GAL OYA WATER MANAGEMENT RESEARCH PROJECT

SEASONAL REPORT

1983/84
MAHA SEASON

Occasional Publication 35

March 1987

AGRARIAN RESEARCH AND TRAINING INSTITUTE,
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SRI LANKA

GALOYA WATER MANAGEMENT RESEARCH PROJECT

Seasonal Report 1983/84 Maha Season

R. de. S. Ariyabandu

Occasional Publication Series 35 **March 1987**

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FOREWORD

Under the Gal Oya Water Management Project which was implemented by the Ministry of Lands and Land Development through the Irrigation Department with financial assistance from USAID, the Agrarian Research and Training Institute was commissioned to carry out a socio-economic research in the Project area. This assignment included, among other things, an experiment with a suitable model to secure farmer participation in water management and to monitor changes resulting from the irrigation rehabilitation.

The ARTI research programme had several components. It started with a baseline survey of the project area, followed by a record-keeping programme of about 300 selected farm households. Information from the record-keeping programme was analysed seasonally, with a view to observing the changes in cultivation practices in the project area. The record-keeping programme was also expected to be a major source of information for several other research studies in Gal Oya Left Bank.

This report on the Maha cultivation season of 1983/84 is the second of the Seasonal Report series published by the ARTI. The report contains data obtained through the record-keeping programme on reservoir storage, water issues, rainfall, land authorization, staggering of cultivation, resource use characteristics and on agricultural production. It also highlights some important aspects relating to irrigation system operations during the season.

My thanks are due to Mr. R.de.S. Ariyabandu, Research and Training Officer, who prepared the report in this form.

T.B. Subasinghe
DIRECTOR.

ACKNOWLEDGEMENTS

I am grateful to Dr. Hammond Murray-Rust (Cornell Consultant/Water Management) who helped in many ways especially in the technical aspects of water measuring, channel flow, etc and to Mr. A.S.Widanapathirana for giving me support in the economic analysis part. Dr. Jayantha Perera kindly read the final draft and gave several constructive comments on the report. I thank him too.

My sincere thanks are due to Mr. K.L.G. Siripala, Investigator, who assisted me in completing the field work. I wish to thank Mr. M.A. Gunawardena and Mr. D.G. Karunaratne, Statistical Assistants for their help in collecting data.

Sinnathul Muflia and Nilanthi Felix typed the report deligently and I would like to place on record their tireless efforts in preparing the draft in this form.

Last but not least, I am grateful to Mr. T.B. Subasinghe, the Director for his continuous encouragement in completing this study.

R.de.S. Ariyabandu.

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SEASONAL REPORT FOR 1983/84 MAHA SEASON - GAL OYA LEFT BANK

1. SUMMARY AND INTRODUCTION

The 1983/84 Maha Season which commenced in September 1983 continued through February 1984. Land preparation was mainly carried out using rain water. However, an issue of irrigation water was made available for a period of 17 days (Nov. 21-Dec.7) in order to supplement crop water requirements. A great majority of the tail-end farmers and many in the head end, practised dry sowing of paddy.

Unlike in the previous seasons the Maha rains (1983/84) were unusually intense during the latter part of the season. As a result heavy crop losses and severe damage to rehabilitated structures were observed.

At the beginning of the season the storage capacity of the Senanayake Samudra was 28,670 acre-feet which is 3.68 percent of the full storage capacity. Subsequently, with the heavy Maha rains received in the area the tank storage increased to its full capacity, with a peak storage of 777,000 acre-feet recorded on the 28th February. A total of 24,936 acre-feet of water was issued to the left bank system during the 1983/84 Maha Season.

According to the decisions taken at the Kanna meetings in different locations of the system, the first issue of water was to be released on the 15th of January 1984. However, there was an issue of water delivered on the 21st November to 7th of December 1983.

The overall accomplishment of the Physical Rehabilitation work stands at 64.8 percent as against a scheduled 67.5 percent at the end of the 1983/84 Maha Season. The construction activities were possible to a lesser extent during the first 3 months of the season due to an unscheduled release of water in late November that continued through the first 7 days of December and was followed by intermittent heavy rainfall for the rest of the month. Continuous heavy rainfall and in some cases flood conditions throughout January and February, had limited construction activities for the last 3 months of the season.

Table (1) SUMMARY OF ACTIVITIES IN THE LEFT BANK AREA

1983/84 MAHA SEASON

Description	
Storage level at the beginning of the season	28,670 acre feet
Storage level at the end of the season	777,000 acre feet (full capacity)
First date of water issue (proposed)*	15 - 01 - 1984
Final date of water issue (proposed)	15 - 02 - 1984
Mean Rainfall per month**	15.08" (383 mm)

* - There was an issue of water on 21st November until 7th December due to inqdequate rainfall.

** - Mean for Ampara Station.

GAL OYA PROJECT

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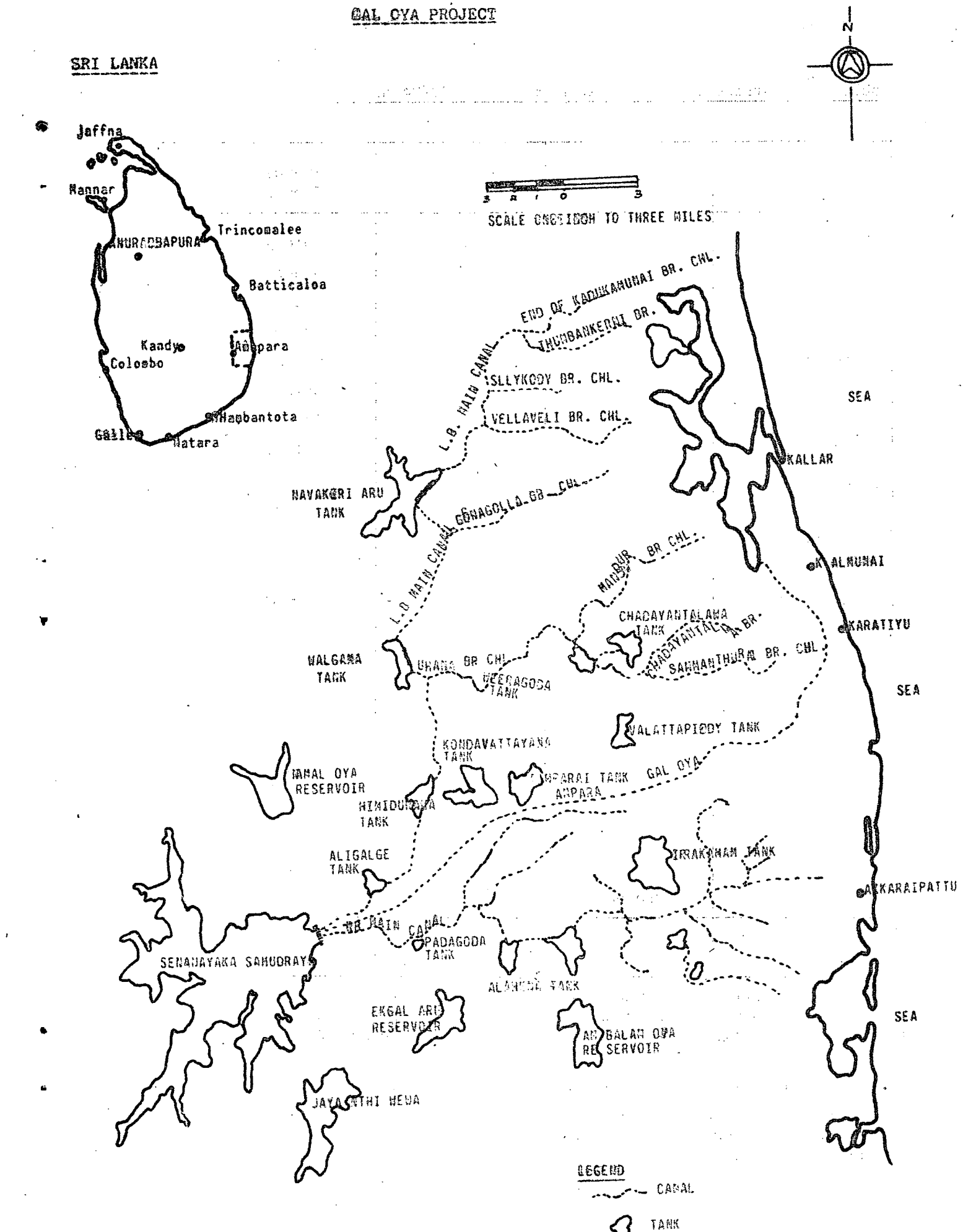


