GAL OYA WATER MANAGEMENT RESEARCH PROJECT SEASONAL REPORT 1983 YALA SEASON

OCCASIONAL PUBLICATION NO.31

OCTOBER 1984

AGRARIAN RESEARCH AND TRAINING INSTITUTE,
114, Wijerama Mawatha, Colombo 7.

SRI LANKA

GAL OYA WATER MANAGEMENT RESEARCH PROJECT: SEASONAL REPORT FOR 1983 YALA SEASON

A S WIDANAPATHIRANA

OCCASIONAL PUBLICATION NO 31 OCTOBER 1984

Agrarian Research and Training Institute
P O Box 1522
Colombo
SRI LANKA

FOREWORD

The rehabilitation of the Gal Oya irrigation scheme got under way in 1979 with assistance from the United States Agency for International Development (USAID). The programme is expected to modernize the left bank of the Gal Oya scheme while developing master plans for the purpose. Conducting on farm water management research, improving irrigation training and extension programmes and the promotion of farmer participation for the design, reconstruction, operation and maintenance of irrigation infrastructure constitute specific objectives of this rehabilitation programme.

The involvement of the Agrarian Research and Training Institute in this project centred mainly on the following aspects:

a) to conduct a baseline study covering socio-economic characteristics of the Gal Oya settlers,
b) evaluation studies and monitoring the effects of the changes resulting from rehabilitation work,
c) research on water management and
d) evolving a mechanism to secure farmer participation for system design and water management.

To realise the objectives detailed in (b) and (c), the Agrarian Research and Training Institute has been conducting a continuous farm record keeping exercise for selected farmers in the left bank of the Gal Oya scheme since 1979/80 Maha season. Several independent research studies have made use of the data generated by this exercise to throw some light on some project components. However, a comprehensive analysis of the data in its entirety has not been attempted as yet. The presentation of such data in summary form seasonally is considered useful for evaluation studies yet to be done.

This report for the Yala cultivation season in 1983 is the first of a series of such presentations planned by the ARTI. Data on reservoir storage and land authorization, water issues, rainfall, planning and staggered cultivation, resource use characteristics and agricultural production, complemented with important aspects relating to systems operation are included in this report.

I thank Mr. A.S. Widanapathirana Research and Training Officer, Agrarian Research and Training Institute who was responsible for the preparation of this report.

T.B. Subasinghe
DIRECTOR

ACKNOWLEDGEMENTS

The data presented in this report are generated through the farm record-keeping survey of the Gal Oya Water Management Project. I thank M/s C.M. Wijayaratne and R.B. Senaka Arachchi, Research and Training Officers who planned and organized the record-keeping survey in 1979/80 Maha season which continued through 1983 Yala season.

I express my gratitude to Professor Randolph Barker, Department of Agricultural Economics, Cornell University for his advice on the development of a continuous system of reporting of data as they are collected and his critical comments at several stages of its preparation. Dr. Hammond Murray Rust, Cornell University Consultant provided valuable comments on the report. Dr. J.D. Brewer, Cornell University Consultant, contributed for a part of the section vii. I thank both of them. I must also thank Mr. T.B. Subasinghe, Director, ARTI for the encouragement given to me in the preparation of this report. Dr. Jayantha Perera, Deputy Director, Irrigation Water Management and Agrarian Relations Division, ARTI assisted in the editorial work of the report.

I am very thankful to Mr. S. Senthinathan, Deputy Director of Irrigation (Ampara range) and his staff for the enthusiastic support and cooperation given in the collection of rainfall and water discharge data presented in this report.

M/s D.G. Karunaratna and M.A. Gunawardena both Statistical Assistants of the ARTI in the supervision of field work and tabulation of data. I appreciate their services.

A S W

CONTENTS

LIST OF TABLES

LIST OF FIGURES

SEASONAL REPORT FOR 1983 YALA SEASON
LEFT BANK OF GAL OYA

1. SUMMARY AND INTRODUCTION

This report attempts to present water distribution, resource use and productivity in respect of paddy and other important matters occurred in the Gal Oya Left Bank Irrigation Scheme during 1983 Yala (dry) season. It is a part of a programme to develop a regular report highlighting major events in each season.

1983 Yala season commenced with a storage water level of 41.6% of full capacity in the main reservoir, Senanayaka Samudra. The season commenced on 20th of March with the release of first water issue for land preparation.

Yala season continued until the end of August 1983, by which time the tank water storage was 3.7% of full storage capacity. The usual 'dry' climate continued throughout and weed problem was intense during the season. The price of paddy and fertilizer remained unchanged from the previous season. (Table 1)

Major physical rehabilitation work (branch, distributory, and field channel) was completed in the Uhana area except for the construction work on two branch channel regulators. Left Bank main channel rehabilitation work was in progress below the reservoir down to Uhana bifurcation; rehabilitation of Gonagolla and Mandur branch channels too were continued.

The Agrarian Research and Training Institute (ARTI) continued with both its activities namely research on farmer organizations and monitoring changes of rehabilitation throughout the season. A total of 175 field channel farmer organizations and one distributory channel

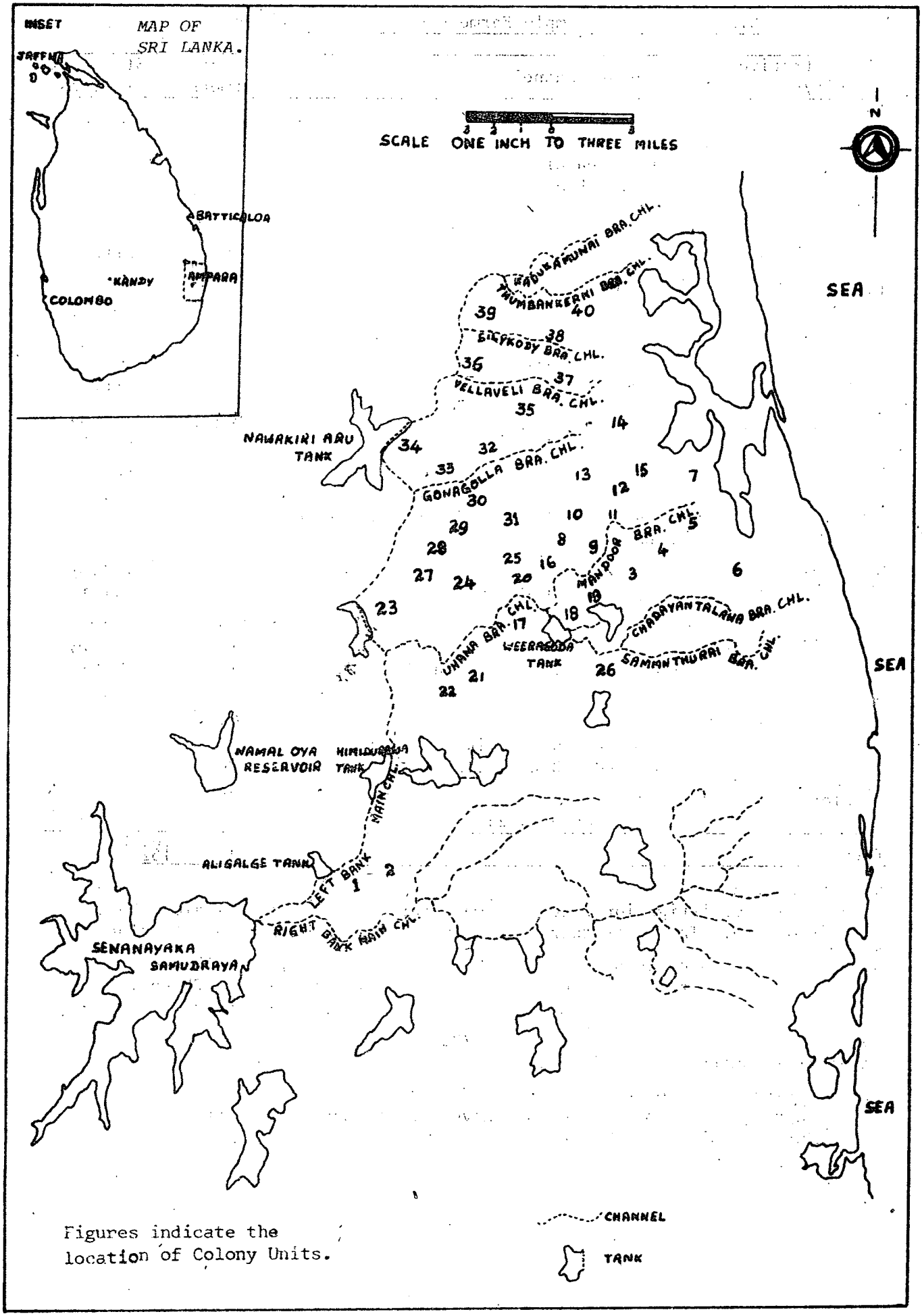
farmer organization were in operation. With the fielding of a new batch of Institutional Organizers (IO) in April, the total number of 73 increased to 100. The number of Institutional Organizers (IOo) however dropped again in July.

