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Département du Centre de Coopération Internationale
en Recherche Agronomique pour le Développement (CIRAD)

**SRI-LANKA FRENCH AGRICULTURAL
RESEARCH DEVELOPMENT PROJECT
(SFARDP)**
**UNIVERSITY OF RUHUNA
MATARA - SRILANKA**

**INSTITUTE DE RECHERCHE
AGRONOMIQUE TROPICALE
(IRAT/CIRAD)**
**INSTITUTE FRANCAIS DE
RECHERCHE SCIENTIFIQUE
POUR LE DEVELOPPEMENT EN
COOPERATION
(ORSTOM)**
MONTPELLIER - FRANCE

AGRO-CLIMATOLOGICAL RISK AND THE IRRIGATION NEED IN DRY REGIONS OF SRI-LANKA

**K. D. N. WEERASINGHE
JANUARY 1990**

**DRN-IRAT/CIRAD
PROGRAMME HYDRAULIQUE
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RESUME

In the present work an analysis of daily rainfall of 19 rainfall stations in dry, wet and intermediate zones of sri-lanka, for Initial and conditional probabilities in weekly and monthly intervals are presented;it highlights the rainfall distribution pattern and climatic risk of wetland rice,especially in the dry regions of the country. It also discussed a methodology to decide upon the crop establishment time, and the crop performance probabilities,by exploiting the forward and backward moisture accumulation curves.In the final part of the work, a crop performance probability map and the maps of irrigation need for both 'Yala' and 'Maha' seasons, in normal and dry years are presented.

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1. INTRODUCTION

Sri Lanka is a tropical island with an area of 65610 km² where the double cropping system of agriculture is practised for centuries, using the rainfall of North-east and South-west monsoons. The monsoon regime demarcates two distinct seasons for cropping practices namely 'Maha' (major) and 'Yala' (minor) seasons. The minor season doesn't carry sufficient moisture for a pure rainfed crop in many part of the island. Thus in respect to the rainfall distribution pattern Sri Lanka is divided into Wet, Intermediate and Dry zones which are further sub divided into 23 agroecological Zones (National Atlas of Sri Lanka ,1981).

The wet zone covers 1.54 mln ha where annual precipitation ranges from 2300-5100 mm. This zone supports more than three quarter of the total population and accounts for about 70% of the cultivated land. The major crops of the low country wet zone are paddy, coconut, rubber and agroforestry systems of home gardens with varieties of tropical crops.

The intermediate zone is spread over relatively small area (0.85 mln. ha). The rainfall in intermediate zone ranges between 1500 - 2300 mm. Agriculture in wet and dry intermediate zones are based on paddy, coconut, cinnamon, pepper, citronella, cloves, agroforestry homergardens with pulses vegetables and horticultural fruit crops.

The major part of the island is covered by the dry zone (4.17 mln ha) where annual rainfall ranges from 900 - 1500 mm.

The dry zone is located in the north central, eastern, and south eastern parts of the country. The government strategy to increase the food production of the country is based on the better utilization of unexploited land of the dry zone by improving existing irrigation facilities and creation of new irrigation potential. The largest irrigation scheme of the country 'Mahaweli' facilitated to irrigate additional land of 364200 ha in north central and 60000 ha in south eastern dry zones.

Cropping systems in dry zone agriculture have three major components; viz paddy cropping, Chena cultivation of highland crops (slash and burn system of agriculture) and home gardens of vegetable and horticultural crops.

Slash and burn system of agriculture is practised in nearly all jungle areas, although the government legislation doesn't permit the unauthorised land clearing. Cleaning and land preparation commence in June or July and is normally completed in August followed by burning. Sowing and planting on the chena land commence with the rain towards the end of September and extends till November.

Cereals such as Kurakkan, maize and sorghum are grown in chenas in the Maha season. Pulses such as Cowpea, Blackgram, Greengram, Groundnut and pigeonpea are grown under rainfed condition. Sesame (Sesamum indicum) is the only crop grown under rainfed, during the Yala season due to its low water requirement.

The total area of Sri Lanka's rice fields is about 580000 ha. About 50% of the rice lands are situated in the dry zone; 20% in the intermediate zone and 30% in the wet zone. The total area of the rice lands in dry zone is about 275000 ha (Panabokke 1978).

The low rainfall in 'Yala' season compelled the farmers of dry and intermediate zones to conserve the additional moisture of 'Maha' season to meet the water deficit in 'Yala' season. This promoted the engineering skills of Sri Lankans to construct dams, dikes, water storage reservoirs, and water conveyance systems.

The cropping calendar of the Sri Lankan farmer is closely associated with rainfall pattern. The following local names of the months in Maha season shows the historical adaptation of the cropping practices in order to suit the rainfall pattern of the season;

September	<u>BINARA</u>	'Month of land opening'
October	<u>WAP</u>	'Month of sowing'
November	<u>IL</u>	'Month of pest attack'
December	<u>Unduwap</u>	'Sowing month of short duration Crop <u>Undu</u> '

The farmers cropping strategies were arranged in respect to the onset of the season and crop water requirement. The short duration crops are sown in December, after the heavy November rains.

The rainfall expectation in the beginning of the season associated with luna cycle. normally the rain is expected on full moon (Poya) day. Such an approach helped the farmer to develop Agronomical and Irrigation skills.

This process of development is changed by British colonization, giving more emphasis to the plantation crops.

The present agricultural policies of the government is geared to settle the farmers in north central and eastern dry zones under the accelerated Mahaweli scheme with the aim of intensifying paddy cultivation by means of irrigation. Nevertheless with limited funds and limited supplies of water for irrigation , dry zone farmer has to give much greater attention to diversify the crops.

The objective of the present paper is to assess the moisture availability and the Agroclimatological risk of the dry regions for rainfed farming; the actual irrigation requirement for intensified cropping practices in different part of the country is also presented.

2. MATERIALS AND METHODS

Daily rainfall data of 10 rainfall stations in north, north central, east, south eastern and southern dry areas for 37 consecutive years (1950-1987) were used for the Agroclimatological analysis of the dry areas.

The computer Programmes available at the 'DRN, Programme Hydraulique' IRAT, Montpellier were used to create the data base.

The initial and conditional probabilities of the rainfall for weekly, ten-day and monthly periods and the forward and backward moisture accumulation for both 'Yala' and 'Maha' seasons were assessed with program 'FIRST'(Weerasinghe,Sabatier,Luc, 1989).

The forward and backward moisture accumulation curves are used to decide upon the crop establishment period and the satisfaction of the rainfall to meet the crop water demand. The probability level at which the two curves of a given crop are bisected is considered to be the probability at which the particular crop could be grown.

The program 'CROPWAT' (FAO,1988) is used to assess the actual water demand of the crops.

2.1 THE DEPENDABLE PRECIPITATION

In order to determine the rainfall availability for rainfed agriculture or irrigation water requirement, a rainfall probability analysis needs to be made from longterm rainfall records of atleast 35 years. In rainfed agriculture one may be interested on, how much rainfall can be expected atleast in 3 out of 4 years. The dependable rainfall of 75% or 80% corresponding one out of four or five years is used for the design of the irrigation system capacity. Nevertheless it is an unfortunate that rainfall data in climatic summaries are seldom given as probabilities, but as arithmetic means.

It has been reported the possibility to use linear regression models between monthly rainfall and the dependable rainfall in order to overcome this problem (Hargreaves 1975, Oldeman 1977, Zaki and Nieuwolt ,1981).The analogical regression models are incorporated in the water balance models such as 'CROPWAT' and 'IRCIS'.

The aim of the present work is to search such a relationship for Sri Lanka which may help to simulate rainfall probabilities for different periods ; month, ten-day (decade) or week.

The daily rainfall of 19 rainfall stations in Dry, wet and Intermediate zones of Sri Lanka, for 35 consecutive years were used for the analysis. The rainfall probabilities for the selected time intervals were calculated by ranking order method using the program FIRST. A regression analysis was conducted using the computer model CHART.

A highly significant correlation exists between monthly rainfall of > 40 mm. and the 75% probable rainfall ($r = 0.91$); This helped to suggest the following regression line for the estimation of dependable rainfall of the month (Fig.1)

$$P_{75} = 0.693 \text{ pm} - 26.263 \quad (\text{for } R_f > 40 \text{ mm})$$

The above regression model agrees with the models established by Oldeman (1977) for Indonesia ($P_{75} = 0.82 \text{ pm} - 32$), Chaki and Neuwolt (1981) for Malaysia ($P_{80} = 0.78 \text{ pm} - 32$), Hargreaves (1975) for thirteen south eastern states of the United States ($P_{75} = 0.84 \text{ PM} - 23$), and Oldeman (1981) for Thailand ($P_{75} = 0.76 \text{ pm} - 20$).

The correlation between the monthly rainfall below 40 cm and the dependable precipitation appeared to be low ($r = 0.61$) compared to rainfall > 40 mm. (Fig.2). Following relationship would be valid for the monthly rain of < 40 mm;

$$P_{75} = 0.245 \text{ pm} - 1.38 \quad (\text{for } R_f < 40 \text{ mm})$$

Analogically a highly significant linear relationship exists between mean rainfall of weekly and ten-day intervals with the dependable rainfall ($r = 0.852$ and 0.885 for the weekly and ten-day rainfall $> 15\text{mm}$ and $> 18\text{mm}$ respectively) (Fig. 3,5).

Nevertheless in respect to the lower rainfall limits the relationship appeared to follow a well pronounced exponentiality (Fig.4,6). Thus the following exponential equations seems to have a better validity for the assessment of dependable rainfall of the week and ten-day periods.

FIG. 1

RELATIONSHIP BETWEEN DEPENDABLE PRECIPITATION
AND MONTHLY RAINFALL > 40 mm.

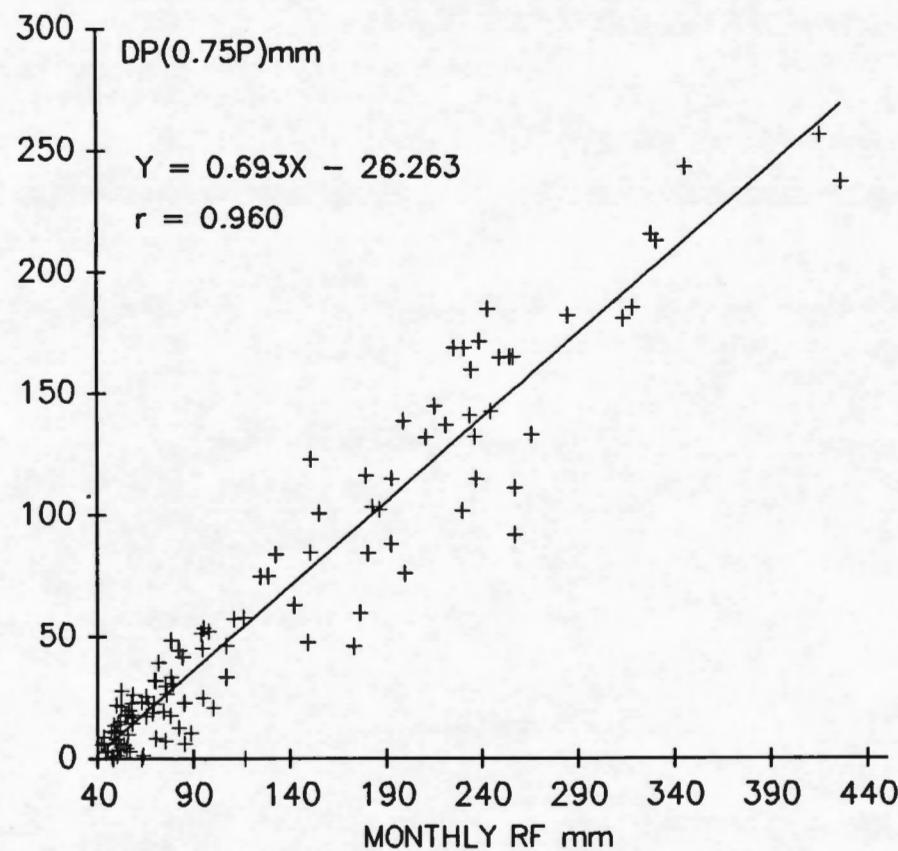


FIG. 2

RELATIONSHIP BETWEEN DEPENDABLE PRECIPITATION
AND MONTHLY RAINFALL < 40 mm.

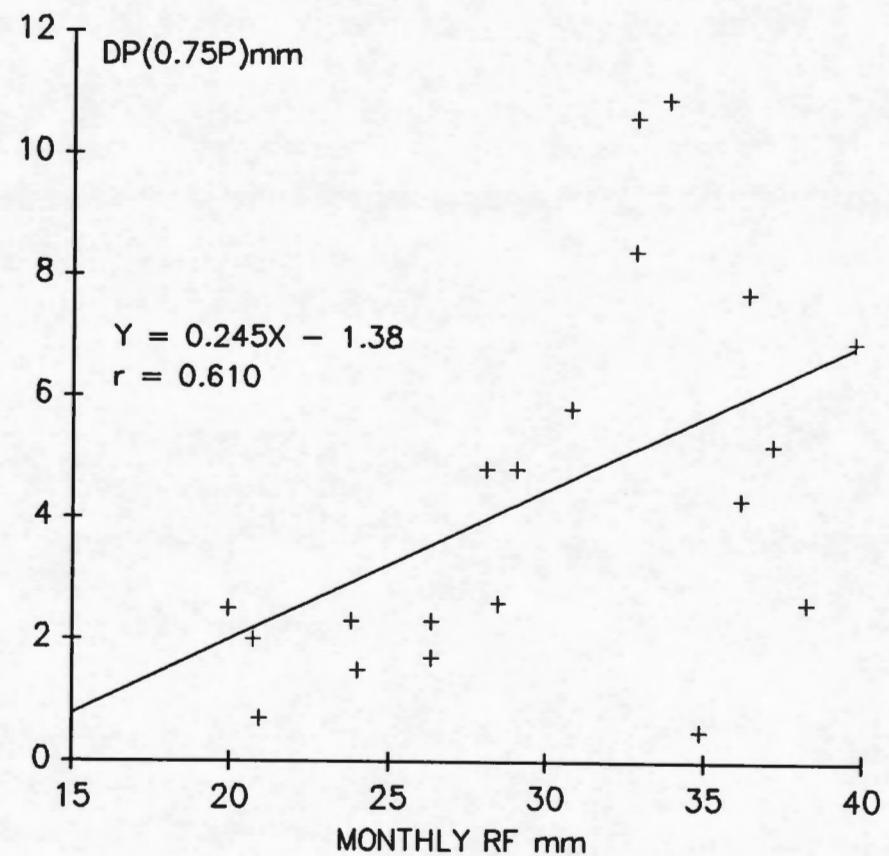


FIG. 3

RELATIONSHIP BETWEEN TENDAY RAINFALL >18 mm AND
DEPENDABLE PRECIPITATION

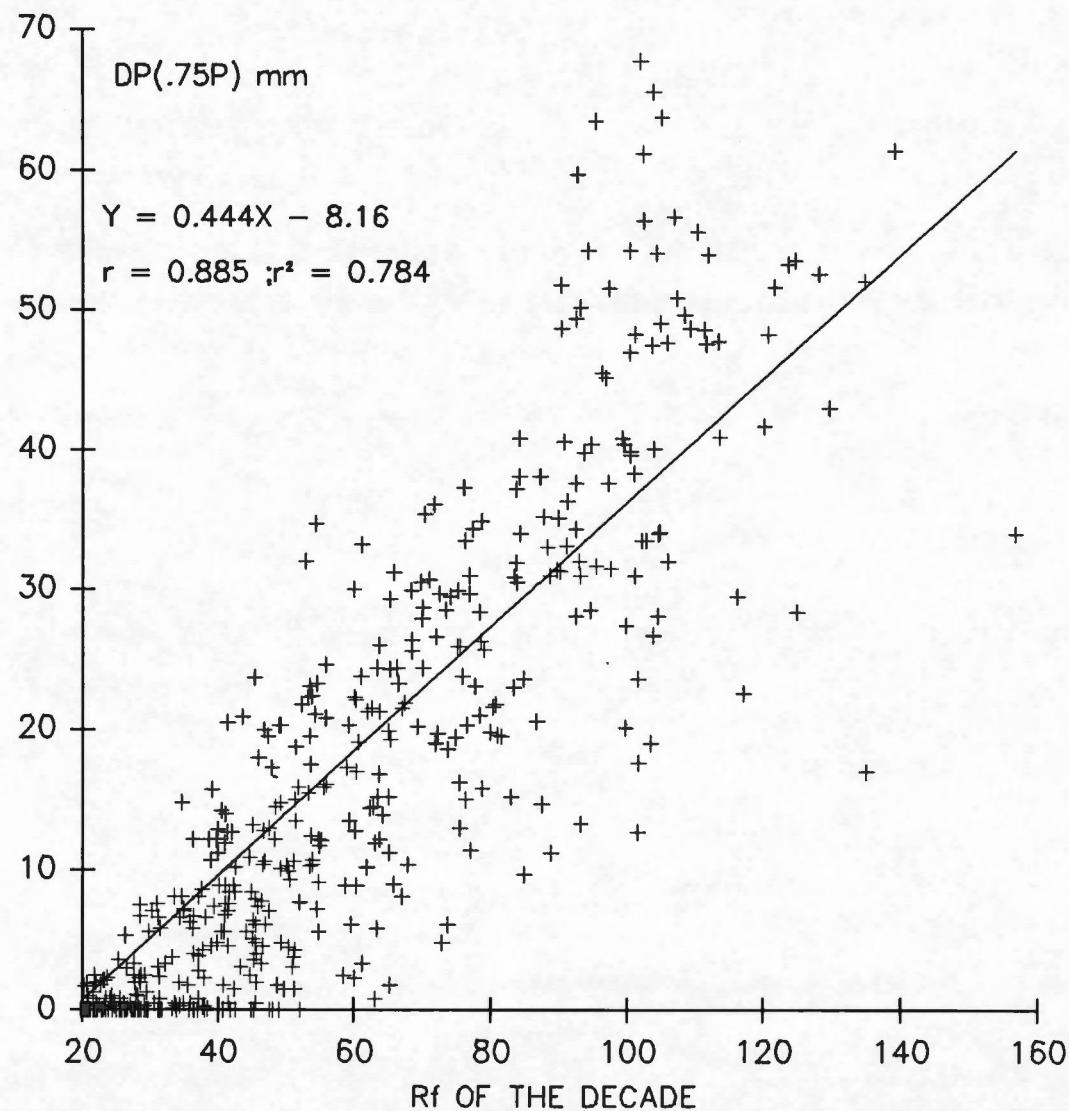


FIG. 4

RELATIONSHIP BETWEEN TENDAY RAINFALL AND DEPENDABLE PRECIPITATION

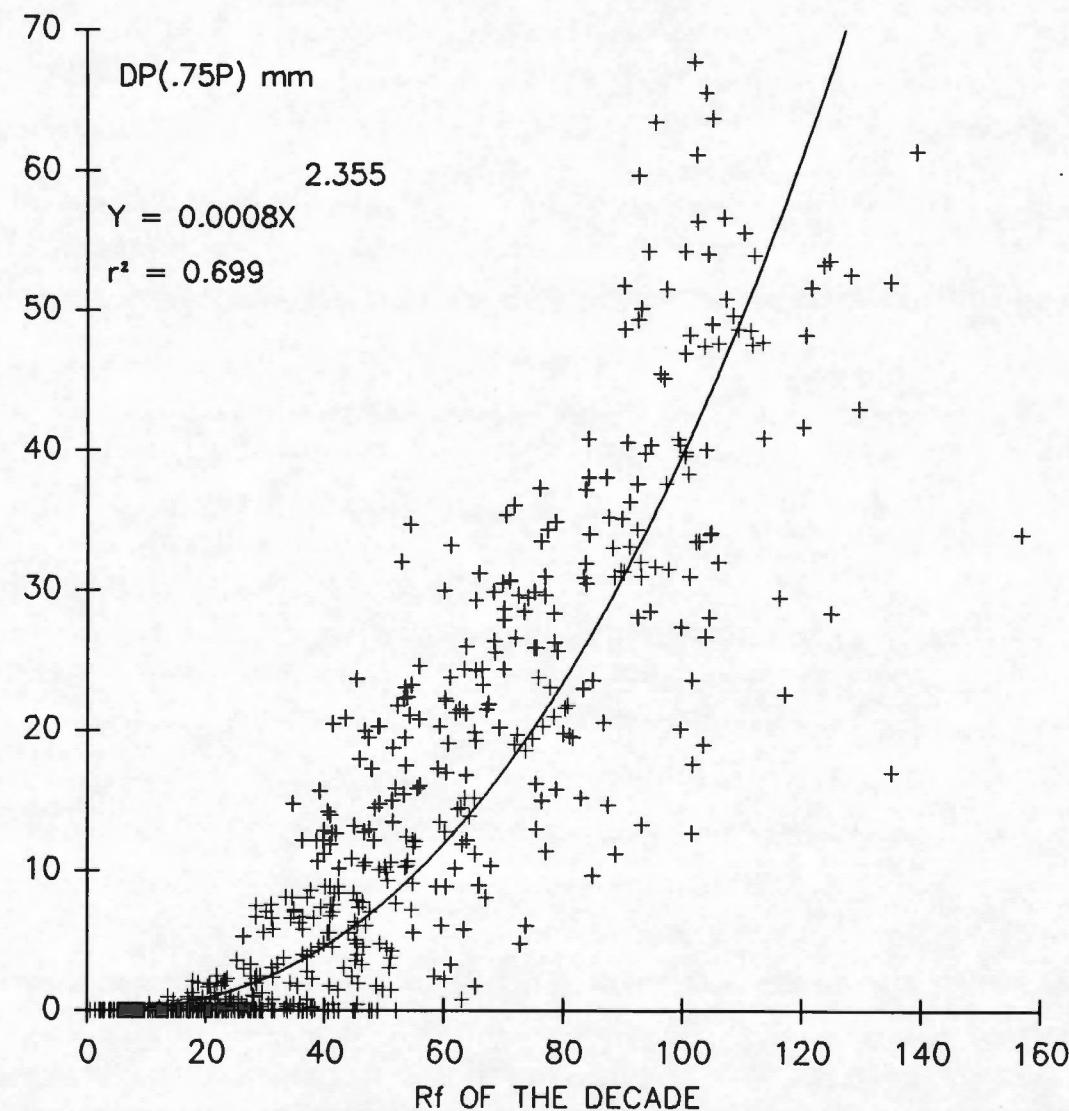


FIG. 5

RELATIONSHIP BETWEEN WEEKLY RAINFALL >15 mm AND DEPENDABLE
PRECIPITATION (SRI LANKA)

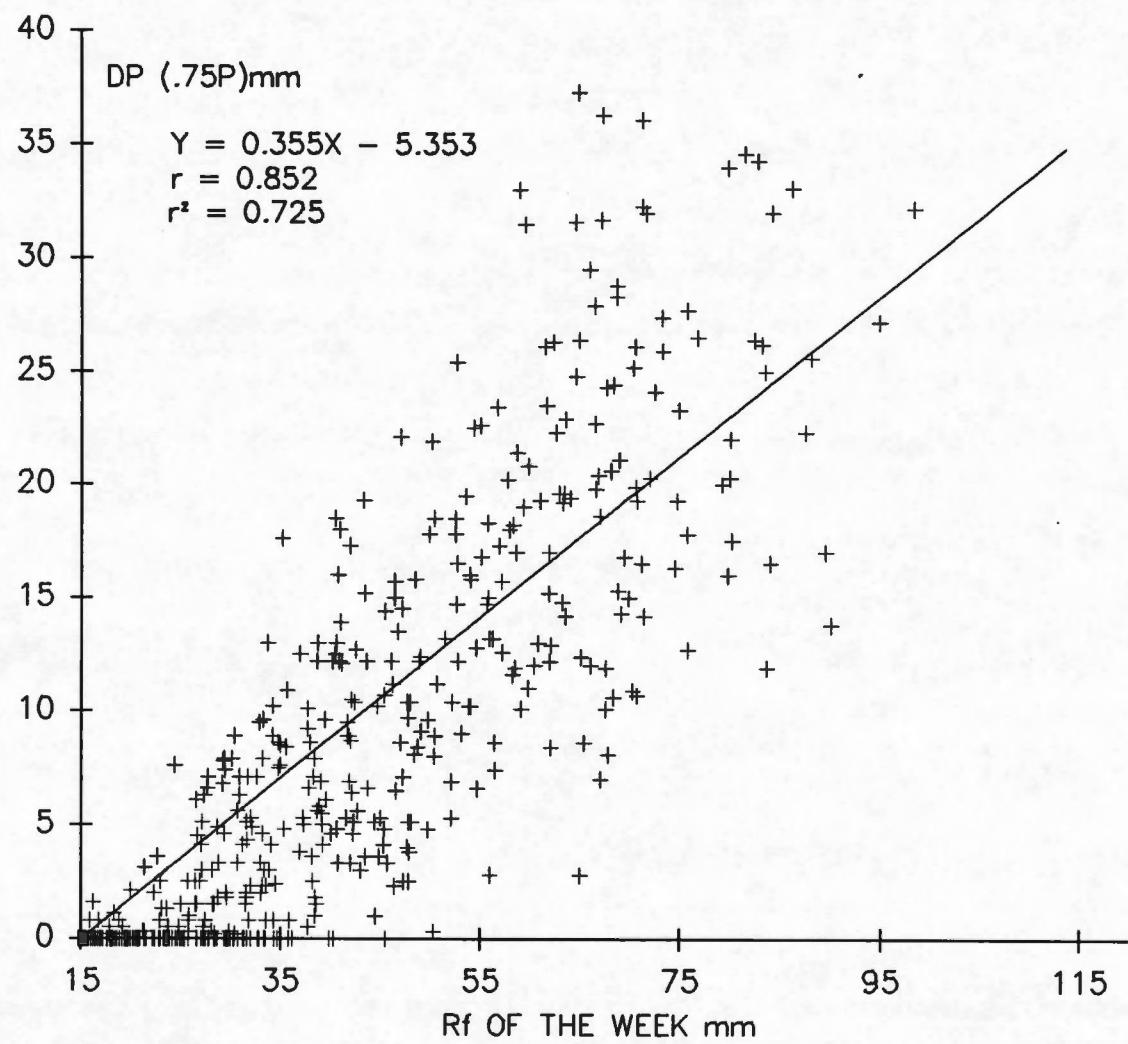
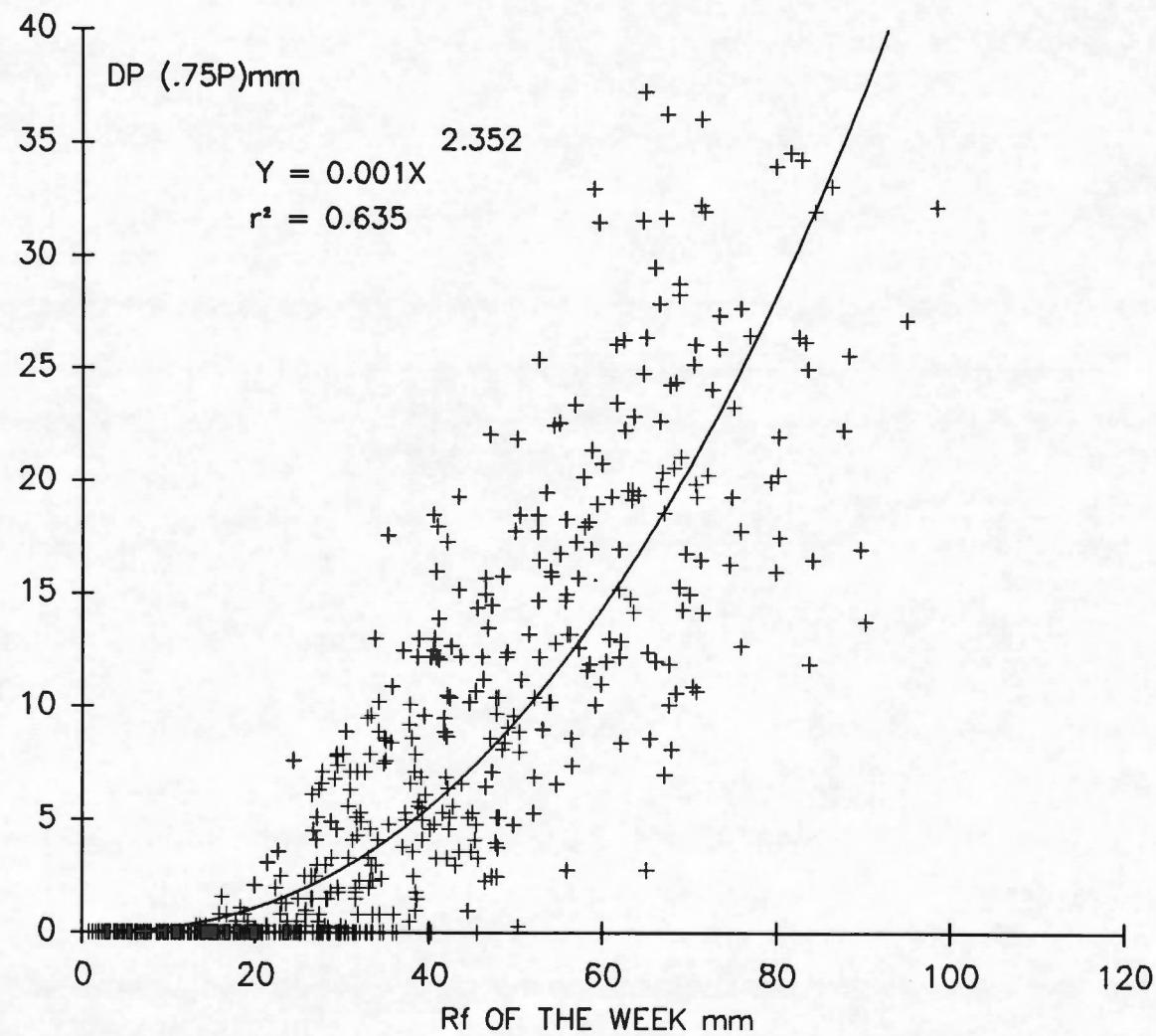


FIG. 6

RELATIONSHIP BETWEEN DEPENDABLE PRECIPITATION AND WEEKLY
RAINFALL (SRI LANKA)



$$\text{P75 (wk)} = 0.001X \quad (X = \text{rainfall of the week})$$

$$\text{P75 (TD)} = 0.008X \quad (X = \text{rainfall of the ten-day period}).$$

It is clear that the dependable rainfall of the week and ten-day intervals approaches zero when the average rainfall of the period is < 20mm. As such the suggested linear regression equations may use with fare accuracy for the computation of dependable rainfall of weekly and tenday intervals.

3. RESULTS AND DISCUSSION

3.1 RAINFALL OF THE DRY ZONE

In respect to the distribution and the magnitude of the 'Yala' and 'Maha' rains two major hydrologic regions are identified in the dry zone , ie regions with distinct bimodality and the regions with only one rainy season with very low or no rainfall in 'Yala' season (Agroecological map of Sri Lanka 1981).

According to Abeyratne (1962) ,there is a good chance in most of the years in the dry zone for the successful cultivation of 4 month or shorter duration crops in Maha season ; the cultivation of rainfed 'Yala' crops may be possible atleast in the Northern dry zone if proper water conservation methods are used. More over within the dry zone there is a significant regional differentiation in the break of 'Maha'season which ranges from 38th to 42nd weeks (Panabokke, Walgama, 1974).

The considerable advances has been made in the past for the study of the soil plant water relationships of the dry zone of Sri lanka.

The modified climatic regions map of Srilanka by Thambipillay (1960) identified Mannar and Hambantota regions of dry zone as two semi arid regions of the island. The Agroecological map of Sri Lanka (1981) designated these regions as very dry low land (D16) with, mean annual rainfall of less than 1270 mm and with a pronounced dry season.

The climatological indices based on Ivanov's moisture availability criteria indicated that the, location of dry zone in the regions of 'forested steppe' where the climatological coefficient 'K' according to Ivanov was in the range of 0.60 - 0.99 (Weerasinghe 1988)

Agro-climatological zones of sri lanka, and the maps based on Hargreaves moisture availability index, and Troll's aridity index were presented in our erlier studies (Weerasinghe ,1989).Here the duration of growth cycles were demarcated in respect to Cochme and Franquin's moisture availability criteria.

It has been demonstrated that the dry zone of Sri lanka can differentiate into two distinct Agroclimatological zones in respect to both Troll's and Hargreave's indices.;ie regions with 4.5 to 7 humid months (wet dry semi arid tropics) and with 2.5 to 4.5 humid months (dry semi arid tropics) in respect to Troll's criteria and 'moderately deficient' and 'somewhat deficient 'moisture regions according to Hargreave's MAI.

In respect to the Cocheme and Franquin's criteria the dry zone (excluding Hambantota) have atleast 3 months of humid periods in Maha season. More over Eastern and North eastern dry zone have a humid period of 4 months. During October -December the moisture availability in Hambantota and eastern part of the Amparai district considered to be 'somewhat deficient' while other parts of the northwestern and south eastern parts have excess moisture (Weerasinghe, 1989).

The average annual rainfall of the dry zone is 900-1500 mm with a dependable rainfall of 750 - 900 mm (Agroclimatological map 1981).

From the available rainfall data of 1950-1987, it is clear that the annual rainfall of the dry zone has a significant tendency to decrease (Fig.7) which may be associated with massive deforestation in these areas. The phenomena is well pronounced in Batticaloa, Anuradhapura, and Trincomalee areas.

The annual average rainfall of Anuradhapura was around 1500 mm prior to 1970, which is 100 -200 mm more compared to Jaffna and Puttalam. At present Anuradhapura, Puttalam, and Jaffna fall in one homogenous rainfall group with annual rainfall of 1200 mm (table 1) . Analogical situation exists in Batticaloa. In respect to the present annual rainfall, following three rainfall classes seems to be typical for dry zone areas.:

Batticaloa, Trincomalee, Polonnaruwa and Vavuniya with annual rainfall >1400 mm;

Anuradhapura, Puttalam, Jaffna with 1200-1400 mm. rain.

Hambantota, and Mannar with 800-1000 mm rain.

Nevertheless rainfall expectancy of Anuradhapura in 8 out of 10 years is high compared to Jaffna and Puttalam (Table 1).