Map 1 - Map of the Gal Oya Project

Table 2 - Distribution of Sample Farmers - 1983/84 Maha Season

Administrative Unit	Channel	Number of Farmers	Status of Farmers
38 (Tail)	S 8	18	Colony
	Drainage	20	Other
10 (Middle)	M 16	21	Colony
	Drainage	14	Other
02 (Head)	LB 7	19	Colony
	LB 10	15	Colony
	Drainage	11	Other
7/15 (Tail)	M 31	40	Colony
18/19 (Head)	M 1	15	Colony
	UB 17	30	Colony
D_2 (Tail)	G 16	20	Colony
	G 21/24	25	Other
22/23/24 (Head)	UB 02	16	Colony
	Drainage	24	Other
34/36 (Middle)	LB 39	17	Colony
	V 2	12	Colony
	Drainage	15	Other
33 (Middle)	G 3	15	Colony
	LB 29	15	Colony
	Drainage	4	Other
	Rainfed	11	Other
D_1 (Tail)	V 21	20	Colony
	Drainage	20	Other
Total		417	298 Colony 119 Other

Note: LB - Left Bank Channel
UB - Uhana Branch Channel
G - Gonagola 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, D1, D2, 38

Other refers to following category of farmers :
Encroachers, those who do not have direct supply of channel water, purana land operations etc.

Table 3: Classification of Selected Distributary Channels by Location

Reservoir	Branch Channel	Distributary Channel	Administrative Units
Senanayake 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	V_2, 21	36, D_1 Block
	Sillikkody	S 7, 8	38

A total of 270 field channel farmer organizations and 3 Distributory Channel organizations were in operation during the season. With the fielding of the 3rd batch of Institutional Organizers (IOs), the total number of IOs increased to 70.

2. ORGANIZATION OF THE REPORT

The report is organized into the following sections .

1) Pre-seasonal activities.
2) Water issues and field water availability.
3) Area planted and incidence of crop damage.
4) Staggering of agricultural practices.
5) Resources use and returns to paddy production.
6) Paddy yield.
7) Other activities.

(i) Pre-Seasonal Activities

This section presents information with respect to water issues and agricultural operations as proposed at the kanna meetings conducted at various locations of the system. As can be seen from the Table 4, the proposed dates for various agricultural operations in most parts of the Left Bank System seem to be similar, with the exception of Palayadivattai Agrarian Service area.

There was a notable difference in the proposed date and the actual date of water issue from the Senanayake Samudra. Land preparation

during Maha season generally takes place a few days after monsoon rains in late October or early November which continues until about mid January. This reduces the need for irrigation water until mid January. Accordingly, the date proposed for first issue of water was 15th January, but the actual issue was delivered on the 21st November 1983. This was necessary because in some parts of the Left Bank System rice plants were stressed due to insufficient rain received in the early part of the season. In Palayadiviattai Agrarian Services area the decision was to deliver the first issue of water on the 31st of January. However, the first issue was delivered on the 23rd November.

(ii) Reservoir Storage, Water Issues, Distribution and Field Water Adequacy

a) Reservoir Storage

Reservoir storage and issues to Left Bank, Right Bank and River Division during the season are shown in figure(1)

Storage of the Senanayake Samudra at the beginning of the season was 28,670 acre-feet 3.68 percent of the full capacity). Subsequently with the heavy Maha rains the storage increased to its full capacity with peak storage of 777,000 acre-feet recorded on the 28th February during the season. The last time Senanayake Samudra was filled in 1964.

There was only one issue of irrigation water delivered to the Left Bank system, from 21st of November to 7th of December. As mentioned before this was due to insufficient rainfall in the system during this period of the season. Subsequently, water issues to the Left Bank were cut-off in response to the heavy rains.

The Right Bank system had water continuously from the beginning of the season to 8th of December. A total of 20,242 acre feet of water was issued to the Right Bank system during the season.

In the Navakiri system the first issue of irrigation water was delivered on the 23rd of November. This was in contrary to the decision taken at the Palayadivattai kanna meeting. The delivery of irrigation water before the scheduled date was due to lack of rain after dry sowing of paddy generally practised in this area.

b) Rainfall

During the months of September to November there was moderate rainfall. The monthly total rainfall for Ampara, Gonagolla and Namaloya rainfall stations did not exceed more than 6 inches for these 3 months. From December to February there was very heavy rainfall. The same three

