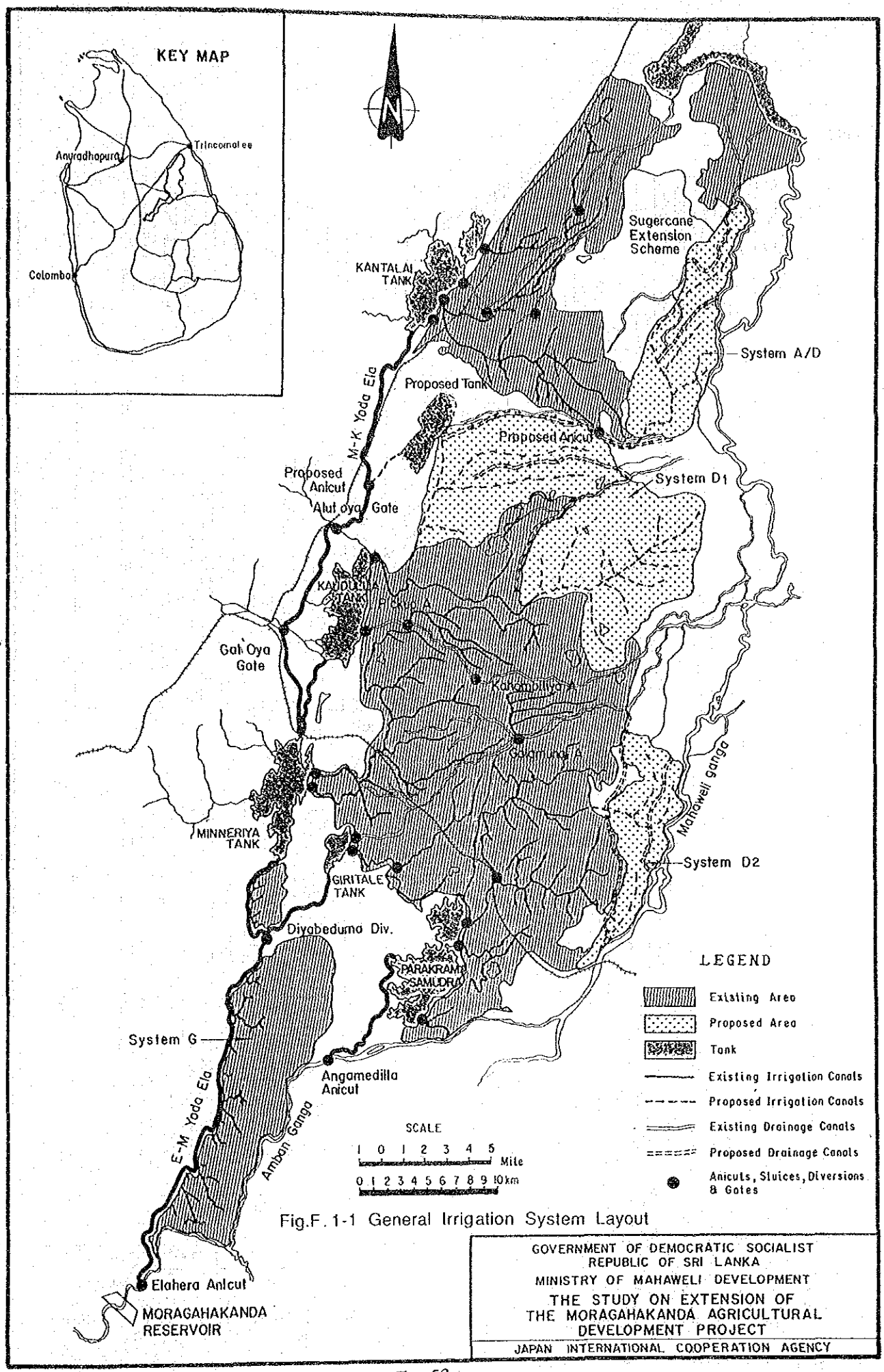


Fig.F. 1-1 General Irrigation System Layout

GOVERNMENT OF DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF MAHAWELI DEVELOPMENT
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JAPAN INTERNATIONAL COOPERATION AGENCY