Table 1.: Summary of Activities in the Left Bank Area
1983 Yala Season

Description	
Storage level at the begining of the season	320,550 acre feet
Storage level at the end of the season	28.715 acre feet
First date of water issue	20-03-1983[a]
Final date of water issue	15-07-1983[a]
Mean Rainfall[b] per month	29.22 mm
Area Irrigated (proposed)	22864[c]
Price of 50 kg fertilizer (farm gate)	151
Price of 1 bushel of paddy (consumption)	Rs. 62.50
Cost of hired labour day	Rs. 41.00

[a] See Table 4
[b] Mean of 5 rainfall stations for the period March to August
[c] Within Agrarian Service areas of Namaltalawa, Uhana, Werenketagoda (including units 34/36), Weeragoda and Palayadiwaddai.

The number of investigators collecting socio-economic and agro-hydrological data remained at 12. The distribution of sample farmers across the scheme is shown in Table 2.



MAP 1: *Map of the Gal Oya Project.*

Table 2: Distribution of Sample Farmers - 1983 Yala Season

Administrative Unit/s	Name of Channel	No. of farmers	Status of farmers
2	L B 7	20	Colony
	L B 10	15	Colony
	Drainage area of L B 6 and L B 7	10	Other
22/23/24	U B 2	20	Colony
	Drainage area along Andella Oya and U B 2	20	Other
18/19	U B 17	28	Colony[b]
	M 1	17	Colony
10	M 16	22	Colony
	Drainage area along Andella Oya and M 16	13	Other
7/15	M 31	20[a]	Colony
	Drainage area of M 31	20[a]	Other
33	L B 29	15	Colony
	G 3	16	Colony
	Drainage area of G 3 and Navakiri river	11	Other
	Rainfed	03	
D_2 Block	G 16	20	Colony
	Drainage area of G 2 and G 24	20[a]	Other
34/36	L B 39	15	Colony
	V 2	15	Colony
	Drainage area of L B 36 and L B 39	15	Other
38	S 8	19	Colony
	S 7	01	Colony
	Drainage area of Sillikkody Branch Channel and L B Channels	20	Other
D_1 Block	V 21	20[a]	Colony
	Drainage area of V 21	20[a]	Other
Total		415	263 Colony 152 Other

a. Not planted.

b. Provision of irrigation water was made for 12 encroachments along UB 17 in this season. In effect therefore only 16 colony farmers operate along UB 17.

Note: L B Left Bank Channel
U B Uhana Branch Channel
G Gonagolla Branch Channel
V Vellaveli Branch Channel
S Sillikkody Branch Channel
M Mandur Branch Channel

Head Units : 2, 18/19, 22/23/24
Middle/Tail Units : 10, 33, 34/36, 7/15, D 1, D 2, 38

Other refers to following category of farmers:
Encroachers, those who do not have direct supply of channel water, Purana Land operators, etc.

Data collected through the monitoring programme are presented on a distributory channel basis and relevant administrative units/villages are also given for easy reference. The selected distributory channels are classified as head and middle/tail according to their location[1] along the branch channel. (Map 1, and Table 3).

Table 3: Classification of Selected Distributory Channels by Location

Reservoir	Branch Channel	Distributory Channel	Administrative Units
Senanayaka Samudra	LB Main up to Navakiri	LB 7,10,29	2, 33
	Uhana	UB 2,17	18, 22/23/24
	Mandur	M 1,16,31	7/15, 10, 19
	Gonagolla	G 3,16,24	33, D_2, Block
Navakiri Tank	LB Main below		
	Navakiri	LB 39	34
	Vellaveli	V2, 21	36, D_1, Block
	Sillikkody	S 7, 8	38

2. ORGANIZATION OF THE REPORT

This report is organized into the following sections:

i. Pre-seasonal activities

ii. Water issues and field water availability

iii. Area planted and crop damage

1. A distributory channel originating from head of a branch channel is identified as a head channel and one that originates from tail as a tail distributory. That portion of the branch channel close to the reservior from which it gets water supply is named as head of branch channel, that portion further down is called tail portion.

iv. Staggering of agricultural operations

v. Resource use and returns to paddy production

vi. Paddy yield

vii. Other important matters related to agricultural production and systems rehabilitation.

i. Pre-Seasonal Activities

This section presents information and decisions with respect to water issues, area authorization, schedule of agricultural operations etc, as proposed at Kanna Meetings[2] conducted at various locations of the scheme. Schedule of activities and other decisions (Table 4) indicate that the area authorization, period of water issue, agricultural operations and other activities are different across Agrarian Service Areas. Basically four areas with similar schedule of activities except the area authorization are seen. The period of water issue was 118 days and April 15th has been selected as the final data of sowing in Uhana, Weeragoda, and Werenketagoda areas. In Namaltalawa the period of water issue was 123 days and the selected final data of sowing was April 20th; in units 34/36 the period between the first and final issue of water was 121 days with the final date of sowing of April 30th; still in Palayadiwaddai the water issue continued for 144 days with the same final date of sowing as in units 34/36. The agricultural decisions of the latter two areas are operated under Navakiri System while the other areas are operated under Senanayake Samudra Scheme. Palayadiwaddai had altogether a different schedule from that of units 34/36 becuase the cultivation schedule with respect to the former area was based on the Navakiri River System. The period between clearing bunds etc. to final date of sowing follows a different schedule; in Weeragoda, Namal Oya and Uhana areas

2. Meeting of farmers and officials before the commencement of the season.

Table 4 : Schedule of Cultivation Activities and Other Important Decisions - 1983 Yala Season

	Agrarian Services Area					
	Weeragoda	Namaltalawa[a]	Uhana	Werenketagoda	34/36 Units	Palayadivaddai
1. Total area authorised (acres)	4243	2300	4802	5124	3000	3395
2. Paddy variety (growth duration in months)	3 - 3 1/2	3 - 3 1/2	3 - 3 1/2	3 - 3 1/2	3 - 3 1/2	3 - 3 1/2
3. Final date of sowing	1983/4/15	1983/4/20	1983/4/15	1983/4/15	1983/4/30	1983/4/30
4. First issue of water	March 20	March 20 (March 15)	March 20 (March 15)	March 20 (March 15)	April 01	March 10
5. Final Issue of water	July 15	July 20	July 15	July 15	July 30	July 31
6. Final date of payment of insurance premium	April 15	April 15	April 15	April 15	April 30	March 31
7. Clearing of channels, bunds etc.	March 15	March 20	March 15	March 20	March 31	March 01
8. Removal of Cattle	April 15	April 20	April 15	April 15	April 30	April 01

[a]The area of authority includes unit 1, 2, Himidurawa and the area under Namal Oya reservoir.