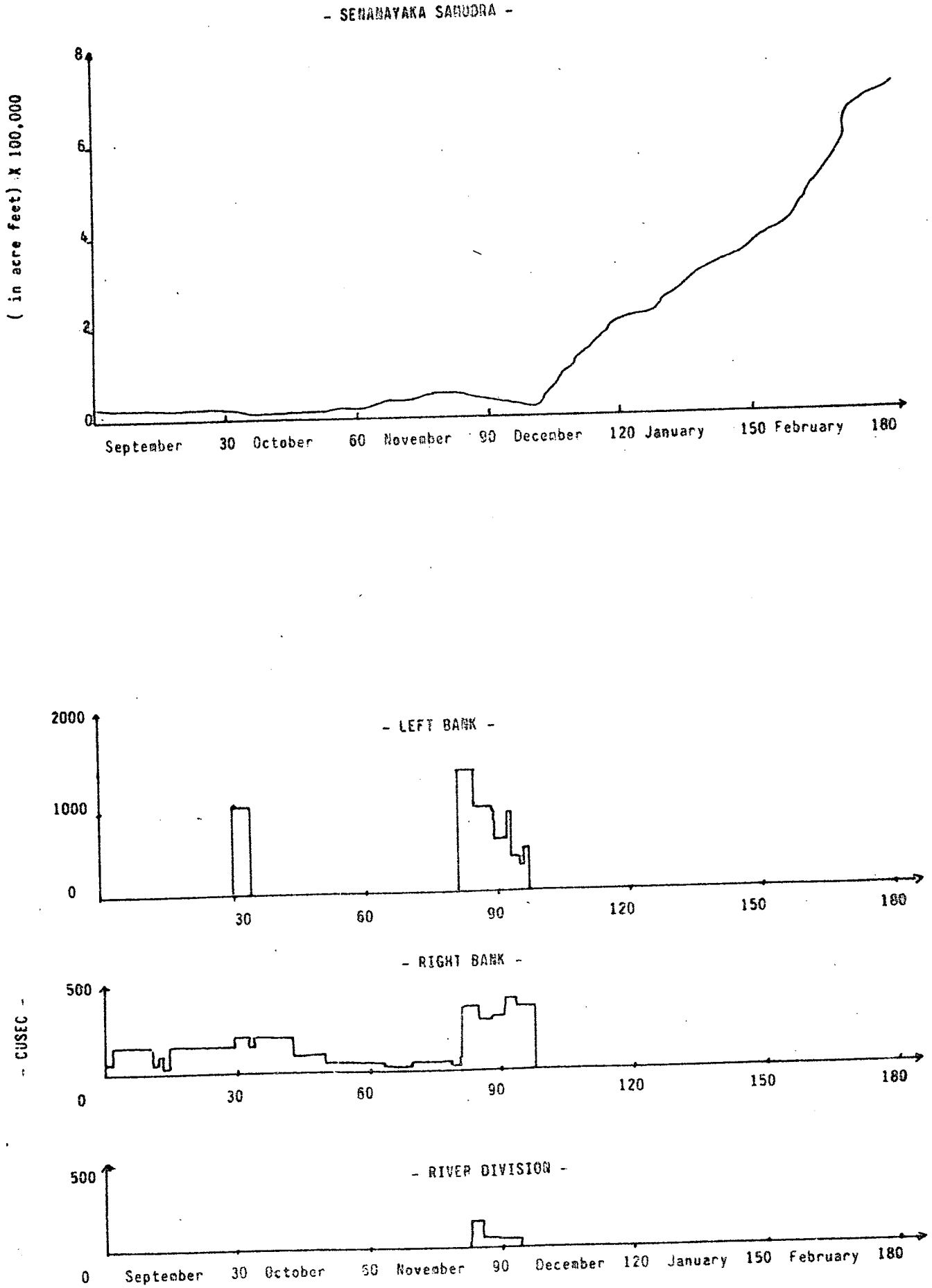
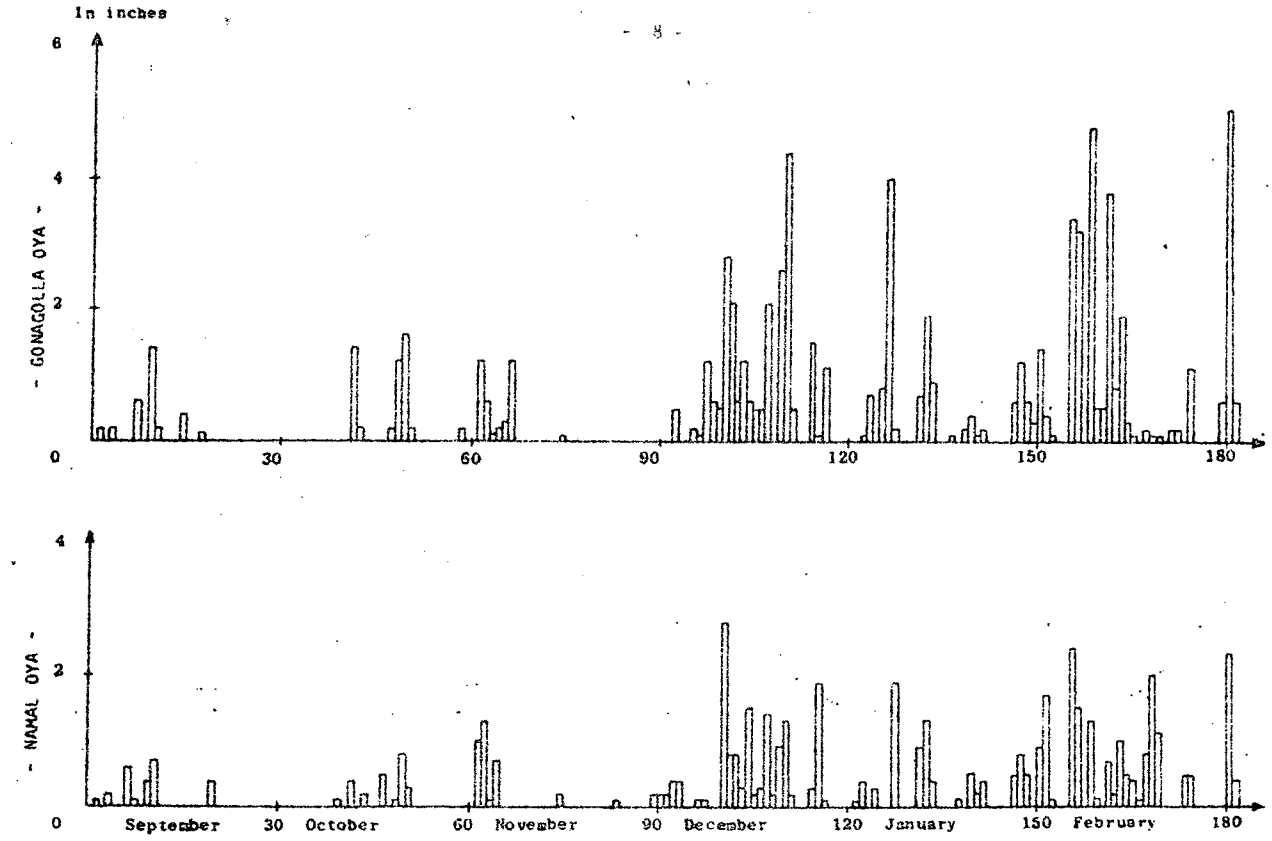


Figure 1 : Reservoir capacity and water issues to Left Bank System during 1983/84 Maha season