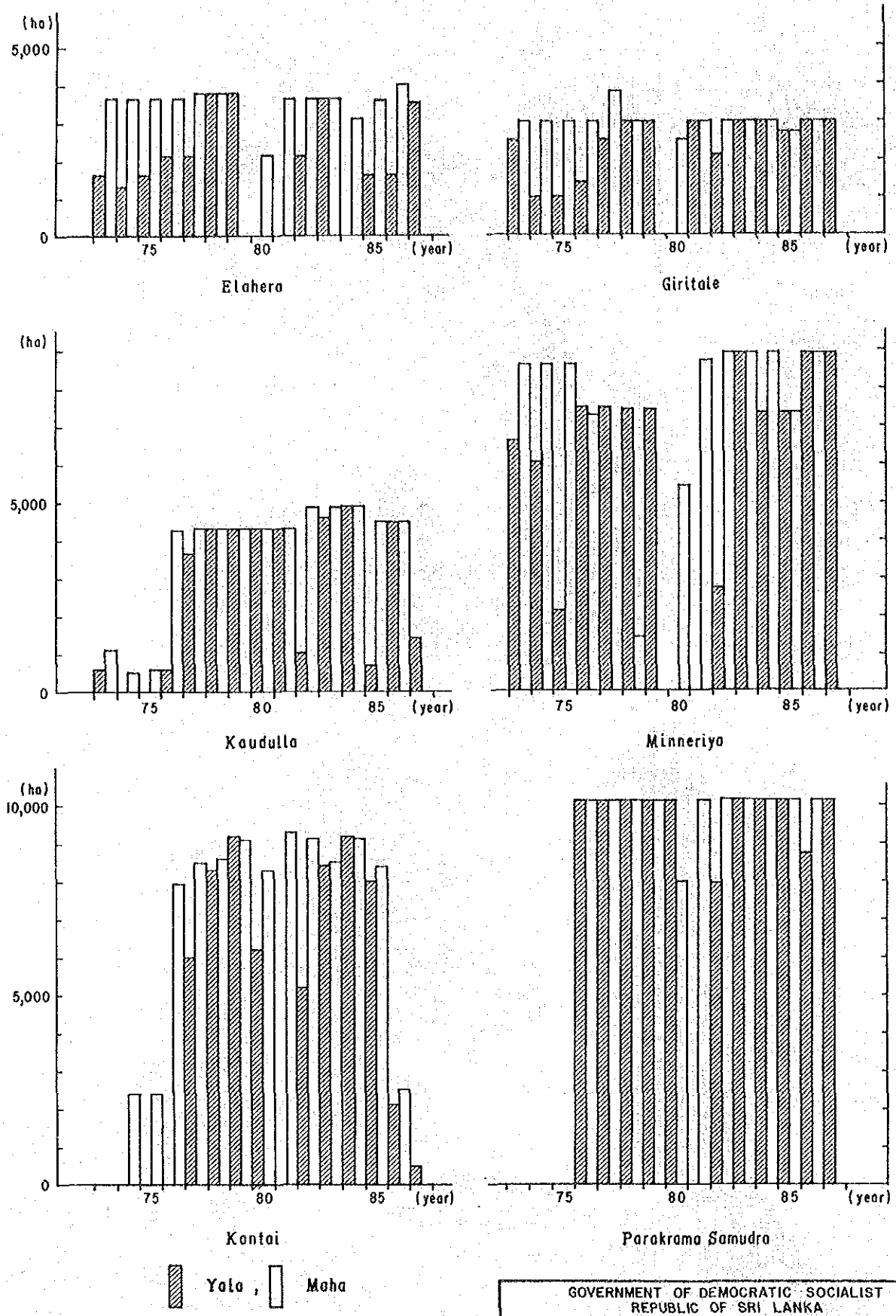

Fig.F.1-2 Harvested Areas for Respective Tank

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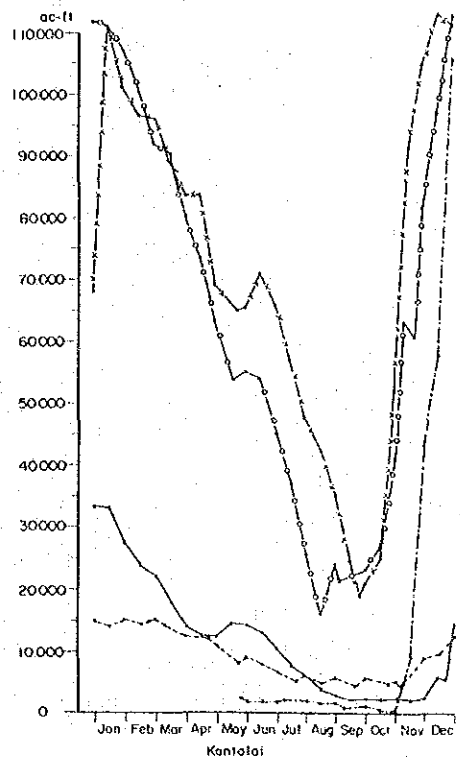