Source: Records of Department of Agrarian Services, Ampara.
Reports of ARTI Investigators.
Figures in parentheses are the dates presented at Kanna meetings.

this period is 32 days (the date of commencement and conclusion is different in Namal Oya area), in Werenketagoda it is 27 days, 31 days in units 34/36 and 61 days in the case of Palayadiwaddai. The only activity which is similar across all Agrarian Service areas is the authorisation to plant short aged (3-3 1/2 months old) paddy varieties during the Yala season.

It can be noted from the Table 4 that there is apparently a difference in dates proposed at Kanna Meetings and what the official records indicate. The actual water issues followed the official dates. However, farmers were not informed of the changes in advance.

ii. Reservoir Storage, Water Issues, Distribution and Field Water Adqeuacy

a. Reservoir storage:

The reservoir storage and issues to the Right Bank, River Division, and Left Bank are shown in the Figure 1. It is evident that water issues to the Right Bank and River Division systems are continuous while issues to the Left Bank system are rotational from the main reservoir. Water deliveries in the former two systems have been shut-off only for two days in April and a few days in June in response to rainfall.

For the Left Bank above Navakiri Tank, the first issue of water commenced on 21st of March and the final issue on 21st of July. Below Navakiri Tank the first and the last water issues were on 31st March and 16th August respectively for the channels off the Left Bank Main Channel. Under Navakiri River Division the respective dates were 5th May and 10th August.

In comparison with the dates proposed at Kanna Meetings (Table 4) it is seen that actual water deliveries are comparable with the decisions already taken in most of the areas. Under

Navakiri River, however, deliveries have not been comparable with the decisions.

b. Rainfall:

Rainfall during the season has been small (Figure 2) with absolute dry spells from the beginning of the season up to about the last few days of April. Again most of May and July months were dry. There was sufficient rainfall during June and the last week of July. Water deliveries into the Left Bank System have been cut off in response to rainfall during June and July.

c. Water deliveries in channels:

Irrigation water for cultivation was actually delivered only up to parts of distributory channel M 18 in the Uhana - Mandur branch channel, G 16 in the Gonagolla branch channel, S 8 in the Sillikkody branch channel and up to V 5 in the Vellaveli branch channel.

Water deliveries in selected branch channel locations are graphically presented in Annexes 1 and 2.

The system of water delivery throughout the Yala season was rotational after a continuous water issue for the first 23 days. In addition to one issue for land preparation and planting, there were nine individual rotations of varying duration from 2 days on - 4 days off to 13 days on - 7 days off during the season. Not all the rotation schedules were conveyed to farmers in advance by the authorities concerned. As a consequence there was some dissatisfaction among farmers in various areas of the scheme.

d. Field water adequacy:

Selected paddy 'liyaddas' were observed by the investigators in

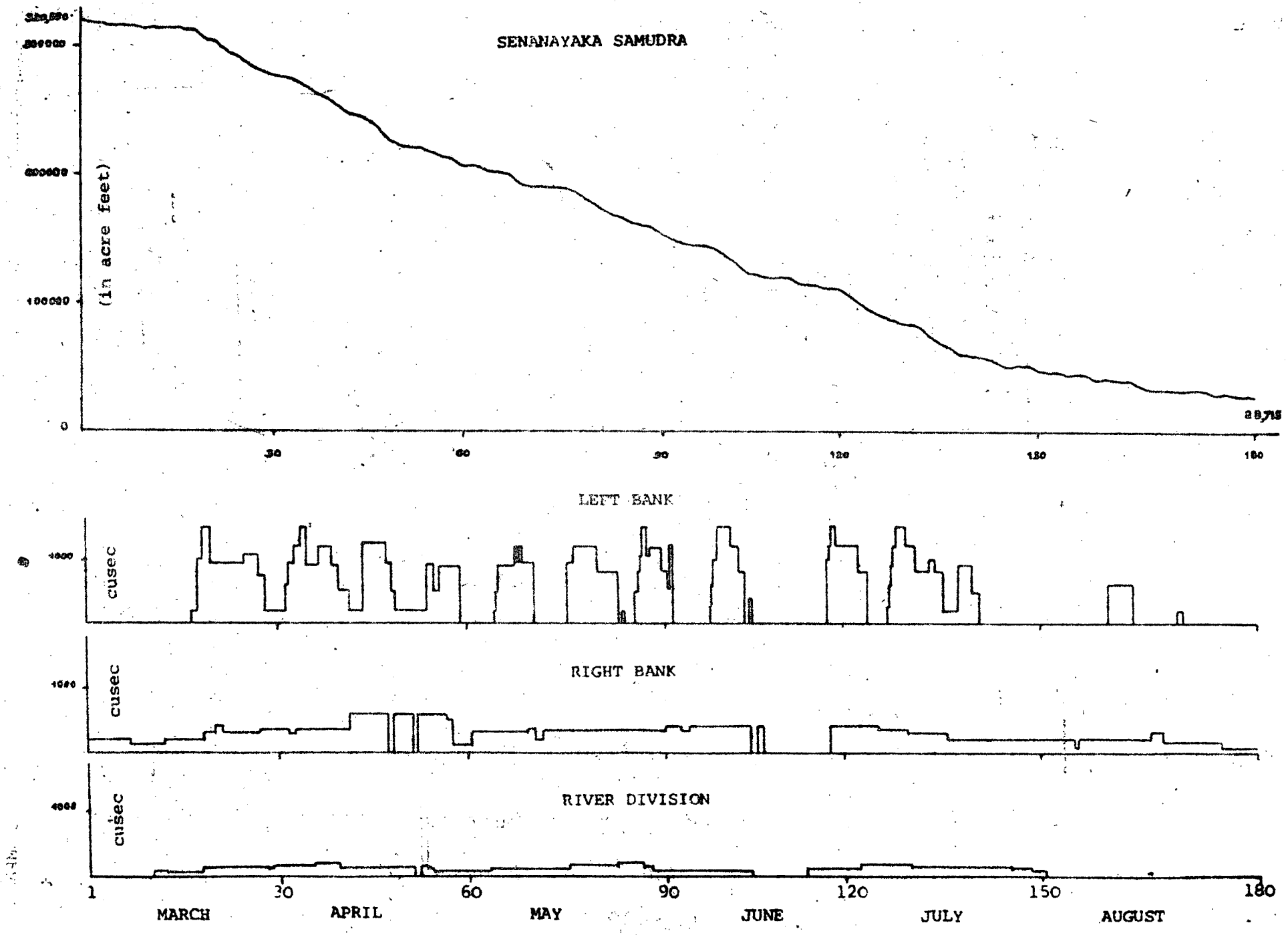
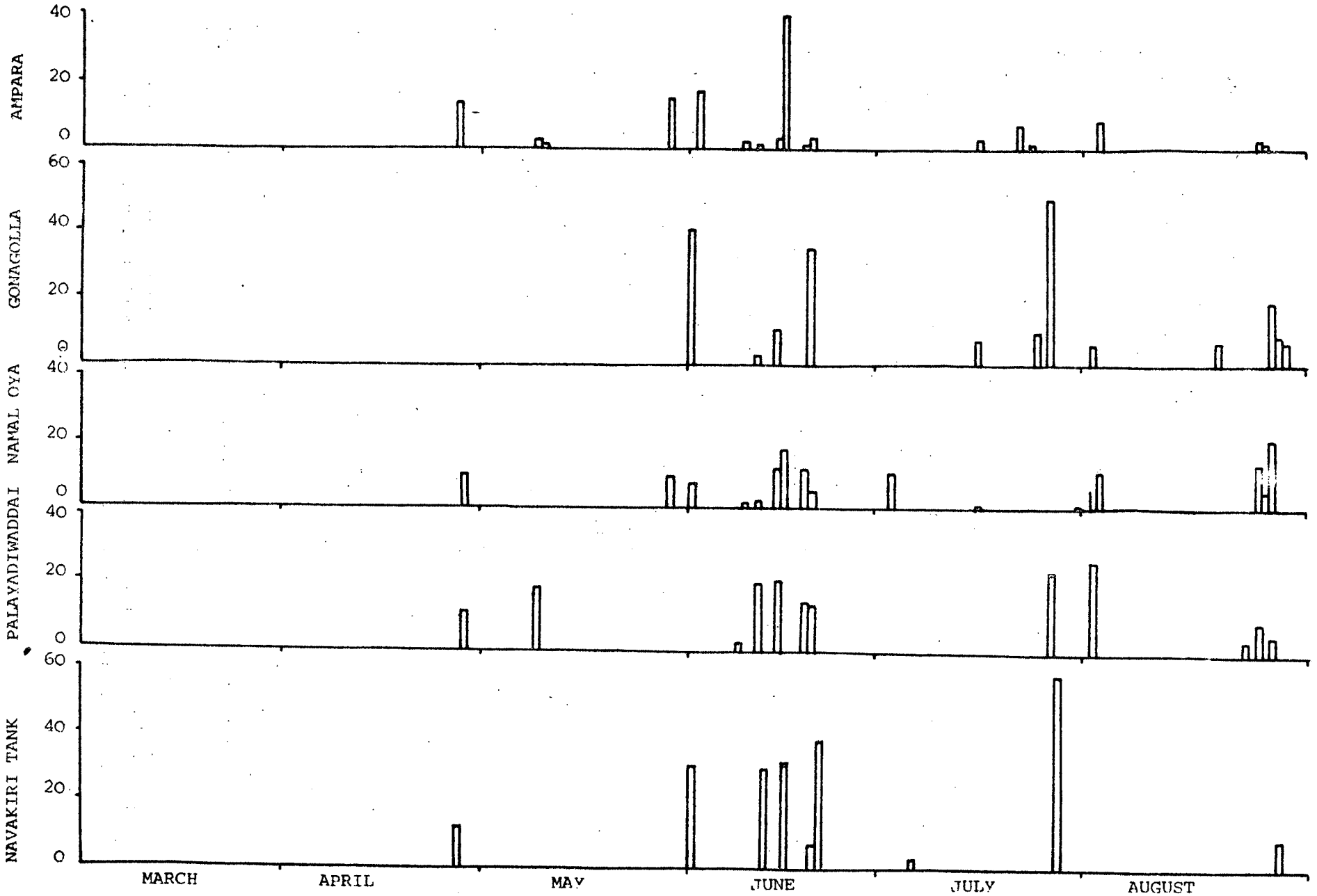