FIG. 7

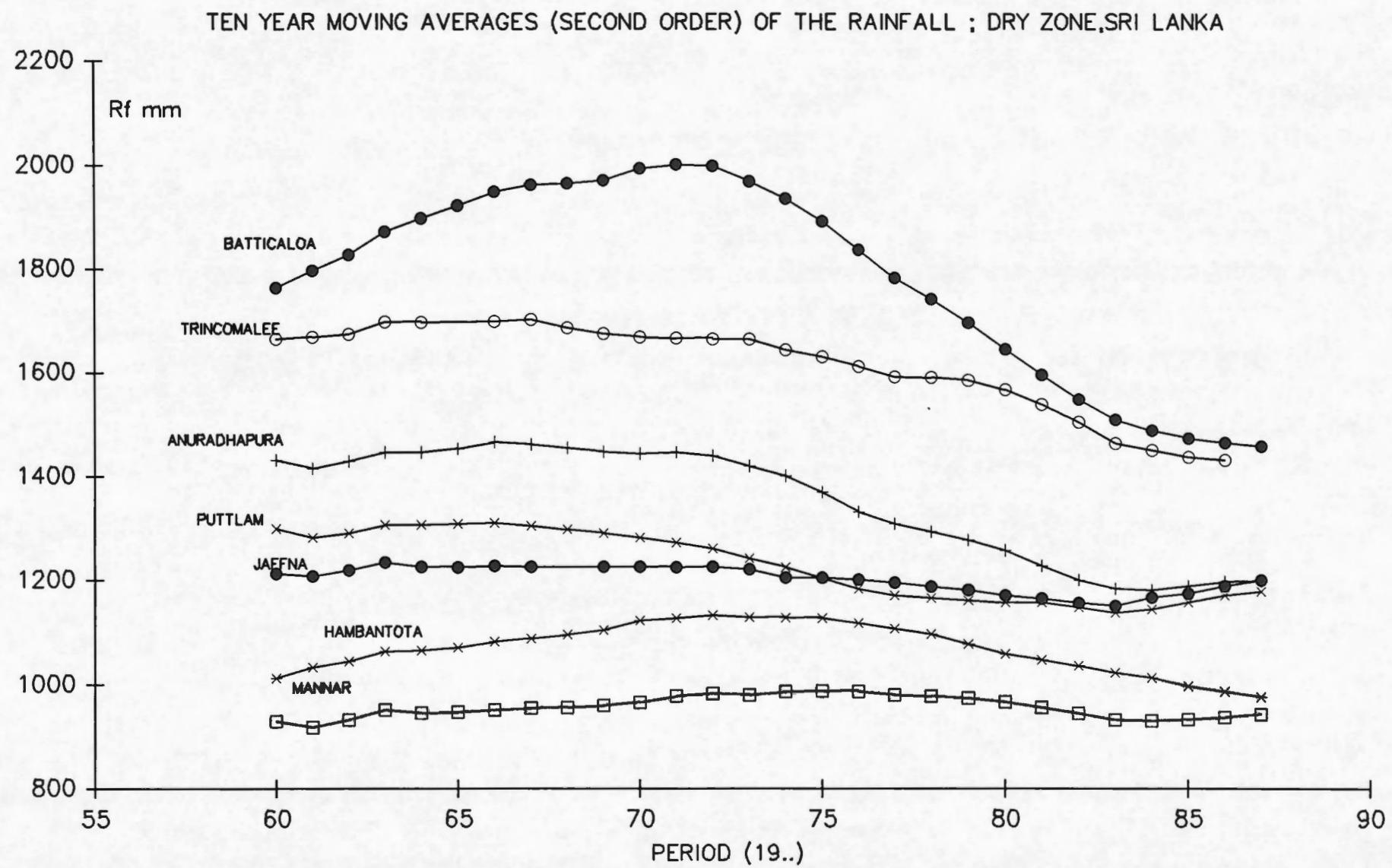


TABLE 1 AVERAGE ANNUAL AND DEPENDABLE RAINFALL OF DRY ZONE

LOCATION	AV.RF (mm)	Rf at selected Prob.mm		
		80%	50%	20%
1.ANURADHAPURA	1282	1023	1201	1495
2.BATTICALOA	1765	1468	1632	2091
3.HAMBANTOTA	1041	794	981	1264
4.JAFFNA	1213	964	1175	1420
5.MANNAR	958	697	916	1161
6.PUTTALAM	1226	926	1162	1483
7.POLONNARUWA	1669	929	1458	2061
8.TRINCOMALEE	1522	1214	1524	1802
9.VAVUNIYA	1420	1098	1482	1712

In the dry zone where the temperature is not generally a limiting factor, the duration of the crop season depends on rainfall. According to the criteria proposed by IRRI (1974) and adapted by FAO (1980), monthly precipitation should be atleast 200 mm. for three consecutive months to allow a cultivation of a bunded wetland rice. Our earlier investigations in Matara district (Weerasinghe,1988), shows that this criteria could be used for the first catogorization of rice growing regions.

It is clear that only Batticaloa, Jaffna, Trincomalee, Polonnaruwa, and vavuniya have 3 consecutive wet months with > 200 mm. rain in Maha season (table 2). The overall moisture availability in other locations may have limitations for a pure rainfed Maha crop, which shows need of irrigation.

Fig 1,(Appendix) showes the monthly rainfall and the rainfall at selected probabilities. Rainfall at 50% probability is in general the amount that can expect atleast in 50% of the years. The 25P rainfall represents the maximum rain which can expect in wet years.

The water requirement for dry land crops may satisfies if the monthly precipitation is atleast 92 mm.

TABLE 2 **NUMBER OF WET MONTHS IN 'YALA' AND 'MAHA' SEASONS (DRY AREAS, SRILANKA)**

LOCATION	No of wet months with monthly rain o			
	(200mm)		(90mm)	
	YALA	MAHA	YALA	MAHA
1. ANURADHAPURA	-	2	2	3
2. BATTICALOA	-	3	-	5
3. HAMBANTOTA	-	-	1	3
4. JAFFNA	-	3	-	3
5. KALAWEWA		3	1	4
6. MANNAR	-	3		3
7. POLONNARUWA	-	3	1	5
8. PUTTALAM	-	2	2	3
9. TRINCOMALEE	-	3	-	4
10 . VAVUNIYA	-	3	1	3

It is clear that the dry zone can be divided in to two major subdivisions in respect to the water availability for two seasons.

Anuradhapura, Puttalam, Vavuniya, Polonnaruwa and Hambantota have atleast One wet month with rainfall more than 90 mm in 'Yala' season; the entire yala of the other locations remains dry in respect to the present criteria.

Fig. 8,9 and Appendix Fig 2 indicate the dependable rainfall and the mean rainfall of weekly intervals at different locations. In general, the dry areas with two distinct seasons seems to be wet during 13th to 18th and 40th to 52nd weeks. Batticaloa, Trincomalee and Polonnaruwa have an elongated Maha season (41st to 4th week), compared to Mannar and Jaffna where the rainy periods fall in 41st to 52nd and 40th to 52nd weeks respectively.

The three weekly moving averages of rain at 75% probability are presented in Fig. 10 and 11.

It is evident that the weekly rainfall is much low in Hambantota and Mannar, which are the driest areas of the country. During 37th to 40th weeks slight showers can expect in Hambantota, which may help the land preperation work.

FIG. 8

DEPENDABLE RAINFALL (.75P) OF THE DRY AREAS WITH TWO DISTINCT RAINY SEASONS.

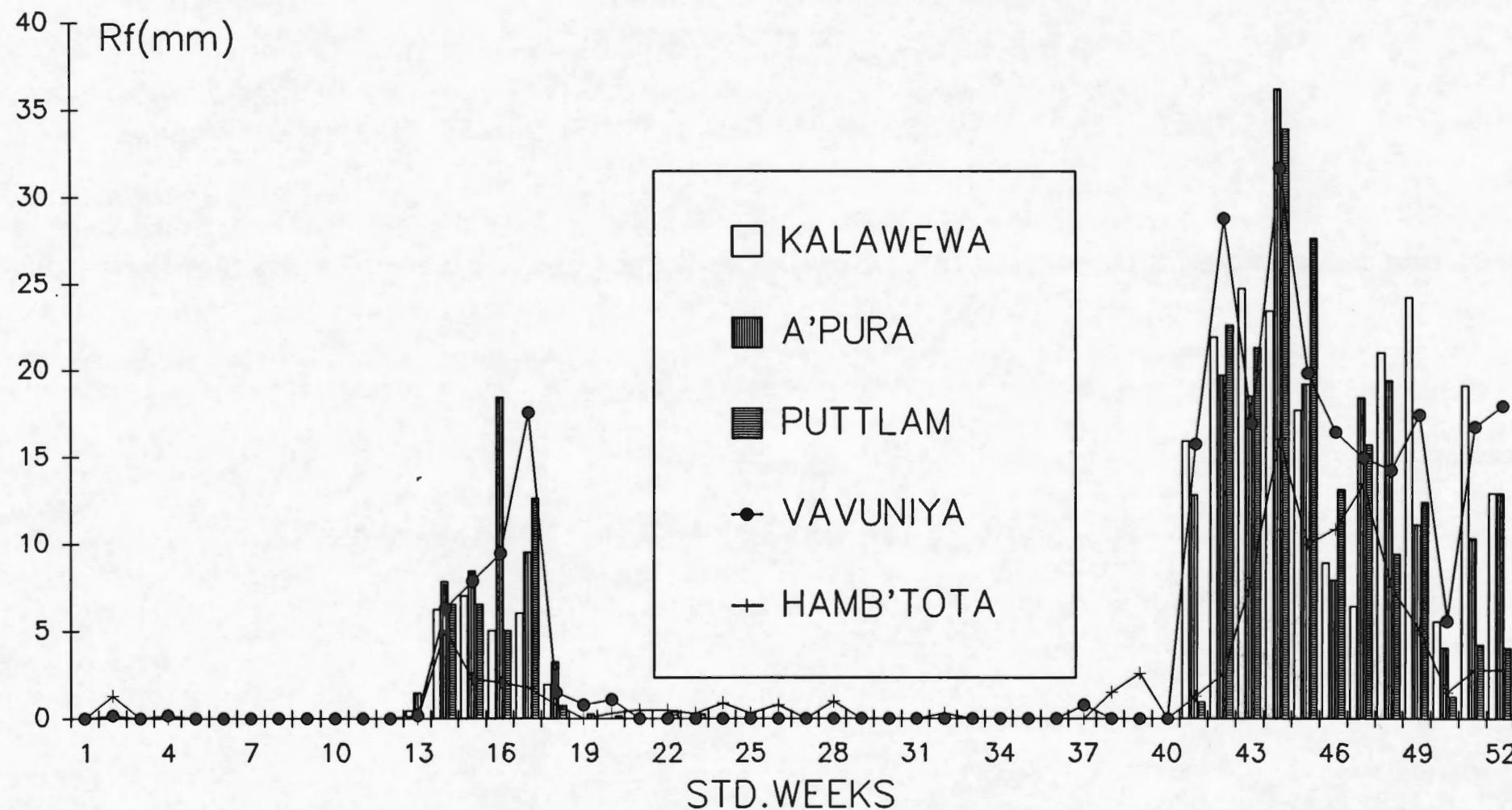


FIG. 9

DEPENDABLE RAINFALL (.75P) OF THE DRY AREAS WITH ONE DISTINCT RAINY SEASON.

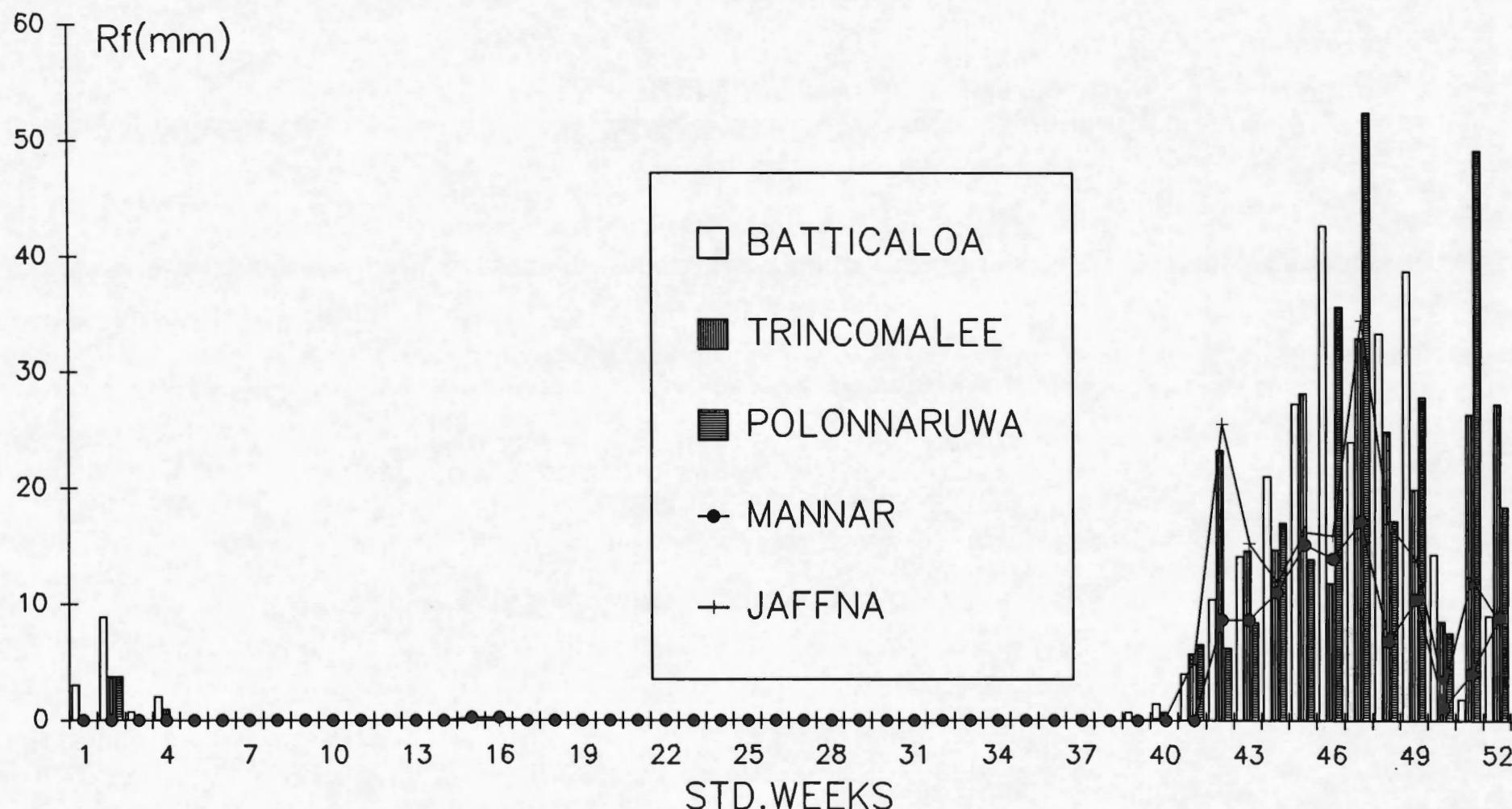


FIG. 10

RAINFALL OF THREE OUT OF FOUR YEARS IN DRY AREAS WITH DISTINCT MONO MODALITY (3 weekly moving average)

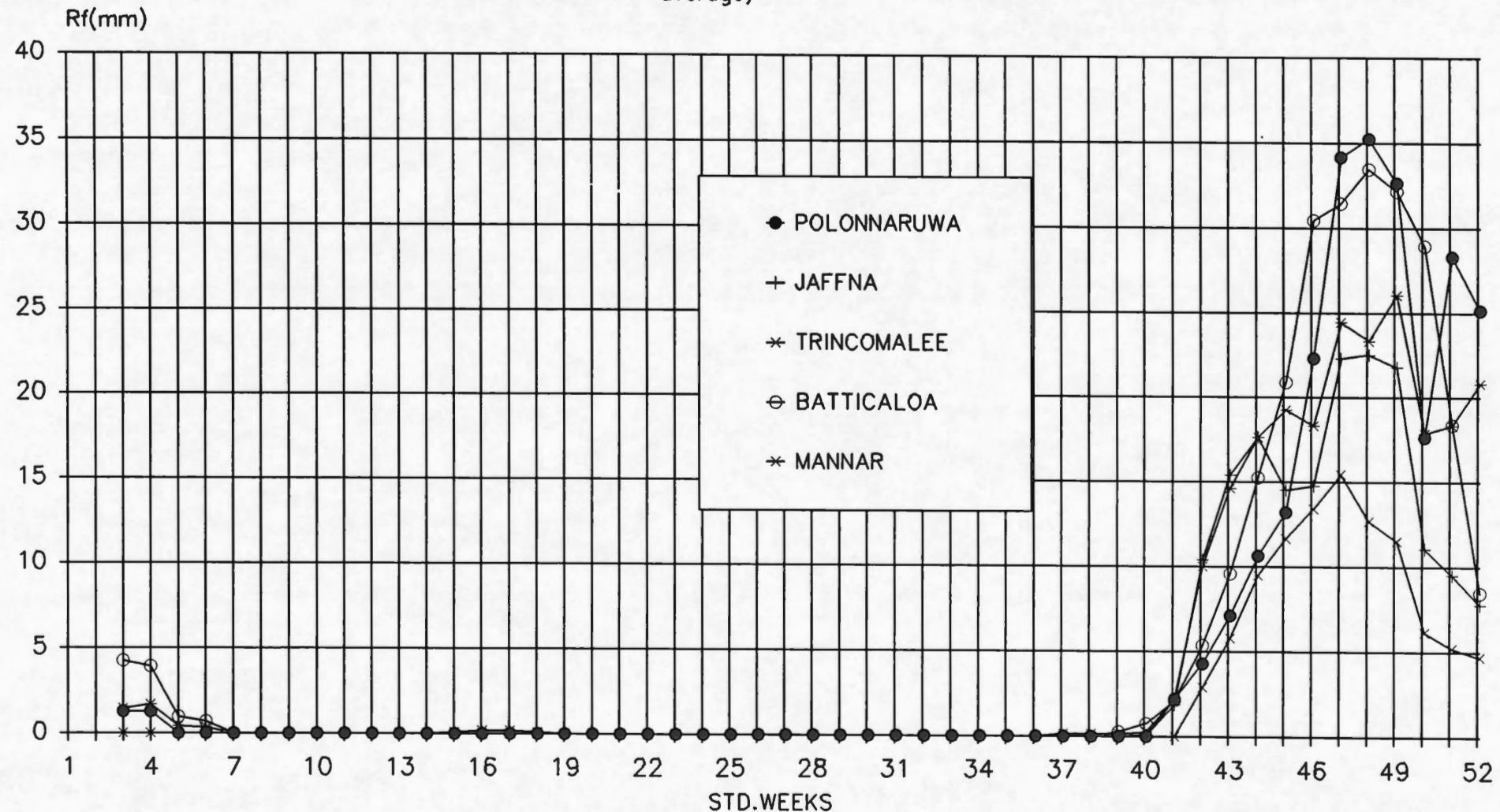
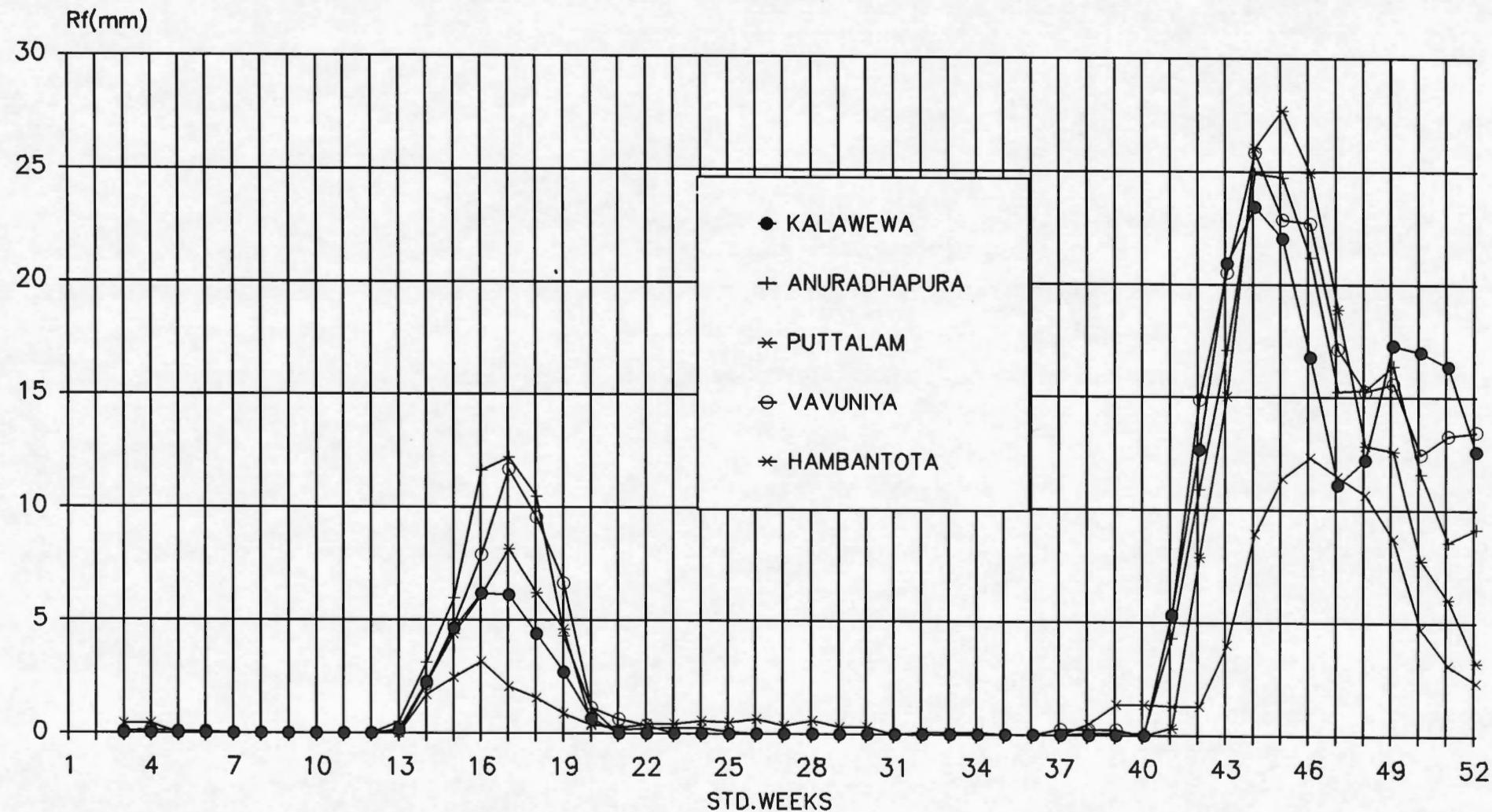


FIG. 11

RAINFALL OF THREE OUT OF FOUR YEARS IN DRY AREAS WITH DISTINCT BI MODALITY (3 weekly moving average)



3.2 INITIAL AND CONDITIONAL (MARKOV) PROBABILITIES OF RAINFALL IN DRY AREAS

The concept of estimating probabilities with respect to a given amount of rainfall is extremely useful for agricultural operational planning (Virmani et.al 1980).

In a given crop-growing season many times decisions have to be taken based on the probability of receiving certain amount of rainfall during a given week [P(W)] (Initial probability). It is also possible to examine the rainfall probability of the next week if rain is experienced in this week [P(W/W)], probability to repeat two wet weeks [P(WW)], two dry weeks [P(DD)] and the probability of next week being wet if this week is dry [P(W/D)] (conditional probability) using the Markov chain analysis. The degree of wetness could be defined in terms of any amount of rainfall. The weekly rainfall of >10 mm. at 75% probability would be a sufficient level to satisfy the moisture requirement of rainfed crops.

The initial and conditional probabilities of weekly rainfall in respect to 10 and 20 mm. wetness are given in appendix 3.

It is clear that the initial probabilities of >10 mm rains in Yala are always less than 75% in locations with one distinct rainy season (Fig 12.13).

The moving averages of the weekly rainfall probabilities > 10 mm are presented in Fig.14, 15. There will be around 20% probability that 37th week of the Maha season receives atleast 10mm of rain. This shows that onset of the season in wet years may expect around 37th week.

The 43rd week of the Maha season remains wet for entire dry zone except Mannar Hambantota and Puttalam ; 44th week appeared to be wet in these three areas in 3 out of 4 years. The risk of Maha season will be higher in Hambantota Mannar and Jaffna. Hambantota appeared to have only 3 weeks in Maha season with >10mm rain in three out of four years. The 43rd to 52nd weeks are wet in all other locations in 3 out of four years.

Our earlier observations in Matara District, showed that the successful rainfed rice growing locations have atleast 10 wet weeks with more than 10mm rain in 3 out of four years. This appeared to be true for the dryzone of Sri Lanka as well.

The Maha season of the entire dry zone except Hambantota, have atleast 8 - 10 wet weeks within the season at 70 - 75% probability. It is often experience that Hambantota does not receive sufficient moisture for a rainfed Maha rice.

FIG. 12

INITIAL PROBABILITIES OF WEEKLY RAINFALL >10mm IN AREAS WITH ONE DISTINCT RAINY SEASON

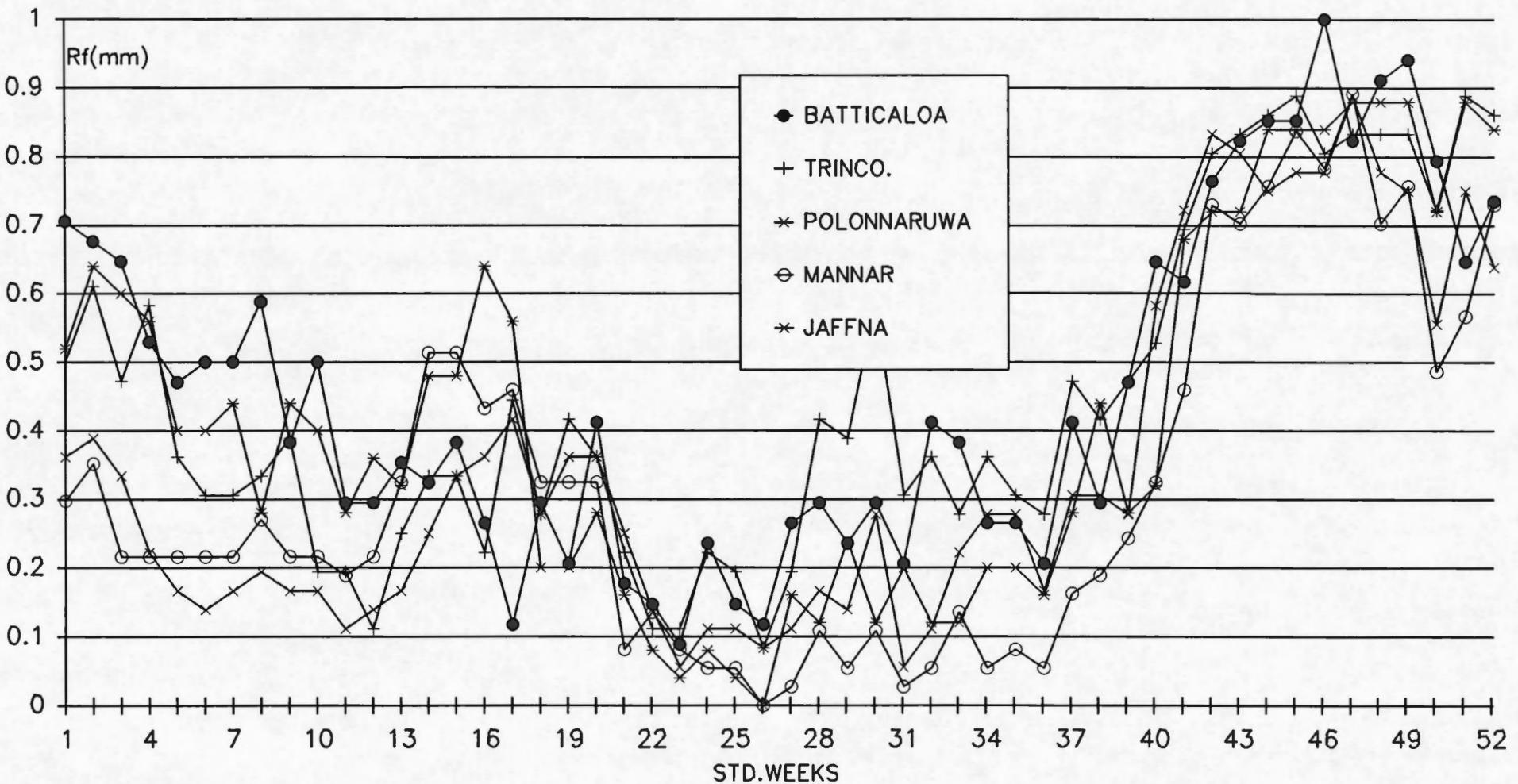


FIG. 13

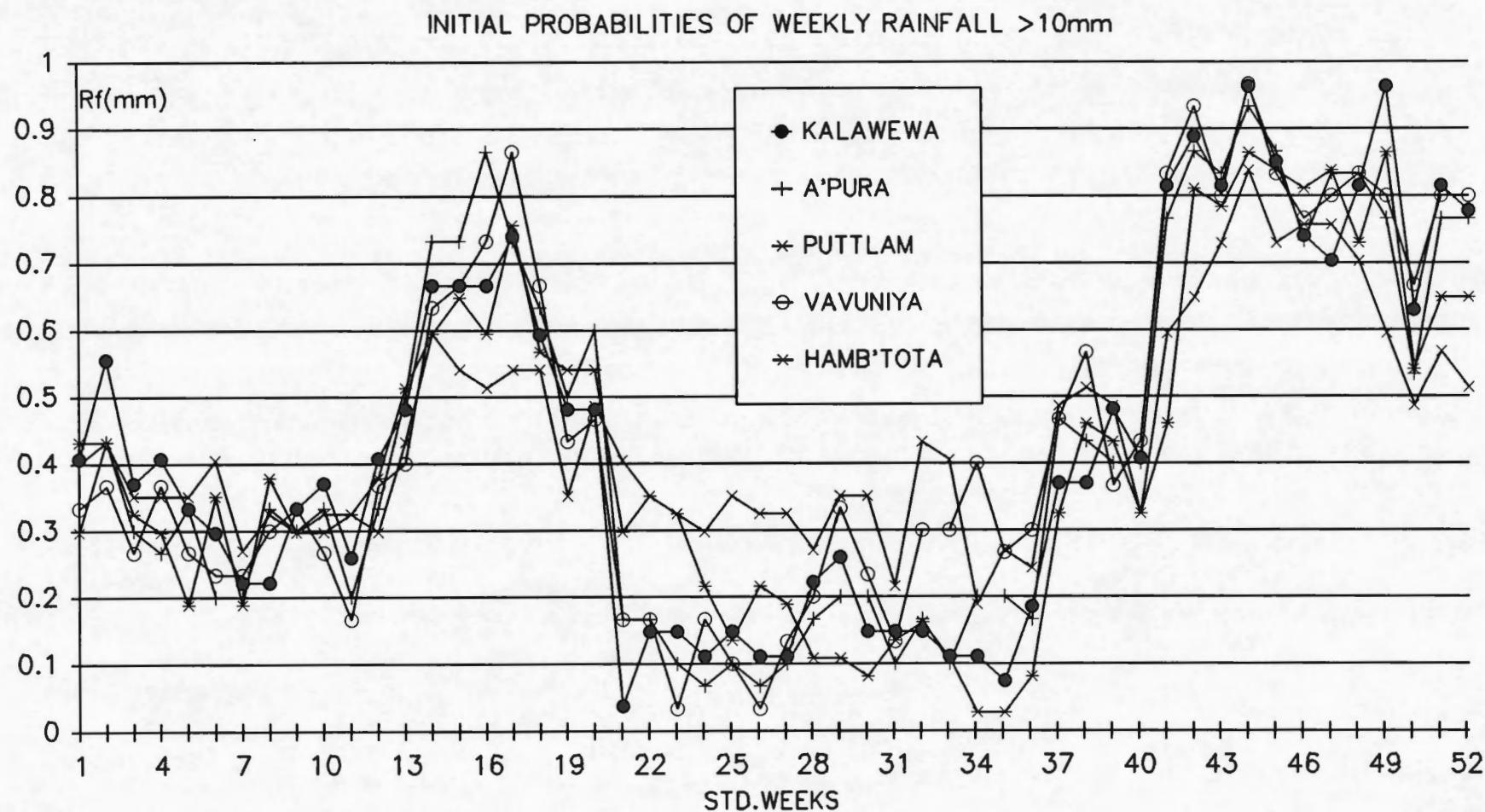


FIG. 14

INITIAL PROBABILITIES OF WEEKLY RAINFALL >10mm (THREE WEEKLY MOVING AVERAGES)

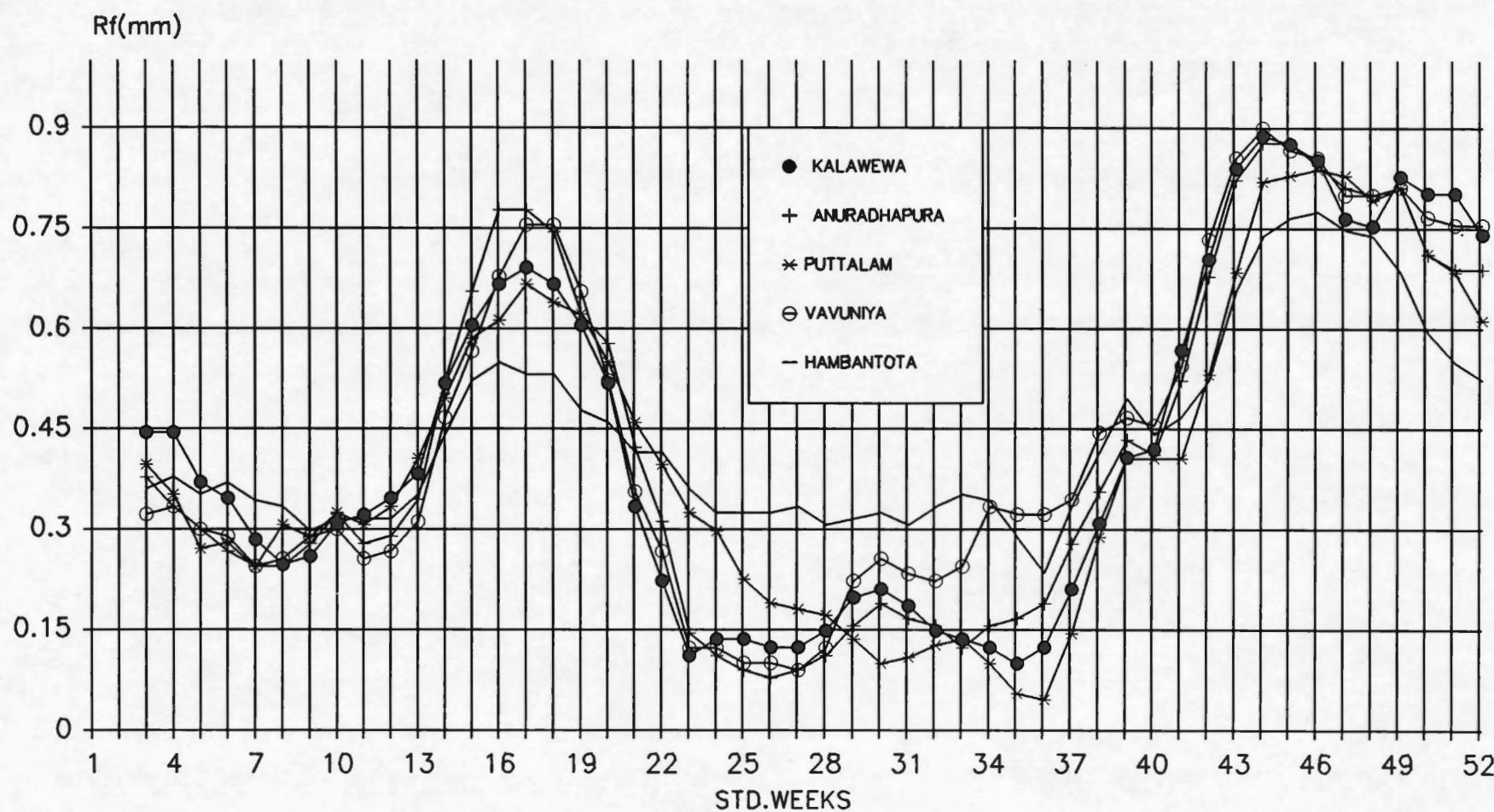
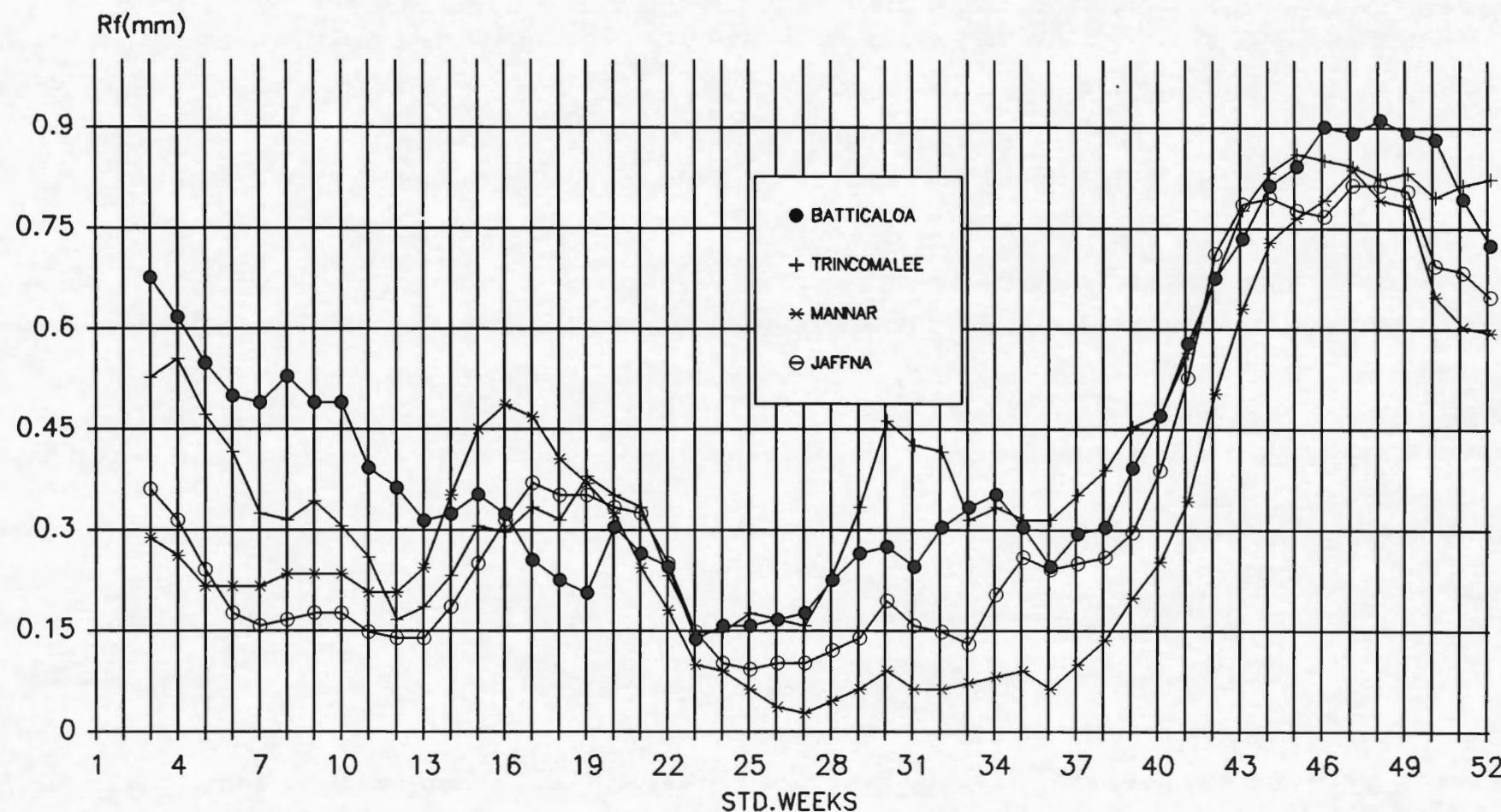


FIG. 15

INITIAL PROBABILITIES OF WEEKLY RAINFALL >10mm (THREE WEEKLY MOVING AVERAGES)



It is evident that Batticaloa and Trincomalee have the highest probabilities to repeat two wet weeks during 44th- 48th weeks of the Maha season (Appendix 3); which shows susceptibility of these areas for frequent crop damage due to additional rains in this period.