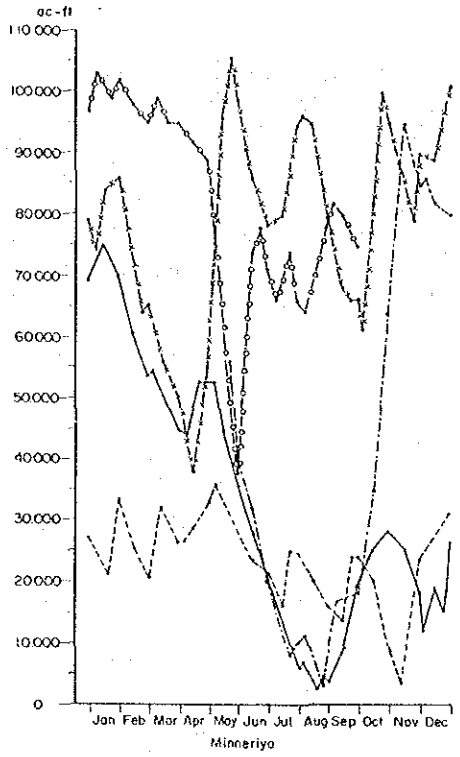

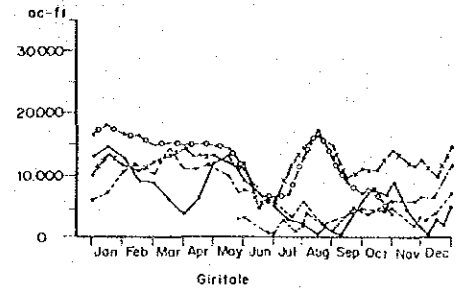

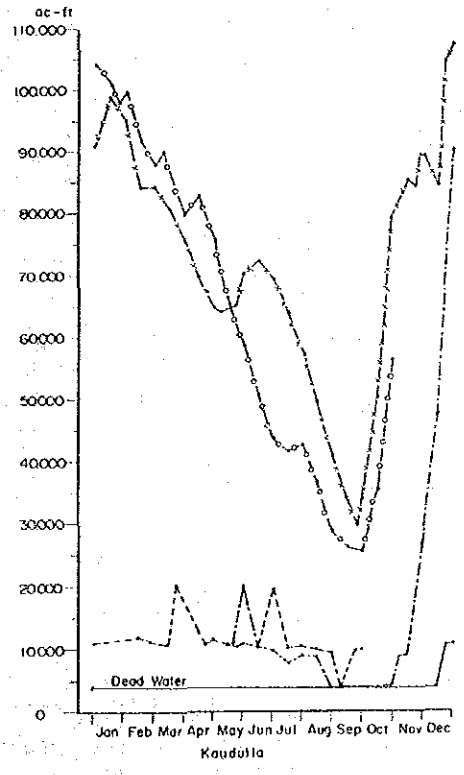

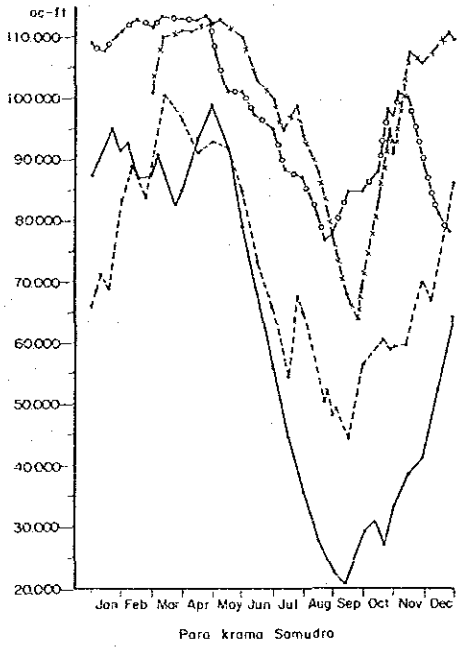