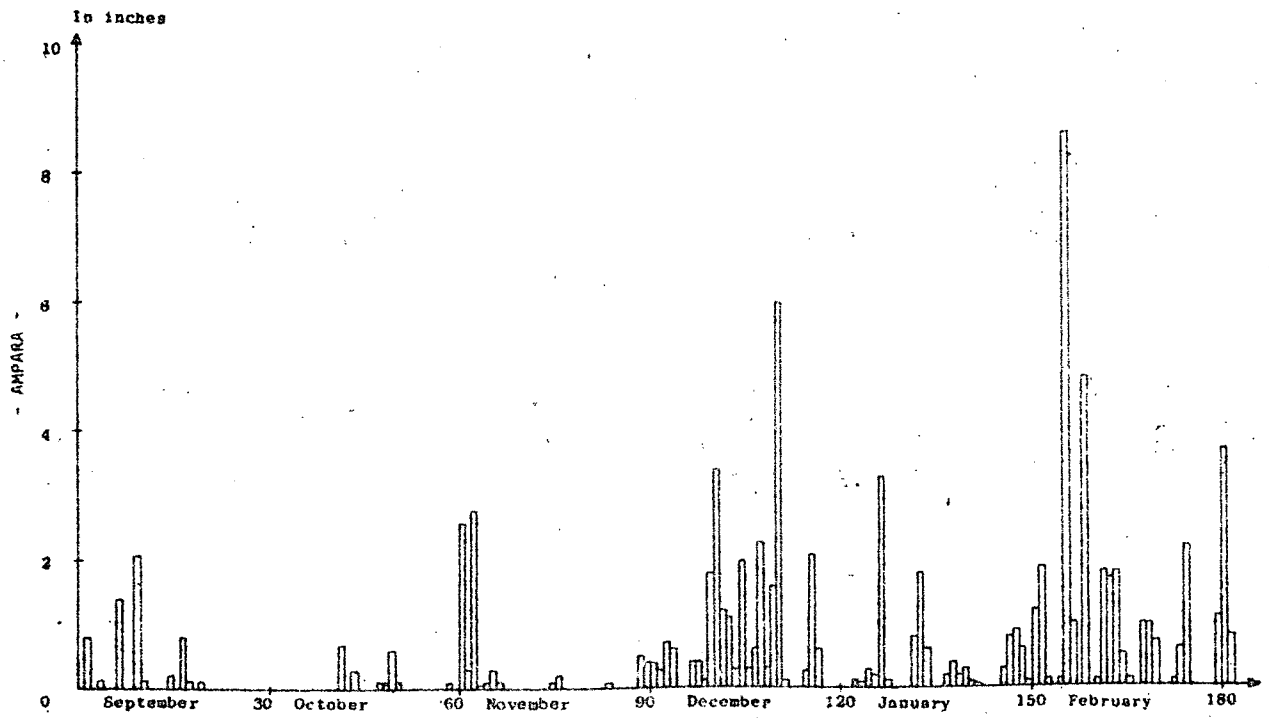


Figure 2 Distribution Of Rainfall In Selected Locaiton
1983/84

Table 4 - Schedule of Cultivation Activities and Other Important Decisions 1983/84 Maha Season

	Weeragoda	Werankatagoda(b)	Uhana	Namaltalawa(a)	Palayadivattai
1. Total area authorised for cultivation (Acres)	6888	8668	8526	5532	450
2. Paddy variety (Growth duration in months)	B.G. 1/94 (3-3½ months)	B.G. 1/94 (3-3½ months)	B.G. 1/94 (3-3½ months)	B.G. 1/94 (3-3½ months)	B.G. 1/94 (3-3½ months)
3. Final date of sowing	83.11.15	83.11.15	83.11.15	83.11.15	83.10.01
4. First issue of water	84.01.15	84.01.15	84.01.15	84.01.15	84.01.31
5. Final issue of water	84.02.15	84.02.15	84.02.15	84.02.15	84.02.29
6. Final date of payment of Insurance Premium	83.11.15	83.11.15	83.11.15	83.11.15	83.10.01
7. Clearing of channel Bunds etc.	83.10.15	83.09.10	83.10.15	83.11.15	83.09.01
8. Removal of cattle	83.10.15	83.09.10	83.10.15	83.11.15	83.09.01

(a) The area of authority includes units 1,2, Himadurawa and the area under Namal Oya reservoir.
Source : Records of the Department of Agrarian Services Ampara/Reports of ARTI investigators.

(b) Includes units 34,36 and the area under Navakiri reservoir.

rainfall stations recorded a monthly total of more than 15 iches from December to February. Highest rainfall of 32 inches was recorded in the Ampara rainfall station for the month of February. The rainfall stations in Ampara, Gonagolla and Namal Oya recorded a total rainfall of 90.45", 80.30" and 51.14" during the season. Rainfall station in Navakiri area had recorded a total rainfall of 77" with a maximum rainfall of 22" received in the month of December. Comparatively, October had been a dry month during the season.

c) Water Deliveries in Channels

There was only one issue of water delivered from Senanayake Samudra to the LB system. The issue was for a period of 18 days from 21st November to 7th December. This issue of irrigation water was cut-off from 7th December, in response to heavy rain received in the area. This issue of irrigation water was delivered up to M 31 in the Uhana branch channel and G-24 in the Gonagolla Branch channel.
Navakiri system also had only one issue of irrigation water for the season from 23rd November to 2nd December, over a period of 10 days. This issue of irrigation water was delivered down LB 39, S 8 in Sillikkody Branch channel, V_2 and V 21 in Velleveli Branch Channel. Issues from Navakiri system were cut off from 2nd December in response to heavy rain in the area.

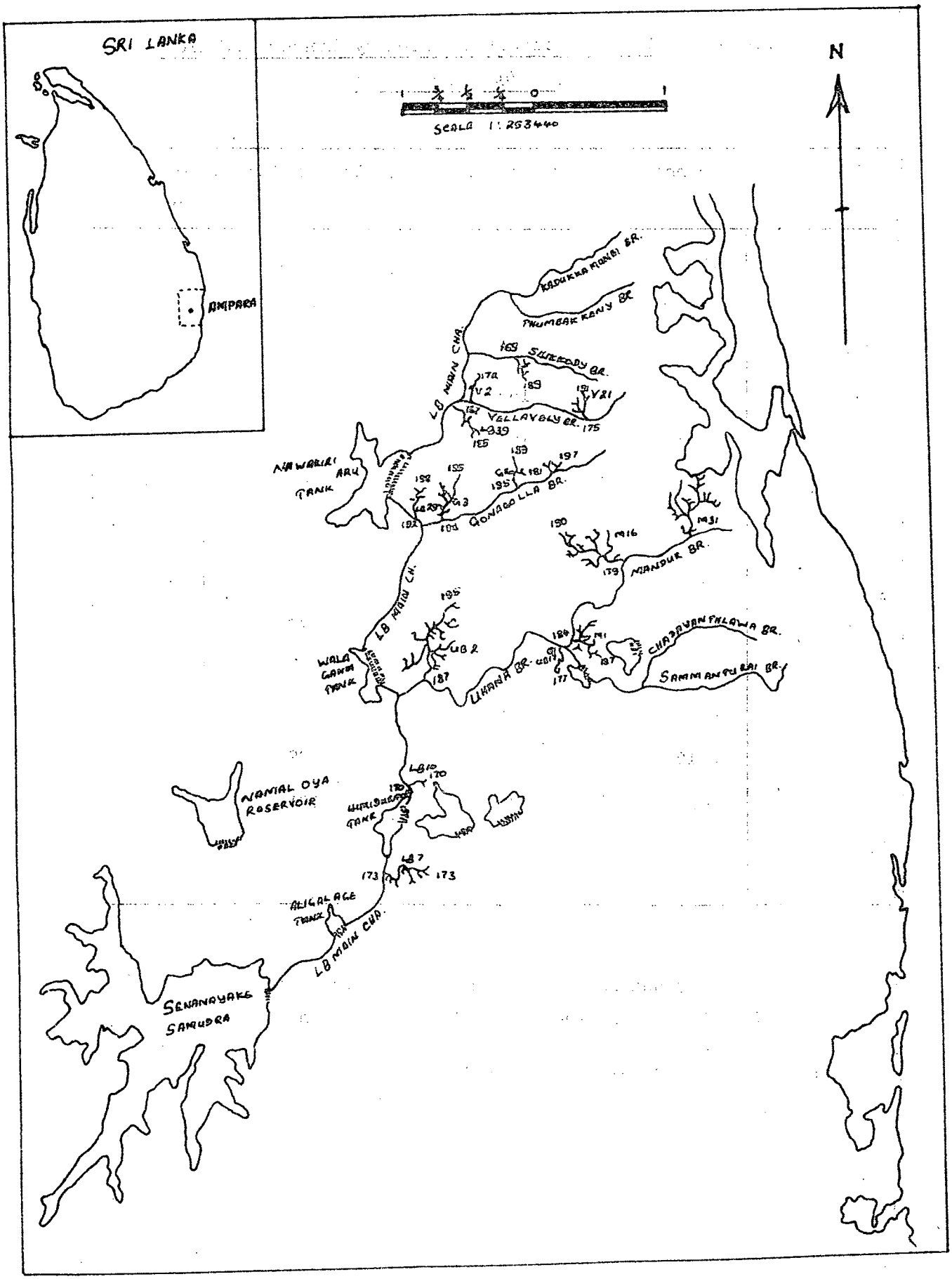
d) Field Water Availability

The mean values for the water availability index for the sampled channels are show in Map (2). It is evident that there was good availability of water throughout the system due to the heavy rains. Most of the sampled fields were flooded during the months of December and January. Higher water availability indices were obtained in many of the field observations.