3.3 DURATION AND THE COMMENCEMENT OF CROPPING CYCLES

The central strategy of the optimum utilization of the rainfall resources in dry areas should be based on selection of the appropriate crops, and their sowing dates which will fit the moisture availability of the location.

The manner of choosing sowing date and the sowing to harvest duration for 19 locations in wet, intermediate, and dry zones, based on the rainfall confidence limits are described elsewhere (Panabokke, Walgama, 1975). It has been reported that within the dry zone there is a significant regional differentiation in the break of the Maha season, which ranges from 38th to 42nd weeks.

There are two widely adapted approaches in the selection of cropping cycles and cropping periods. The first approach based on the rainfall availability and its probability assessment. Such methods are described by Oldeman (1982), Morris and Zandsra (1979), Hills Morgan (1980).

The second approach is the agropedoclimatological approach which counts the water balance in soil-plant and atmosphere systems. The Agroclimatological models developed in IRAT, France are based on ETR/ETP relationship of the plant for the selection of cropping dates and the duration of cropping cycles (Forest, Franquin, 1977).

The moisture availability at the different locations of Sri-Lanka based on the Cochemé and Franquins' (1978) water balance approach has been discussed in our earlier studies.

In the present study forward and backward moisture accumulation curves and their accumulated probabilities are used to decide upon the crop establishment time and the performance probabilities (success) of the crop.

The reliability of the method depends on the assessment of water requirement prior to crop commencement and during the cropping cycle.

According to Morris and Zandstra (1979) the forward accumulation of 75mm rainfall could be sufficient for the dry seeding crops and 200 mm accumulation for initiation of puddling , wetland preparation of rice fields.The present criteria is used by Oldeman and Frere (1982), in order to determine the onset and termination of rice growing seasons in south east Asian countries.

The forward accumulation of 200mm and backward accumulation of 500 mm appeared to be satisfactory level for rice in wet and intermediate zones of Matara District (Weerasinghe, 1989)

In the present study onset time was examined on the basis of forward rainfall accumulation starting at 1 April and 1 September for Yala and Maha seasons respectively.The rainfall satisfaction during the cycle was examined on the basis of backward rainfall accumulation from 1st July and 31st December for two respective seasons.

For the 'Yala' season several accumulation levels were considered to investigate the onset time for different crops (25,50,75,100,125,150,175,200 mm.).The lower value 25 mm corresponds to the approximate amount of rainfall necessary to commence drought resistant crops such as Sesame. The accumulation of 50mm is considered as the amount of rainfall needed for Groundnut, Soya and other pulses at sowing time.

Considering the high moisture availability in the season,only forward accumulation curves of 75,150, and 200 mm are simulated for 'Maha' season.

The backward accumulation of 200, 300, and 500 mm rainfall from the last date of the season were considered as the satisfactory moisture levels for Sesame, Pulses and Rice respectively.

The date on which the forward moisture accumulation reaches 75% probability is considered to be the probable date of crop commencement in three out of four years.

The forward and backward moisture accumulation curves are much elongated and more closer to the X axis when the moisture availability of the location is low (Appendix, Fig.4).The different curve patterns and the angles they make with X axis at different periods show the accumulation intensity of rains at different years.

The meeting point of the two curves seems to be a good indicator to decide upon the latest possible date of the crop commencement and the crop performance probabilities.

The forward moisture accumulation of the dry zone in Maha and Yala seasons at 50% and 75% probabilities are shown in fig.16,17,18 and 19.

In 3 out of 4 years, 75 mm rain for dry sowing crops can expect at 40th 41st weeks (Fig 17); but in Mannar and Hambantota rainfall arrival will be late by about one week. This agrees with the earlier research of Panabokke,Walgama (1975).

In 3 out of 4 years , the 200 mm moisture can be expected at 42nd 43rd weeks in all locations except Batticaloa, Puttalam, and Mannar.The moisture accumulation (200 mm) in Batticaloa will be late by about one week, while for Hambantota and Mannar it would be much later (Fig. 17).

The accumulation of 25 mm rain for the commencement of short duration 'Yala' crops can expect at 15th week in Vavuniya,Puttalam,Anuradhapura and Kalawewa areas.In Hambantota it would be about one week later, while in other locations the accumulation may not have a significant contribution (Fig.18,19).

The forward accumulation curve helps to decide upon the date of sowing based on water availability for crop commencement, but it doesn't explain how water need of the crop could be met during the cropping cycle.Thus in rainfed agriculture it is necessary to consider both forward and backward moisture accumulation probability curves to decide upon the crop establishment period; this permits to minimise the crop failure due to water deficit during the cropping cycle.

FIG. 16

RAINFALL ACCUMULATION AT THE BEGINING OF MAHA SEASON AT 50% PROBABILITY

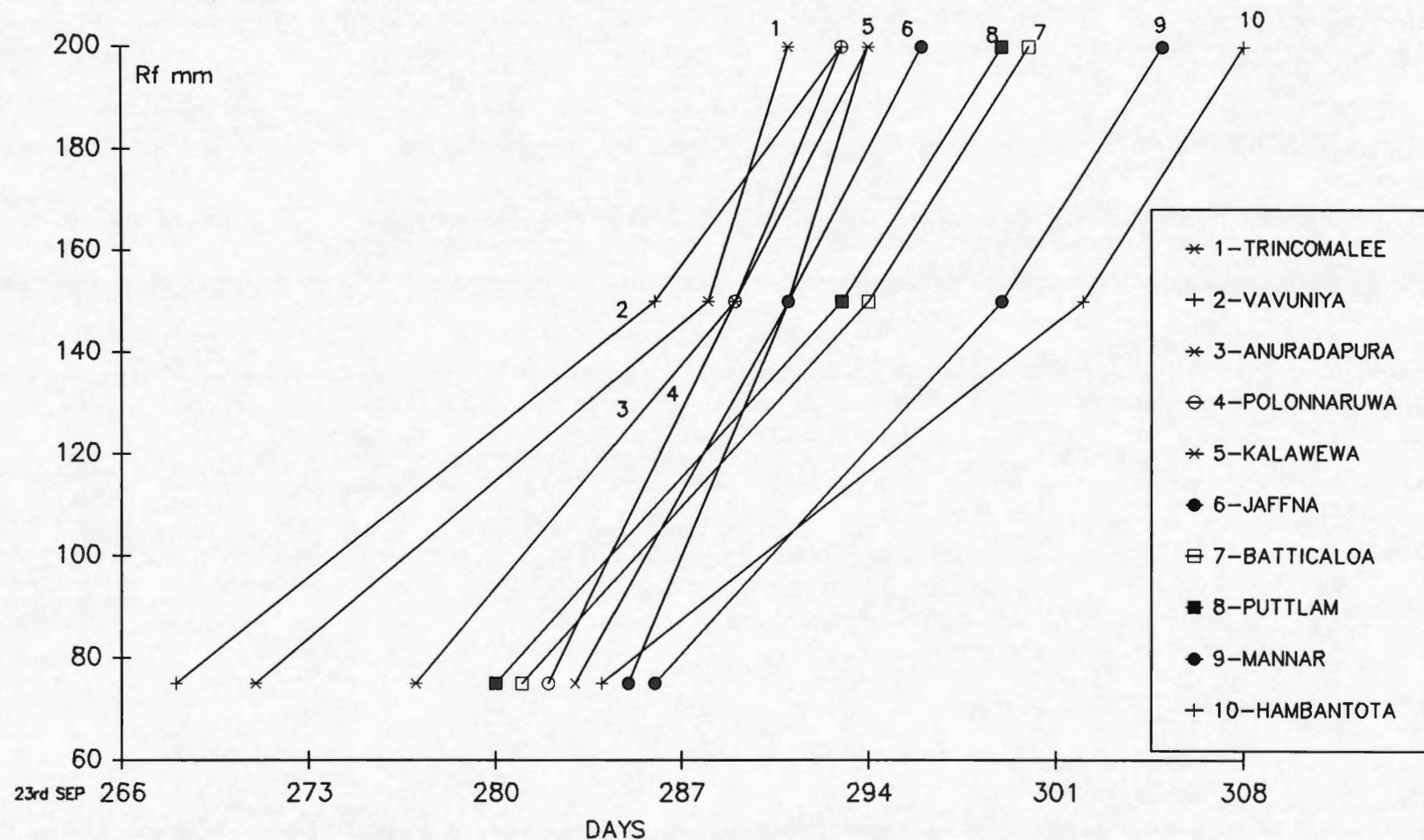


FIG. 17

RAINFALL ACCUMULATION AT THE BEGINNING OF MAHA SEASON IN THREE OUT OF FOUR
YEARS (75% probability)

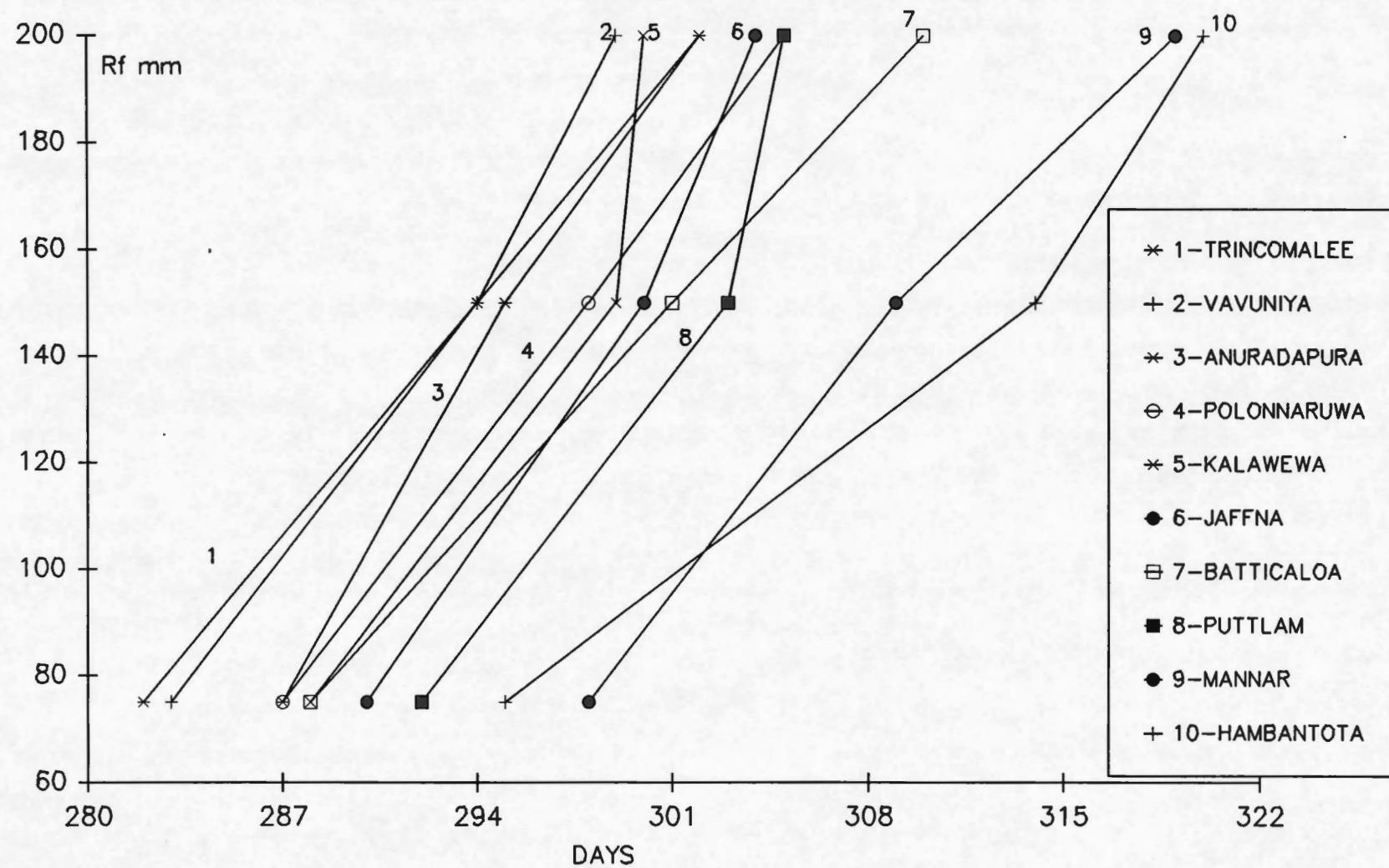
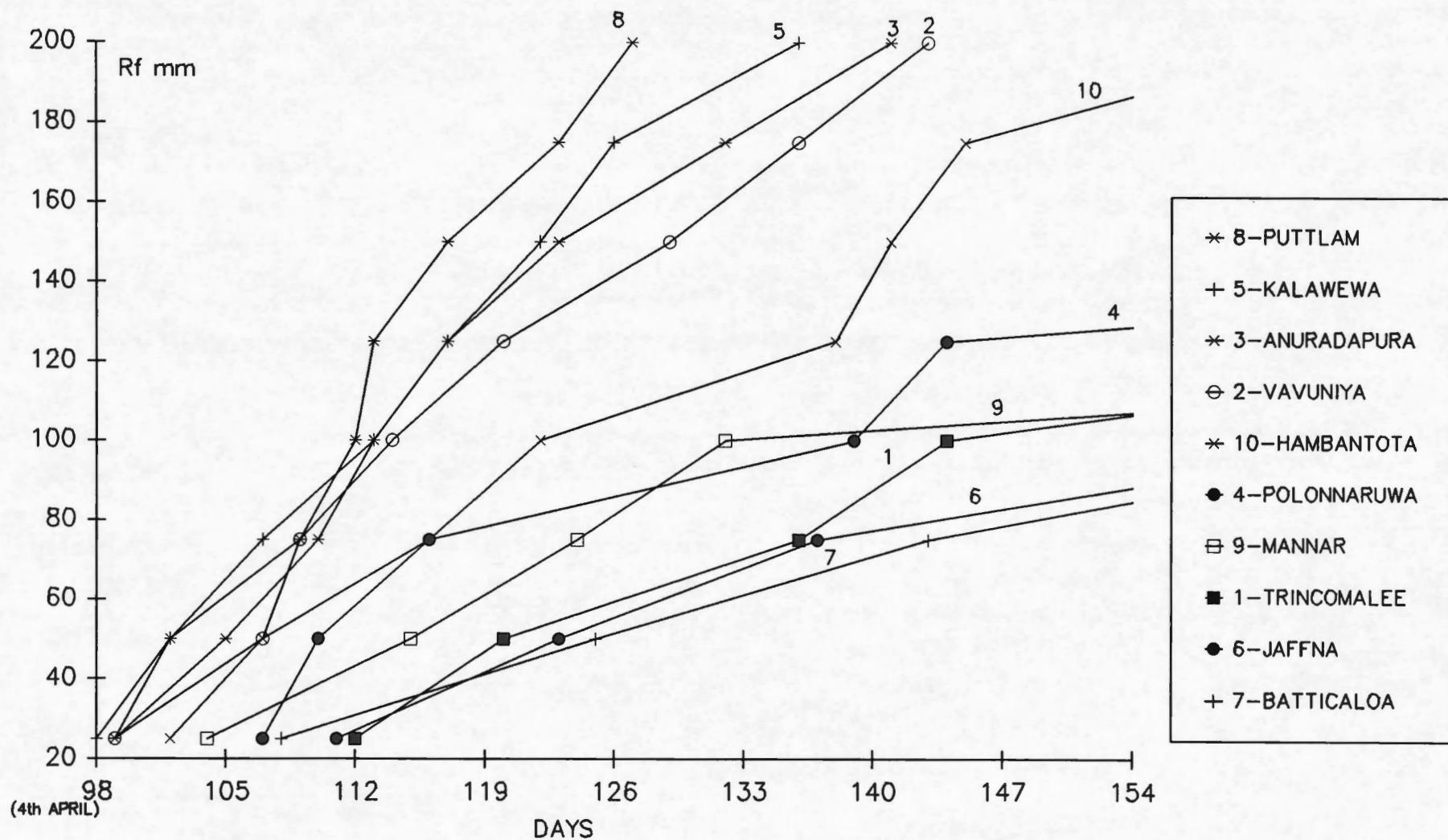
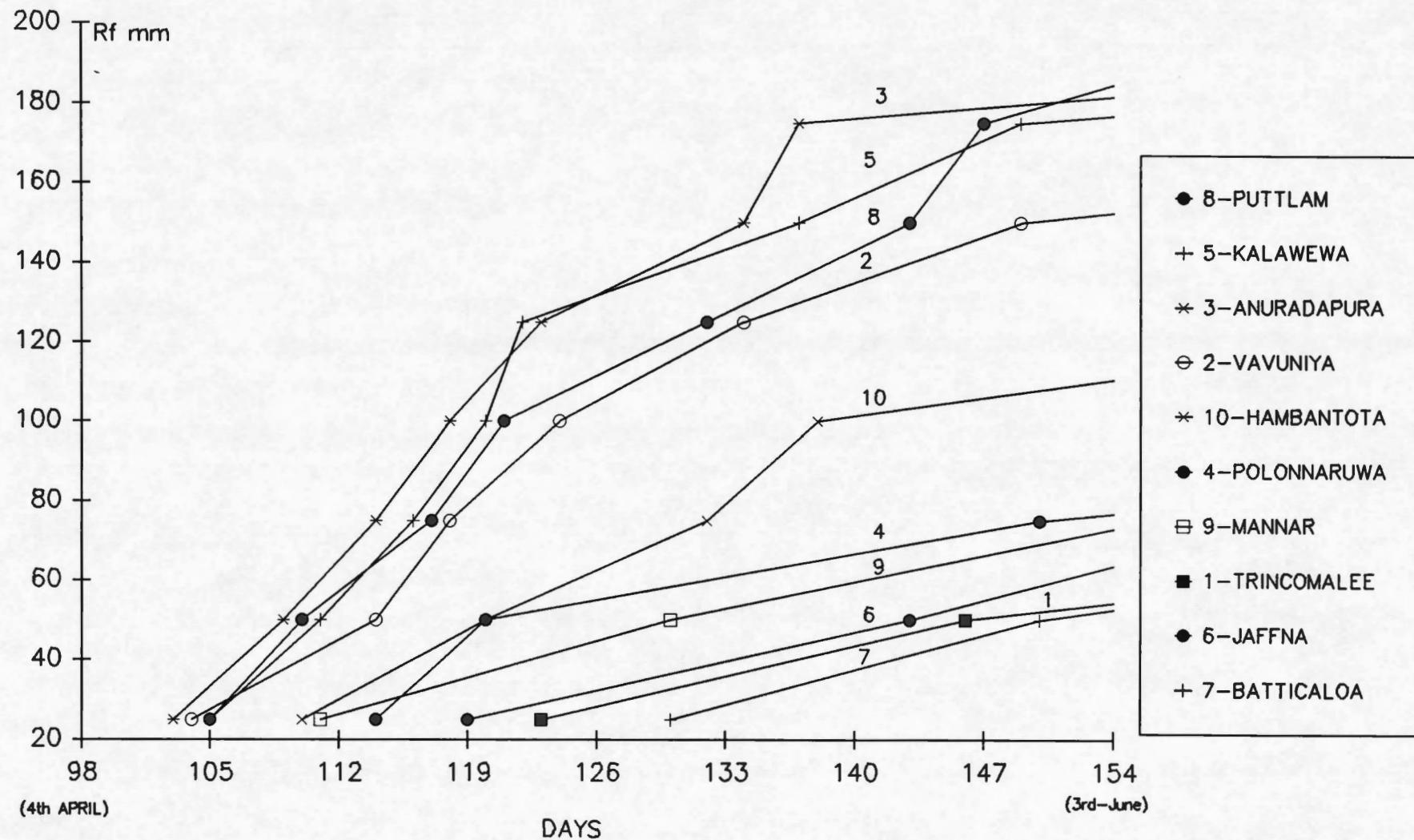


FIG. 18

FORWARD ACCUMULATION OF RAINFALL AT THE BEGINING OF 'YALA' SEASON IN 5 OUT OF 10 YEARS(.50P)



FORWARD ACCUMULATION OF RAINFALL AT THE BEGINING OF 'YALA' SEASON IN 3 OUT OF 4 YEARS(.75P)



3.4 PROBABILITY OF THE 'MAHA' RICE CROP IN DRY ZONE OF SRI LANKA

It is clear that in the sufficient moisture regions for wetland rice , the forward and backward moisture accumulation curves of 200 and 500 mm meet at a level above 75% probability (Appendix, Fig.3); where rainfall is inadequate the two curves meet at a low probability level.Thus the meeting point of the two curves indicate the possible probability of the crop in respect to the satisfaction of water during the cycle and the crop establishment time. This agrees with our earlier studies in wet and intermediate zones of Matara district.

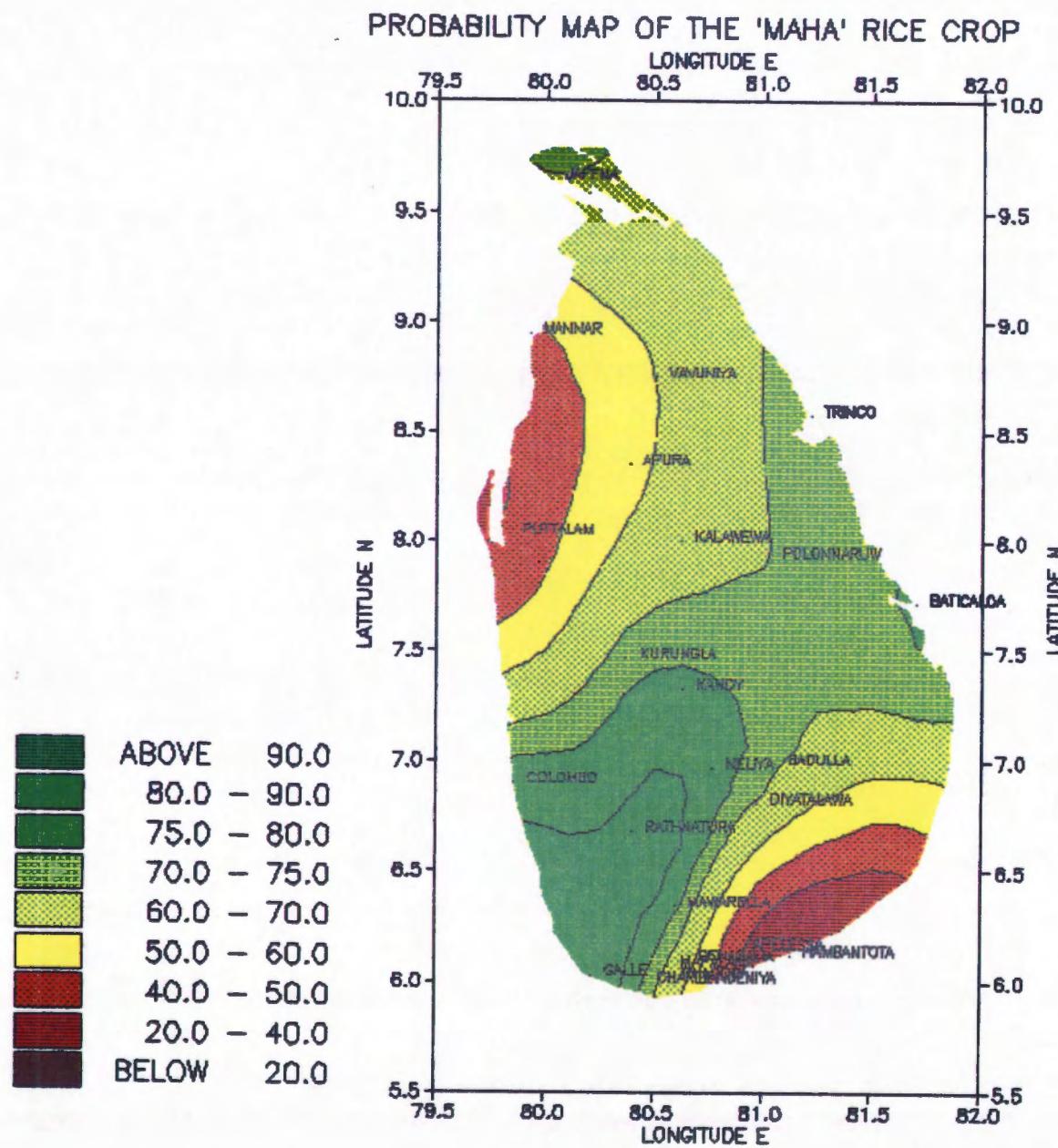
Further more in order to achieve the possible probability, the crop has to be sown prior to the date indicated at the meeting point of the two curves. The crop performance probabilities and latest period of crop commencement at different locations of the dry areas were evaluated by this method (table 3).

Table 3 THE PERFORMANCE PROBABILITY (SUCCESS) OF THE RAINFED
'MAHA' RICE IN DRY AREAS

Location	Probability of Maha crop (%)	last date of crop commencement
1.BATTICALOA	75	* 312 (45)
2.TRINCOMALEE	75	302 (43)
3.POLONNARUWA	70	303 (44)
4.JAFFNA	70	302 (43)
5.KALAWEWA	65	297 (43)
6.VAVUNIYA	60	298 (43)
7.ANURADHAPURA	55	295 (42)
8.MANNAR	40	301 (43)
9.PUTTALAM	40	294 (42)
10.HAMBANTOTA	18	293 (42)

* week

FIG. 20



The success of the Maha rice crop is much low in Hambantota. Similarly the risk in North western dry regions appeared to be high. The chances to have a successful crop in Batticaloa and Trincomalee is higher compared to other locations; the probability of Maha rice crop in Anuradhapura and Kalawewa areas seemed to be low compared to North Eastern dry areas.

The period at which the backward moisture accumulation curve achieves 75% probability, could considerd to be the optimum time for crop commencement, minimising the climatological risk during the cropping cycle.

The optimum time of crop commencement in North Central dry zone will be around 41st week which is about one week erlier compared to Polonnaruwa, kalawewa and Trincomalee . The crop commencement at Batticaloa may delayed by further one week.

Table 4

THE OPTIMUM PERIOD OF CROP COMMENCEMENT IN DRY AREAS

Location	Date of Crop commencement
1.BATTICALOA	307 (44)
2.TRINCOMALEE	292 (42)
3.POLONNARUWA	289 (42)
4.JAFFNA	300 (43)
5.KALAWEWA	291 (42)
6.VAVUNIYA	287 (41)
7.ANURADHAPURA	282 (41)
8.MANNAR	-
9.PUTTALAM	278 (40)
10.HAMBANTOTA	-

The results of the forward and backward moisture accumulation in dry zone and the 6 locations in wet and intermediate zones in Matara district are used to make the probability map of the Maha rice crop (Fig 20). The probabilities at mountaneous wet zone condnsidered as > 75% for calculation purposes. The map will help to identify the risk of the Maha rice crop in different parts of dry and intermediate zones.

3.5 THE IRRIGATION REQUIREMENT OF RICE

The water requirement of wetland rice for both 'Yala' and 'Maha' seasons were assessed with program 'CROPWAT' (Smith, 1988). The rainfall and the potential evapotranspiration of 22 stations at Wet, Dry, and Intermediate zones were used for the analysis (Appendix 5).

The effective rainfall of dry years were estimated on the basis of 75% probability of the monthly rainfall; the average monthly rainfall is considered as the available rainfall in normal years. The simulation has been done for transplanted paddy in LHG soils. The percolation rate considered as 5mm/day. The water requirement for flooding and wetland preparation is considered as 180-200 mm. The duration of the Yala and 'Maha' crops were taken as 105, and 135 days respectively. The duration of the crop and the crop coefficients at different phases are given in Table 5 and 6.

The date of transplantation for Maha season was decided upon the forward and backward accumulation of 200 and 500 mm rainfall as described in previous chapter. The transplanting date of the 'Yala' season for dry areas were decided upon the forward accumulation of 75mm rainfall. The land preparation period of 18 days was assumed as allow time for the land to be worked and for weed decomposition.

The irrigation requirement of different locations in respect to 'Yala' and 'Maha' seasons are presented in Fig. 17,18,19,20 . The seasonal water requirements at different locations are given in appendix table 3.

The highest irrigation need in 'Maha' seemed to be in Hambantota district followed by Puttalam and Mannar. It appeared that there would be around 1000 -1200 mm net irrigation need in Hambantota during the Maha season. The water requirement at 'Yala' accounts for 1200 - 1500 mm in entire dry zone in Normal years.

The water requirement of the Yala season is much higher in north , south eastern, and eastern dry areas. In normal years north central dry zone may required 900-1000 mm water for 'Yala' rice. It would be about 200 mm more in 3 out of four years.

The simulated data for Anuradhapura agrees with the simulation made for Mahaweli ganga development scheme by the world Bank (1977). According to this report, the irrigation requirement of the Mahaweli 'H' area would be 1333 and 1246 mm in 90% of the field efficiency for Maha and Yala rice respectively.