Figure 1 : Reservoir capacity and water issues to Left Bank System during 1983 Yala season.

FIGURE 2: Distribution of rainfall in selected locations - 1983 Yala (in m.m.)



order to assess the adequacy of the water supply throughout the season. The observations are classified into five major categories and are used to develop an index called Water Availability Index.[3] This index is calculated for the period of 20 and 70 days before harvest for each sampled 'liyadda'. The higher value of the index indicates better water availability and the lower value corresponds to reduced water availability.

The mean value of the index for sampled distributories (Map 2) shows that water availability deteriorates from the head to tail of the branch channels and also along distributory channels.

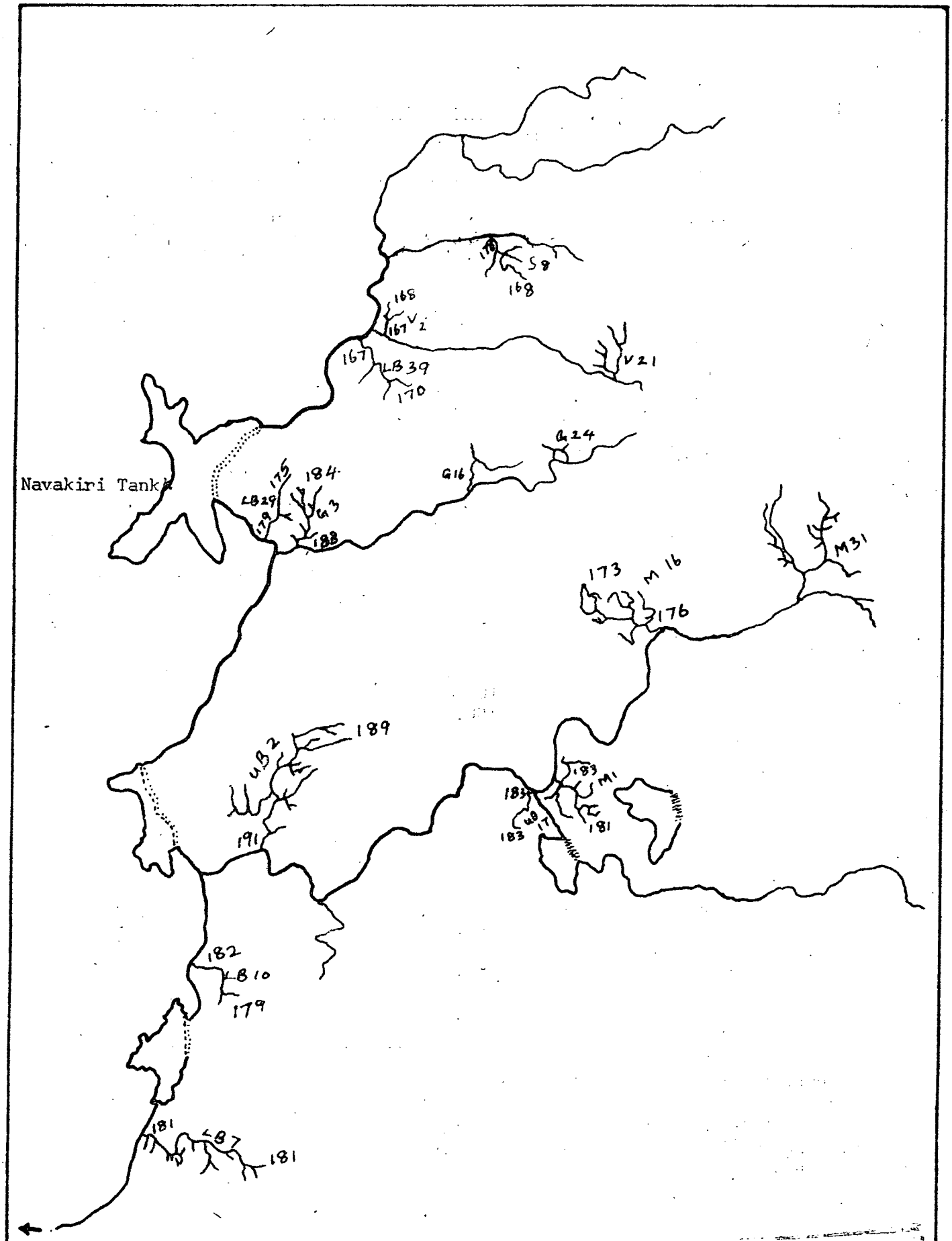
iii. Area Planted and Crop Damage:

The estimation of actual area planted within the Left Bank system during any season is a much more difficult task. Through the ARTI monitoring programme an estimate has been made of the area cropped in selected channel locations. The approximately 400 sample points described in the preceding section are spread over the Left Bank command area. It is therefore possible to examine the approximate degree of cropping in different channel areas by evaluating the selected sample locations. Table 5 presents the proportion of area planted in selected channel locations during 1983 Yala season. It is seen that as much as 90% of the sample area has been planted with excepting M 16 and drainage areas of UB 2 tail, G 3 tail, and drainage area of Sillikkody channel.

Crop damage of sampled farmers resulting from lack of irrigation water was observed in distributory channels M 16 and G 16 (Table 5) during the season.