(iii) AREA PLANTED AND THE INCIDENCE OF CROP DAMAGE

During 1983/84 Maha season 100 percent of the ARTI sample area had been cultivated with paddy.

The size of the planted holdings were higher in the tail areas as against the head areas of the LB system. In tail units such as 7/15, 10 and 38 the average size of land holdings vary between 2.6 to 3.4 acres. In general, it is seen that in the head area of the system, land holdings tend to be fragmented, ranging from 1.0 acre(unit 33 rainfed)to 2.7 acres (unit D_1 - Vellaveli 21) (Table 6). The higher



Map 2 : Water Availability Index by Channels

Table 5: Water Availability Index by Channel Location

1983/84 Maha Season

Unit No.	Channel	Average W.A.I. L I*	Average W.A.I. L II*	Overall Average
02	LB 07	173	173	173
02	LB 10	170	170	170
22/23/24	UB 02	187	195	191
18/19	M 1	184	187	186
18/19	UB 17	191	177	184
10	M 16	179	190	185
33	G 3	188	195	192
33	LB 29	192	198	195
34/36	LB 39	177	185	183
34/36	V 2	167	172	175
D 2	G 24	181	197	189
D 2	G 16	195	199	197
D 1	V 21	175	191	183
38	S 8	169	189	179

L I - Liyadda on the head end of a field channel.

L II - Liyadda on the tail end of a field channel.

Source : ARTI Sample of 258 farmers.

Table 6 : Size of Planted Holdings by Channel Locations 83/84

Maha Season

Unit No.	Channel	Size of the Planted Holding (Average acre per farmer)	No. of Farmers	Total Acreage
38	S 8	2.68	18	48.25
	Drainage	3.28	20	65.5
10	M 16	2.64	21	55.5
	Drainage	3.32	14	46.5
02	LB 07	2.05	19	39
	LB 10	1.96	15	29.5
	Drainage	2.36	11	26
7/15	M 31	3.4	40	136
18/19	UB 17	1.41	30	42.5
	M 1	1.63	15	21.25
D 2	V 21	2.75	20	55
	Drainage	2.73	20	54.75
32	G 16	2.95	20	59
22/23/24	UB 2	1.82	16	29.25
	Drainage	1.17	24	28.25
34/36	LB 39	1.97	17	33.5
	V 2	1.87	12	22.5
	Drainage	2.1	15	31.5
33	G 3	1.43	15	21.5
	LB 29	1.73	15	26
	Drainage	1.37	4	5.5
	Rainfed	1.04	11	11.5

Source : ARTI Sample of 417 farmers

Table 7 : Schedule of Dates (First and Last) for Various Activities by Channels 1983/84 Maha Season

Unit	Channel	Land Preparation	Sowing	Harvesting
38 (Tail)	S 8	1983.09.07 1983.10.30	1983.10.10 1983.11.02	1984.02.13 1984.03.09
	Drainage	1983.09.05 1983.10.29	1983.10.07 1983.10.31	1984.02.10 1984.03.11
10 (Middle)	M 16	1983.09.12 1983.11.06	1983.10.05 1983.11.13	1984.02.19 1984.03.11
	Drainage	1983.09.14 1983.11.08	1983.10.17 1983.11.17	1984.02.19 1984.03.19
02 (Head)	LB 07	1983.09.19 1983.11.26	1983.10.27 1983.11.27	1984.02.15 1984.03.18
	LB 10	1983.10.02 1983.12.03	1983.11.01 1983.12.06	1984.02.26 1984.03.21
	Drainage	1983.09.18 1983.11.25	1983.11.01 1983.12.03	1984.02.17 1984.02.24
7/15 (Tail)	M 31	1983.08.09 1983.11.02	1983.10.13 1983.11.02	1984.02.17 1984.03.07
18/19 (Head)	UB 17	1983.10.06 1983.12.09	1983.10.30 1983.12.09	1984.02.19 1984.03.19
	M 1	1983.09.20 1983.11.30	1983.10.28 1983.12.01	1984.02.15 1984.03.18
D 1 (Tail)	V 21	1983.09.02 1983.11.20	1983.10.27 1983.11.20	1984.02.19 1984.03.17
	Drainage	1983.09.01 1983.11.09	1983.10.20 1983.11.18	1984.02.19 1984.03.20
D_2 (Tail)	G 24	1983.09.01 1983.11.11	1983.10.11 1983.11.11	1984.02.15 1984.03.23
32 (Tail)	G 16	1983.08.12 1983.12.01	1983.10.11 1983.12.02	1984.02.03 1984.03.22
22/23/24 (Head)	UB 2	1983.10.15 1983.12.04	1983.11.10 1983.12.10	1984.02.08 1984.03.25
	Drainage	1983.10.05 1983.12.26	1983.11.02 1983.12.28	1984.02.18 1984.03.28

Contd..2/

Unit	Channel	Land Preparation	Sowing	Harvesing
34/36	LB 39	1983.09.05 1983.12.07	1983.10.24 1983.12.01	1984.02.21 1984.03.17
	V_2	1983.09.25 1983.11.21	1983.11.03 1983.12.21	1984.02.20 1984.03.18
	Drainage	1983.10.02 1983.12.05	1983.11.03 1983.12.08	1984.02.22 1984.03.20
33 (Middle)	G 3	1983.09.12 1983.12.04	1983.10.13 1983.12.05	1984.02.07 1984.03.23
	LB 29	1983.10.15 1983.12.10	1983.11.01 1983.12.11	1984.03.05 1984.03.23
	Drainage	1983.09.18 1983.11.29	1983.11.01 1983.11.30	1984.03.11 1984.03.23
	Rainfed	1983.09.17 1983.11.30	1983.10.24 1983.12.03	1984.02.28 1984.03.22

Source : ARTI Sample of 417 farmers.

Land holding size in the tail area is due to irregular and uncertain water supply*. Cultivation of small holdings in these areas do not bring sufficient returns to sustain a family. However, cultivation of small land holdings in the head areas are viable because of the assured irrigation water supply to the farmers.

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* The high land holding size in the tail area does not necessarily mean that the average size of the land owned by farmers is high. In most cases the land had been divided and passed on to children, but in practice the cultivation of these plots is assigned to one of them.

(IV) STAGGERING OF CULTIVATION PRACTICES

The schedule of dates followed by different farmers for the three major planting operations namely land preparation, sowing and harvesting are shown in Table 7. Most of the head-end farmers started their land preparation with the rains from late September until early October (UB 7, UB 2, UB 17) while many tail-end farmers began their land preparations as early as August until early September (M 31, V 21, S 8). Sowing of paddy in the head-end of the system began with the first Maha rains in late October to early November (LB 7, UB 17, UB 2) while most tail-end farmers practised dry sowing before the onset of the actual Maha rains. Almost all the farmers in the sample area (irrespective of head or tail) started harvesting by February, with the exception of LB 29 and Drainage of G 3/5 farmers who started harvesting by early March. The total crop duration (see Table 8) calculated from the first date of sowing to last date of harvesting varies from 116 days in drainage area of LB 6/7 to 165 days in G 24.