FIG. 21

IRRIGATION NEED OF THE 'MAHA' RICE IN NORMAL YEARS

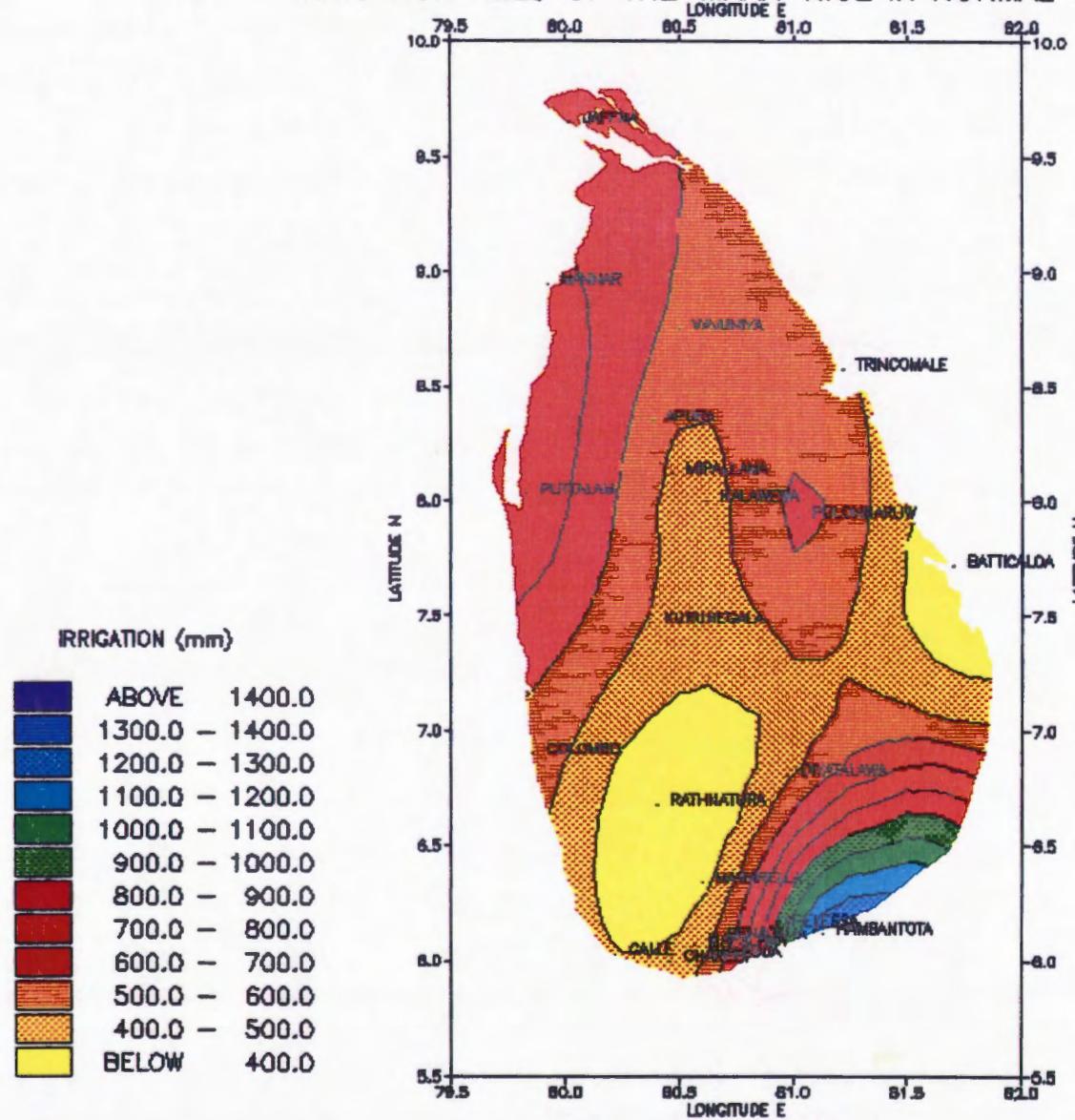


FIG. 22

IRRIGATION NEED OF THE 'MAHA' RICE IN DRY YEARS

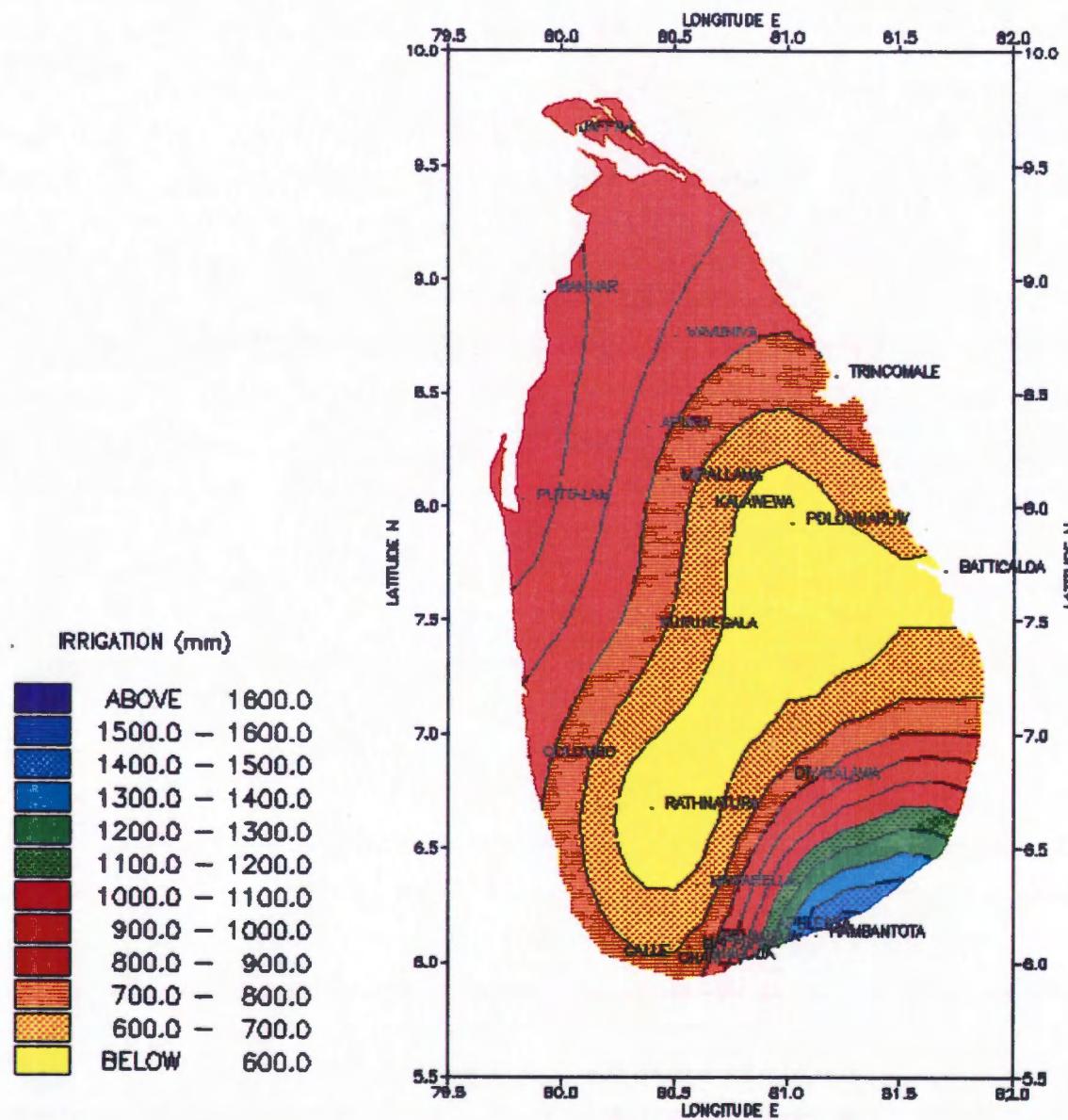


FIG. 23

IRRIGATION NEED OF THE 'YALA' RICE IN NORMAL YEARS

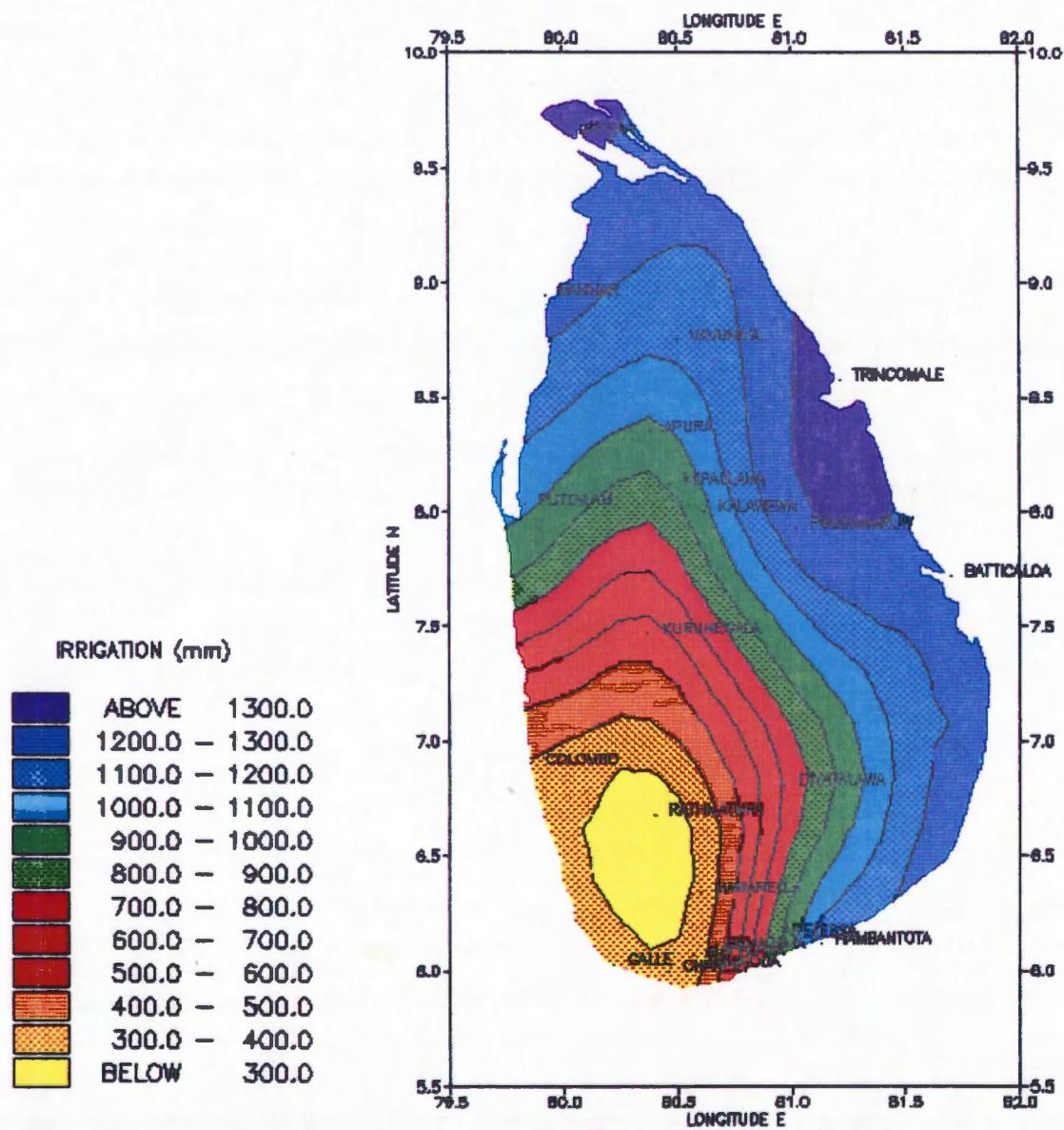
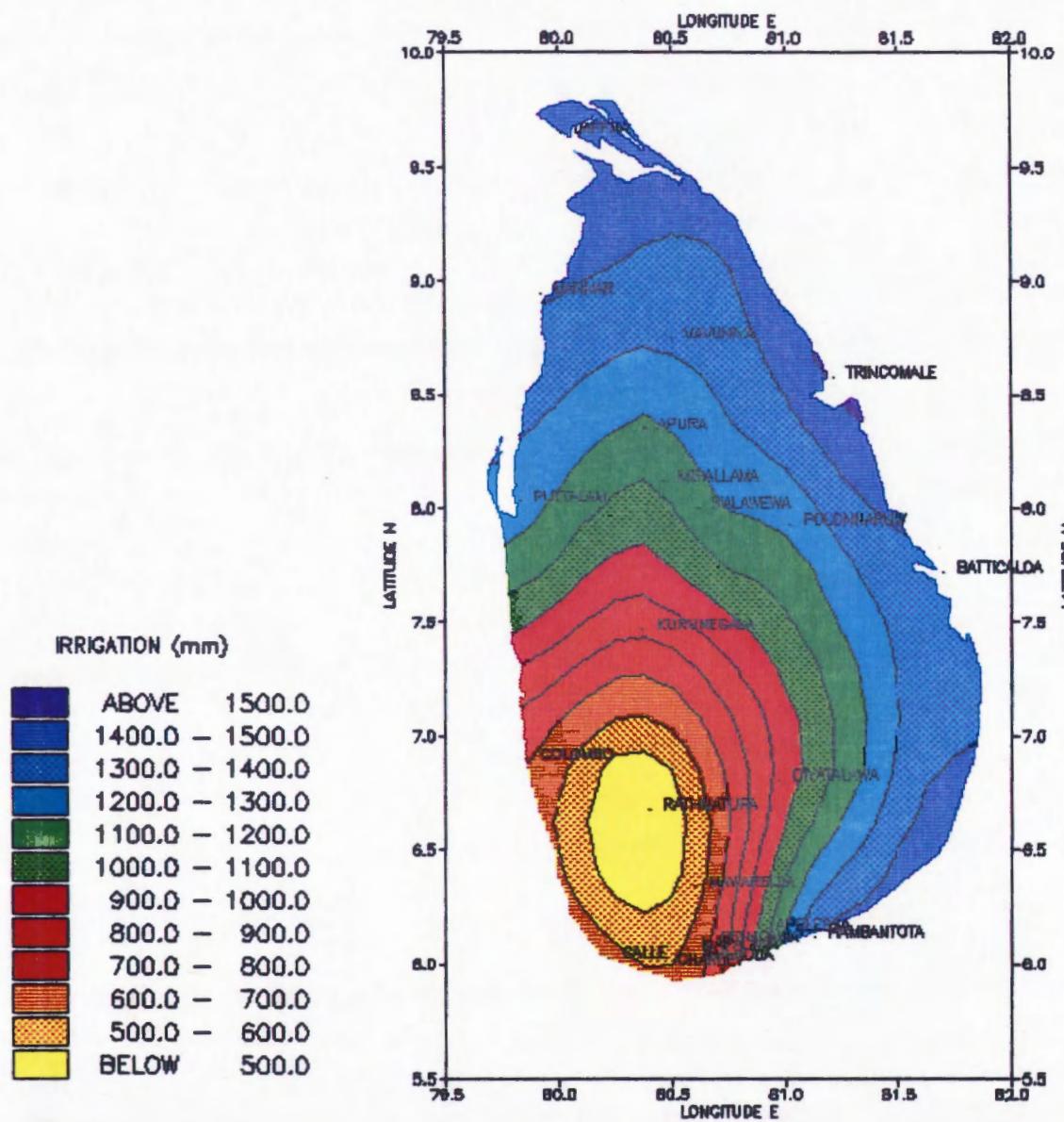


FIG 24

IRRIGATION NEED OF THE 'YALA' RICE IN DRY YEARS



CONCLUSIONS

A highly significant linear relationship exists between the dependable rainfall and the mean rainfall of monthly, ten-day, and weekly periods. Nevertheless in respect to lower rainfall limits the relationship appears to follow a well pronounced exponentiality.

The agroclimatological risk of drought in the Maha season seems to be high in Hambantota and Mannar districts. Here the success of the Maha rice is very much low. The success of the Maha crop in Anuradhapura and Kalawewa areas appears to be low Compared to North Eastern dry zone.

Batticaloa and Trincomalee have the highest probabilities to repeat two wet weeks in 44th 48th weeks. These areas may subjected to frequent crop damage due to additional moisture during this period.

In three out of four years, the sufficient rainfall accumulation for the establishment of a puddled wetland rice in dry areas can be expected in 42nd - 43rd weeks; this would be about one week later in Batticaloa. Nevertheless the optimum period for crop commencement in North-Central dry zone falls on 41st week which is about one week earlier compared to North Eastern dry zone.

The highest irrigation need in 'Maha' seems to be in Hambantota (1000-1200 mm) district, followed by Puttalam and Mannar. The water requirement at 'Yala' accounts for 1200-1500 mm in Northern dry zone, and 900- 1000 in North Central dry Zone.

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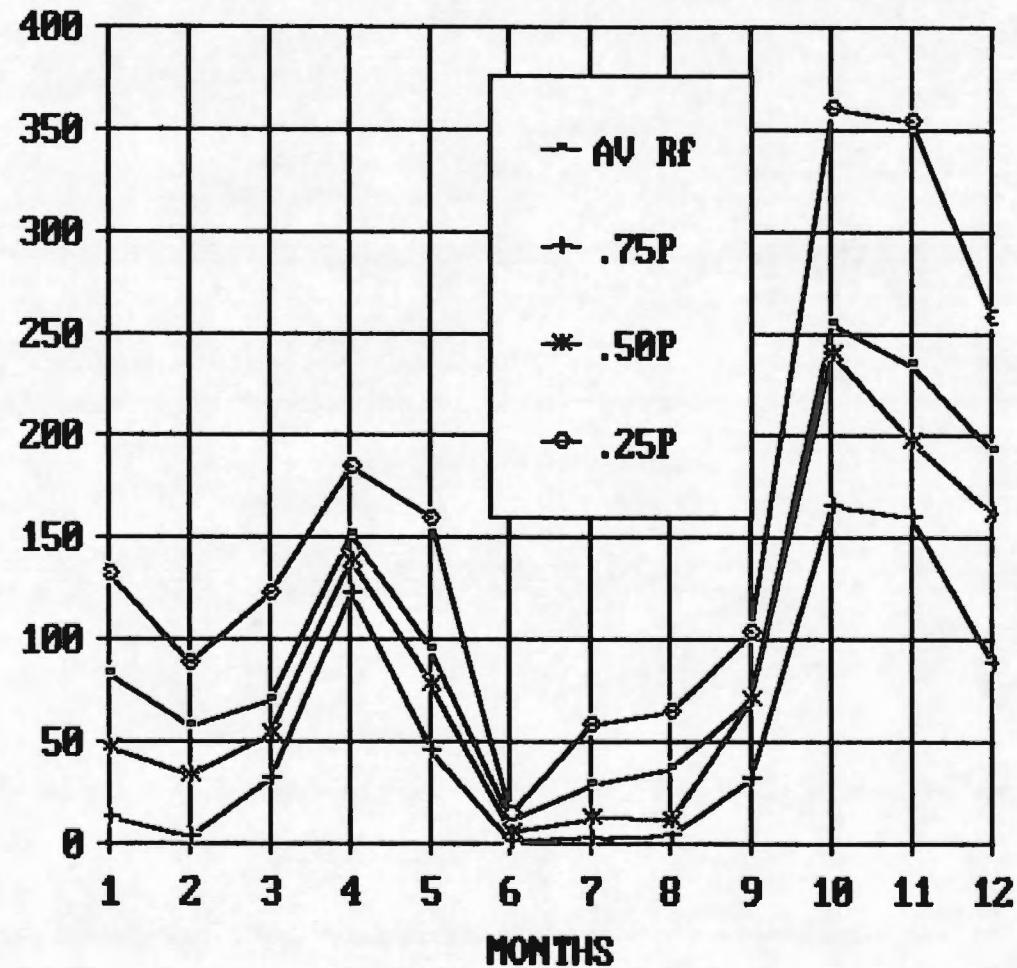
**World Bank report No.1487 (1987)
Sri Lanka- Appraisal of Mahaweli ganga development project II.**

APPENDIX I

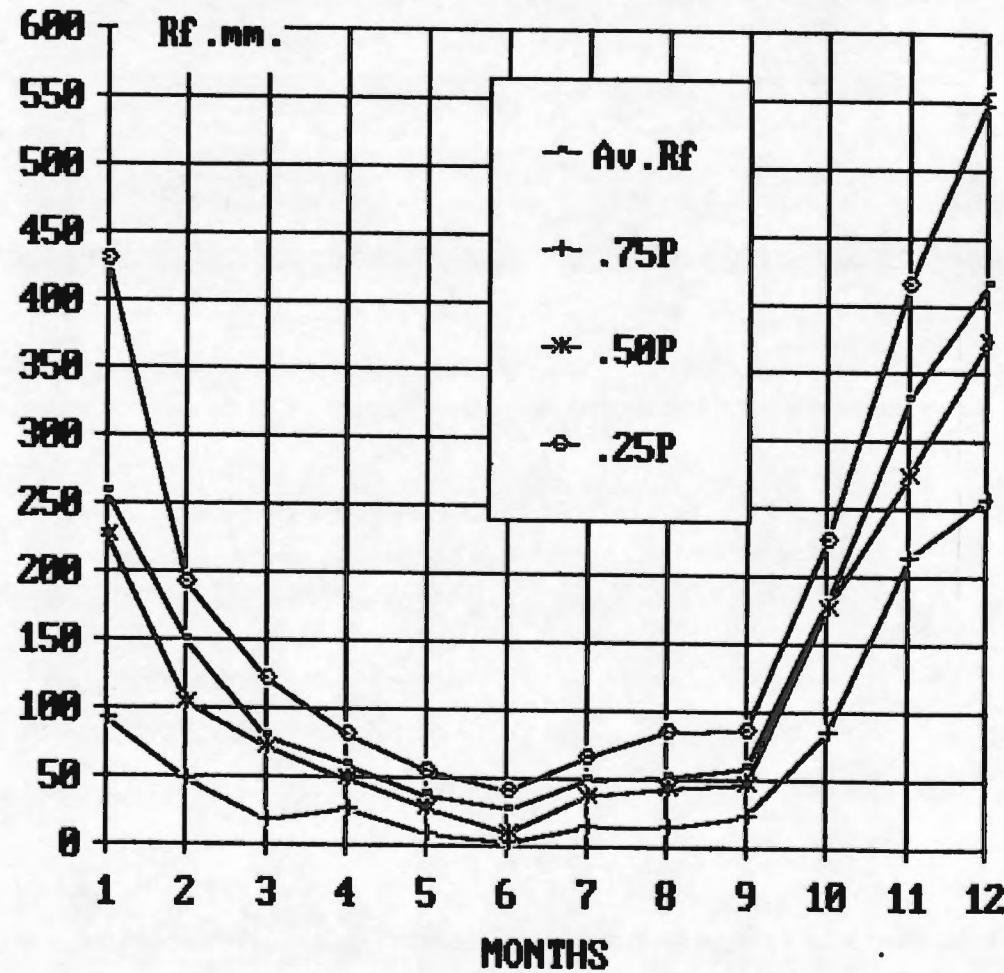
**AVERAGE MONTHLY RAINFALL AND
RAINFALL AT SELECTED
PROBABILITIES**

AVERAGE MONTHLY RAINFALL AND THE RAINFALL AT
SELECTED PROBABILITIES ,ANURADHAPURA

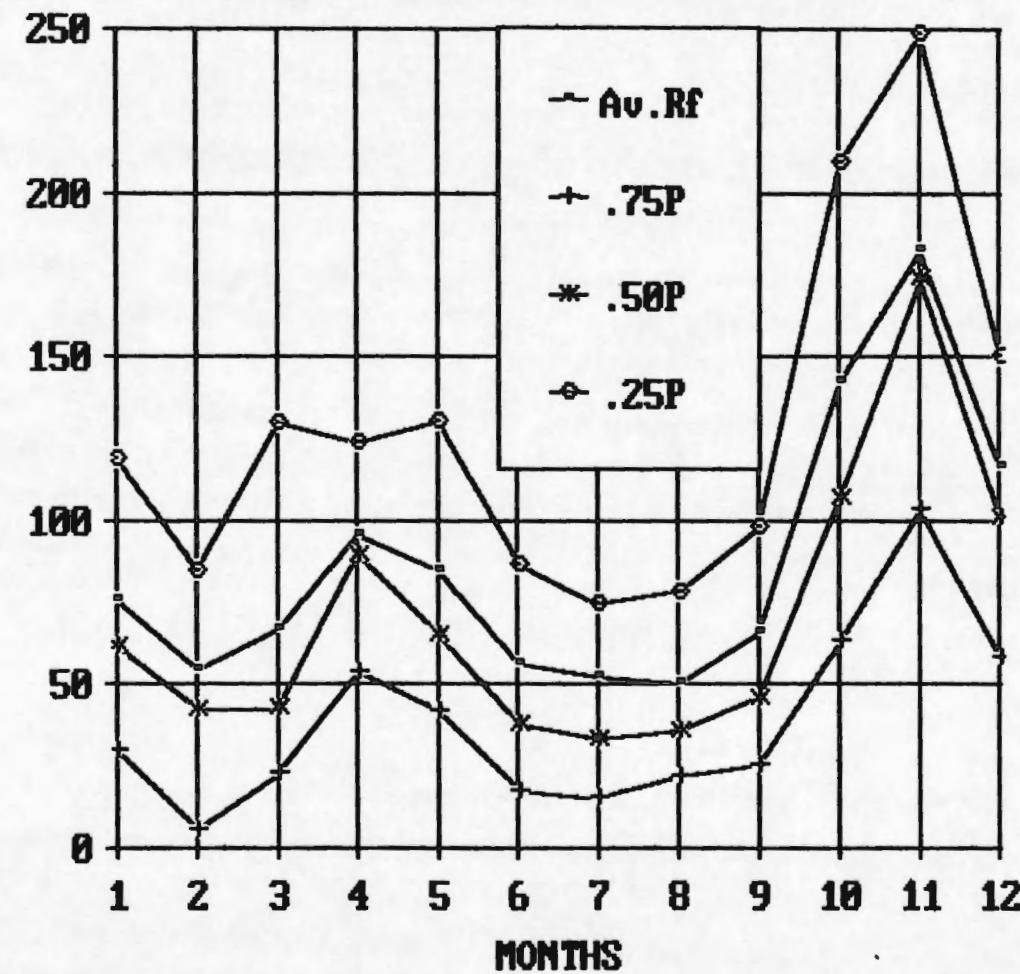
Rf



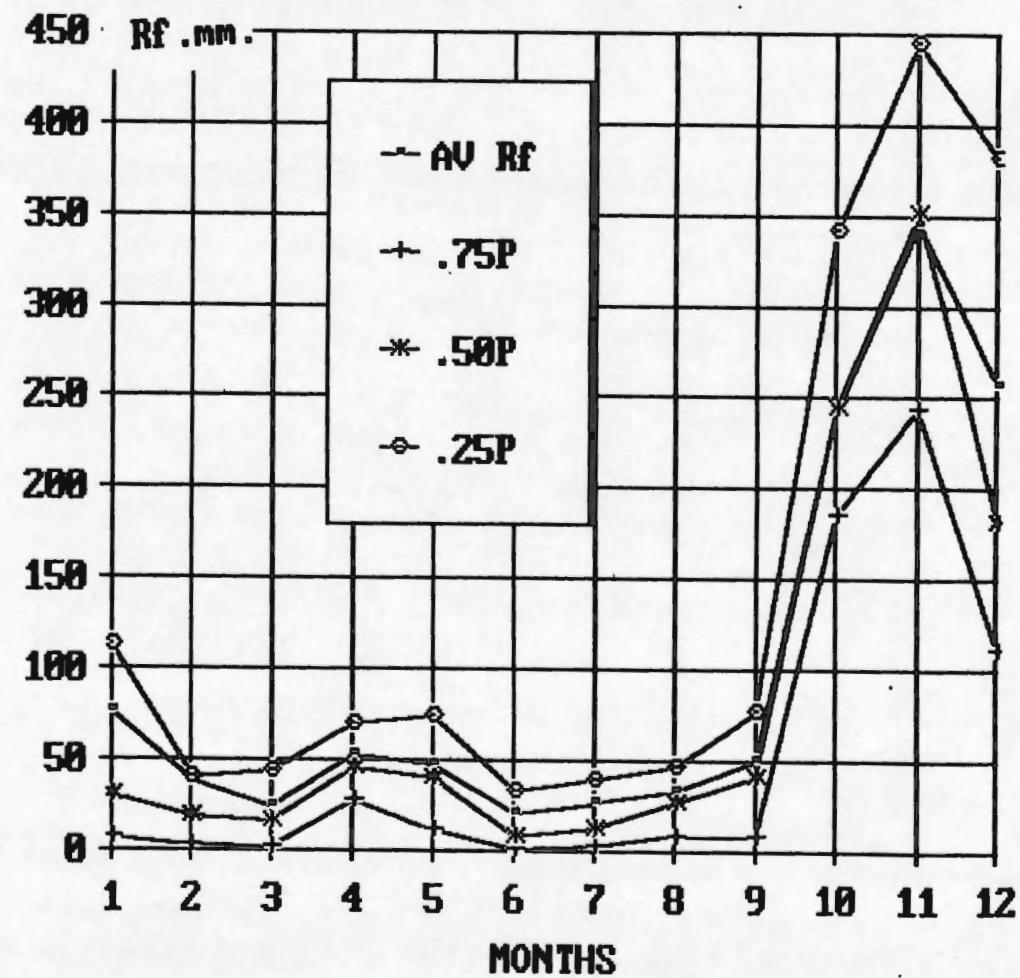
AVERAGE MONTHLY RAINFALL AND THE RAINFALL AT
SELECTED PROBABILITIES ,BATTICALOA



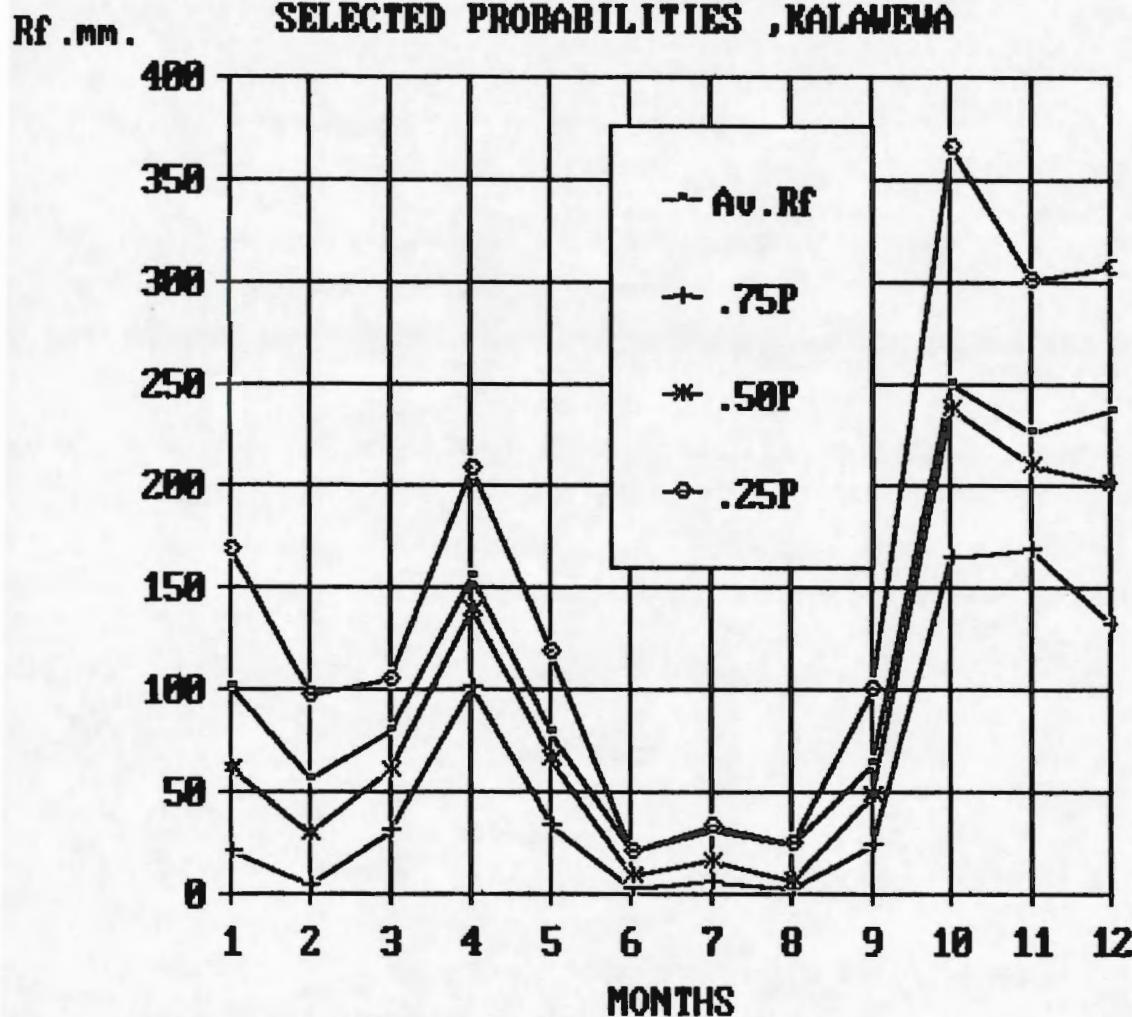
AVERAGE MONTHLY RAINFALL AND THE RAINFALL AT
Rf .mm. SELECTED PROBABILITIES ,HAMBANTOTA



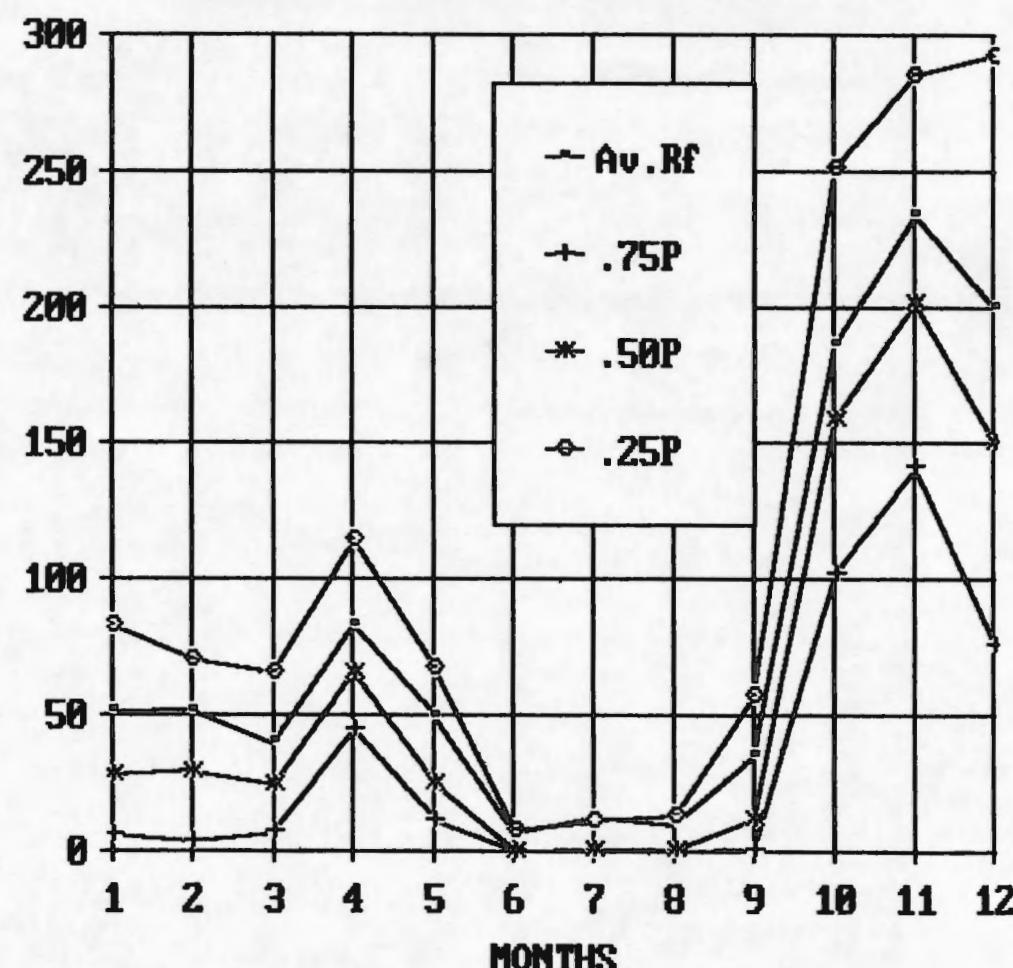
AVERAGE MONTHLY RAINFALL AND THE RAINFALL AT
SELECTED PROBABILITIES ,JAFFNA



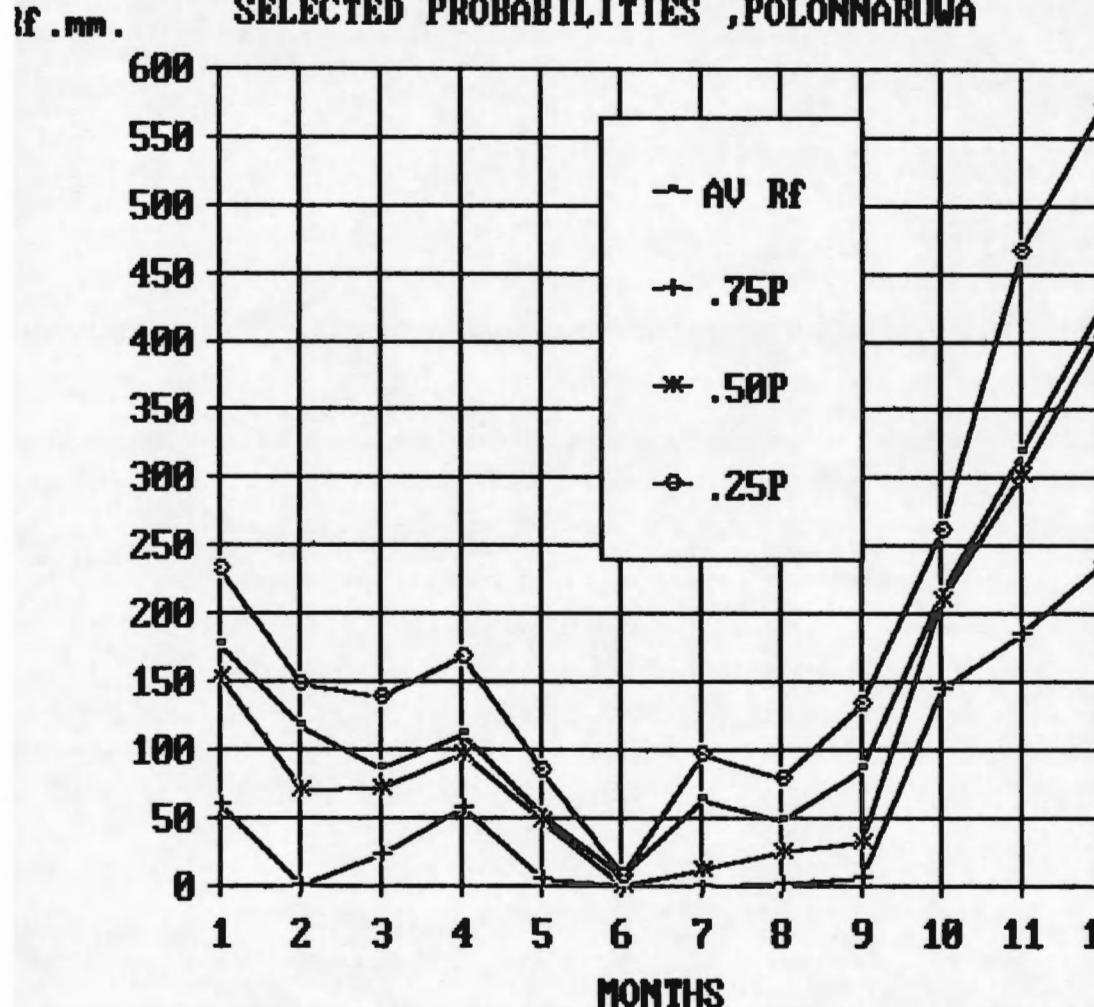
AVERAGE MONTHLY RAINFALL AND THE RAINFALL AT
SELECTED PROBABILITIES ,KALAWEWA



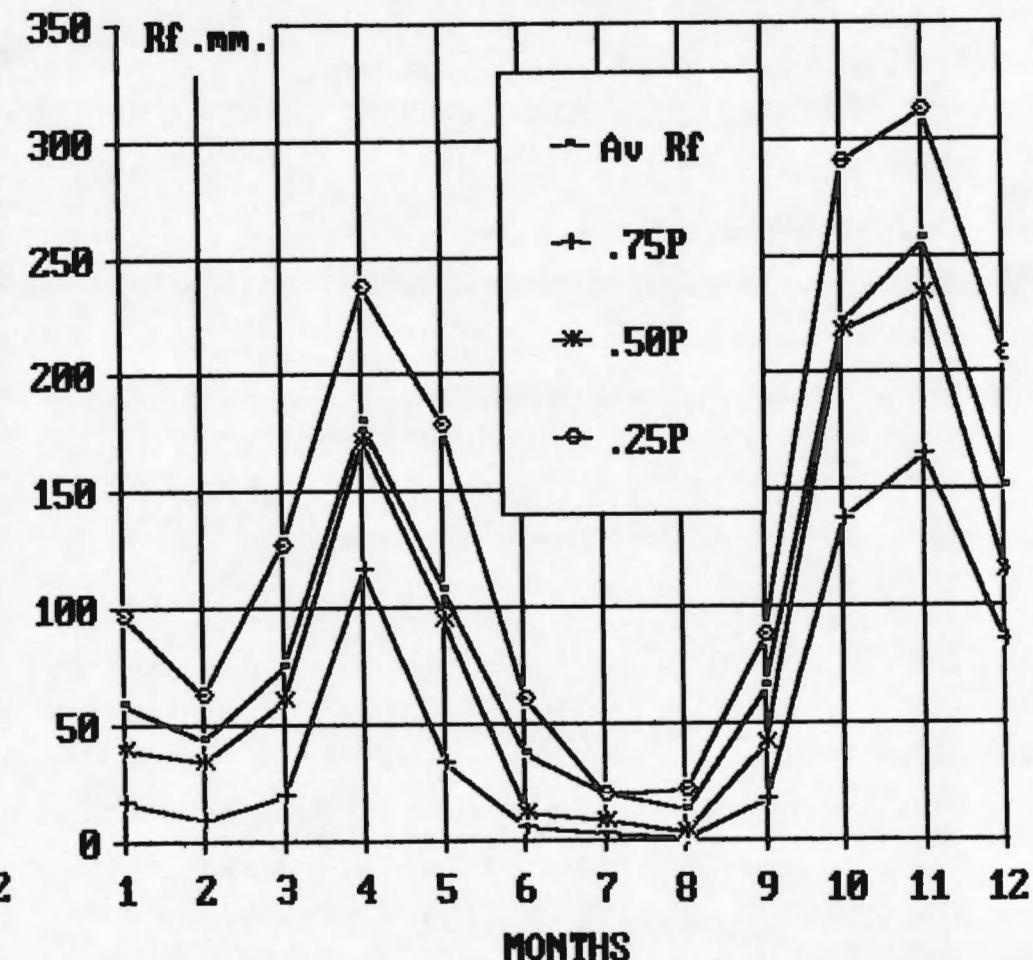
AVERAGE MONTHLY RAINFALL AND THE RAINFALL AT
SELECTED PROBABILITIES ,MANNAR



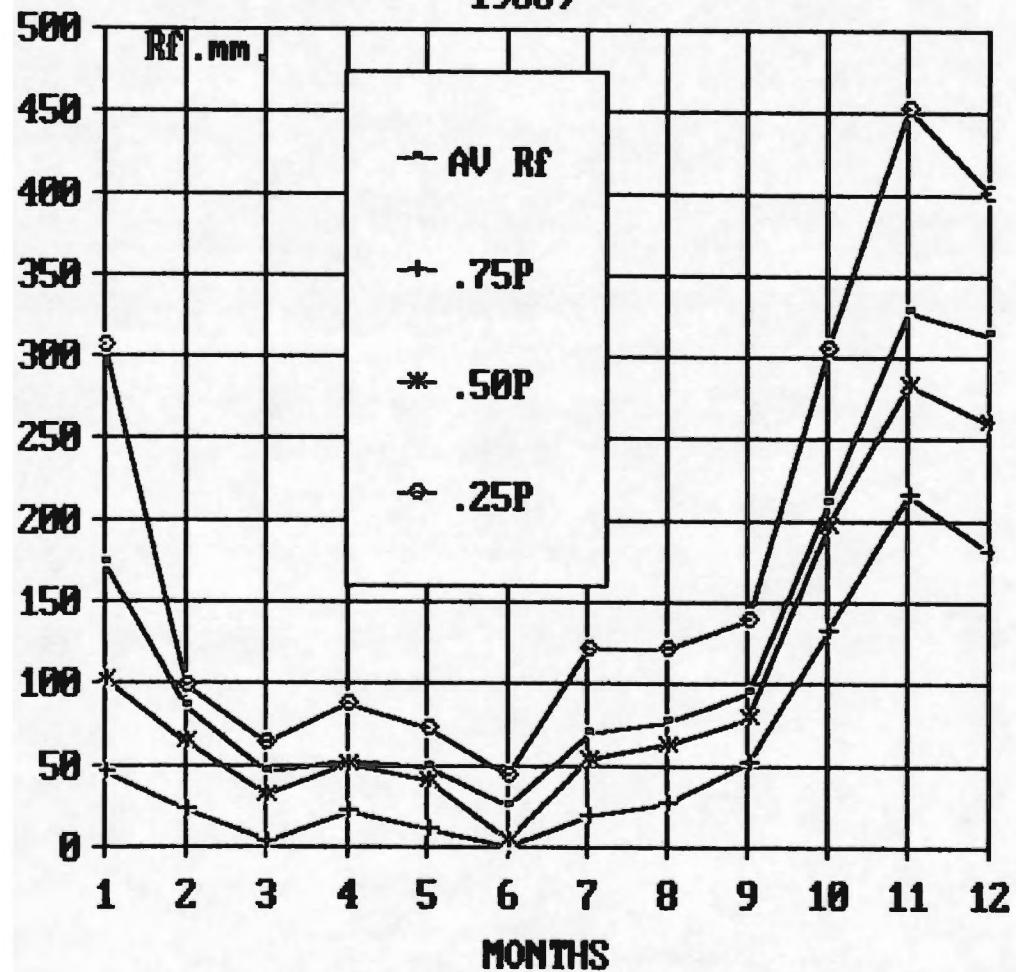
AVERAGE MONTHLY RAINFALL AND THE RAINFALL AT
SELECTED PROBABILITIES ,POLONNARUWA