---

3. The 1980 Yearbook for Sri Lanka Water Management Research carries a detailed discussion of this index.



MAP 2 : WATER AVAILABILITY INDEX BY CHANNELS

Table 5 : Percentage Area Planted Holding Size and Extent Crop Damaged by Channels - 1983 Yala

Unit	Channel	% area[a] Planted	Size of the planted Holding (average areas)	Total extent[b] damaged (acres)
2	L B 7	98.9	2.1	*
	L B 10	100.0	1.8	*
	Drainage area of L B 6 and L B 7	100.0	2.0	*
22/23/24	U B 2	89.7	1.8	*
	Drainage area of U B 2 (tail)	44.2	0.8	*
18/19	U B 17	100.00	1.3	*
	M 1	89.8	1.4	*
10	M 16	86.6	2.3	1.0
	Drainage area along Andella Oya and M 16	90.0	3.3	0.5
33	L B 29	100.0	1.5	*
	G 3	100.0	1.3	*
	Drainage area of G 3 Navakiri River	27.2	1.1	*
D_2 Block 1.0	G 16	100.0		2.6
34/36	L B 39	100.0	2.5	*
	V 2	100.0	1.6	*
	Drainage area of L B 36 and L B 39	100.0	2.2	*
38	S 7	100.0	3.0	*
	S 8	96.2	2.5	*
	Drainage area	75.2	3.0	*

Source: ARTI Sample of 315 farmers.

[a] Percentage of sample area planted in 1983 Yala over the sample area planted in 1982/83 Maha season.

[b] Crop failure of sample farmers due to lack of water.

[c] Undamaged sample area.

The size of the planted allotment is higher in middle/tail areas such as in Units 10 and 38 while it is smaller in head areas (Table 5). This is because of the greater fragmentation of alloted land in head areas, particularly among family members. The small-sized holdings in head areas are yet viable as irrigation water is assured for them. In tail areas the situation is such that due to irregular and uncertain supplies of irrigation water, cultivation of small fragmented allotments may not bring about sufficient returns in order to sustain large families[4]. Hence prevention of fragmentation of alloted holdings may be a strategy adopted by tail area farmers towards maximizing per farm returns.

During 1983 Yala season subsidiary food crops were not planted on lowlands by the sampled farmers. However, it was observed that some lowland allotments along M 18 and M 31 were planted with vegetables such as long beans and brinjals, and tobacco.

iv. Staggering of Cultivation Practices:

The spread of dates taken by different farmers for three major planting operations are shown in Table 6.

Table 6 shows that first dates of land preparation in head distributory channels coincide with the first water issue while in tail distributories (M 16, G,16), the land preparation has begun, 1 to 2 weeks earlier than the first water issue. This is because of the 'dry' land preparation technique adopted by farmers along M 16 and G 16 channels. Similar trend are also seen with regard to sowing (dry sowing) and harvesting. The total crop duration calculated from the first date of planting to last date of harvest of paddy is over 120[5] days in LB 7, UB 2, UB 17, M 1, G 3, S 8, G 16 and drainage areas of UB 2, LB 39, V 2 and M 16.

---

4. See forthcoming ARTI publication on Pre-rehabilitation situation of the Gal Oya Left Bank.

Table 6 : Spread of Dates (First and Last) for Various Activities by Channels

Unit	Channel	Land Preparation	Sowing	Harvesting
2	LB 7	March 20th to April 27	April 7th to April 29	July 10th to August 10
	LB 10	March 23rd to April 22	April 7th to April 23	July 15th to July 29
	Drainage area of LB6 & LB7	March 23rd to May 29	April 19th to May 30	July 23rd to August 10
22/23/24	UB 2	March 21st to April 26	April 6th to April 27	July 14th to August 6
	Drainage area along Andella Oya and UB 2	March 22nd to May 1	April 7th to May 2	July 20th to August 9
18/19	UB 17	March 21st to to April 28	April 1st to May 2nd	July 8th to August 14
	M 1	March 20th to April 29th	April 7th to May 1	July 12th to August 7
10	M 16	March 5th to April 16	April 1st to April 20	July 14th to July 27
	Drainage area of Andella Oya and G 16	March 12th to April 18	April 8th to April 30th	July 21st to August 25
33	LB 29	March 21st to April 2	April 10th to April 25	July 15th to August 7
	G 3	March 17th to April 28	March 30th to April 29	July 12th to August 6
	Drainage area of Nawakiri river and G3	March 24th to April 4	April 10th to April 20	July 19th to July 30
D_2	G 16	March 14th to April 5	April 2nd to April 18	July 16 to August 7
34/36	LB 39	April 2nd to April 21	April 17th to April 29	August 2nd to August 10
	V 2	April 3rd to April 25	April 22nd to May 5	August 1st to August 15
	Drainage area of LB 36 & 39	April 2nd to April 28	April 19th to May 7	August 2nd to August 18
38	S 8	March 28th to April 27	April 13th to May 1	July 26th to August 11
	S 7	April 6th to April 20th	April 25th to	August 2nd
	Drainage area of Sillikkody Branch Channel and LB Channel	April 2nd to April 24	April 21st to April 30th	August 2nd to August 9

Source : ARTI Sample of 315 farmers.

The shortest crop duration has been recorded by farmers along the drainage area of S B, and Navakiri Tank.

Table 7 : Actual Crop Duration by Channels

Channel/Area	Crop Duration (days)
LB 7	138
LB 10	118
Drainage area of LB 6 and LB 7	114
UB 2	123
Drainage area along Andella Oya and UB2	125
UB 17	136
M 1	123
M 16	118
Drainage area along Andelle Oya and M 16	140
LB 29	119
G 3	130
Drainage area of Navakiri river and G 3	111
G 16	128
LB 39	116
V 2	116
Drainage area of LB 36 & LB 39	122
S 8	121
S 7	104[b]
Drainage area of Sillikkody Branch Channel and LB Channel	111

Source : ARTI Sample of 315 farmers
[a] Duration between first date of planting to last date of harvest.
[b] Duration only for one farmer.

5. Refers to the duration of the first-date of planting to the last date of harvesting in each sample channel.

v. Resource Use and Returns to Paddy Production

This section presents information on resource use such as the adoption of paddy varieties, seed paddy use and fertilizer practices of the sample farmers. This will be followed by a discussion on the cost of paddy production in the sample area.

a. Adoption of paddy varieties:

Paddy varieties adopted by farmers in the Left Bank of Gal Oya during 1983 Yala season include all BG varieties such as 94-1, 94-2, 34-8 and 276-5. Of them, BG 94-1 is the most widely adopted variety as 66.7% of sample farmers use this variety. The rate of adoption of other varieties by locations of farmers is shown in Table 8. It is evident that none of the farmers have adopted either old improved varieties or old varieties. All these varieties except BG 34-8 are 3 1/2 months while BG 34-8 is a short aged (3 months) variety.

b. Seed paddy:

The quantity of seed paddy used per acre is 3.5 bushels with a range of 2.2 to 5.6 bushels. Table 9 shows that the seed rate is high (over 3.8 bushels) in tail/middle units such as 38,10 and 33; it is also higher in most of the areas fed by drainage water. The high seed rate is attributable to the dry sowing techniques adopted in tail areas.

c. Fertilizer use:

The proportion of farmers and the sample extent which received three main types of fertilizer namely Top Dressing Mixture (TDM), urea and Basal Mixture (V 1) are given in Table 10. The largest extent of 92% of the sampled area received TDM. 83% of the extent, received urea while an extent of 66% has received V 1 mixture.