Generally farmers tend to stagger cultivation work in Maha season. This is particularly true of head-end farmers, but in 1983/84 Maha season staggering has become more evident with the tail end farmers. Farmers of G 24, G 16, S 8 etc., had a crop duration of mroe than 150 days. This was due to very early sowing of paddy by some farmers. Almost all the farmers in the sample area cultivated 3-3½ month paddy varieties, complying with the decisions taken at the kanna meetings.

(V) RESOURCE USE AND RETURNS TO PADDY PRODUCTION

The resources used such as the use of recommended paddy varieties, quantities of seed paddy and fertilizer will be discussed in this section. This will be followed by a discussion on the cost of production of paddy in the sample area.

a) Use of Recommended Paddy Varieties

The paddy varieties cultivated by farmers in the Gal Oya Left Bank during 1983/84 Maha constituted 3-3½ month duration B.G. varieties such as 94-1, 94-2, 34-8, 276-5 etc. Rate of adoption of varieties by locations of farmers are shown in Table 9. BG 94-1 was the most popular and widely used variety and 76 percent of the total sample farmers cultivated this variety. A small percentage of the farmers used 4-4½ month old varieties like BG 1/400 and 1/90. One farmer in rainfed area of Unit 33 used old improved variety H-8.

Table 8: Actual Crop Duration by Channels - 1983/84 Maha Season

Unit	Channel	Crop Duration (Days)
38	S 8	151
	Drainage	156
10	M 16	158
	Drainage	154
02	LB 07	143
	LB 10	142
	Drainage	116
7/15	M 31	146
18/19	UB 17	142
	M 1	160
D_1	V 21	142
	Drainage	152
D_2	G 16	164
	G 24	165
22/23/24	UB 2	138
	Drainage	148
34/36	LB 39	146
	V 2	138
	Drainage	139
33	G 3	163
	LB 29	144
	Drainage	144
	Rainfed	151

Source : ARTI Sample of 417 farmers.

Table 9 : Varietal Adoption by Channel Location 1983/84 Maha Season (percentage of farmers)

Unit No.	Channell.	BG 1/94	BG 2/94	BG 2/90	BG 5/276	BG 1/400	BG 6/34	BG 2/379	BG 1/300	BG 1/90	Mixture of BG Varieties
38	S 8	100.0	-	-	-	-	-	-	-	-	-
	Drainage	100.0	-	-	-	-	-	-	-	-	-
10	M 16	66.7	9.5	4.8	-	-	-	-	-	-	19.0
	Drainage	78.6	-	-	14.3	7.1	-	-	-	-	-
02	LB 07	86.7	-	-	-	-	-	-	-	-	13.3
	LB 10	73.3	-	-	-	-	6.7	-	-	-	20.0
	Drainage	57.1	-	-	-	7.1	-	28.6	-	-	7.2
7/15	M 31	94.9	-	-	-	-	-	-	2.6	-	2.5
18/19	UB 17	86.7	-	-	-	10.0	-	-	-	-	3.3
	M 1	84.6	-	-	-	15.4	-	-	-	-	-
D 1	V 21	94.7	-	-	-	-	-	-	-	-	5.3
	Drainage	84.2	-	-	-	-	-	-	-	-	15.8
32	G 16	75.0	-	-	-	-	-	-	-	-	25.0
	G 24	100.0	-	-	-	-	-	-	-	-	-
22/23/24	UB 02	87.5	12.5	-	-	-	-	-	-	-	-
	Drainage	87.0	-	-	13.0	-	-	-	-	-	-
34/36	LB 39	76.5	23.5	-	-	-	-	-	-	-	-
	V 2	33.3	58.3	-	-	-	-	-	-	-	8.4
	Drainage	86.7	13.3	-	-	-	-	-	-	-	-
33	G 3	40.0	-	-	40.0	-	-	-	-	-	20.0
	Drainage	25.0	-	-	25.0	-	-	-	-	25	25.0
	Rainfed	25.0	-	-	62.5	-	-	-	-	-	12.5
	LB 29	21.4	-	-	64.3	-	-	-	-	-	14.3
	LB Area	76.3	4.1	0.24	6.2	1.6	0.24	0.96	0.24	0.72	9.4

Table 10: Distribution of Seed Rate by Sample Area (Bushels per Acre)
1983/84 Maha Season

Unit	Channel	Seed Rate Bushels/Ac.	Standard Diviation	Number of Farmers
38	S 8	6.38	1.24	18
	Drainage	6.37	0.88	20
10	M 16	4.72	1.06	21
	Drainage	4.53	1.11	13
02	LB 07	3.85	1.01	19
	LB 10	2.58	0.52	15
	Drainage	4.02	1.37	10
7/15	M 31	7.27	0.86	39
18/19	UB 17	4.6	1.39	30
	M 1	4.27	1.02	13
D 1	V 21	5.57	1.91	18
	Drainage	5.61	1.32	19
D 2	G 16	4.06	1.22	20
	G 24	6.78	1.46	25
22/23/24	UB 02	3.7	0.682	16
	Drainage	3.53	0.89	23
34/36	LB 39	3.46	1.41	17
	V 2	3.9	1.11	12
	Drainage	2.94	0.97	15
33	G 3	3.62	1.07	15
	LB 29	3.48	0.96	14
	Drainage	3.0	0.81	4
	Rainfed	3.6	0.70	8
Left Bank		4.4		

Source : ARTI Sample of 404 farmers.

b) Seed Paddy

The average quantity of seed paddy used per acre was 4.4 bushels with a range of 2.5 to 7.2 bushels per acre. Table 10 shows that the seed rate is high (over 5.0 bushels per acre) in the tail-end units such as 38, 7/15, D 1 and D_2. Unit 7/15 channel M 31 area had the highest use of seed paddy per acre with 7.2 bushels per acre. The high seed rates in the tail units are due to the practise of dry sowing of paddy which invariably requires a larger quantity of seed paddy.

c) Fertilizer Use

The proportion of farmers as well as the extent of cultivated land which received the three main types of fertilizers, namely the Top Dressing Mixture (TDM) Urea and the Basal Mixtures (V_1) are given in Table 11. For the sampled area, both TDM and Urea had been applied to an extent of 72 percent while the use of V_1 was only to an extent of 25 percent. Farmers of units 02, D_1 and about 80 percent in unit 33 have not used the basal mixture (V_1). The rate of fertilizer use by sample farmers were 74 percent for TDM, 69 percent for Urea and 23 percent for the Basal Mixture (V_1).

The use of fertilizer by the sample farmers and the extent of cultivated land which received the three main fertilizer types for 1983/84 Maha season was much less than that for the 1983 Yala season. (see 1983 Yala Seasonal Report).

The rate of application of the three main types of fertilizers given in the Table 12, indicates that many of the sample farmers have not applied the recommended quantities of the fertilizer types. Application of Basal Mixture (V_1) is less than the recommended quantities in the entire sample area. Application of urea was more than the recommended quantities in the tail end areas (units D_2, D_1 and 38). Though some of the farmers have applied the recommended quantities of fertilizer the actual qualities of nutrient have not been supplied to the plant. This is because farmers use more than the recommended quantity of fertilizer in some cases and much less than the recommended quantity in others. This is particularly true where farmers apply large quantities of urea and apply less quantities of TDM which in turn also contributes to the total Nitrogen requirements of the Rice plant (urea contains 46 percent of N while TDM contains 30 percent of N), to a large extent.