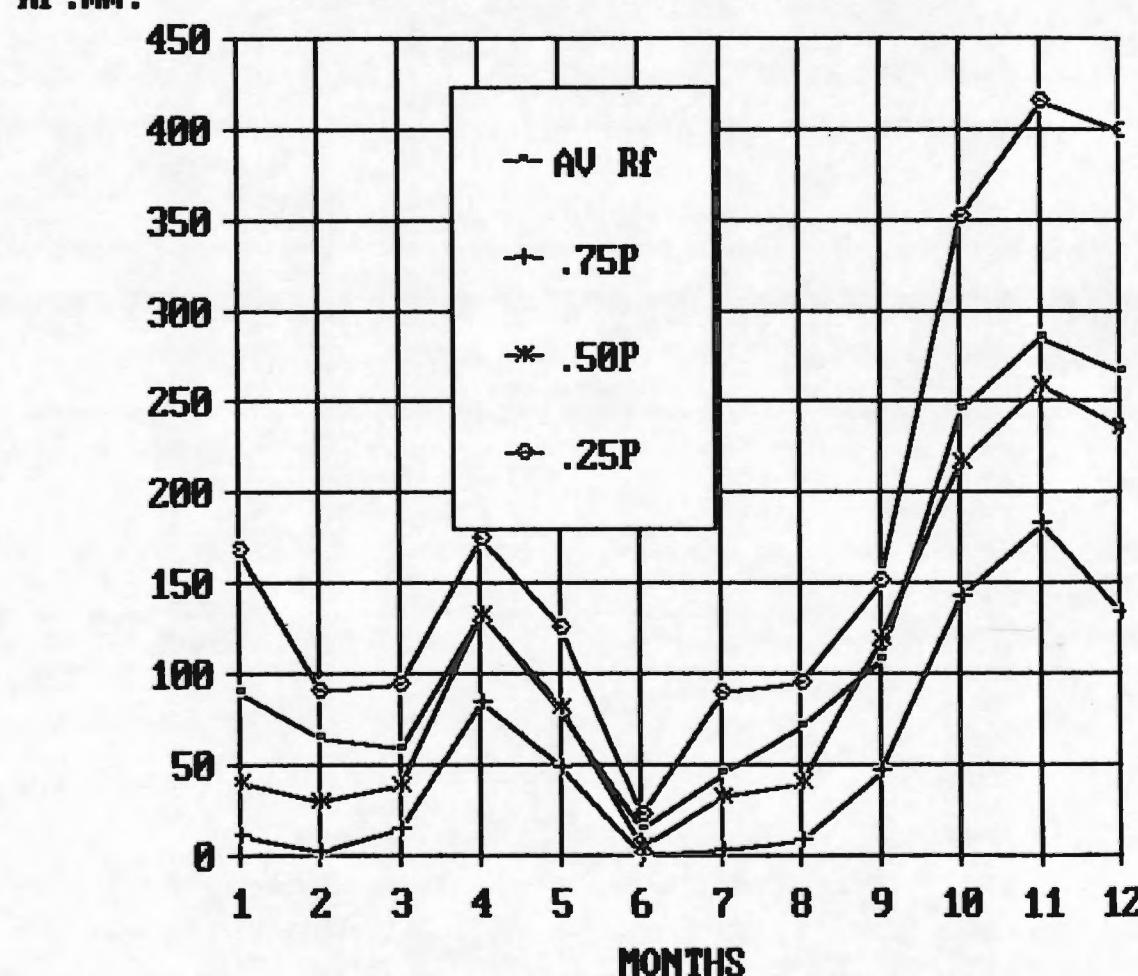
AVERAGE MONTHLY RAINFALL AND THE RAINFALL AT
SELECTED PROBABILITIES ,PUTTALAM



AVERAGE MONTHLY RAINFALL AND THE RAINFALL AT
SELECTED PROBABILITIES ,TRINCOMALEE (1951-
1986)