Table 8 : Varietal Adoption by Channel Area - 1983 Yala Season (% Farmers)

Unit	Channel area	94-1	94-2	90-2	90-1	34-8	276-5	400-1	275-1	270-5	275-2	379-2	Mixtures of BG varieties	No Response
2	LB 7	85							15					
	LB 10	53							20				27	
	Drainage area of LB 7	60										40		
22/23/24	UB 2	88	4			4	4							
	Drainage area along Andella Oya and UB 2	70		10		10	10							
	UB 17	50	3		4	4	11	14	11		3			
18/19	M 1	47	6		12	6			12	12			05	
10	M 16	97	3											
	Drainage area of Andella Oya and M 16	100												
33	LB 29	67	13			13	7							
	G 3	81	6				12							
	Drainage area of Navakiri river and G 3	67					33							
D_2 Block	G 16	85					15							
34/36	LB 39	100												
	V 2	7	87										6	
	Drainage area of LB 36 and LB 39	13	87											
38	S 7 and S 8	100												
	Drainage area of Sillikody Branch Channel/LB Channel	100												
	Left bank Area	67	16	0.3	1	2	4	1	4	1	0.3	1	2	2

Source: ARTI sample of 315 farmers

Table 9 : Distribution of Seed Paddy Use by Sample Area
1983 Yala Season

Unit	Channel	Seed rate Bushels per acre	Standard Deviation
2	LB 7	3.6	0.69
	LB 10	2.6	0.48
	Drainage area	4.0	0.76
22/23/24	UB 2	3.4	0.76
	Drainage area	3.2	0.70
18/19	UB 17	2.9	0.56
	M 1	3.2	0.61
10	M 16	3.8	0.37
	Drainage area	4.0	0.48
33	LB 29	4.0	0.56
	G 3	3.8	0.61
	Drainage area	3.8	0.84
D_2 Block	G 16	3.6	0.46
34/36	LB 39	2.2	0.45
	V 2	2.7	0.87
	Drainage area	2.2	0.41
38	S 7 and S 8	5.6	1.32
	Drainage area	5.3	0.96
	Left Bank	3.5	

Source : ARTI sample of 315 farmers.

Table 10 : Fertilizer Use by Area (% farmers and % extent fertilized)

CHANNEL AREA	TDM		UREA		V1 MIXTURE	
	% Extent	% Farmers	% Extent	% Farmers	% Extent	% Farmers
LB 7	82.5	75	86.2	85	46.2	35
LB 10	86.4	87	100.0	100	13.5	13
Drainage area	92.0	90	100.0	100	16.0	20
UB 2	100.0	100	80.7	79	89.7	92
Drainage area	90.4	90	85.7	80	66.6	70
UB 17	100.0	100	76.5	75	87.2	89
M 1	100.0	100	83.0	82	79.2	82
M 16	77.0	82	98.0	95	94.0	91
Drainage area	77.0	77	90.0	92	76.0	71
LB 29	100.0	100	09.0	07	22.0	27
G 3	100.0	100	40.0	31	45.0	37
Drainage area	100.0	100	*	*	67.0	67
G 16	95.0	95	100.0	100	65.0	65
LB 39	90.0	87	81.0	80	68.0	67
V 2	73.0	87	63.0	67	57.0	53
Drainage area	100.0	100	79.0	73	53.0	47
S 8	100.0	100	94.0	95	75.0	60
Drainage area	100.0	100	100.0	100	92.0	93
LEFT BANK	92.0	93	83.0	78	66.0	64

* Not Adopted

Source : ARTI sample of 315 farmers.

The rate of adoption of major types of fertilizer materials by sampled farmers are 78% for urea, and 64% each for V 1 and TDM respectively.

Of the three types of fertilizer materials only V 1 mixture is applied less, while urea and TDM are applied more than the recommended[6] quantity.

d. Cost of paddy production:

Table 12 presents the cost of paddy production by cash[7] and non-cash[8] items, during the Yala season. It is evident that labour accounts for about 45% of total paddy production cost. There again the cost of family labour alone has taken a share of 27% of production costs. The next important item is fertilizer which together with other agro-chemicals have represented a 23% of production cost. Seed paddy contributes 2 - 8% of cost. The percentage cost of animal power is 2.5 - 1% while that for the tractor is 0.3 - 6%. Cost of other materials and services such as sacks, transport etc. have been 1.8%. On this basis, it has cost Rs. 2234 excluding family labour and Rs. 3059 if family labour was included per acre of paddy production, during 1983 Yala season.

---

6. Recommended rates of application of fertilizer for Ampara district (3 1/2 month paddy variety) by the Department of Agriculture are : V 1 mixture 168.75 lbs. or 75 kg. per acre, Urea 85 lbs. or 37.5 kg. per acre, TDM 112.5 lbs. or 50 kg. per acre.
7. Cash cost refers to those items which have to be purchased by the operator.
8. Non-cash items are those not purchased by operators.

Table 11: Rate of Application of Fertilizer by Channel Locations (Pounds per acre)

Unit	Channel	T.D.M.	V I	Urea
01	LB 7	98	50	99
	LB 10	110	11	102
	Drainage area	81	18	87
22/23/24	UB 2	146	109	93
	Drainage area	101	80	101
18/19	UB 17	134	91	69
	M 1	116	80	80
10	M 16	87	122	126
	Drainage area	93	96	76
33	LB 29	184	27	7
	G 3	157	55	24
	Drainage area	208	86	*
D_2 Block	G 16	119	73	130
34/36	LB 39	112	74	60
	V 2	111	94	43
	Drainage area	115	64	59
38	S 8	116	84	107
	Drainage area	112	112	124
	Total	116	78	88

* Not adopted

Source : ARTI Sample of 315 farmers.

Table 12 : Estimated Cost of Paddy Production in the Left Bank 1983 Yala Season

Cost Item	Cost (Rs. per acre)	% of Total Cost
a. Cash Cost		
Hired labour	387	13
Contract labour	15	0.5
Fertilizer	385	12.5
Agro-chemicals	326	11
Seed paddy	65	02
Farm Power - Buffaloe	78	2.5
Tractor	197	6
Other costs	40	01
SUB TOTAL	1638	53
b. Non-cash Cost		
Family labour	825	27
Exchange labour	145	5
Seed paddy	240	8
Farm Power- Buffalo	328	11
Tractor	10	0.3
Other costs	26	0.8
SUB TOTAL	1429	47
GRAND TOTAL	3067	100

Source : ARTI sample of 270 farmers (exclude units 34/36).

Note : Non-cash items valued at market price.

vi. Paddy yield:

Figure 3 presents the distribution of paddy yield within the Left Bank area. It is seen that the majority of farmers obtain a per acre yield of less than 60 bushels.

Paddy yield per acre in the Left Bank of Gal Oya has been only 53 bushels[9] during 1983 Yala season. (Table 13). The per acre paddy yield realised by individual sample farmers however,

[9]Unweighted average for the area.