LEGEND

1974
1975
1976
1977
1978

Fig.F.1-3 Records of Tank Water Level

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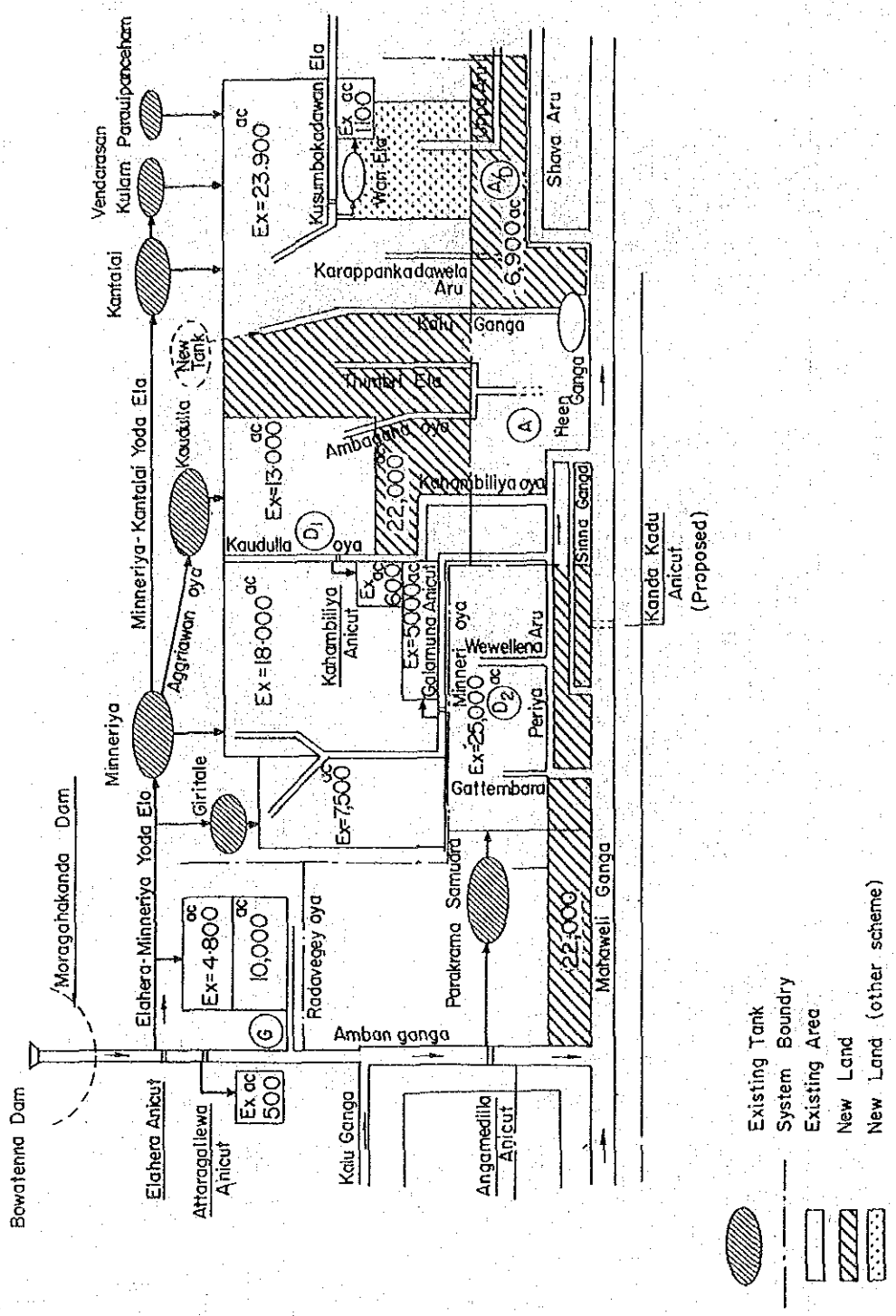