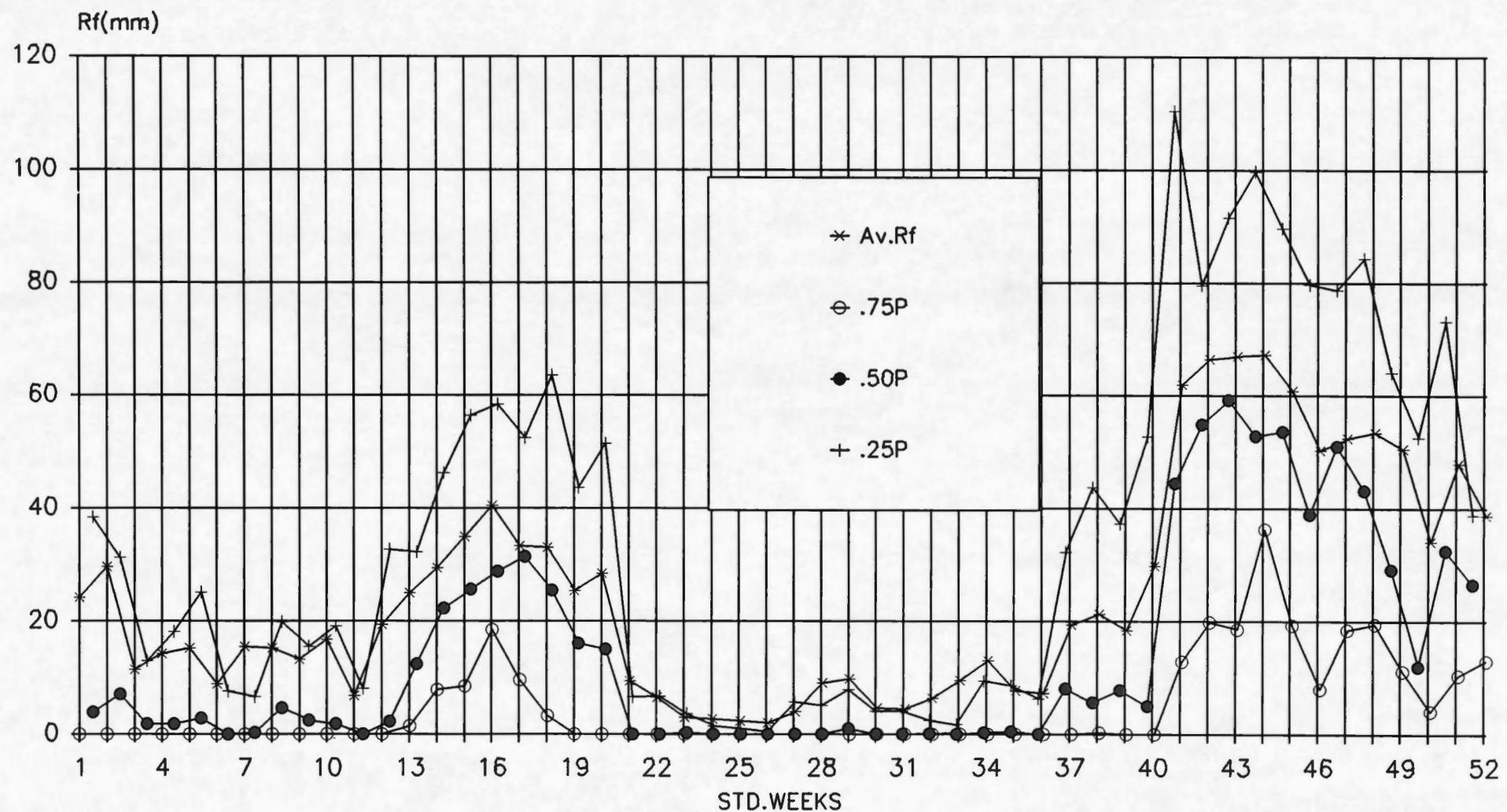
AVERAGE MONTHLY RAINFALL AND THE RAINFALL AT
SELECTED PROBABILITIES ,VAVUNIYA



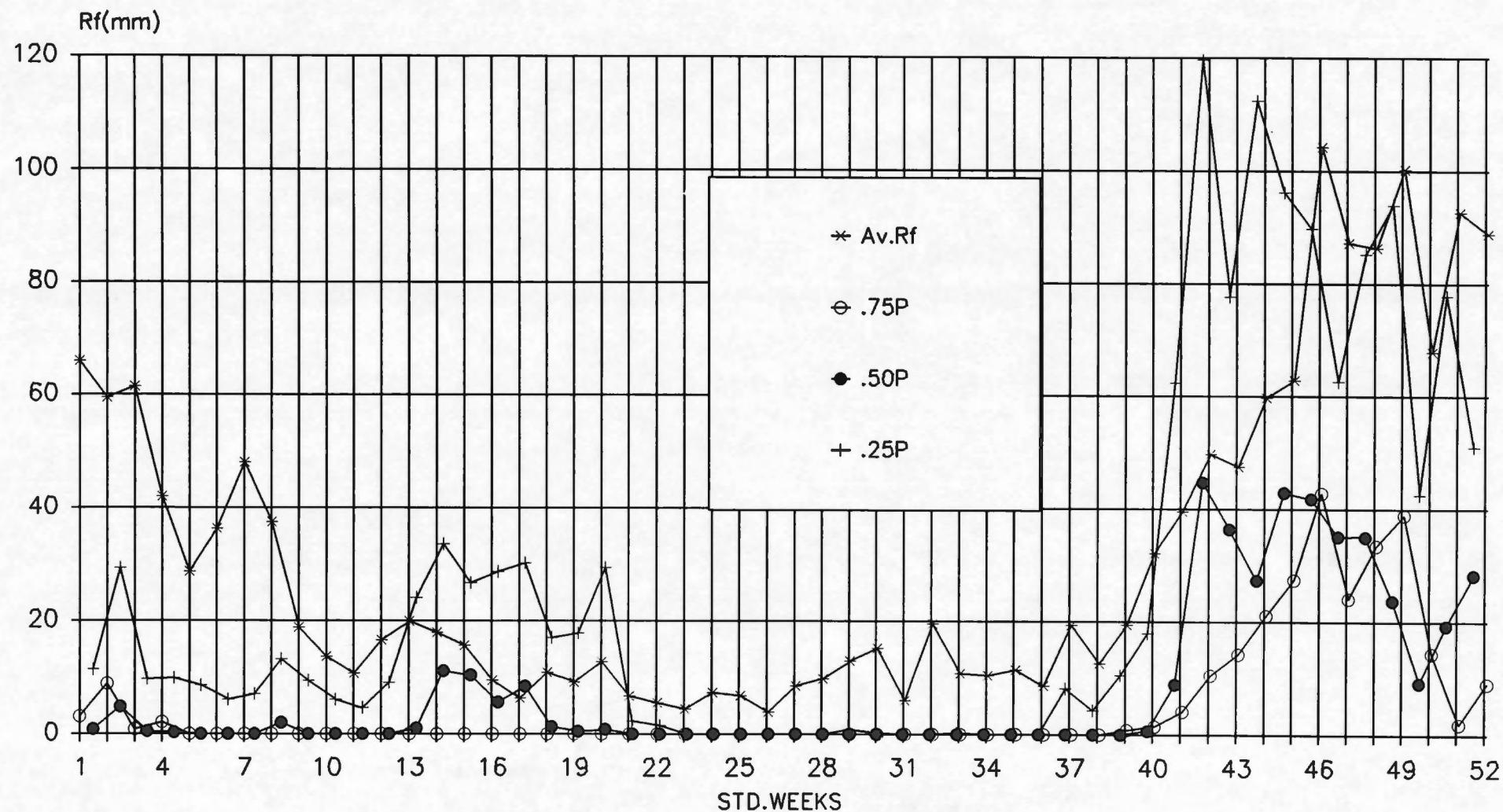
APPENDIX II

**WEEKLY RAINFALL AND RAINFALL
AT SELECTED
PROBABILITIES**

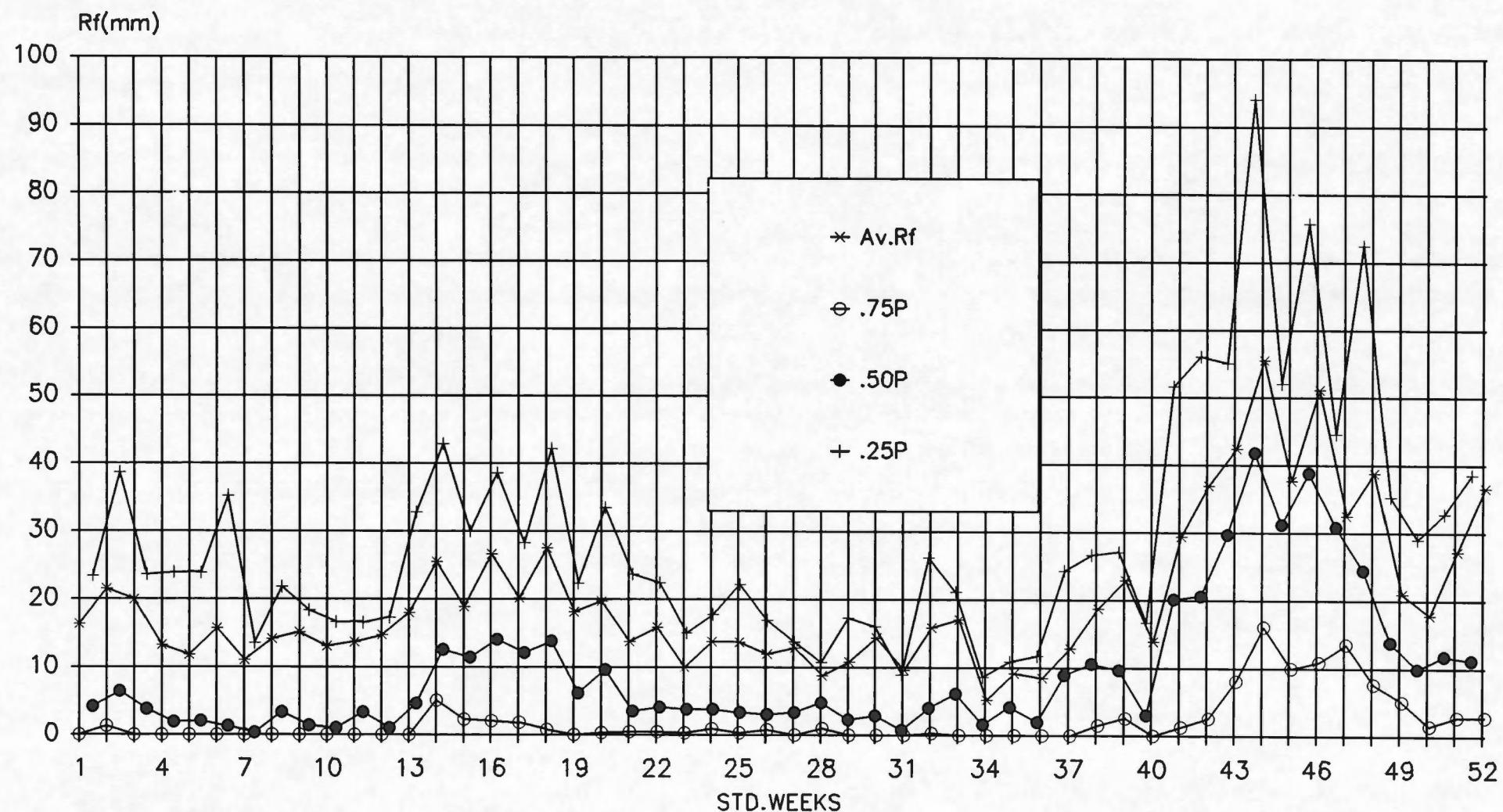
WEEKLY RAINFALL AND RAINFALL AT SELECTED PROBABILITIES , ANURADHAPURA



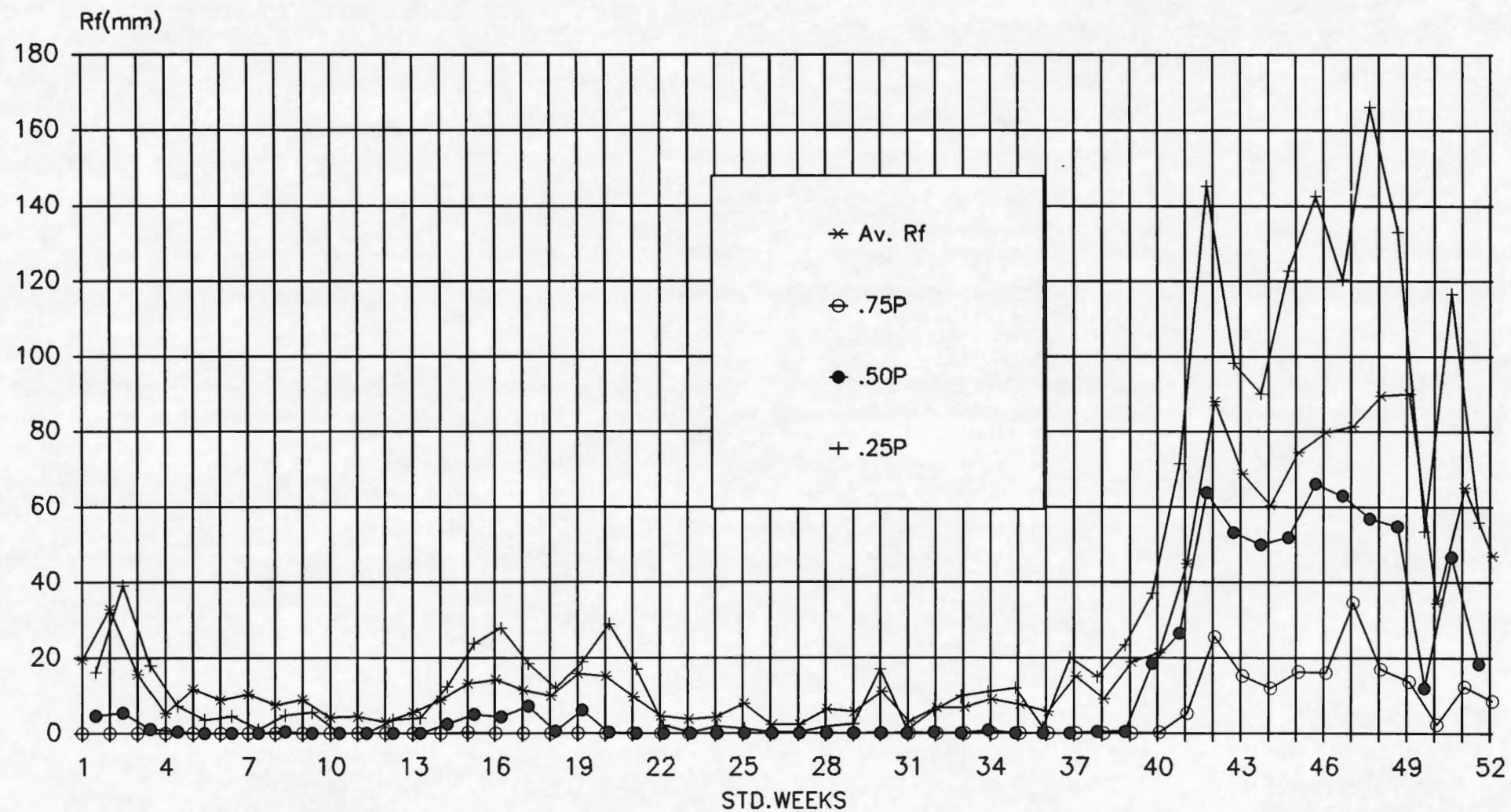
WEEKLY RAINFALL AND RAINFALL AT SELECTED PROBABILITIES,BATTICALOA



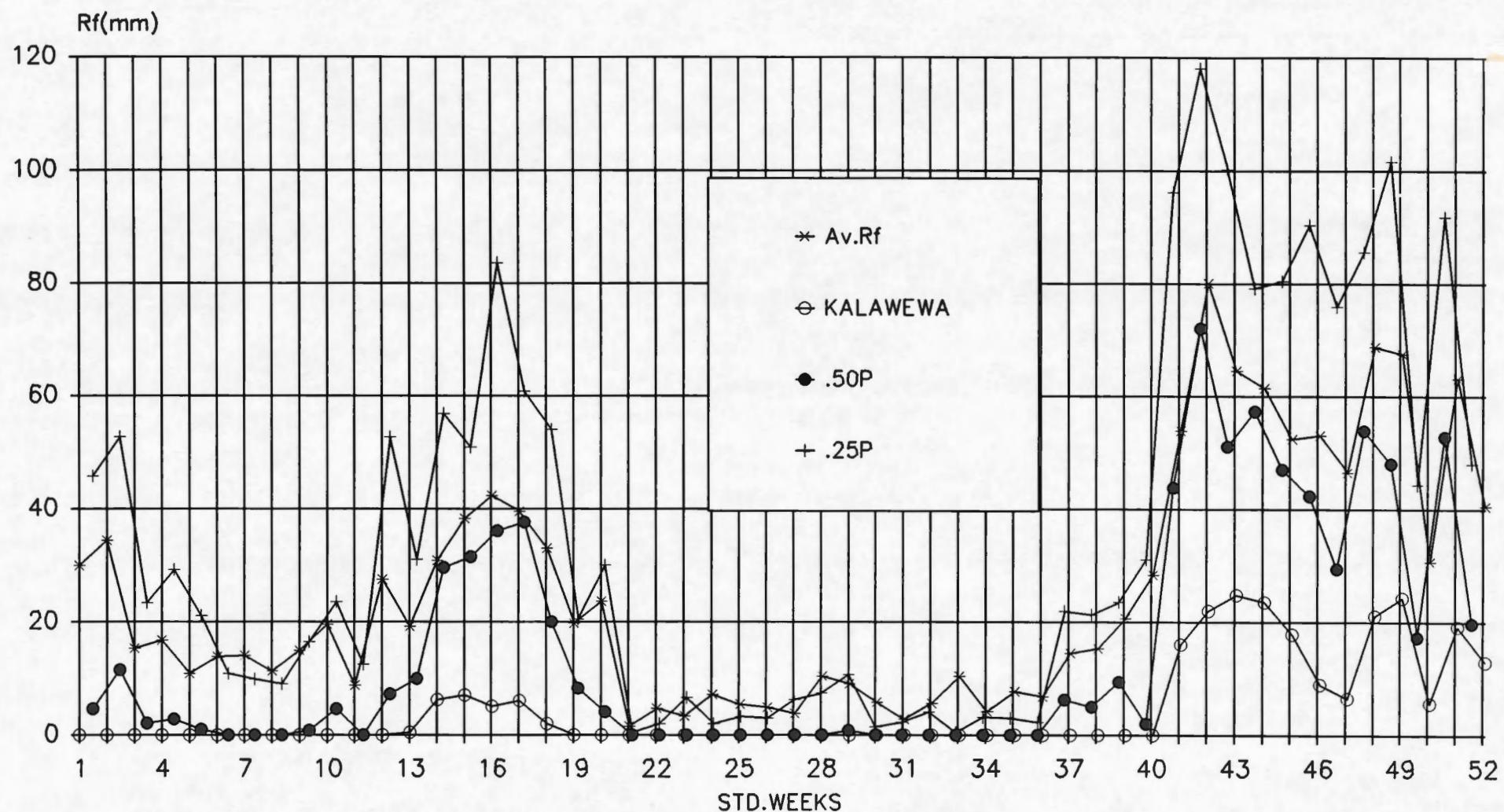
WEEKLY RAINFALL AND RAINFALL AT SELECTED PROBABILITIES , HAMBANTOTA



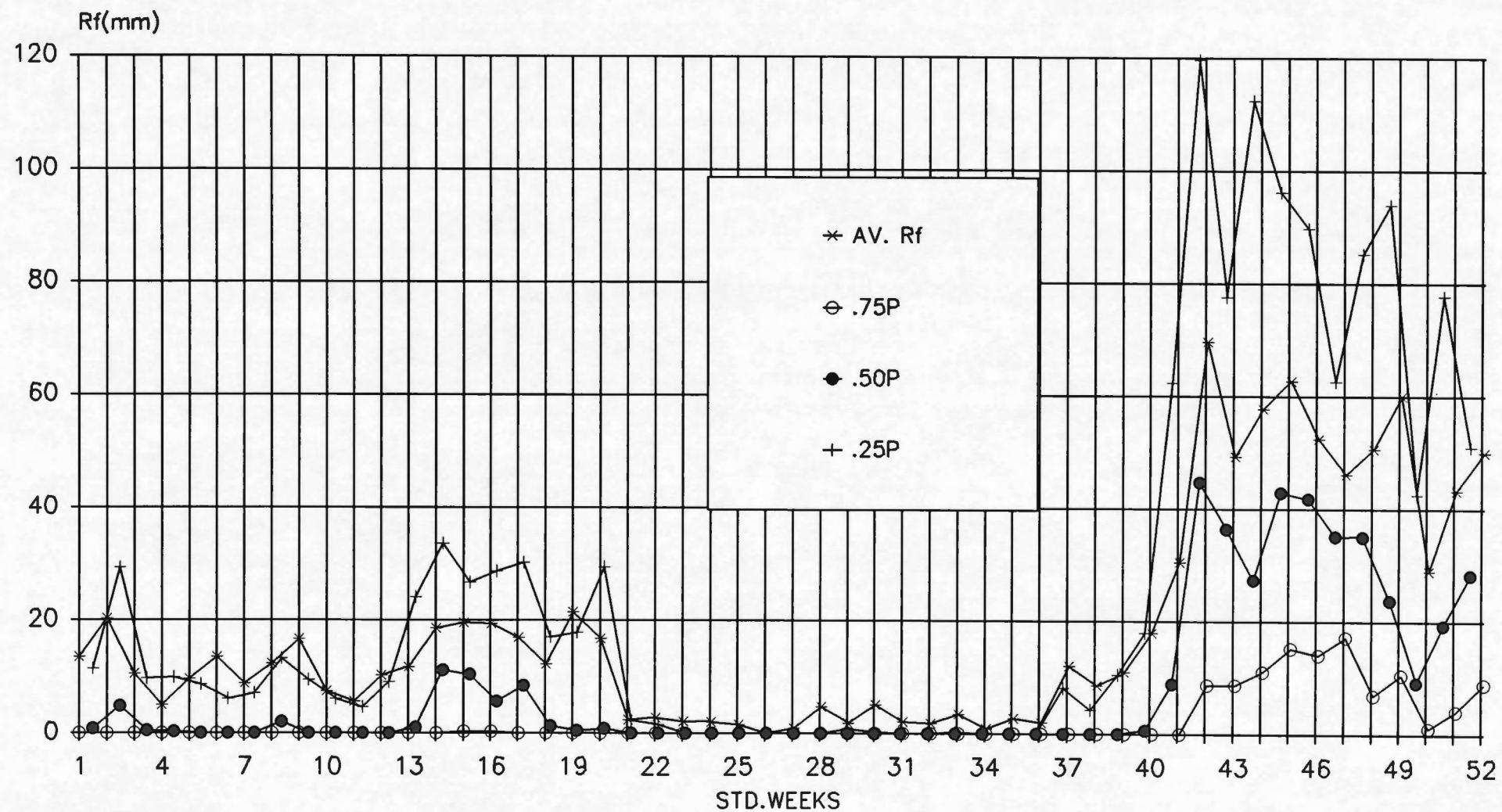
WEEKLY RAINFALL AND RAINFALL AT SELECTED PROBABILITIES , JAFFNA



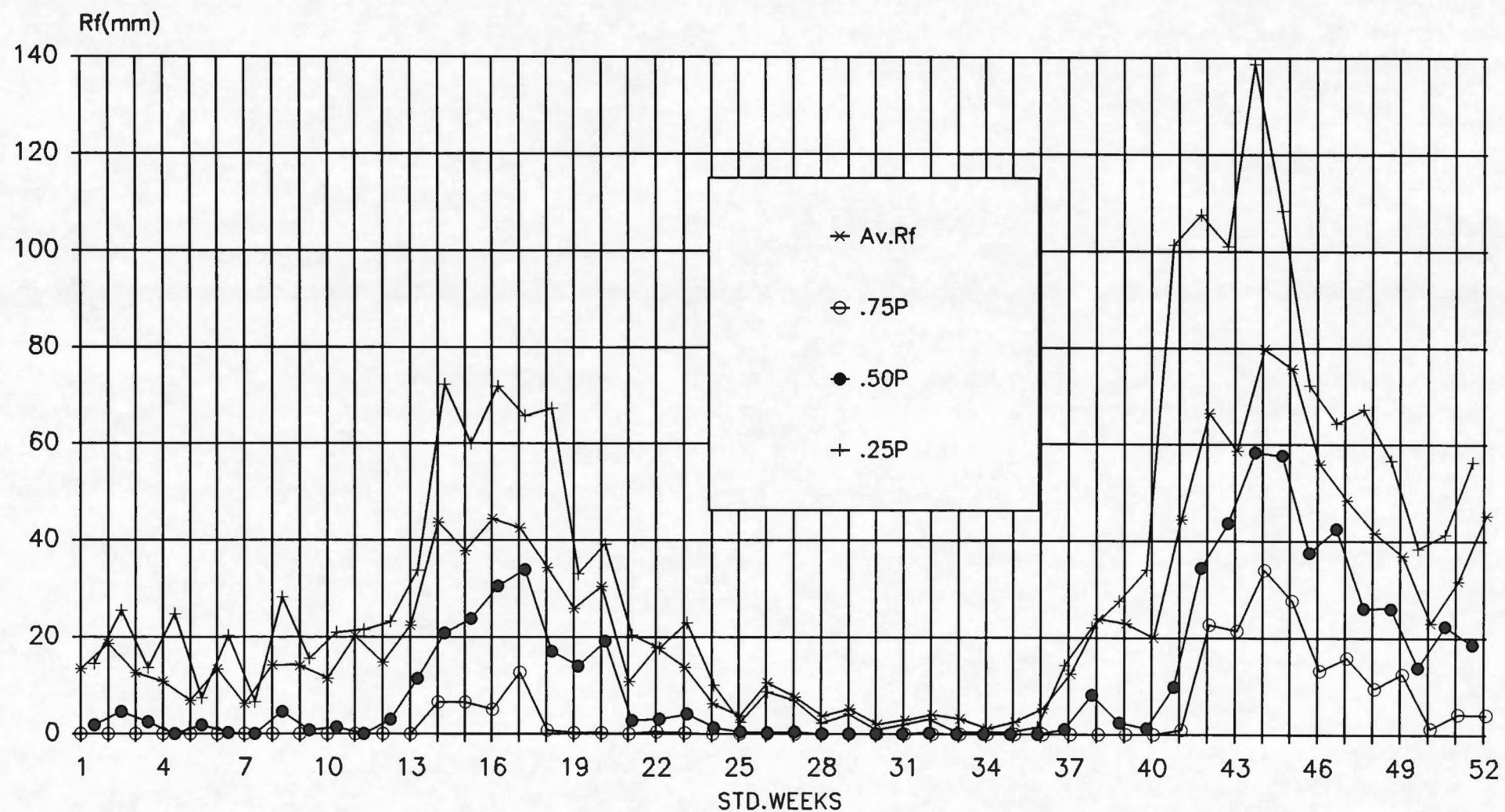
WEEKLY RAINFALL AND RAINFALL AT SELECTED PROBABILITIES , KALAWEWA



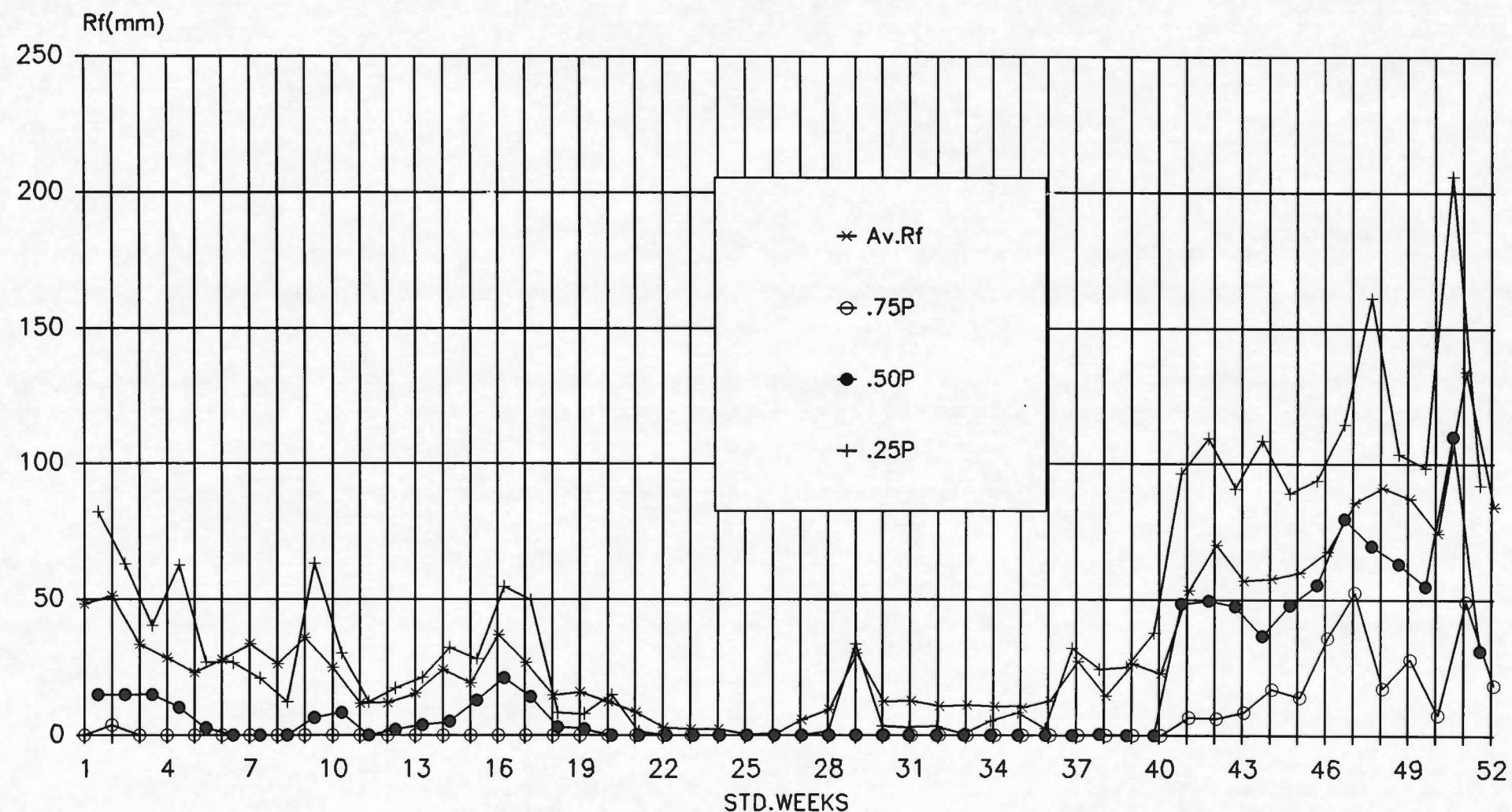
WEEKLY RAINFALL AND RAINFALL AT SELECTED PROBABILITIES , MANNAR



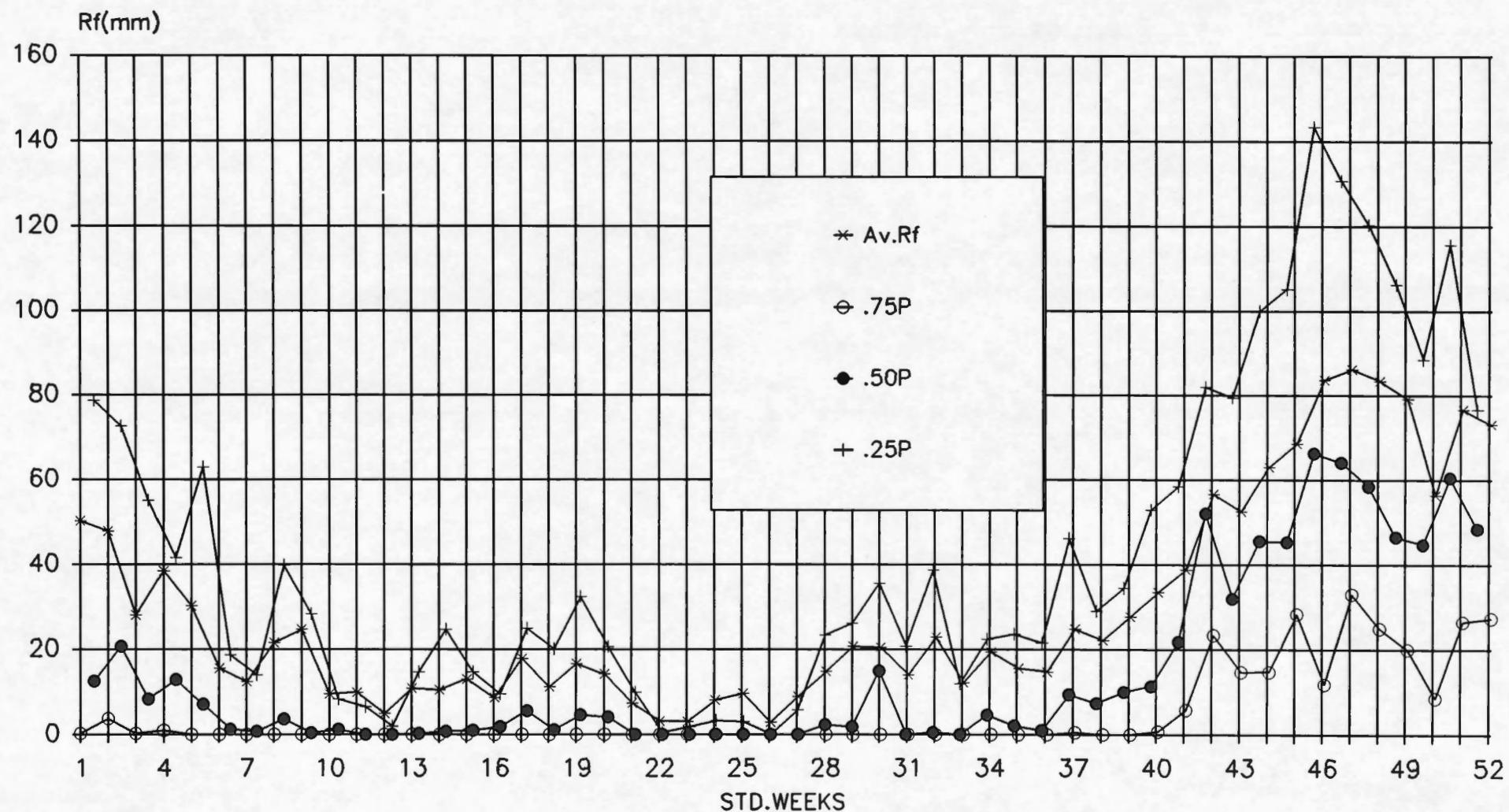
WEEKLY RAINFALL AND RAINFALL AT SELECTED PROBABILITIES , PUTTALAM



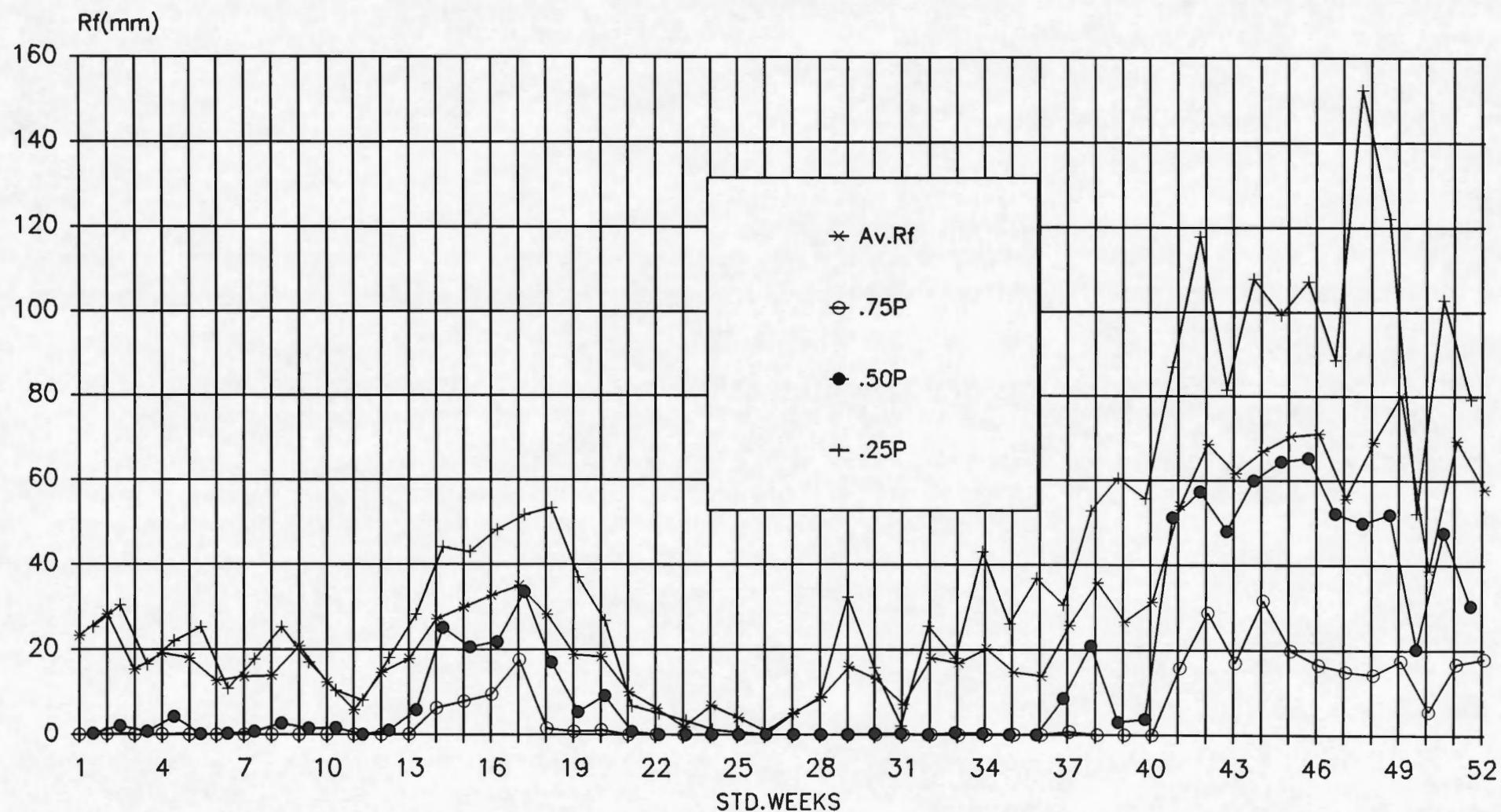
WEEKLY RAINFALL AND RAINFALL AT SELECTED PROBABILITIES, POLONNARUWA



WEEKLY RAINFALL AND RAINFALL AT SELECTED PROBABILITIES , TRINCOMALEE



WEEKLY RAINFALL AND RAINFALL AT SELECTED PROBABILITIES , VAVUNIYA



APPENDIX III

**INITIAL AND CONDITIONAL
PROBABILITIES OF WEEKLY
RAINFALL**

ANURADHAPURA

ANURADHAPURA

PROBABILITY PC(W) LIMIT 20 mm

PROBABILITY PC(D) LIMIT 20 mm

PROBABILITY $P(\text{WW})$ LIMIT 20 mm

PROBABILITY PC(DD) LIMIT 20 mm

PROBABILITY P(W/W) LIMIT 20 mm

PROBABILITY P(W/D) LIMIT 20 mm

BATTICALOA

PROBABILITY PC(W) LIMIT 10 ■■■

PROBABILITY P(D) LIMIT 10 ■

PROBABILITY P(W) LIMIT 10 MM

PROBABILITY PC (DD) LIMIT 10 ■■■

PROBABILITY P(W/W) LIMIT

PROBABILITY P(W/D) LIMIT

BATTICALOA

PROBABILITY PC(W) LIMIT 20 mm

PROBABILITY PC D LIMIT 20 ■

PROBABILITY PC(W) LIMIT 20 MM

PROBABILITY PC (DD) LIMIT 20 mm

PROBABILITY $P(W/D)$ LIMIT

PROBABILITY P(W/H) LIMIT

HAMBANTOTA

PROBABILITY PC 10 LIMIT 10 m

PROBABILITY PC-DJ LIMIT 10 MM

PROBABILITY PC(W) LIMIT 10 MM

PROBABILITY PC (DD) LIMIT 10 MM

PROBABILITY P(W/W) LIMIT 10 mm

PROBABILITY P(W/D) LIMIT 10 mm

HAMBANTOTA

PROBABILITY PC(W) LIMIT 20 MM

PROBABILITY P(B) LIMIT 20 mm

PROBABILITY PC (W) LIMIT 20 MM

PROBABILITY P(DD) LIMIT 20 MM

PROBABILITY P(W/W) LIMIT 20 mm

PROBABILITY P(W/D) LIMIT 20 MM

JAFFNA

PROBABILITY P(W) LIMIT 10 mm

PROBABILITY P(D) LIMIT 10 mm

PROBABILITY P(WW) LIMIT 10 mm

PROBABILITY P(DD) LIMIT 10 mm

PROBABILITY P(W/W) LIMIT 10 mm

PROBABILITY P(W/D) LIMIT 10 mm

JAFFNA

PROBABILITY $P($ W) LIMIT 20 mm

PROBABILITY P(D) LIMIT 20 mm

PROBABILITY P(WW) LIMIT 20 mm

PROBABILITY PC DD LIMIT 20 mm

PROBABILITY P(W/W) LIMIT 20 mm

PROBABILITY P(W/D) LIMIT 20 mm

KALAWEWA

PROBABILITY P(W) LIMIT 10 mm

PROBABILITY P(D) LIMIT 10 mm

PROBABILITY P(WW) LIMIT 10 mm

PROBABILITY P(DD) LIMIT 10 mm

PROBABILITY P(W/W) LIMIT 10 mm

PROBABILITY P(W/D) LIMIT 10 mm

KALAWEWA

PROBABILITY $P(\text{W})$ LIMIT 20 mm

PROBABILITY P(D) LIMIT 20 mm

PROBABILITY P(WW) LIMIT 20 mm

PROBABILITY P(DD) LIMIT 20 mm

PROBABILITY P(W/W) LIMIT 20 mm

PROBABILITY P(W/D) LIMIT 20 mm

MANNAR

PROBABILITY P{ W LIMIT } = 10 %

PROBABILITY PC (D) LIMIT 10 mm

PROBABILITY PC (W) LIMIT

PROBABILITY PC (DD) LIMIT 10 MM

PROBABILITY P(W/H) LIMIT 19 ■■■

PROBABILITY P(W/D) LIMIT

MANNAR

PROBABILITY P(W) LIMIT 20 mA

PROBABILITY P(D) LIMIT

PROBABILITY P(W) LIMIT 20 ■■■

PROBABILITY P(DD) LIMIT

PROBABILITY P(W/W) LIMIT 20 MM

PROBABILITY P(W/D) LIMIT 20 m

POLONNARUWA

PROBABILITY P(W) LIMIT 19 MB

PROBABILITY P(D) LIMIT 10 mm

PROBABILITY PC (W) LIMIT

PROBABILITY P(DD) LIMIT 10 MM

PROBABILITY P(W/W) LIMIT 10 MM

PROBABILITY P(W/D) LIMIT

POLONNARUWA

PROBABILITY P(W) LIMIT 20 MM

PROBABILITY PC (%) LIMIT 20

PROBABILITY PC(%) LIMIT 20 MM

PROBABILITY PC (DD) LIMIT

PROBABILITY P(W/W) LIMIT 20 MM

PROBABILITY PCW(B) LIMIT 29 ■

PUTTALAM

PROBABILITY P(\bar{W}) LIMIT 10 mm

PROBABILITY PC(D) LIMIT 10 mm

PROBABILITY P(WW) LIMIT 10 mm

PROBABILITY PC DD LIMIT 10 MM

PROBABILITY P(W/W) LIMIT 10 mm

PROBABILITY P(W/D) LIMIT 10 mm

PUTTALAM

PROBABILITY $P\{W\}$ LIMIT 20 mm

PROBABILITY P(D) LIMIT 20 mm

PROBABILITY P(WW) LIMIT 20 mm

PROBABILITY P(DD) LIMIT 20 mm

PROBABILITY P(W/W) LIMIT 20 mm

PROBABILITY P(W/D) LIMIT 20 mm

TRINCOMALEE

PROBABILITY P(W) LIMIT 10 mm

0.50	0.61	0.47	0.58	0.36	0.31	0.31	0.33	0.39	0.19
0.19	0.11	0.25	0.33	0.33	0.22	0.44	0.28	0.42	0.36
0.22	0.11	0.11	0.22	0.19	0.08	0.19	0.42	0.39	0.58
0.31	0.36	0.28	0.36	0.31	0.28	0.47	0.42	0.47	0.53
0.69	0.81	0.83	0.86	0.89	0.81	0.83	0.83	0.83	0.72
0.89	0.86								

PROBABILITY P(D) LIMIT 10 mm

0.50	0.39	0.53	0.42	0.64	0.69	0.69	0.67	0.61	0.81
0.81	0.89	0.75	0.67	0.67	0.78	0.56	0.72	0.58	0.64
0.78	0.89	0.89	0.78	0.81	0.92	0.81	0.58	0.61	0.42
0.69	0.64	0.72	0.64	0.69	0.72	0.53	0.58	0.53	0.47
0.31	0.19	0.17	0.14	0.11	0.19	0.17	0.17	0.17	0.28
0.11	0.14								

PROBABILITY P(WW) LIMIT 10 mm

0.44	0.39	0.33	0.36	0.28	0.14	0.11	0.11	0.19	0.11
0.08	0.03	0.03	0.11	0.06	0.08	0.11	0.19	0.14	0.17
0.11	0.08	0.06	0.03	0.08	0.03	0.00	0.14	0.31	0.22
0.28	0.08	0.06	0.06	0.17	0.06	0.14	0.17	0.22	0.31
0.44	0.67	0.69	0.75	0.78	0.78	0.75	0.75	0.72	0.67
0.69	0.78								

PROBABILITY P(DD) LIMIT 10 mm

0.08	0.28	0.25	0.31	0.33	0.47	0.50	0.47	0.47	0.53
0.69	0.72	0.67	0.53	0.39	0.53	0.44	0.47	0.44	0.39
0.53	0.75	0.83	0.69	0.67	0.75	0.72	0.53	0.50	0.25
0.39	0.42	0.42	0.42	0.50	0.47	0.39	0.28	0.33	0.31
0.22	0.17	0.06	0.06	0.03	0.08	0.11	0.08	0.06	0.11
0.08	0.03								

PROBABILITY P(W/W) LIMIT 10 mm

0.52	0.78	0.55	0.76	0.48	0.38	0.36	0.36	0.58	0.29
0.43	0.14	0.25	0.44	0.17	0.25	0.50	0.44	0.50	0.40
0.31	0.37	0.50	0.25	0.37	0.14	0.00	0.71	0.73	0.57
0.48	0.27	0.15	0.20	0.46	0.18	0.50	0.35	0.53	0.65
0.84	0.96	0.86	0.90	0.90	0.87	0.93	0.90	0.87	0.80
0.96	0.87								

PROBABILITY P(W/D) LIMIT 10 mm

0.40	0.44	0.36	0.42	0.20	0.26	0.28	0.32	0.29	0.14
0.14	0.10	0.25	0.30	0.42	0.21	0.43	0.15	0.38	0.33
0.17	0.04	0.06	0.22	0.14	0.07	0.21	0.34	0.14	0.59
0.07	0.40	0.35	0.42	0.22	0.32	0.46	0.47	0.43	0.42
0.53	0.45	0.71	0.67	0.80	0.25	0.43	0.50	0.67	0.33
0.70	0.75								

PRINTED OUT - ----- 10 mm -----

TRINCOMALEE

PROBABILITY P(W) LIMIT 20 mm

PROBABILITY PS (P) LIMIT 20 mm

PROBABILITY $P\{WW\}$ LIMIT 20 mm

PROBABILITY P(DD) LIMIT 20 mm

PROBABILITY P(W/W) LIMIT 20 mm

VAVUNIYA

PROBABILITY P(W) LIMIT 20 mm

PROBABILITY P(D) LIMIT 20 mm

PROBABILITY P(WW) LIMIT 20 mm

PROBABILITY P(DD) LIMIT 20 mm

PROBABILITY P(W/W) LIMIT 20 mm

PROBABILITY P(W/D) LIMIT 20 mm

VAVUNIYA

PROBABILITY P(W) LIMIT 10 MM

PROBABILITY P(D) LIMIT 10 mm

PROBABILITY P(WW) LIMIT 10 mm

PROBABILITY PC(DD) LIMIT 10 mm

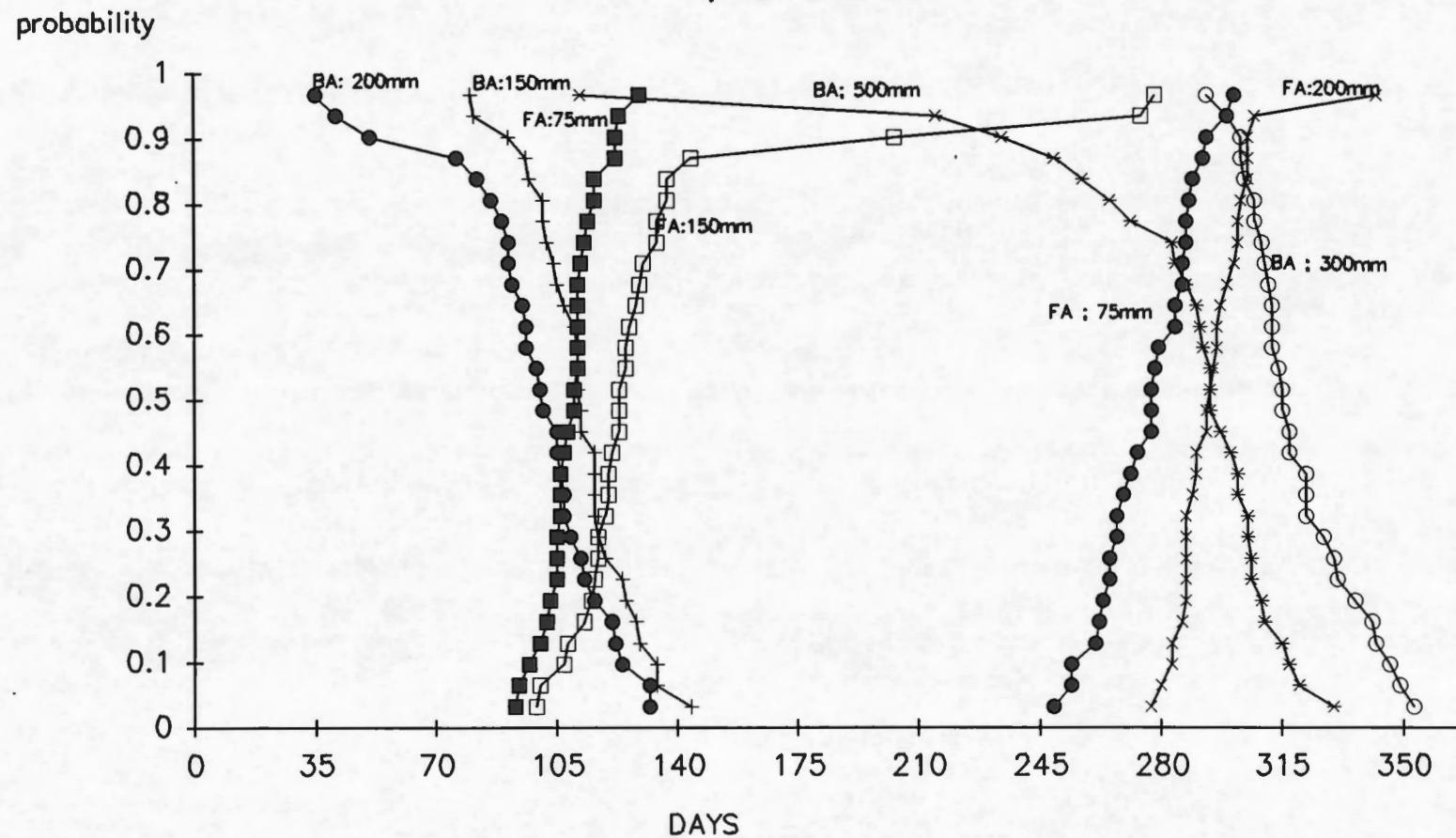
PROBABILITY P(W/W) LIMIT 10 MM

PROBABILITY P(W/D) LIMIT 10 mm

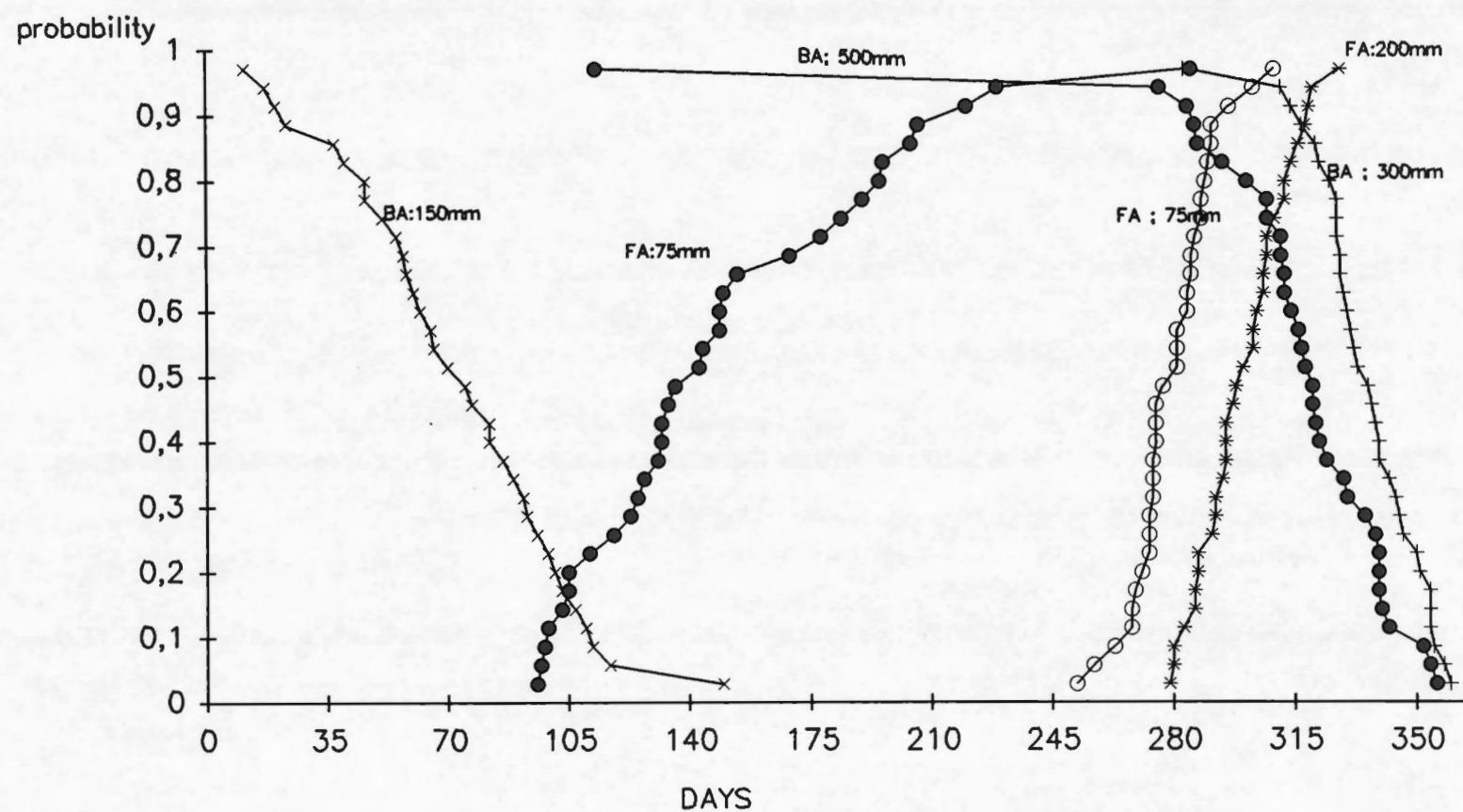
APPENDIX IV

**CUMULATED PROBABILITIES
OF FORWARD AND BACKWARD
ACCUMULATED RAINFALL**

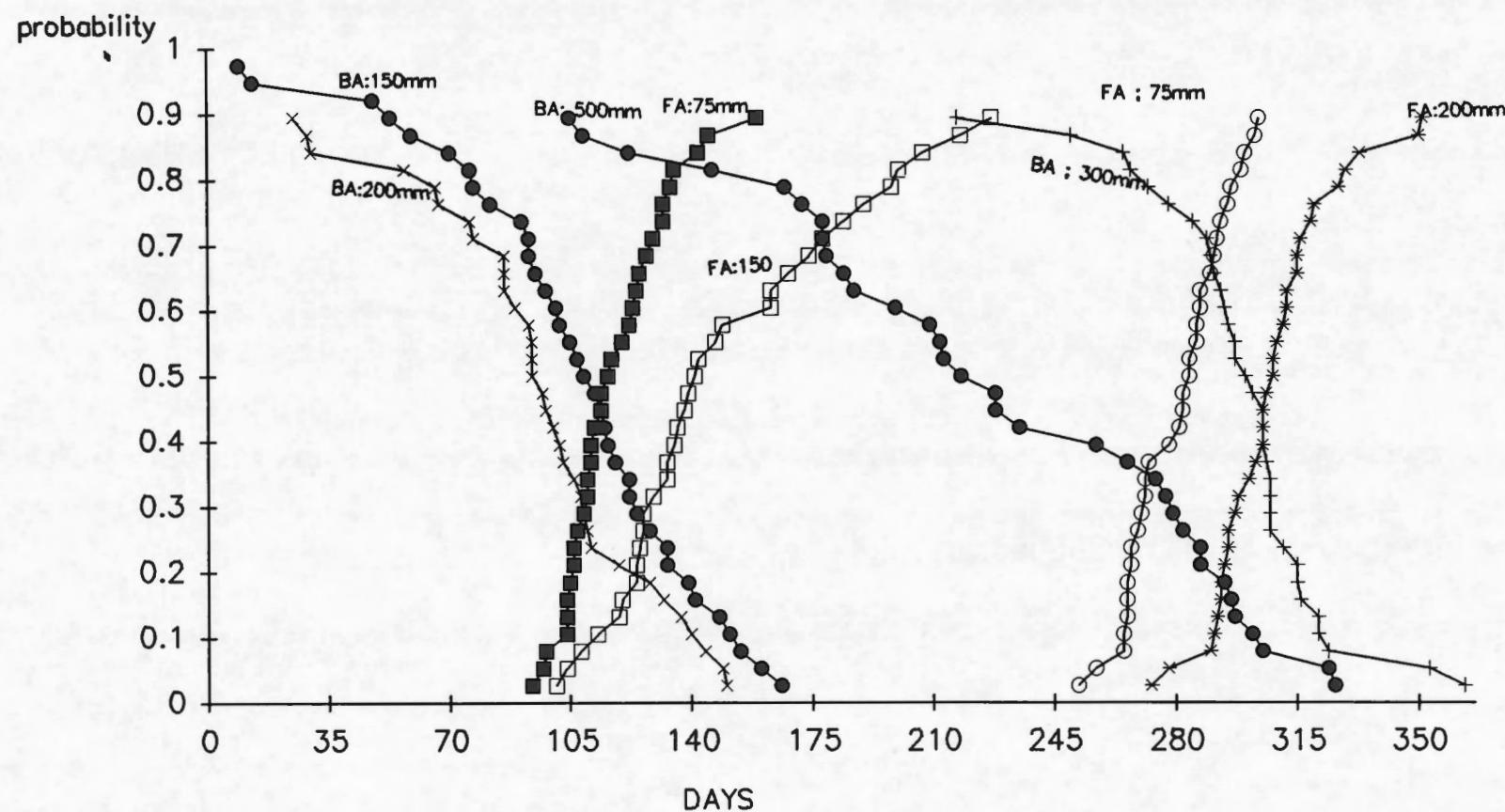
CUMULATIVE PROBABILITY OF FORWARD (FA) and BACKWARD (BA) ACCUMULATED RAINFALL
ANURADHAPURA