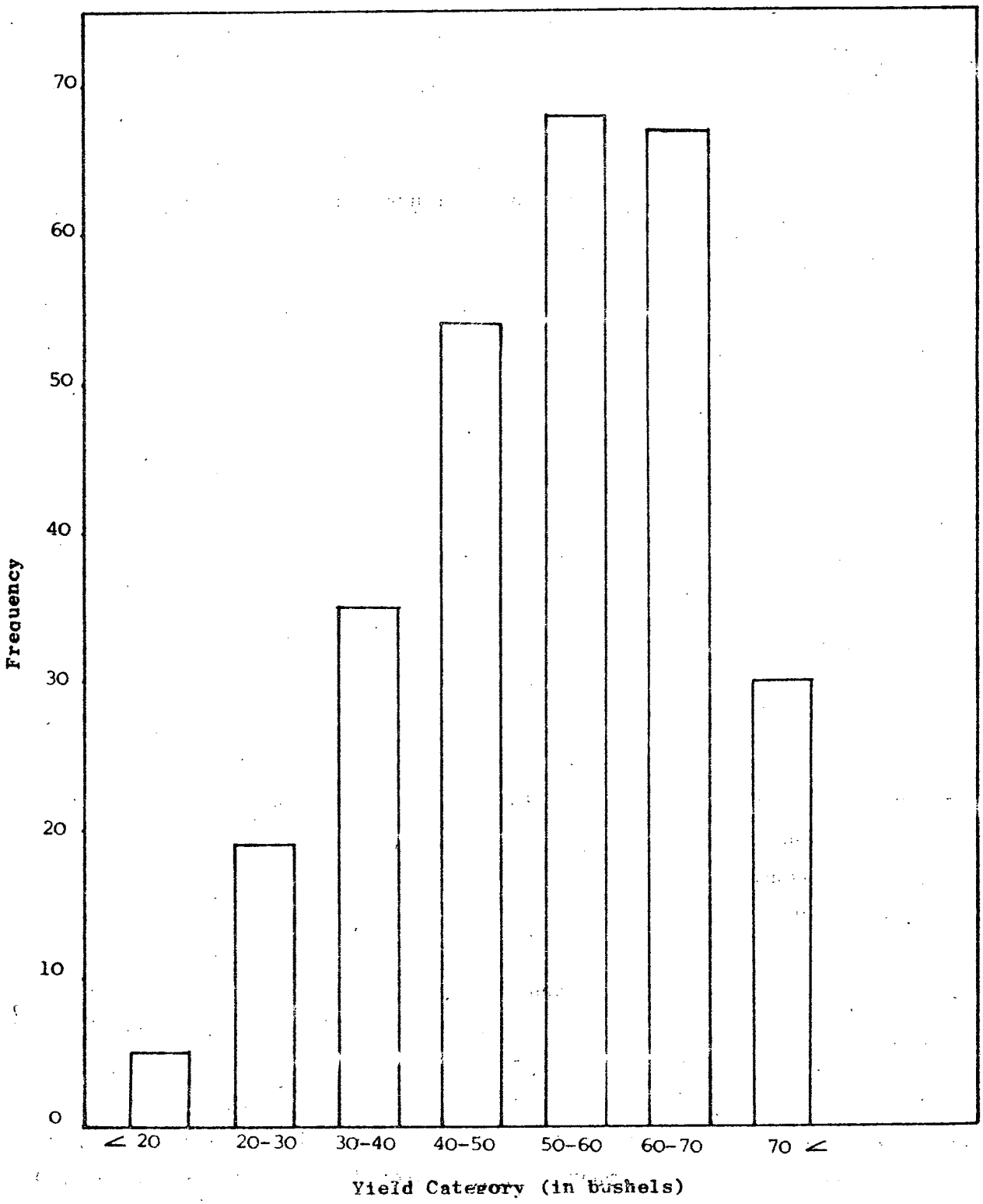


Figure 3 : Frequency Distribution of per acre Paddy Yield - 1983 Yala

ranged from 10-121 bushels. The highest yield of 68 bushels was recorded in LB 10; however, the variability of the same is very great as seen in the standard of deviation.

vii. Other matters related to agricultural production and systems rehabilitation

Three important agro-ecological changes were observed during the season. First, the weed problem was very serious inspite of several attempts of chemical weed control by farmers. Paddy liyaddas in most areas of Left Bank were full of bloomed weeds, even at the stage of harvest. Second, an epidemic of leaf blight disease of paddy was observed in most of the sample locations. Third, a strong wind was observed around flowering stage of paddy in some of the areas. These three factors together with localised attacks of Brown Plant Hopper may have contributed to the low paddy yield during the season, as shown in section vi.

Two problems arose from Water Management Project activities. First, most of the rehabilitated structures along the Uhana Branch and distributory channels were completed prior to the season. Hence, the usual problem that accompany new structures arose right at the beginning of the season. In particular, as a regulator that was to be built below UB 12 was not constructed, water did not enter channels UB 8, UB 9, UB 11, and UB 12 in the expected quantities. This was a major problem only along UB 9 where in the first three days of the water issue, the farmers alone or Irrigation Department officers and farmers together damaged four structures to increase the flow of water. Subsequently, a temporary regulator of sandbag was built below UB 12 and there was no further trouble during the season.

The second problem occurred in Gonagolla where no 'D' channel rehabilitation has yet commenced; since it was one of the first

Table 13 : Distribution of Paddy Output in the Left Bank System 1983 Yala Season

Channel/Area	Yield/Acre (bushels)	Standard Deviation
LB 7	54	12.95
LB 10	68	23.83
Drainage	53	7.47
UB 3	63	13.90
Drainage	52	12.66
UB 17	60	7.61
M 1	55	8.78
M 16	49	17.89
Drainage of M 16	59	14.92
LB 29	38	21.10
G 3	39	14.13
Drainage of Navakiri River	42	3.52
G 16	45	21.04
LB 39	47	15.38
V 2	53	15.96
Drainage area of LB 39/V 2	50	15.12
S 7 and S 8	54	8.27
Drainage of Sillikkody Distributory	57	10.60
Left Bank	53[a]	16.21

a. Unweighted mean

Source: ARTI sample of 315 farmers.

areas for the farmer organization programme, farmers could often speak with some voice. One result was a request to the Irrigation Department (ID) to deliver the usual five days issue of water in three days during the season, so that the head could be increased and the water could be pushed further along the channels. Although the discussion was held early in the season, the request was not made until May. Following this change, Gonagolla farmers had a three day on and seven days off Schedule.

In June, the ID decided that to conserve a rapidly dwindling supply of reservoir the yet to be implemented schedule for the Left Bank should be changed from five days on and five days off to five days on and six days off cycle. This meant that the Gonagolla schedule changed from three days on and seven days off to three days on and eight days off for one water rotation. This schedule may have placed great stress on farmers along LB 29 in August.

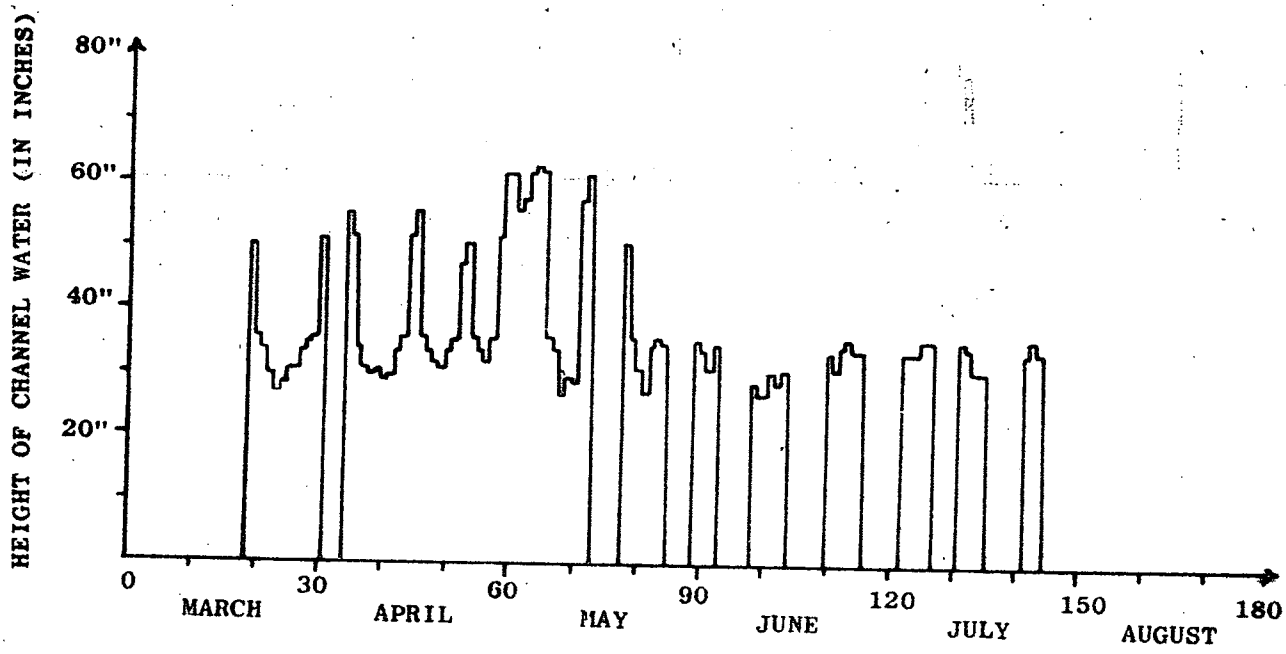
The agreement to supply five days water in three days is a good example of farmers and ID officers working together to solve a problem. On the other hand, the change to a longer off period appears to have been made without any recognition that it would be a stress on some Gonagolla crops.