Table 11: Fertilizer Use by Sample Location 1983/84 Maha Season (%-Farmers and % extent Received)

Unit	Channel	TDM		Urea		V 1	
		% Extent	% Farmers	% Extent	% Farmers	% Extent	% Farmers
38	S 8	100.0	100.0	100.0	100.0	34.19	44.4
	Drainage	86.25	85	100.0	100.0	74.8	75
10	M 16	64.86	61.9	84.68	80.95	11.7	9.52
	Drainage	68.27	64.28	61.29	64.28	27.95	21.42
02	LB 07	94.87	89.47	89.74	89.47	0	0
	LB 10	67.79	66.66	100.0	100.0	0	0
	Drainage	76.92	81.81	57.69	63.63	0	0
18/19	LB 17	90.58	90.0	45.29	46.66	39.41	40.0
	M 1	83.52	84.6	41.17	46.15	0	0
D 1	V 21	51.92	55	73.55	80	0	0
	Drainage	48.85	57.89	84.01	94.73	0	0
D 2	G 16	60.16	70	80.5	90	15.25	15
	G 4	76.15	72	90	88	56.13	52
22/23/24	UB 02	66.6	75	70.9	81.25	27.1	12.5
	Drainage	63.9	60.8	18.9	21.7	7.2	8.69
34/36	LB 39	49.25	41.17	77.6	70.58	65.6	58.8
	V 2	77.7	83.3	64.4	58.3	40	53.3
	Drainage	69.8	73.3	58.7	80	57.14	66.6
33	G 3	83.7	100.0	46.5	33.3	0	0
	LB 29	92.39	100.0	17.39	21.4	0	0
	Drainage	45.45	50	0	0	0	0
	Rainfed	43.47	33.3	13.04	11.1	26.08	11.1
Left Bank Average		71.95	73.98	72.15	69.0	25.3	23.0

Source : ARTI Sample of 377 farmers

Table 12 : Rate of Application of Fertilizer and Total N.P.K. for Different Channel Locations (Kg/Ac)

Unit	Channel	Urea	V_1	T.D.M.	N	P_2O_5	K_2O
02	LB 7	58	-	64	46	-	13
	LB 10	46	-	31	30	-	6
	Drainage	20	-	20	15	-	4
22/23/24	UB 02	28	14	32	20	4	8
	Drainage	9	5	52	20	2	11
18/19	UB 17	16	23	65	28	7	15
	M 1	26	-	56	29	-	11
10	M 16	44	5	26	28	2	7
	Drainagw	40	19	41	31	6	10
33	G 3	18	-	51	23	-	10
	LB 29	7	-	42	16	-	8
	Drainage	-	-	64	29	-	13
	Rainfed	11	33	61	24	10	15
34/36	LB 39	24	39	18	18	12	8
	V 2	31	21	52	30	6	13
D 2	G 16	43	8	32	30	2	7
	G 24	46	23	30	31	7	8
D 1	V 21	56	38	28	36	11	9
	Drainage	43	51	19	27	15	9
38	S 8	43	16	37	32	5	9
	Drainage	53	41	46	39	12	13

Source : ARTI Sample of 377 farmers.

Table 13 : Estimated Cost of Paddy Production in the Left Bank Area During 1983/84 Maha Season

	Cost (Rs. per acre)				
	Unit 10	Units 18/19	Units 22/23/24	Average	% of Total Cost
a. Cash Cost					
Hired labour	473	202	501	405	14
Contract labour	0	6	0	2	*
Fertilizer	258	383	276	298	10
Weedicide	96	119	125	111	4
Insecticide	73	18	41	48	2
Seed paddy	30	72	120	68	2
Other chemicals	28	68	2	32	1
Tractor	146	116	93	123	4
Buffaloe	49	37	126	67	2
Other	39	53	44	43	1
Sub-total 1	1192	1074	1328	1197	41
b. Non-Cash Cost					
Family labour	637	1435	855	923	32
Exchange labour	15	101	137	74	3
Seed paddy	428	349	229	349	12
Tractor	7	0	0	3	*
Buffaloe	267	421	362	337	12
Other	12	13	9	11	*
Sub-total II	1366	2320	1592	1697	59
GRAND TOTAL	2558	3394	2920	2894	100

* Negligible

SOURCE : ARTI sample of 30 farmers. The labour records sample for 1983/84 Maha was reduced to 50 farmers, and the units 7/15 had to be excluded from cost estimations due to incomplete data.

NOTE : Non-cash items valued at market price.

(d) COST OF PADDY PRODUCTION

The cost of production of paddy classified by source during 1983/84 Maha season is shown in Table 13. The average cost of production per acre (Rs.2894) is divided between cash and non-cash items. The cash items has a value of Rs.1197., while the non-cash component is Rs.1697 per acre. When compared with the previous Yala (1983) season, three main factors have contributed to the changes in the cost structure of paddy production in Maha (1983/84) season. First the season commenced late mainly due to non-availability of irrigation water for land preparation. As a result, planting was done mainly by dry sowing which, requires more seed paddy than for wet sowing. Therefore, the per acre cost of seed paddy (Rs.417) was higher than in the previous Yala season (Rs. 305). (It should be noted that the sample for previous season included some tail units where seed rate is usually higher than in the head units). Second, farmers in heard units undertook land preparation and planting late after waiting for irrigation water. In November a short water issue was made from the storage tanks and farmers had to complete planting within a short period. This prevented the chances of exchanging labour for cultivation work. A greater part of the work was done by family labour and hired labour. In unit 18/19 the cost of family labour is much higher than in other units due to increased application of labour for channel repair work damaged by rain.

In fact, farmers in these units (18/19) suffered heavily because the newly constructed bunds suffered from torrential showers several times. Third, the season was quite unusual in terms of rains which experienced throughout the latter part of the season beginning December. The heavy rain interfered with a chemical application and resulted in reduced application of most of the inputs such as fertilizer, weedicides, insecticides etc. Hence, labour which is usually spent for the application of these inputs was not registered in this season. Heavy rains also reduced the use of labour for activities such as on-farm water management and after care operations. These changes have led to slightly lower cost of labour for paddy production during 1983/84 Maha season than in 1983 yala season. The middle unit (unit 10) registered the lowest cost of labour (Rs.1125 per acre) since the incidence of crop damage was more in this unit. This was because of stagnation of water in these areas. Therefore, cost of labour spend on harvesting has been low in unit 10.