CUMULATIVE PROBABILITY OF FORWARD and BACKWARD ACCUMULATED RAINFALL ,BATTICALOA

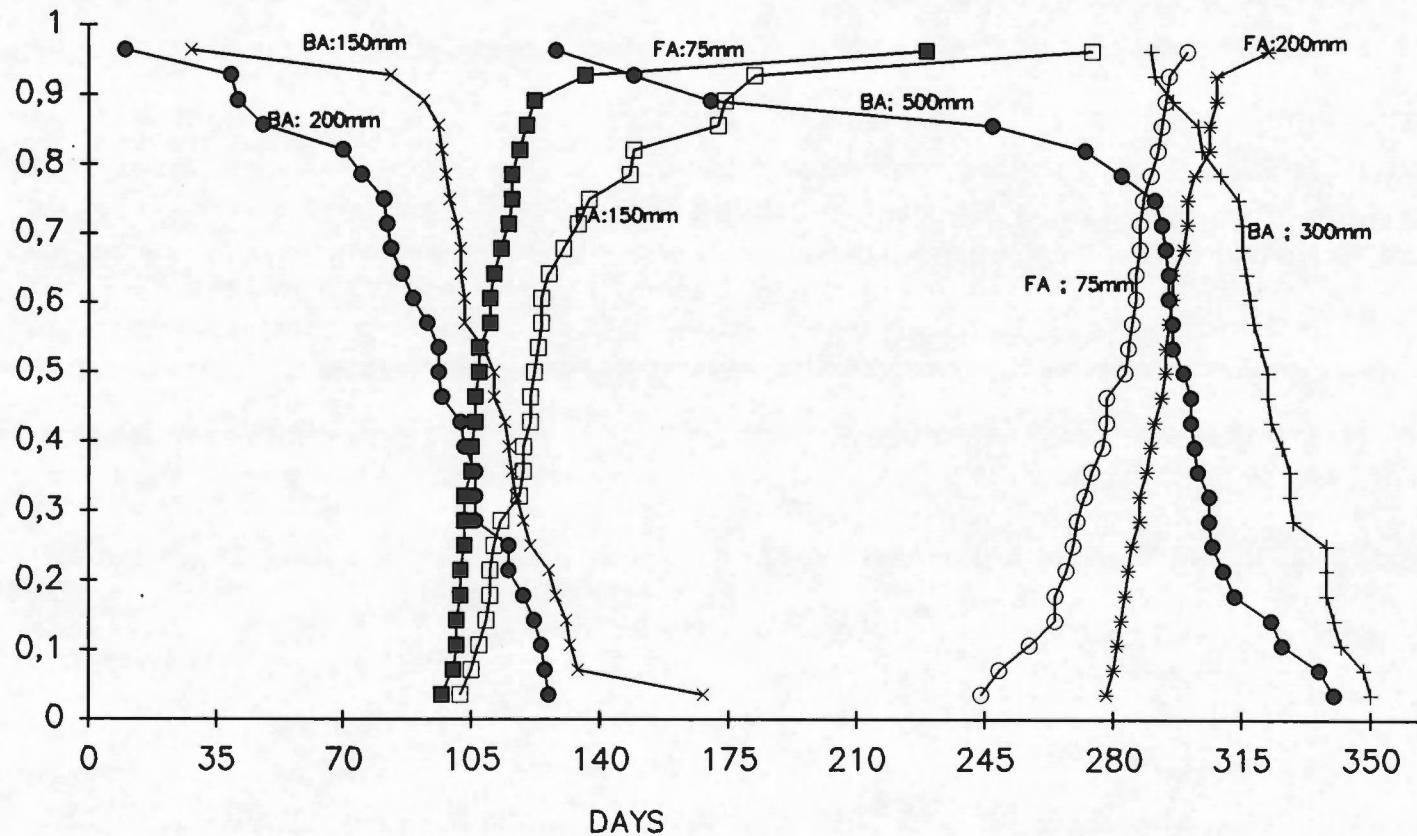


CUMULATIVE PROBABILITY OF FORWARD and BACKWARD ACCUMULATED RAINFALL ,HAMBANTOTA

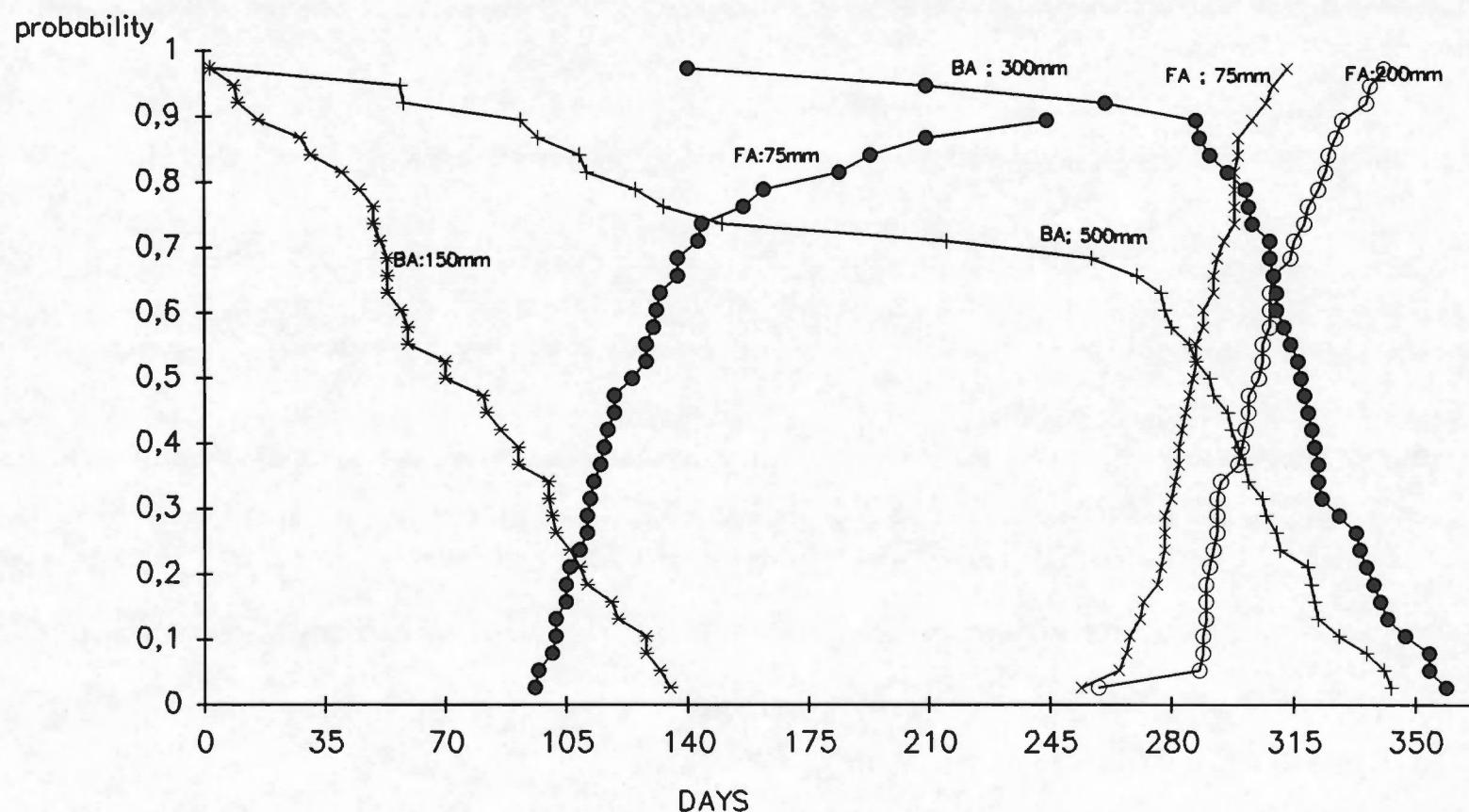


CUMULATIVE PROBABILITY OF FORWARD and BACKWARD ACCUMULATED RAINFALL ,KALAWEWA

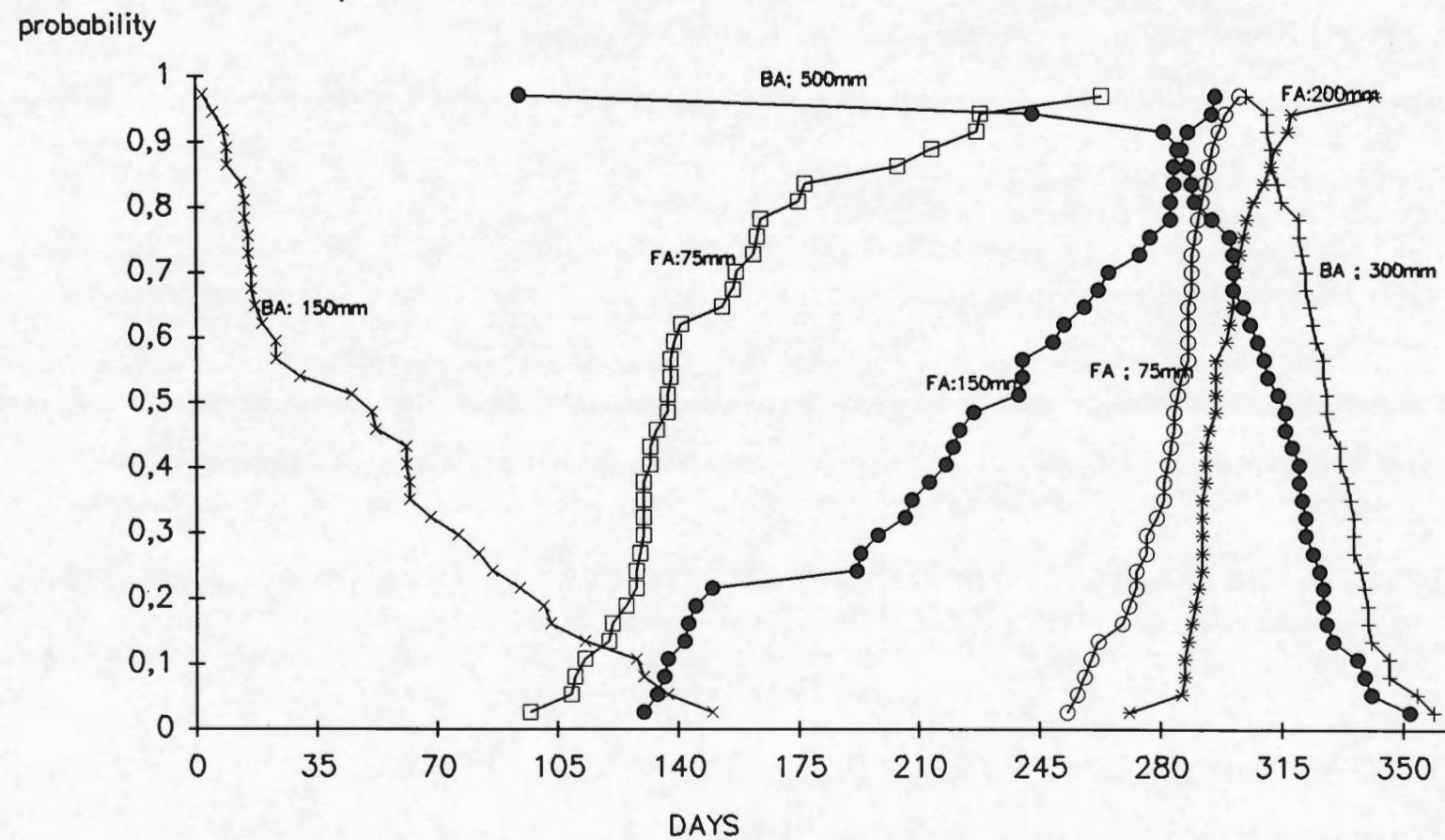
probability



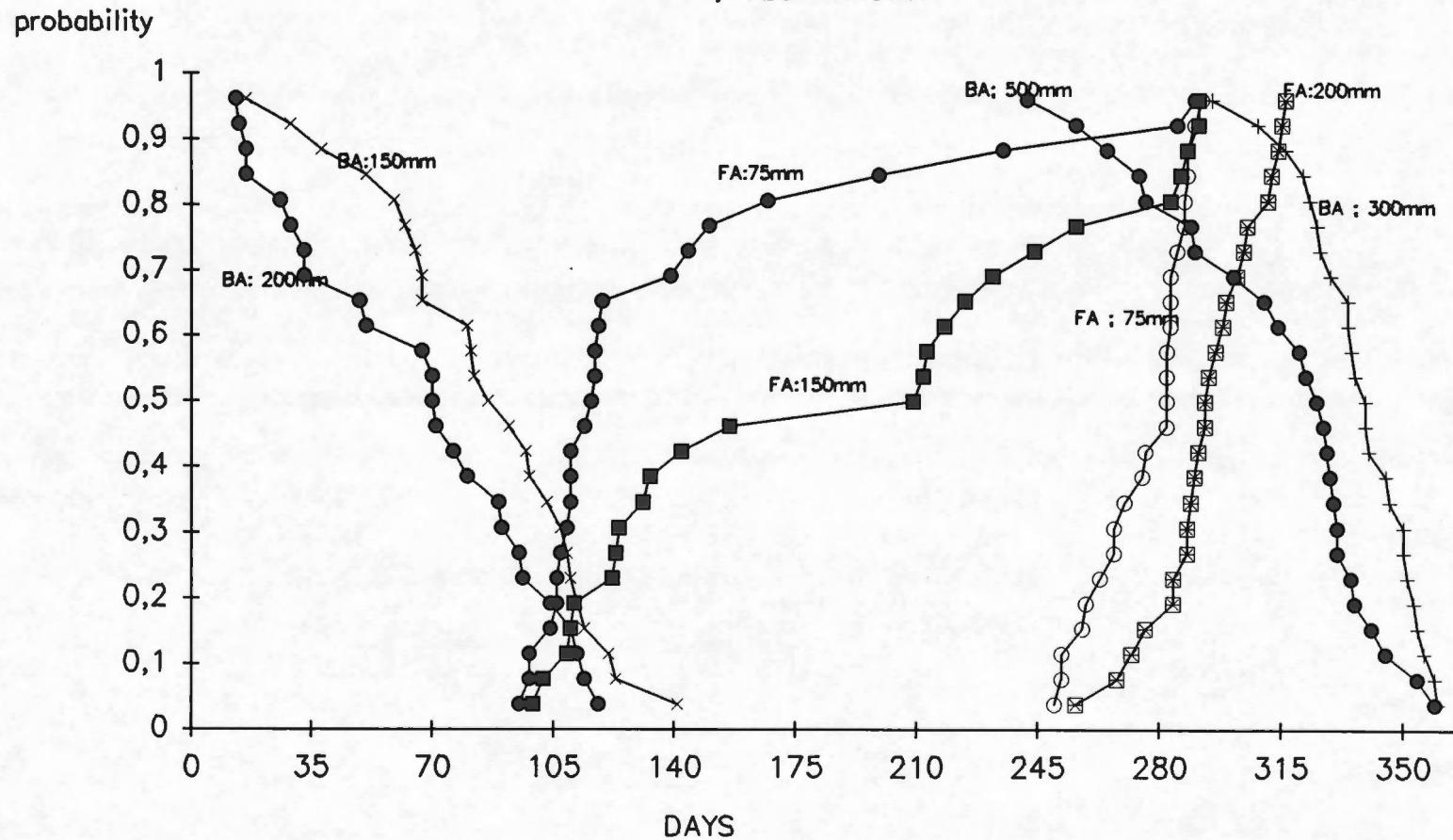
CUMULATIVE PROBABILITY OF FORWARD and BACKWARD ACCUMULATED RAINFALL ,MANNAR



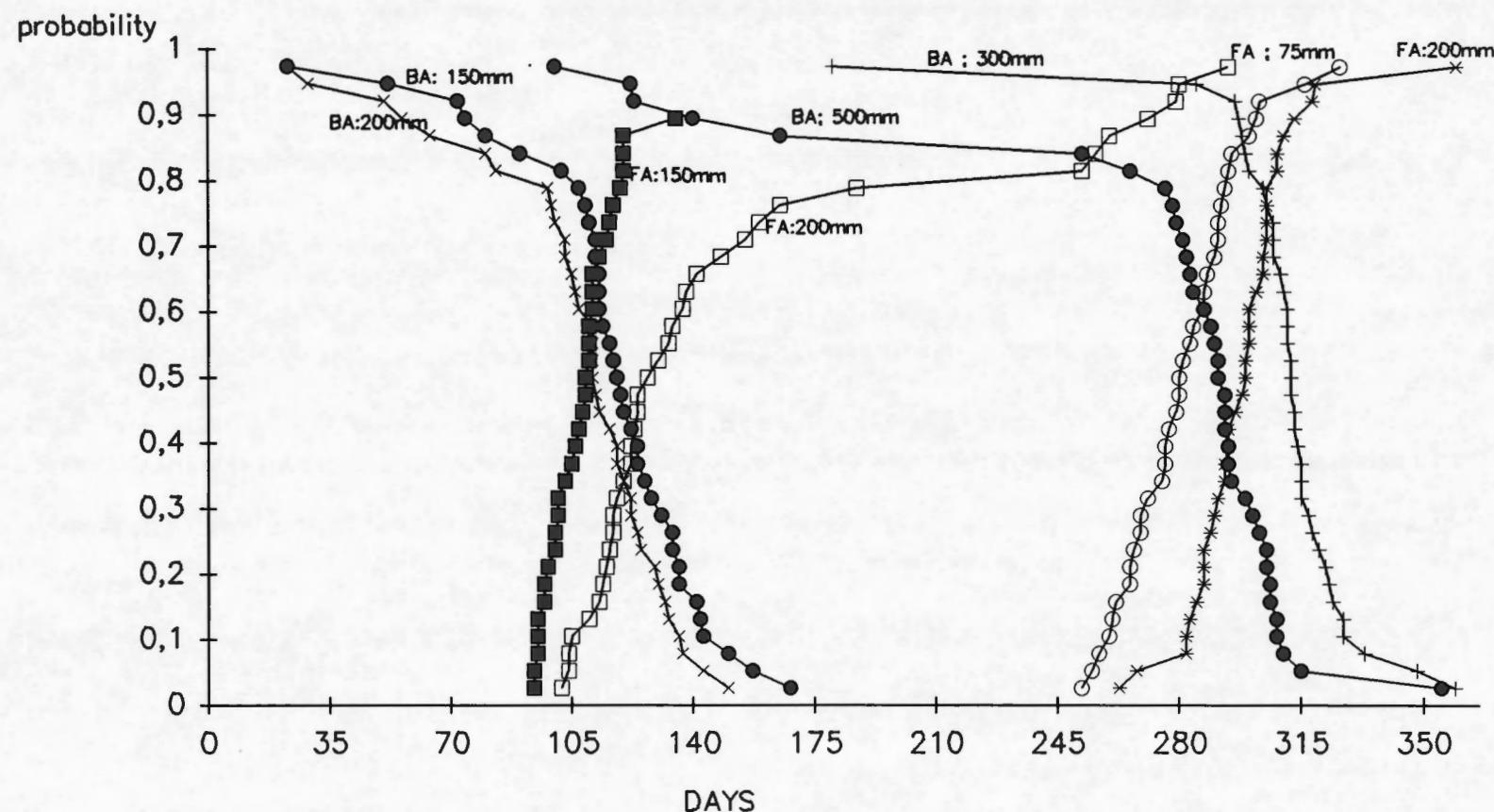
CUMULATIVE PROBABILITY OF FORWARD and BACKWARD ACCUMULATED RAINFALL ,JAFFNA



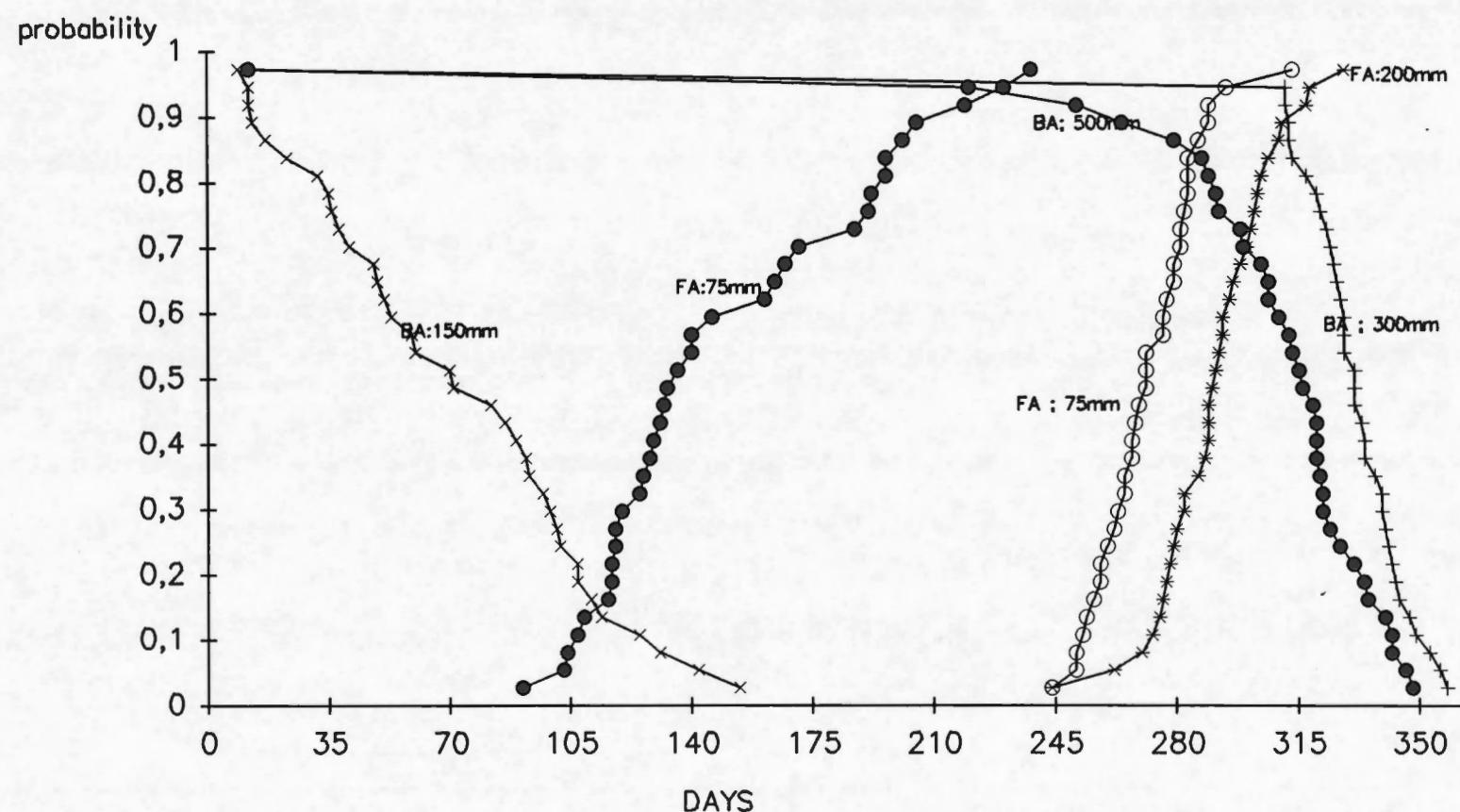
CUMULATIVE PROBABILITY OF FORWARD (FA) and BACKWARD (BA) ACCUMULATED RAINFALL
POLONNARUWA



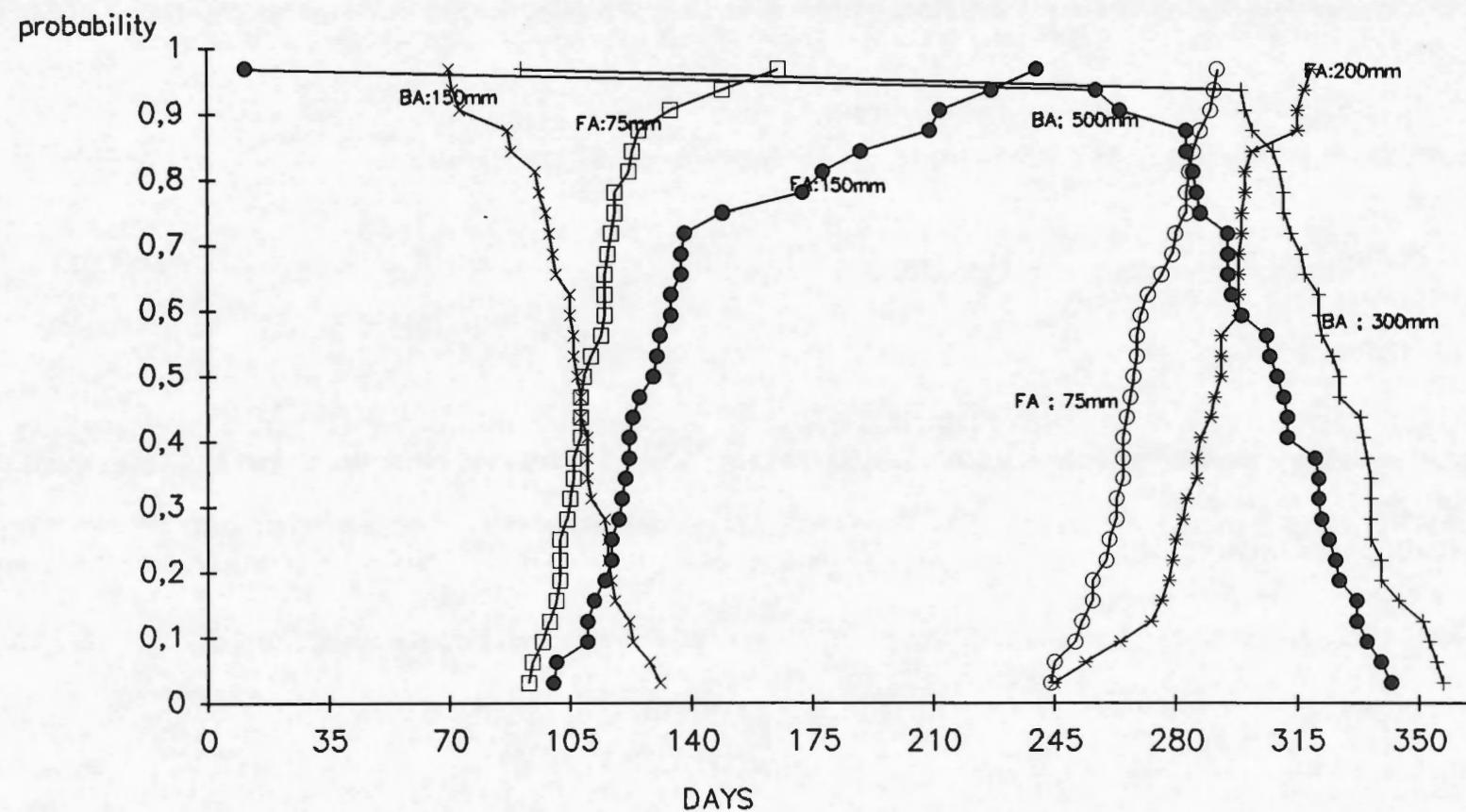
CUMULATIVE PROBABILITY OF FORWARD and BACKWARD ACCUMULATED RAINFALL ,PUTTLAM.



CUMULATIVE PROBABILITY OF FORWARD and BACKWARD ACCUMULATED RAINFALL
TRINCOMALEE.



CUMULATIVE PROBABILITY OF FORWARD and BACKWARD ACCUMULATED RAINFALL ,VAVUNIYA.



APPENDIX V

RICE EVAPOTRANSPIRATION AND IRRIGATION REQUIREMENT

APPENDIX V

CROP CHARACTERISTIC CHART (MAHA)

Phase	Nurs	L.Prep	A	B	C	D	Total
Length stage	20	18	18	25	30	20	113 days
Crop Coeffic.	0.80	-->	1.00	-->	1.30	0.80	
Nursery Area	10	%					
Land Preparation	180	mm					
Percolation rate	5.0	mm/day					

(YALA)

Phase	Nurs	L.Prep	A	B	C	D	Total
Length stage	20	18	20	30	40	25	135 days
Crop Coeffic.	0.80	-->	1.00	-->	1.30	0.80	
Nursery Area	10	%					
Land Preparation	180	mm					
Percolation rate	5.0	mm/day					

A: Initial phase

B: Development phase

C: Mid phase

D: Late season

Rice Evapotranspiration and Irrigation Requirements

Climate : arid

Station: ANURADHAPURA

Cross : PADDY

Date of Transplant : 15 October

If P(a)K = 40 mm then Effective Rainfall is $245 + P(a) = 1,36$ mm (monthly values).

If $P_{(m)} > 40$ mm then Effective Rainfall = $.693 + P_{(m)} - 20$ mm (monthly values).

Month	Stage	Area	Coeff	ETcrop	Perc.	LPrep	RiceRc	EffRain	IRRred.	IRRrec
	Decade	%		mm/day	mm/dy	mm/dv	mm/dav	mm/sec	mm/day	mm/dec
Sept	3	N/L	0.18	0.82	0.88	0.9	3.6	5.4	5.6	4.80
Oct	1	LP	0.50	0.89	2.49	2.5	9.9	14.9	20.7	12.82
Oct	2	L/A	0.88	0.97	4.36	4.4	4.5	19.2	51.8	5.06
Oct	3	A	1.00	1.00	4.62	5.0	0.0	9.6	55.3	4.09
Nov	1	A/B	1.00	1.03	4.14	5.0	0.0	9.1	51.3	4.00
Nov	2	B	1.00	1.10	3.84	5.0	0.0	8.8	47.4	4.10
Nov	3	B	1.00	1.20	4.23	5.0	0.0	9.2	44.2	4.82
Dec	1	B/C	1.00	1.28	4.59	5.0	0.0	9.6	41.6	5.43
Dec	2	C	1.00	1.30	4.68	5.0	0.0	9.7	36.7	5.81
Dec	3	C	1.00	1.30	4.80	5.0	0.0	9.8	29.9	5.81
Jan	1	C	1.00	1.20	4.92	5.0	0.0	9.9	19.5	7.97
Jan	2	C/D	1.00	1.25	4.85	4.5	0.0	9.4	10.4	8.31
Jan	3	D	1.00	1.10	4.52	3.3	0.0	7.8	9.1	6.85
Feb	1	D	1.00	0.90	3.90	1.6	0.0	5.5	7.8	4.74
Totals				572	576	150	1343	433		910

Rice Evapotranspiration and Irrigation Requirements

Climate : arid

Station: ANURADHAPURA

Crop : PADDY

Date of Transplant : 20 April

If P_(MM) = 0 mm then Effective Rainfall = .245 * P_(MM) - 1.38 mm (monthly values).

If $P_{im} > 40$ mm then Effective Rainfall = $.693 + P_{im} - 20$ mm (monthly values).

Month	Stage	Area	Coeff	ETcrop		Perc.	LPred	RiceRc	EffRain	IRRrec.	IRRrec
				Decade	%						
				mm/day	mm/day	mm/day	mm/day	mm/day	mm/day	mm/dec	mm/day
Apr	1	N/L	0.30	0.84	1.88	1.5	9.0	11.9	7.3	11.15	111.5
Apr	2	L/P	0.75	0.94	3.91	3.8	9.0	16.7	24.2	14.24	142.4
Apr	3	A	1.00	1.00	5.47	5.0	0.0	10.5	26.5	7.82	78.2
May	1	A/B	1.00	1.01	5.49	5.0	0.0	10.5	20.9	8.41	84.1
May	2	B	1.00	1.04	5.43	5.0	0.0	10.4	15.2	9.31	93.1
May	3	B	1.00	1.20	6.71	5.0	0.0	11.7	10.3	10.68	106.8
Jun	1	B/C	1.00	1.28	7.39	5.0	0.0	12.4	4.0	11.99	119.9
Jun	2	C	1.00	1.30	7.75	5.0	0.0	12.7	0.0	12.75	127.5
Jul	3	C	1.00	1.30	7.92	5.0	0.0	12.9	0.0	12.92	129.2
Jul	1	C/D	1.00	1.21	7.54	4.1	0.0	11.7	1.2	11.54	115.4
Jul	2	D	1.00	1.00	6.35	2.4	0.0	6.8	1.9	8.60	86.0
Jul	3	D	1.00	0.75	4.83	0.3	0.0	5.2	0.6	5.11	15.3
Totals				672	469	180	1322	112			1209

Rice Evapotranspiration and Irrigation Requirements

Climate : A:APLSSA Station: APELESSA
 Crop : PADDY Date of Transplant : 20 October
 If $P(m) < 40$ mm then Effective Rainfall= $.245 * P(m) - 1.36$ mm (monthly values).
 If $P(m) > 40$ mm then Effective Rainfall= $.693 * P(m) - 20$ mm (monthly values).

Month	Stage	Area	Coeff	ETcrop	Perc.	LPrep	RiceRo	EffRain	IRRreq.	IRRreq	
Decade	%			mm/day	mm/dy	mm/dy	mm/day	mm/day	mm/dec	mm/day	mm/dec
Oct 1	N/L	0.30	0.84	1.09	1.5	9.0	11.6	5.1	11.07	110.7	
Oct 2	LP	0.75	0.94	2.99	3.8	9.0	15.7	16.7	14.08	140.8	
Oct 3	A	1.00	1.00	3.99	5.0	0.0	9.0	32.5	5.75	57.5	
Nov 1	A	1.00	1.00	3.76	5.0	0.0	8.8	48.7	3.89	38.9	
Nov 2	B	1.00	1.05	3.71	5.0	0.0	8.7	62.0	2.51	25.1	
Nov 3	B	1.00	1.15	3.83	5.0	0.0	8.8	46.9	4.14	41.4	
Dec 1	B	1.00	1.25	3.84	5.0	0.0	8.8	29.2	5.92	59.2	
Dec 2	C	1.00	1.30	3.69	5.0	0.0	8.7	12.8	7.41	74.1	
Dec 3	C	1.00	1.30	4.08	5.0	0.0	9.1	10.5	8.03	80.3	
Jan 1	C	1.00	1.30	4.52	5.0	0.0	9.5	9.6	8.55	85.5	
Jan 2	C	1.00	1.30	4.86	5.0	0.0	9.9	6.0	9.26	92.6	
Jan 3	D	1.00	1.20	4.65	4.0	0.0	8.7	4.9	8.16	81.6	
Feb 1	D	1.00	1.00	4.01	2.5	0.0	6.5	3.7	6.14	61.4	
Feb 2	D	1.00	0.80	3.31	0.8	0.0	4.1	1.3	3.94	19.7	
Totals				507	571	180	1259	290		969	

Rice Evapotranspiration and Irrigation Requirements

Climate : A:APLSSA Station: APELESSA
 Crop : PADDY Date of Transplant : 30 April
 If $P(m) < 40$ mm then Effective Rainfall= $.245 * P(m) - 1.36$ mm (monthly values).
 If $P(m) > 40$ mm then Effective Rainfall= $.693 * P(m) - 20$ mm (monthly values).

Month	Stage	Area	Coeff	ETcrop	Perc.	LPrep	RiceRo	EffRain	IRRreq.	IRRreq	
Decade	%			mm/day	mm/dy	mm/dy	mm/day	mm/day	mm/dec	mm/day	mm/dec
Apr 2	N/L	0.30	0.84	0.95	1.5	9.0	11.4	6.2	10.83	108.3	
Apr 3	LP	0.75	0.94	2.58	3.8	9.0	15.3	17.2	13.61	136.1	
May 1	A	1.00	1.00	3.55	5.0	0.0	8.5	27.4	5.81	58.1	
May 2	A/B	1.00	1.01	3.49	5.0	0.0	8.5	30.8	5.42	54.2	
May 3	B	1.00	1.08	3.90	5.0	0.0	8.9	24.1	6.49	64.9	
Jun 1	B	1.00	1.20	4.52	5.0	0.0	9.5	16.8	7.83	78.3	
Jun 2	B/C	1.00	1.28	5.00	5.0	0.0	10.0	9.9	9.01	90.1	
Jun 3	C	1.00	1.30	5.24	5.0	0.0	10.2	8.6	9.38	93.8	
Jul 1	C	1.00	1.30	5.41	5.0	0.0	10.4	7.4	9.67	96.7	
Jul 2	C/D	1.00	1.21	5.20	4.1	0.0	9.3	6.1	8.71	87.1	
Jul 3	D	1.00	1.00	4.40	2.4	0.0	6.8	5.9	6.25	62.5	
Aug 1	D	1.00	0.75	3.38	0.3	0.0	3.7	1.7	3.55	10.7	
Totals				452	469	180	1103	162		941	

Rice Evapotranspiration and Irrigation Requirements

Climate : a:bat Station: BATTICALOA
 Crop : PADDY Date of Transplant : 30 October
 If $P(m) < 40$ mm then Effective Rainfall = $.245 + P(m) - 1.38$ mm (monthly values).

If $P(m) > 40$ mm then Effective Rainfall = $.693 + P(m) - 20$ mm (monthly values).

Month	Stage	Area	Coeff	ETcrop	Perc.	LPrep	RiceRo	EffRain	IRRreq.	IRRreq
Decade	%			mm/day	mm/dy	mm/day	mm/day	mm/dec	mm/day	mm/dec
Oct	2	N/L	0.30	0.84	1.34	1.5	9.0	11.8	11.0	10.74
Oct	3	LP	0.75	0.94	3.58	3.8	9.0	16.3	36.5	12.68
Nov	1	A	1.00	1.00	4.83	5.0	0.0	9.8	61.5	3.68
Nov	2	A	1.00	1.00	4.60	5.0	0.0	9.6	74.0	2.20
Nov	3	S	1.00	1.05	4.55	5.0	0.0	9.6	80.8	1.47
Dec	1	B	1.00	1.15	4.60	5.0	0.0	9.6	72.9	0.32
Dec	2	E	1.00	1.25	4.63	5.0	0.0	9.6	102.3	0.00
Dec	3	C	1.00	1.30	5.07	5.0	0.0	10.1	66.9	1.38
Jan	1	C	1.00	1.30	5.37	5.0	0.0	10.4	68.2	3.55
Jan	2	C	1.00	1.30	5.58	5.0	0.0	10.6	55.2	5.06
Jan	3	C	1.00	1.30	5.93	5.0	0.0	10.9	46.8	6.25
Feb	1	D	1.00	1.20	5.80	4.0	0.0	9.8	38.4	5.96
Feb	2	D	1.00	1.00	5.11	2.5	0.0	7.6	30.1	4.60
Feb	3	D	1.00	0.89	4.13	0.8	0.0	4.9	11.6	3.70
Totals				631	571	180	1394	796	597	

Rice Evapotranspiration and Irrigation Requirements

Climate : a:bat Station: BATTICALOA
 Crop : PADDY Date of Transplant : 20 April
 If $P(m) < 40$ mm then Effective Rainfall = $.245 + P(m) - 1.38$ mm (monthly values).