List of Main/Branch Channel Water Flow Chart

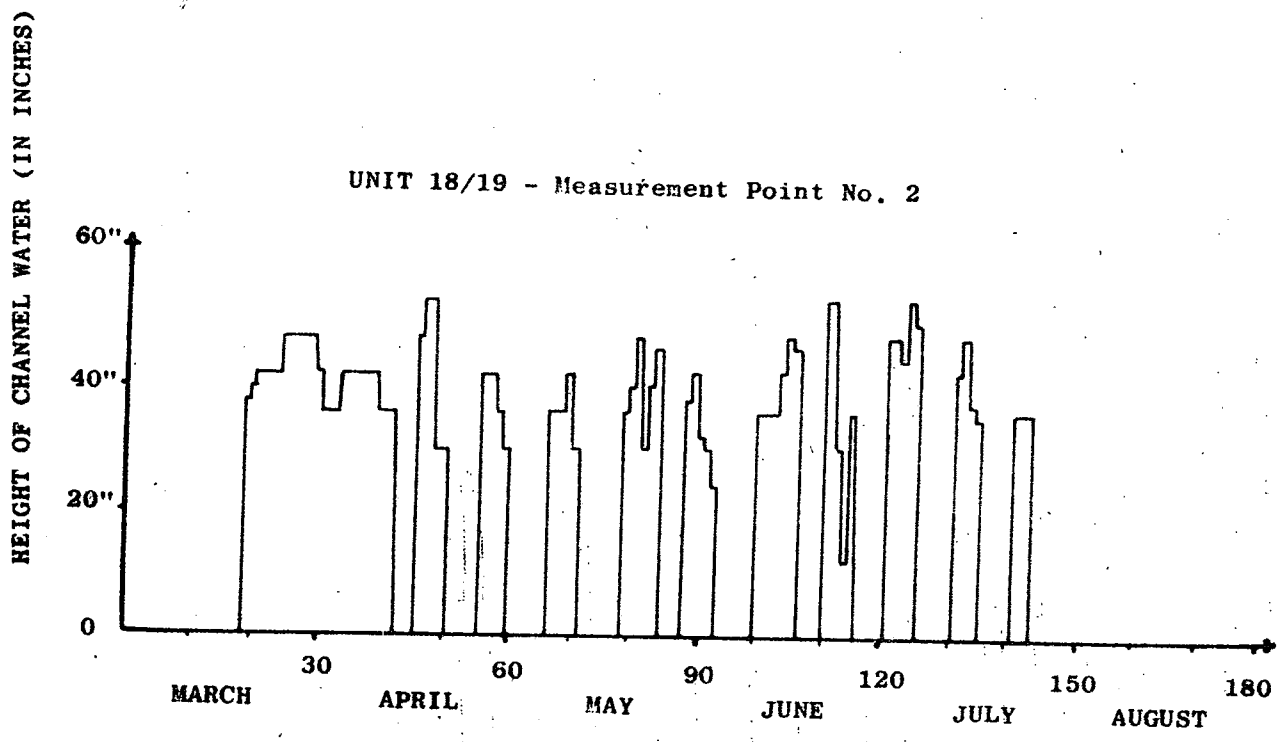
Unit No.	Measuring Point	Serial No.
2	Left Bank Main Channel at LB 7 distributory off-take	1
18/19	Uhana Branch Channel at UB 17 distributory off-take	2
33	Left Bank Main Channel at LB 29 distributory off-take	3
33	Gonagolla Branch Channel at G 3 distributory off-take	4
38	Sillikkody Branch Channel at S 8 distributory off-take	5

ANNEX 1

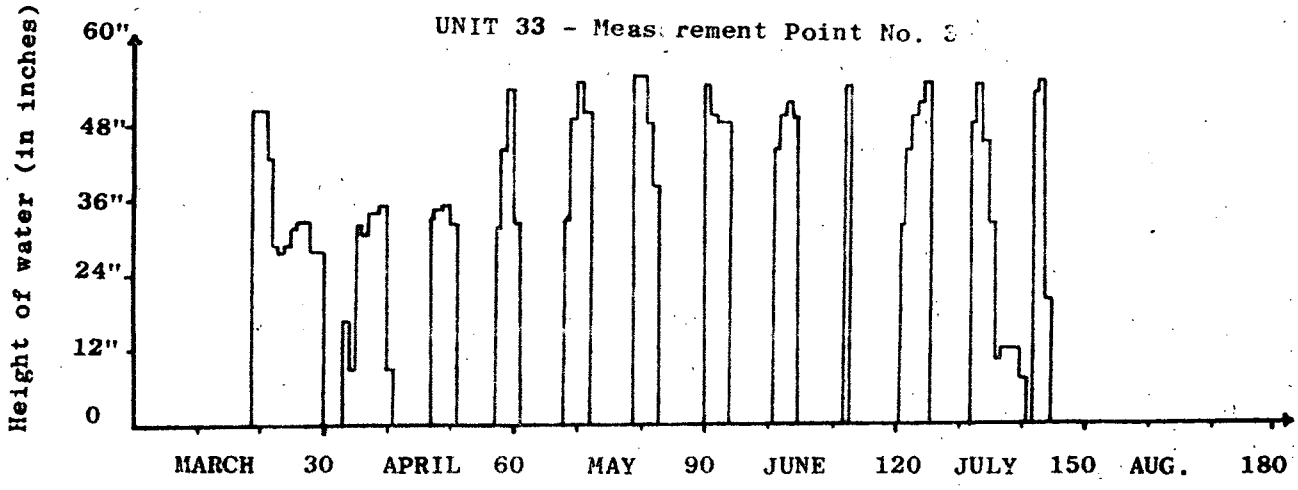
UNIT 2 - Measurement Point No. 1

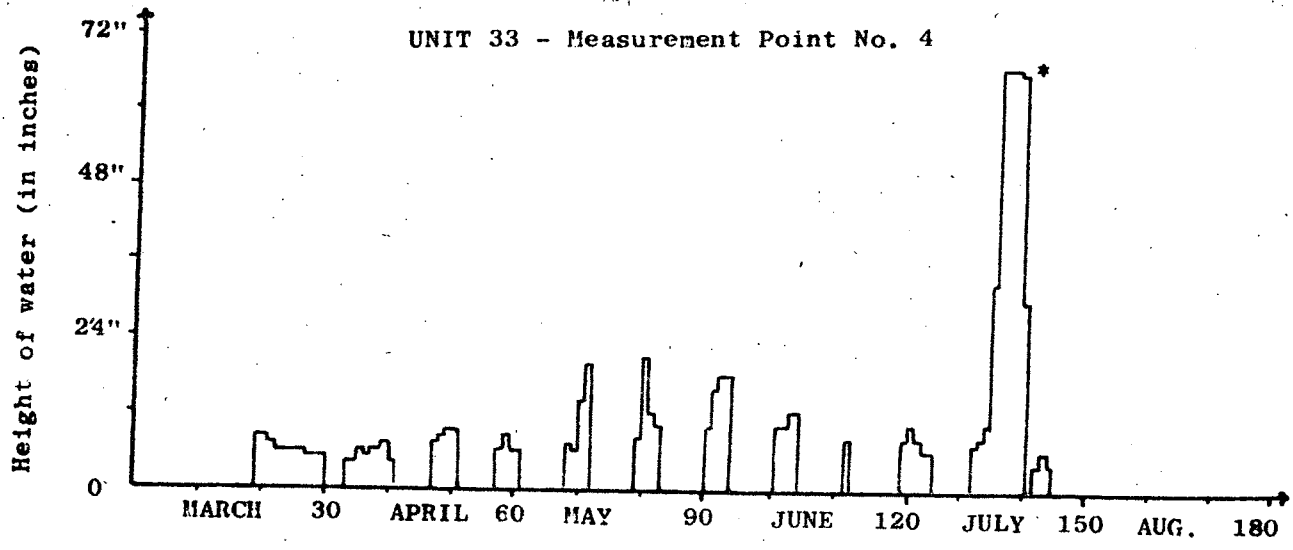


UNIT 18/19 - Measurement Point No. 2



ANNEX 2





* Special issue to augment Navakiri Tank.