Fig.F.1-4 Irrigation and Drainage System

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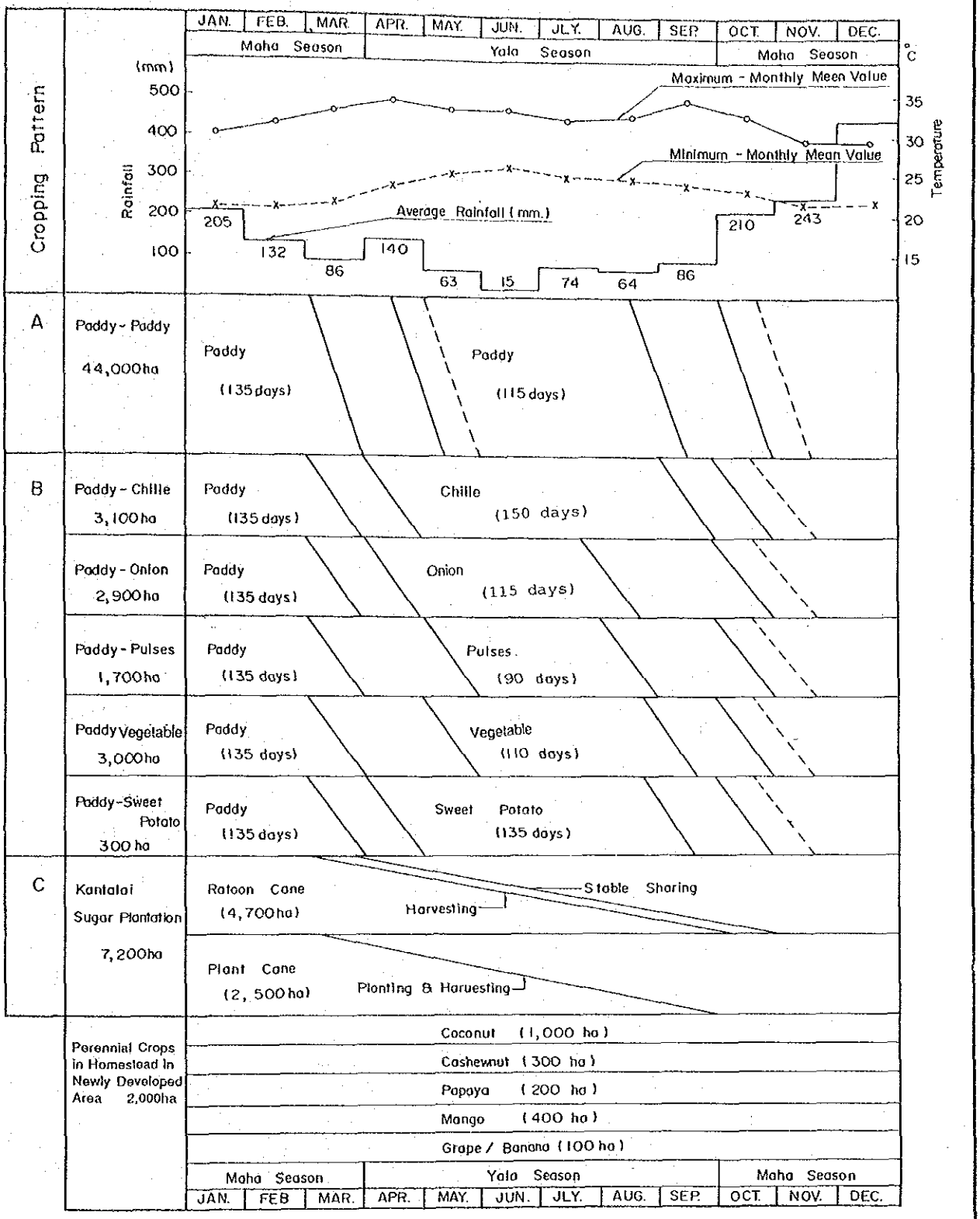

Fig.F.2-1 Proposed Cropping Pattern

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