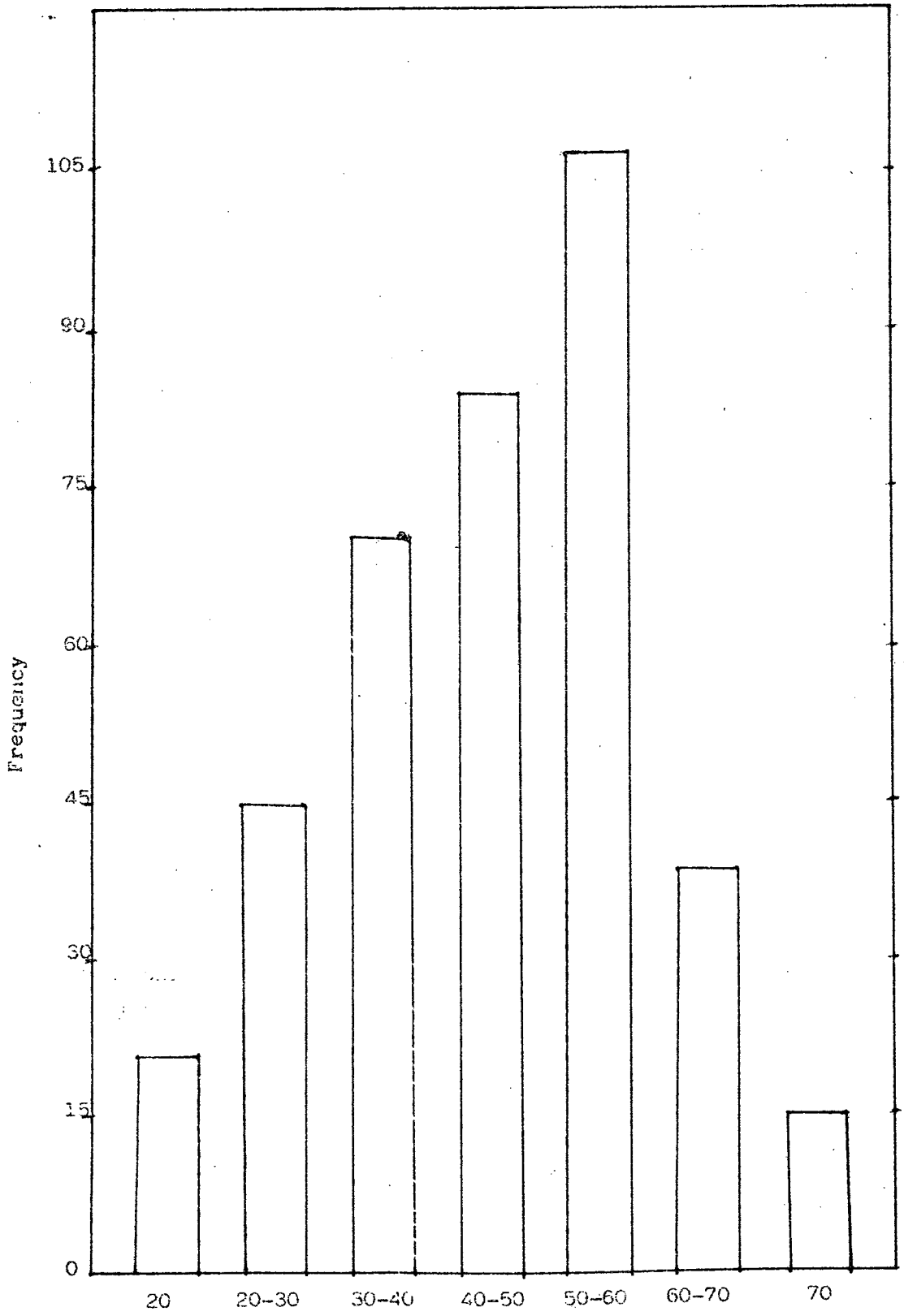

Figure 3 Frequency Distribution of Per Acre Paddy Yield 1983/84 Maha.

As mentioned earlier the per acre cost incurred on fertilizer, weedicides, insecticides and other chemicals are less in this season than in the previous season. The cost of tractor power has registered a slight decline from the previous season on account of reduction in the use of tractors for threshing, consequent to crop damage. Total buffaloe cost remained almost unchanged from the 1983 Yala season. Other costs such as spray mechine, fans, transport cost etc. are Rs. 43 in the case of cach costs and Rs. 11 for non-cash costs.

The percentage distribution of cost is as follows. Hired labour 14 percent, family labour 32 percent, exchange labour 3 percent. Hence, the cost on labour component out of the total cost is 48 percent. Fertilizer cost accounts for 10 percent while agro-chemicals represent 7 percent of total cost (weedicides 4 percent, insecticides 2 percent, and other disease controlling chemicals 1 percent). The cost of own tractor power 3 percent while the cost for hired tractor power is 4 percent. Buffaloe cost is 2 percent and 1[illegible] percent respectively for cash and owned. Seed paddy cost occupies 2 percent (cash) and 12 percent (own) of the total cost. Other material costs amount to 1 percent for cash costs while the cost of own materials is negligible.

(IV) Paddy Yield

The paddy production in Gal Oya area during 1983/84 Maha season has been adversely affected by the continued heavy rain.

As can be seen from the table 14, the average yield per acre was 45.3 bushels which is the lowest average recorded for a season since Maha 1979/80. The heavy rains which continued until late February delayed the harvest and caused severe damage to the paddy crop. The crop was overripe and in most cases decayed due to flood conditions. In addition there were factors, such as; shortage of water during the early part of the season and the outbreak of a plant disease called Neck Blast which also reduced the yield level to some extent.

Thus, the majority of the farmers received an average yield less than 50 bushels per acre (see figure 3). The highest yield recorded for this season was 96 bushels per acre. A substantial number of farmers did not even try to harvest their crop. Among those who gathered the lowest yield was 6.8 bushels per acre. Much of this crop damage was visible in the tail area of the Left Bank.

Table 14 : Distribution of Paddy Output in the Left Bank System 1983/84 Maha Season

Unit	Channel	Yield/Acre (Bushels)	Standard Diviation	N
7/15	M 31	36.46	7.52	34
18/19	M 1	47.58	9.24	14
	UB 17	50.64	9.20	29
22/23/24	UB 02	59.17	16.23	24
	Drainage	26.10	15.10	10
33	G 3	43.58	19.03	15
	LB 29	53.73	11.43	16
	Drainage*	50.58	-	3
	Rainfed*	3.02	-	9
	LB 39	46.61	12.69	9
34/36	V 2	55.04	9.29	6
	Drainage	42.18	18.50	4
38	S 7/8	52.18	12.59	19
	Drainage	50.57	10.75	13
D 1	V 21	42.46	11.92	17
	Drainage	48.83	10.51	18
10	M 16	38.21	11.17	18
	Drainage	38.01	9.76	8
D 2	G 16	40.35	12.96	19
	G 24	44.59	12.35	20
02	LB 07	58.29	10.58	16
	LB 10	42.99	14.39	15
	Drainage	52.54	6.99	12
Left Bank		45.3		336

* Includes 7 farmers who did not harvest the crop damage.

(VII) OTHER MATTERS

The season commenced late in the head units as irrigation water was not made available for land preparation work. Therefore, unlike in the normal Maha season many farmers in the head area (similar to those in the tail area) resorted to dry sowing of paddy. By early November 1983, sowing had been completed throughout the L.B. area. The delayed monsoon rains and insufficient water in the fields caused severe stress on plants. There was very little water in the major reservoir and was hardly sufficient for the entire Gal Oya area. The first water issue was made available by the fourth week of November. It was observed that some of the field channels in the tail area did not receive water even on the 8th day after releasing of water from the major reservoir.

The usual Maha rains delayed but commenced during the second week of December and continued until mid February, 1984. The torrential showers changed the water status altogether, and too much of water was the problem.

Fertilizer and other chemical applications were not possible since fields were full of water. Most of the fields were destroyed beyond recovery. The rains destroyed many structures and bunds constructed by the programme of rehabilitation.

The Maha rains continued until 3rd week of February 1984 by which time the crop was over ripe. During the latter part of February, farmers were busy harvesting the crop which was both over mature and in a state of rotting. Migrant labourers who visited the area from many parts of the country were busy attempting to recover paddy from decayed crop. Even Tamil women in the tail areas who do not normally work in fields were seen working for the first time. Few incidents of farmers committing suicide were also reported as a result of crop failure during this season.

The outbreak of a major disease known as Neck Blast of paddy (caused by a fungus) affected a substantial part of paddy lands. The disease was particularly wide-spread in tail parts of the scheme. A few localized attacks by the Brown Plant Hopper also affected the paddy crop.

/jl.