Month	Stage	Area	Coeff	ETcrop	Perc.	LPrep	RiceRo	EffRain	IRRreq.	IRRreq
Decade	%			mm/day	mm/dy	mm/day	mm/day	mm/dec	mm/day	mm/dec
Apr	1	N/L	0.30	0.84	1.48	1.5	9.0	12.0	2.4	11.74
Apr	2	LP	0.75	0.94	4.32	3.8	9.0	17.1	5.2	16.55
Apr	3	A	1.00	1.00	6.27	5.0	0.0	11.3	5.6	10.71
May	1	A/B	1.00	1.01	6.52	5.0	0.0	11.5	4.1	11.10
May	2	B	1.00	1.05	7.17	5.0	0.0	12.2	2.7	11.90
May	3	B	1.00	1.20	8.08	5.0	0.0	13.1	2.2	12.85
Jun	1	B/C	1.00	1.28	8.72	5.0	0.0	13.7	1.8	13.55
Jun	2	C	1.00	1.30	8.97	5.0	0.0	14.0	1.3	13.44
Jun	3	C	1.00	1.30	9.06	5.0	0.0	14.1	2.6	13.79
Jul	1	C/D	1.00	1.21	8.53	4.1	0.0	12.7	4.0	12.25
Jul	2	D	1.00	1.00	7.10	2.4	0.0	9.5	5.3	9.00
Jul	3	D	1.00	0.75	5.27	0.3	0.0	5.6	1.8	5.44
Totals				776	469	180	1424	39	1369	

Rice Evapotranspiration and Irrigation Requirements

Climate : hambota Station: HAMBANTOTA
 Crop : PADDY Date of Transplant : 20 October
 If $P(m) < 40$ mm then Effective Rainfall= $.245 * P(m) - 1.38$ mm (monthly values).
 If $P(m) > 40$ mm then Effective Rainfall= $.693 * P(m) - 20$ mm (monthly values).

Month	Stage	Area	Coeff	ETcrop	Perc.	LPrec	RiceRd	EffRain	IRRRec	IRRReq
		Decade	%	mm/day	mm/dy	mm/day	mm/day	mm/dec	mm/day	mm/dec
Oct	1	N/L	0.30	0.84	2.61	1.5	9.0	13.1	6.2	12.49
Oct	2	LP	0.75	0.94	8.40	3.8	9.0	21.2	20.4	19.12
Oct	3	A	1.00	1.00	10.23	5.0	0.0	15.2	30.0	12.24
Nov	1	4	1.00	1.00	7.94	5.0	0.0	12.9	34.8	9.46
Nov	2	B	1.00	1.05	6.80	5.0	0.0	11.8	38.6	7.94
Nov	3	B	1.00	1.15	7.75	5.0	0.0	12.7	32.4	9.50
Dec	1	B	1.00	1.25	8.87	5.0	0.0	13.9	25.6	11.30
Dec	2	C	1.00	1.30	9.30	5.0	0.0	14.3	19.1	12.38
Dec	3	C	1.00	1.30	9.87	5.0	0.0	14.9	16.4	12.24
Jan	1	C	1.00	1.30	10.66	5.0	0.0	15.7	13.9	14.27
Jan	2	C	1.00	1.30	11.28	5.0	0.0	16.3	10.8	15.20
Jan	3	D	1.00	1.20	10.06	4.0	0.0	14.1	9.1	13.14
Feb	1	D	1.00	1.00	7.95	2.5	0.0	10.4	7.5	9.70
Feb	2	D	1.00	0.80	6.14	0.8	0.0	6.9	2.9	6.60
Totals				1148	571	180	1901	266	1632	

Rice Evapotranspiration and Irrigation Requirements

Climate : hambota Station: HAMBANTOTA
 Crop : PADDY Date of Transplant : 20 April
 If $P(m) < 40$ mm then Effective Rainfall= $.245 * P(m) - 1.38$ mm (monthly values).
 If $P(m) > 40$ mm then Effective Rainfall= $.693 * P(m) - 20$ mm (monthly values).

Month	Stage	Area	Coeff	ETcrop	Perc.	LPrec	RiceRd	EffRain	IRRRec	IRRReq
		Decade	%	mm/day	mm/dy	mm/day	mm/day	mm/dec	mm/day	mm/dec
Apr	1	N/L	0.30	0.84	1.86	1.5	9.0	12.4	4.2	11.95
Apr	2	LP	0.75	0.94	4.92	3.8	9.0	17.7	12.3	16.44
Apr	3	A	1.00	1.00	7.08	5.0	0.0	12.1	15.2	10.56
May	1	A/B	1.00	1.01	7.33	5.0	0.0	12.3	14.0	10.93
May	2	B	1.00	1.04	7.96	5.0	0.0	13.0	12.8	11.67
May	3	B	1.00	1.20	9.13	5.0	0.0	14.1	10.6	130.5
Jun	1	B/C	1.00	1.25	10.03	5.0	0.0	15.0	8.4	14.18
Jun	2	C	1.00	1.30	10.48	5.0	0.0	15.5	6.2	14.85
Jun	3	C	1.00	1.30	10.96	5.0	0.0	16.0	6.0	15.36
Jul	1	C/D	1.00	1.21	10.91	4.1	0.0	15.0	5.7	14.47
Jul	2	D	1.00	1.00	9.47	2.4	0.0	11.9	5.4	11.37
Jul	3	D	1.00	0.75	6.65	0.8	0.0	7.0	1.6	6.43
Totals				921	469	180	1571	102	1469	

Rice Evapotranspiration and Irrigation Requirements

Climate : A:JAF	Station: JAFFNA
Crop : PADDY	Date of Transplant : 30 October
If P(m) < 40 mm then Effective Rainfall = .245 + P(m) -- 1.38 mm (monthly values).	
If P(m) > 40 mm then Effective Rainfall = .693 + P(m) -- 20 mm (monthly values).	

Month	Stage	Area	Coeff	ETcrop	Perc.	LPrep	RiceRc	EffRain	IRReq.	IRRec
Decade		%		mm/day	mm/dy	mm/dy	mm/day	mm/dec	mm/day	mm/dec
Oct 2	N/L	0.30	0.84	1.56	1.5	9.0	12.1	15.7	10.49	104.9
Oct 3	LP	0.75	0.94	3.93	3.8	9.0	16.7	44.5	12.22	122.2
Nov 1	A	1.00	1.00	4.75	5.0	0.0	9.5	64.7	2.79	27.9
Nov 2	A	1.00	1.00	4.10	5.0	0.0	9.1	78.3	1.27	12.7
Nov 3	B	1.00	1.05	4.37	5.0	0.0	9.4	69.7	2.40	24.0
Dec 1	B	1.00	1.15	4.86	5.0	0.0	9.9	62.5	3.61	36.1
Dec 2	B	1.00	1.25	5.24	5.0	0.0	10.2	54.7	4.77	47.7
Dec 3	C	1.00	1.30	5.92	5.0	0.0	10.9	40.1	6.92	69.2
Jan 1	C	1.00	1.30	6.44	5.0	0.0	11.4	22.1	9.23	92.3
Jan 2	C	1.00	1.30	6.38	5.0	0.0	11.9	5.4	11.20	112.0
Jan 3	C	1.00	1.30	7.23	5.0	0.0	12.2	5.4	11.69	115.9
Feb 1	D	1.00	1.20	7.00	4.0	0.0	11.0	4.0	10.60	106.0
Feb 2	D	1.00	1.00	6.11	2.5	0.0	5.6	2.7	6.34	63.4
Feb 3	D	1.00	0.80	4.95	0.8	0.0	5.7	1.1	5.60	26.0
Totals				709	571	180	1461	477	983	

Rice Evapotranspiration and Irrigation Requirements

Climate : A:JAF	Station: JAFFNA
Crop : PADDY	Date of Transplant : 15 April
If P(m) < 40 mm then Effective Rainfall = .245 + P(m) -- 1.38 mm (monthly values).	
If P(m) > 40 mm then Effective Rainfall = .693 + P(m) -- 20 mm (monthly values).	

Month	Stage	Area	Coeff	ETcrop	Perc.	LPrep	RiceRc	EffRain	IRReq.	IRRec
Decade		%		mm/day	mm/dy	mm/dy	mm/day	mm/dec	mm/day	mm/dec
Mar 3	N/L	0.18	0.82	0.94	0.9	3.6	5.4	0.7	5.34	50.1
Apr 1	LP	0.50	0.89	2.99	2.5	9.9	15.4	2.1	15.18	151.8
Apr 2	L/A	0.88	0.97	5.67	4.4	4.5	14.7	4.8	14.26	142.6
Apr 3	A	1.00	1.00	7.06	5.0	0.0	12.1	5.1	11.55	115.5
May 1	A/B	1.00	1.04	7.53	5.0	0.0	12.5	4.7	12.06	120.6
May 2	B	1.00	1.14	8.45	5.0	0.0	13.5	4.3	13.02	130.2
May 3	B/C	1.00	1.25	9.34	5.0	0.0	14.3	3.3	14.01	140.1
Jun 1	C	1.00	1.30	9.87	5.0	0.0	14.9	2.3	14.65	146.5
Jun 2	C	1.00	1.30	10.01	5.0	0.0	15.0	1.2	14.89	148.9
Jun 3	C/D	1.00	1.24	9.48	4.8	0.0	14.2	1.4	14.09	140.9
Jul 1	D	1.00	1.13	8.03	3.4	0.0	11.4	1.5	11.25	112.5
Jul 2	D	1.00	0.88	6.04	1.4	0.0	7.5	1.4	7.34	56.7
Totals				949	475	180	1521	33	1488	

Rice Evapotranspiration and Irrigation Requirements

Climate : aridman Station: MANNAR
 Crop : PADDY Date of Transplant : 20 October
 If $P(m) < 40$ mm then Effective Rainfall = $.245 * P(m) - 1.36$ mm (monthly values).
 If $P(m) > 40$ mm then Effective Rainfall = $.693 * P(m) - 20$ mm (monthly values).

Month	Stage	Area	Coeff	ETcrop	Perc.	LPrep	RiceRd	EffRain	IRRreq.	IRRreq.
Decade	%			mm/day	mm/day	mm/cy	mm/day	mm/dec	mm/day	mm/dec
Oct 1	N/L	0.30	0.84	1.34	1.5	9.0	11.8	7.9	11.05	110.5
Oct 2	LP	0.75	0.94	3.33	3.8	9.0	16.1	29.5	13.14	131.4
Oct 3	A	1.00	1.00	4.57	5.0	0.0	9.6	42.0	5.37	53.7
Nov 1	A	1.00	1.00	4.47	5.0	0.0	9.5	45.4	4.93	49.3
Nov 2	B	1.00	1.05	4.52	5.0	0.0	9.5	48.4	4.68	46.8
Nov 3	B	1.00	1.15	4.94	5.0	0.0	9.9	45.4	5.40	54.0
Dec 1	B	1.00	1.25	5.37	5.0	0.0	10.4	44.5	5.92	59.2
Dec 2	C	1.00	1.30	5.58	5.0	0.0	10.6	42.5	6.32	63.2
Dec 3	C	1.00	1.30	5.93	5.0	0.0	10.9	30.1	7.92	79.2
Jan 1	C	1.00	1.30	6.28	5.0	0.0	11.3	13.9	9.88	98.8
Jan 2	C	1.00	1.30	6.63	5.0	0.0	11.6	1.1	11.51	115.1
Jan 3	D	1.00	1.20	6.32	4.0	0.0	10.3	2.5	10.07	100.7
Feb 1	D	1.00	1.00	5.37	2.5	0.0	7.9	3.9	7.49	74.9
Feb 2	D	1.00	0.80	4.41	0.8	0.0	5.2	2.6	4.90	24.5
Totals				668	571	180	1421	360	1061	

Rice Evapotranspiration and Irrigation Requirements

Climate : aridman Station: MANNAR
 Crop : PADDY Date of Transplant : 15 April
 If $P(m) < 40$ mm then Effective Rainfall = $.245 * P(m) - 1.36$ mm (monthly values).
 If $P(m) > 40$ mm then Effective Rainfall = $.693 * P(m) - 20$ mm (monthly values).

Month	Stage	Area	Coeff	ETcrop	Perc.	LPrep	RiceRd	EffRain	IRRreq.	IRRreq.
Decade	%			mm/day	mm/day	mm/cy	mm/day	mm/dec	mm/day	mm/dec
Mar 3	N/L	0.18	0.82	1.01	0.9	3.6	5.5	1.4	5.34	80.2
Apr 1	LP	0.50	0.89	3.01	2.5	9.9	15.4	5.1	14.70	149.0
Apr 2	L/A	0.88	0.97	5.61	4.4	4.5	14.5	12.6	13.23	132.3
Apr 3	A	1.00	1.00	6.70	5.0	0.0	11.7	11.2	10.58	105.8
May 1	A/B	1.00	1.04	7.09	5.0	0.0	12.1	8.0	11.29	112.9
May 2	B	1.00	1.14	7.90	5.0	0.0	12.9	4.8	12.42	124.2
May 3	B/C	1.00	1.25	8.52	5.0	0.0	13.5	3.2	13.19	131.9
Jun 1	C	1.00	1.20	8.71	5.0	0.0	13.7	1.6	13.55	135.5
Jun 2	C	1.00	1.30	8.58	5.0	0.0	13.6	0.1	13.57	135.7
Jun 3	C/D	1.00	1.28	8.20	4.8	0.0	13.0	0.2	12.93	129.3
Jul 1	D	1.00	1.13	7.05	3.4	0.0	10.4	0.4	10.38	103.8
Jul 2	D	1.00	0.88	5.33	1.4	0.0	6.8	0.5	6.73	53.8
Totals				771	475	180	1443	49	1394	

Rice Evapotranspiration and Irrigation Requirements

Climate : at:colic Station: POLONNARUWA
 Crop : PADDY Date of Transplant : 16 October
 If $P(m) < 40$ mm then Effective Rainfall= $.245 + P(m) - 1.38$ mm (monthly values).
 If $P(m) > 40$ mm then Effective Rainfall= $.693 + P(m) - 20$ mm (monthly values).

Month	Stage	Area	Coeff.	ETcrop		Perc.	LPrep	RiceRq	EffRain	IRRreq.	IRReq
				Decade	%						
Sep 3	N/L	0.15	0.81	0.76	0.8	2.5	4.0	4.8	3.55	49.7	
Oct 1	LP	0.45	0.88	2.26	2.3	10.1	14.6	15.1	13.08	130.8	
Oct 2	L/A	0.85	0.97	4.35	4.3	5.4	14.0	37.9	10.20	102.0	
Oct 3	A	1.00	1.00	5.0e	5.0	0.0	10.1	52.6	4.80	48.0	
Nov 1	A/B	1.00	1.02	4.93	5.0	0.0	9.9	60.6	3.86	38.6	
Nov 2	B	1.00	1.09	5.01	5.0	0.0	10.0	68.6	3.15	31.5	
Nov 3	B	1.00	1.19	5.16	5.0	0.0	10.2	74.5	2.71	27.1	
Dec 1	B/C	1.00	1.27	5.09	5.0	0.0	10.1	86.3	1.45	14.5	
Dec 2	C	1.00	1.30	4.82	5.0	0.0	5.5	95.2	0.30	3.0	
Dec 3	C	1.00	1.30	5.07	5.0	0.0	10.1	74.7	2.60	26.0	
Jan 1	C	1.00	1.30	5.37	5.0	0.0	10.4	47.9	5.58	55.8	
Jan 2	C/D	1.00	1.26	5.41	4.6	0.0	10.0	26.8	7.13	71.3	
Jan 3	D	1.00	1.12	5.11	3.4	0.0	4.5	25.6	5.95	59.5	
Feb 1	D	1.00	0.92	4.45	1.8	0.0	5.2	22.4	4.01	40.1	
Feb 2	D	1.00	0.72	3.68	0.0	0.0	3.7	1.9	3.49	3.5	
Totals				635	574	180	1398	697	701		

Rice Evapotranspiration and Irrigation Requirements

Climate : at:colic Station: POLONNARUWA
 Crop : PADDY Date of Transplant : 20 April
 If $P(m) < 40$ mm then Effective Rainfall= $.245 + P(m) - 1.38$ mm (monthly values).
 If $P(m) > 40$ mm then Effective Rainfall= $.693 + P(m) - 20$ mm (monthly values).

Month	Stage	Area	Coeff.	ETcrop		Perc.	LPrep	RiceRq	EffRain	IRRreq.	IRReq
				Decade	%						
Apr 1	N/L	0.30	0.44	1.68	1.5	9.0	12.0	5.3	11.45	114.5	
Apr 2	LP	0.75	0.84	4.32	5.8	9.0	17.1	15.6	15.52	155.2	
Apr 3	A	1.00	1.00	5.27	5.0	0.0	11.9	15.5	9.72	97.2	
May 1	A/B	1.00	1.01	5.52	5.0	0.0	11.5	9.7	10.55	105.5	
May 2	B	1.00	1.06	7.17	5.0	0.0	12.2	4.1	11.76	117.6	
May 3	B	1.00	1.20	5.04	5.0	0.0	13.1	2.3	12.60	128.0	
Jun 1	B/C	1.00	1.28	3.72	5.0	0.0	13.7	0.8	13.64	136.4	
Jun 2	C	1.00	1.30	5.97	5.0	0.0	14.0	0.0	13.97	139.7	
Jun 3	C	1.00	1.30	7.06	5.0	0.0	14.1	1.5	13.90	139.0	
Jul 1	C/D	1.00	1.21	4.53	4.1	0.0	12.7	4.9	12.16	121.6	
Jul 2	D	1.00	1.00	7.10	2.4	0.0	9.5	7.3	8.81	88.1	
Jul 3	D	1.00	0.75	5.27	0.3	0.0	5.6	1.7	5.05	56.3	
Totals				778	469	140	1428	69	1359		

Rice Evapotranspiration and Irrigation Requirements

Climate : aridtum Station: PUTTALAM
 Crop : PADDY Date of Transplant : 20 October
 If $P(m) < 40$ mm then Effective Rainfall= $.245 * P(m) - 1.38$ mm (monthly values).
 If $P(m) > 40$ mm then Effective Rainfall= $.693 * P(m) - 20$ mm (monthly values).

Month	Stage	Area Coeff	ETcrop	Perc.	LPrep	RiceRq	EffRain	IRRred.	IRRreq
Decade	%		mm/day	mm/dy	mm/day	mm/day	mm/dec	mm/day	mm/dec
Oct 1	N/L	0.30	0.84	1.38	1.5	9.0	11.9	10.2	10.85
Oct 2	LP	0.75	0.94	3.33	3.8	9.0	16.1	36.3	12.45
Oct 3	A	1.00	1.00	4.50	5.0	0.0	9.5	49.7	4.53
Nov 1	A	1.00	1.00	4.34	5.0	0.0	9.3	53.1	4.02
Nov 2	B	1.00	1.05	4.31	5.0	0.0	9.3	55.5	3.76
Nov 3	B	1.00	1.15	4.71	5.0	0.0	9.7	46.3	5.08
Dec 1	B	1.00	1.25	5.04	5.0	0.0	10.0	37.1	6.32
Dec 2	C	1.00	1.30	5.20	5.0	0.0	10.2	28.0	7.40
Dec 3	C	1.00	1.30	5.76	5.0	0.0	10.8	20.9	8.66
Jan 1	C	1.00	1.30	6.36	5.0	0.0	11.4	12.6	10.10
Jan 2	C	1.00	1.30	6.58	5.0	0.0	11.9	4.9	11.39
Jan 3	D	1.00	1.20	6.55	4.0	0.0	10.5	4.4	10.11
Feb 1	D	1.00	1.00	5.62	2.5	0.0	8.1	3.8	7.74
Feb 2	D	1.00	0.80	4.63	0.8	0.0	5.4	1.7	5.21
Totals			663	571	180	1415	365	1050	

Rice Evapotranspiration and Irrigation Requirements

Climate : aridtum Station: PUTTALAM
 Crop : PADDY Date of Transplant : 16 April
 If $P(m) < 40$ mm then Effective Rainfall= $.245 * P(m) - 1.38$ mm (monthly values).
 If $P(m) > 40$ mm then Effective Rainfall= $.693 * P(m) - 20$ mm (monthly values).

Month	Stage	Area Coeff	ETcrop	Perc.	LPrep	RiceRq	EffRain	IRRred.	IRRreq
Decade	%		mm/day	mm/dy	mm/day	mm/day	mm/dec	mm/day	mm/dec
Mar 1	N/L	0.15	0.81	0.78	0.8	2.5	4.0	3.6	3.69
Apr 1	LP	0.45	0.88	2.29	2.3	10.1	14.6	19.2	13.30
Apr 2	L/A	0.85	0.97	4.44	4.3	5.4	14.1	33.7	10.71
Apr 3	A	1.00	1.00	5.73	5.0	0.0	10.7	32.5	7.48
May 1	A/B	1.00	1.04	6.35	5.0	0.0	11.3	25.3	8.82
May 2	B	1.00	1.12	7.23	5.0	0.0	12.2	18.1	10.43
May 3	B/C	1.00	1.25	8.05	5.0	0.0	13.0	12.9	11.76
Jun 1	C	1.00	1.30	8.49	5.0	0.0	15.5	7.1	12.74
Jun 2	C	1.00	1.30	8.58	5.0	0.0	15.6	1.6	13.42
Jun 3	C/D	1.00	1.29	8.28	4.9	0.0	13.2	1.4	13.01
Jul 1	D	1.00	1.15	7.13	3.6	0.0	10.7	1.3	10.56
Jul 2	D	1.00	0.90	5.40	1.7	0.0	7.1	1.0	6.95
Totals			725	475	180	1349	152	1237	

Rice Evapotranspiration and Irrigation Requirements

Climate : TRI Station: TRINCOMALEE
 Crop : PADDY Date of Transplant : 20 October
 If $P(m) < 40$ mm then Effective Rainfall = $.245 + P(m) - 1.38$ mm (monthly values).
 If $P(m) > 40$ mm then Effective Rainfall = $.693 + P(m) - 20$ mm (monthly values).

Month	Stage	Area	Coeff	ETcrop	Perc.	LPrep	RiceRc	EffRain	IRRreq.	IRRreq.
Decade		%		mm/day	mm/dy	mm/day	mm/day	mm/dec	mm/day	mm/dec
Oct 1	N/L	0.30	0.84	1.62	1.5	9.0	12.1	9.7	11.15	111.5
Oct 2	LP	0.75	0.94	3.90	3.8	9.0	16.7	31.4	13.52	135.2
Oct 3	A	1.00	1.00	5.21	5.0	0.0	10.2	50.9	5.12	51.2
Nov 1	A	1.00	1.00	4.94	5.0	0.0	9.9	62.7	3.67	36.7
Nov 2	B	1.00	1.05	4.83	5.0	0.0	9.8	73.1	2.52	25.2
Nov 3	B	1.00	1.15	5.17	5.0	0.0	10.2	70.7	3.10	31.0
Dec 1	B	1.00	1.25	5.41	5.0	0.0	10.4	70.3	3.34	33.8
Dec 2	C	1.00	1.30	5.45	5.0	0.0	10.4	68.9	3.56	35.6
Dec 3	C	1.00	1.30	5.92	5.0	0.0	10.9	57.0	5.22	52.2
Jan 1	C	1.00	1.30	6.44	5.0	0.0	11.4	43.5	7.10	71.0
Jan 2	C	1.00	1.30	6.88	5.0	0.0	11.9	32.3	8.65	86.5
Jan 3	D	1.00	1.20	6.55	4.0	0.0	10.5	25.9	7.96	79.6
Feb 1	D	1.00	1.00	5.62	2.5	0.0	8.1	18.8	6.24	62.4
Feb 2	D	1.00	0.80	4.63	0.8	0.0	5.4	6.0	4.78	23.9
Totals				703	571	180	1457	621		536

Rice Evapotranspiration and Irrigation Requirements

Climate : TRI Station: TRINCOMALEE
 Crop : PADDY Date of Transplant : 20 April
 If $P(m) < 40$ mm then Effective Rainfall = $.245 + P(m) - 1.38$ mm (monthly values).
 If $P(m) > 40$ mm then Effective Rainfall = $.693 + P(m) - 20$ mm (monthly values).

Month	Stage	Area	Coeff	ETcrop	Perc.	LPrep	RiceRc	EffRain	IRRreq.	IRRreq.
Decade		%		mm/day	mm/dy	mm/day	mm/day	mm/dec	mm/day	mm/dec
Apr 1	N/L	0.30	0.84	1.70	1.5	9.0	12.2	1.4	12.07	120.7
Apr 2	LP	0.75	0.94	4.49	3.4	9.0	17.6	4.1	17.22	172.2
Apr 3	A	1.00	1.00	7.30	5.0	0.0	12.3	5.2	11.75	117.5
May 1	A/B	1.00	1.01	7.79	5.0	0.0	12.8	4.9	12.30	123.0
May 2	B	1.00	1.08	8.78	5.0	0.0	13.6	4.6	13.32	133.2
May 3	B	1.00	1.20	9.95	5.0	0.0	15.0	3.6	14.59	145.9
Jun 1	B/C	1.00	1.28	10.81	5.0	0.0	15.6	1.9	15.62	156.2
Jun 2	C	1.00	1.30	11.18	5.0	0.0	16.2	0.6	16.12	161.2
Jun 3	C	1.00	1.30	11.40	5.0	0.0	16.4	3.5	16.05	160.5
Jul 1	C/D	1.00	1.21	10.91	4.1	0.0	15.0	5.4	14.40	144.0
Jul 2	D	1.00	1.00	9.20	2.4	0.0	11.6	9.3	10.71	107.1
Jul 3	D	1.00	0.75	6.70	0.3	0.0	7.0	3.0	6.74	20.2
Totals				959	469	180	1610	48		1562

Rice Evapotranspiration and Irrigation Requirements

Climate : a:vav Station: VAVUNIYA
 Crop : PADDY Date of Transplant : 30 October
 If P(m) < 40 mm then Effective Rainfall = .245 * P(m) -- 1.36 mm (monthly values).

If P(m) > 40 mm then Effective Rainfall = .693 * P(m) -- 20 mm (monthly values).

Month	Stage	Area Coeff	ETcrop	Perc.	LPrep	RiceRo	EffRain	IRRreq	IRRreq
								mm/dec	mm/day
Oct 1	N/L	0.30	0.44	1.12	1.5	9.0	11.6	15.3	10.09
Oct 2	LP	0.75	0.94	3.05	3.8	9.0	15.8	39.8	11.82
Nov 1	A	1.00	1.00	4.27	5.0	0.0	9.3	55.8	3.70
Nov 2	A	1.00	1.00	4.10	5.0	0.0	9.1	58.1	3.29
Nov 3	B	1.00	1.05	4.02	5.0	0.0	9.0	56.3	3.39
Dec 1	B	1.00	1.15	3.94	5.0	0.0	8.9	57.2	3.22
Dec 2	B	1.00	1.25	3.86	5.0	0.0	8.9	56.7	3.19
Dec 3	C	1.00	1.30	4.54	5.0	0.0	9.5	42.2	5.31
Jan 1	C	1.00	1.30	5.14	5.0	0.0	10.1	23.8	7.76
Jan 2	C	1.00	1.30	5.58	5.0	0.0	10.6	9.3	9.64
Jan 3	C	1.00	1.30	5.79	5.0	0.0	10.8	8.8	9.91
Feb 1	D	1.00	1.20	5.54	4.0	0.0	9.5	8.3	8.72
Feb 2	D	1.00	1.00	4.79	2.5	0.0	7.3	7.8	6.51
Feb 3	D	1.00	0.80	4.10	0.8	0.0	4.9	3.7	4.48
Totals				578	571	180	1331	443	888

Rice Evapotranspiration and Irrigation Requirements

Climate : a:vav Station: VAVUNIYA
 Crop : PADDY Date of Transplant : 18 April
 If P(m) < 40 mm then Effective Rainfall = .245 * P(m) -- 1.36 mm (monthly values).

Month	Stage	Area Coeff	ETcrop	Perc.	LPrep	RiceRo	EffRain	IRRreq	IRRreq
								mm/dec	mm/day
Mar 1	N/L	0.10	0.60	0.47	0.5	0.4	1.3	1.4	1.19
Mar 2	LP	0.35	0.86	1.74	1.5	10.4	13.3	7.2	13.21
Apr 1	A/C	0.50	0.75	4.43	4.0	7.2	15.6	22.6	13.37
Apr 2	A	1.00	1.00	5.91	5.0	0.0	10.3	22.5	8.66
May 1	A/E	1.00	1.02	5.16	5.0	0.0	11.2	15.8	5.49
May 2	E	1.00	1.11	6.79	5.0	0.0	11.8	11.0	10.69
May 3	E	1.00	1.23	7.92	5.0	0.0	12.2	7.8	12.17
Jun 1	B/C	1.00	1.29	8.85	5.0	0.0	13.9	3.5	13.51
Jun 2	C	1.00	1.30	9.36	5.0	0.0	14.4	0.0	14.35
Jun 3	C	1.00	1.30	9.32	5.0	0.0	14.3	1.1	14.21
Jul 1	C/D	1.00	1.19	8.43	3.9	0.0	12.3	2.6	12.05
Jul 2	D	1.00	0.95	6.74	2.1	0.0	8.8	3.9	8.42
Jul 3	D	1.00	0.70	4.97	-0.1	0.0	4.9	0.6	4.82
Totals				767	473	180	1421	101	1320

Rice Evapotranspiration and Irrigation Requirements

Climate : amapala Station: MAPALANA
 Crop : PADDY Date of Transplant : 10 October
 If $P(m) < 40$ mm then Effective Rainfall = $.245 + P(m) - 1.36$ mm (monthly values).
 If $P(m) > 40$ mm then Effective Rainfall = $.693 + P(m) - 20$ mm (monthly values).

Month	Stage	Area	Coeff	ETcrop	Perc.	LPrep	RiceRq	EffRain	IRReq.	IRReq
Decade	%			mm/day	mm/dy	mm/day	mm/day	mm/dec	mm/day	mm/dec
Sep 3	N/L	0.30	0.84	0.89	1.5	9.0	11.4	13.9	10.00	100.0
Oct 1	LP	0.75	0.94	2.69	3.8	9.0	15.4	40.7	11.36	113.6
Oct 2	A	1.00	1.00	4.01	5.0	0.0	9.0	61.6	2.84	28.4
Oct 3	A	1.00	1.00	3.47	5.0	0.0	8.5	61.5	2.32	23.2
Nov 1	B	1.00	1.05	2.87	5.0	0.0	7.9	63.4	1.53	15.3
Nov 2	B	1.00	1.15	2.53	5.0	0.0	7.5	64.2	1.11	11.1
Nov 3	B	1.00	1.25	3.11	5.0	0.0	8.1	54.6	2.65	26.5
Dec 1	C	1.00	1.30	3.70	5.0	0.0	8.7	43.7	4.33	43.3
Dec 2	C	1.00	1.30	3.98	5.0	0.0	9.0	33.4	5.65	56.5
Dec 3	C	1.00	1.30	4.17	5.0	0.0	9.2	31.2	6.05	60.5
Jan 1	C	1.00	1.30	4.35	5.0	0.0	9.3	29.7	6.38	63.8
Jan 2	D	1.00	1.20	4.18	4.0	0.0	8.2	26.8	5.50	55.0
Jan 3	D	1.00	1.00	3.72	2.5	0.0	6.2	23.1	3.90	39.0
Feb 1	D	1.00	0.80	3.21	0.6	0.0	4.0	9.1	3.06	15.3
Totals				453	571	180	1208	557	651	

Rice Evapotranspiration and Irrigation Requirements

Climate : amapala Station: MAPALANA
 Crop : PADDY Date of Transplant : 15 April
 If $P(m) < 40$ mm then Effective Rainfall = $.245 + P(m) - 1.36$ mm (monthly values).
 If $P(m) > 40$ mm then Effective Rainfall = $.693 + P(m) - 20$ mm (monthly values).

Month	Stage	Area	Coeff	ETcrop	Perc.	LPrep	RiceRq	EffRain	IRReq.	IRReq
Decade	%			mm/day	mm/dy	mm/day	mm/day	mm/dec	mm/day	mm/dec
Mar 3	N/L	0.18	0.62	0.51	0.9	3.6	5.0	6.9	4.29	64.4
Apr 1	LP	0.50	0.49	1.55	2.5	9.9	13.9	13.4	12.61	126.1
Apr 2	L/A	0.88	0.97	2.89	4.4	4.5	11.6	24.7	9.30	93.0
Apr 3	A	1.00	1.00	3.46	5.0	0.0	8.5	40.4	4.42	44.2
May 1	A/B	1.00	1.04	3.67	5.0	0.0	8.7	57.2	2.95	29.5
May 2	B	1.00	1.14	4.10	5.0	0.0	9.1	71.7	1.93	19.3
May 3	P/C	1.00	1.25	4.21	5.0	0.0	9.2	62.4	2.98	29.8
Jun 1	C	1.00	1.30	4.01	5.0	0.0	9.0	52.4	3.77	37.7
Jun 2	C	1.00	1.30	3.68	5.0	0.0	8.7	42.7	4.41	44.1
Jun 3	C/D	1.00	1.28	3.82	4.8	0.0	8.6	38.5	4.72	47.2
Jul 1	D	1.00	1.13	3.59	3.4	0.0	7.0	33.6	3.61	36.1
Jul 2	D	1.00	0.88	2.91	1.4	0.0	4.3	23.2	2.02	16.2
Totals				381	475	180	1055	467	587	

Rice Evapotranspiration and Irrigation Requirements

Climate : a:TIHA	Station: TIMAGODA
Crop : PADDY	Date of Transplant : 16 October
If P(m) < 40 mm then Effective Rainfall = .245 * P(m) -- 1.38 mm (monthly values).	
If P(m) > 40 mm then Effective Rainfall = .693 * P(m) -- 20 mm (monthly values).	

Month	Stage	Area	Coeff	ETcrop	Perc.	LPrep	RiceRc	EffRain	IRRreq.	IRRreq.	
Decade		%		mm/day	mm/dy	mm/dy	mm/day	mm/day	mm/dec	mm/day	mm/dec
Sep 3	N/L	0.15	0.81	0.42	0.8	2.5	3.7	5.8	2.82	39.5	
Oct 1	LP	0.45	0.88	1.49	2.3	10.1	13.8	21.8	11.65	116.5	
Oct 2	L/A	0.85	0.97	3.29	4.3	5.4	12.9	46.3	8.31	83.1	
Oct 3	A	1.00	1.00	3.46	5.0	0.0	8.5	52.4	3.22	32.2	
Nov 1	A/B	1.00	1.02	2.77	5.0	0.0	7.8	51.7	2.60	26.0	
Nov 2	B	1.00	1.09	2.36	5.0	0.0	7.4	50.3	2.33	23.3	
Nov 3	B	1.00	1.19	2.93	5.0	0.0	7.9	40.9	3.84	38.4	
Dec 1	B/C	1.00	1.27	3.60	5.0	0.0	8.6	30.2	5.57	55.7	
Dec 2	C	1.00	1.30	3.98	5.0	0.0	9.0	20.2	6.96	69.6	
Dec 3	C	1.00	1.30	4.15	5.0	0.0	9.2	17.0	7.45	74.5	
Jan 1	C	1.00	1.30	4.32	5.0	0.0	9.3	13.7	7.95	79.5	
Jan 2	C/D	1.00	1.26	4.35	4.6	0.0	8.9	9.5	8.00	80.0	
Jan 3	D	1.00	1.12	4.14	3.4	0.0	7.5	9.1	6.63	66.3	
Feb 1	D	1.00	0.92	3.68	1.8	0.0	5.5	8.7	4.62	46.2	
Feb 2	D	1.00	0.72	3.08	0.0	0.0	3.1	0.8	3.00	3.0	
Totals				454	574	180	1215	381	634		

Rice Evapotranspiration and Irrigation Requirements

Climate : a:TIHA	Station: TIMAGODA
Crop : PADDY	Date of Transplant : 1 May
If P(m) < 40 mm then Effective Rainfall = .245 * P(m) -- 1.38 mm (monthly values).	
If P(m) > 40 mm then Effective Rainfall = .693 * P(m) -- 20 mm (monthly values).	

Month	Stage	Area	Coeff	ETcrop	Perc.	LPrep	RiceRc	EffRain	IRRreq.	IRRreq.	
Decade		%		mm/day	mm/dy	mm/dy	mm/day	mm/day	mm/dec	mm/day	mm/dec
Apr 2	N/L	0.30	0.84	0.86	1.5	9.0	11.4	6.9	10.67	106.7	
Apr 3	LP	0.75	0.94	2.45	3.8	9.0	15.2	23.3	12.88	128.5	
May 1	A	1.00	1.00	3.52	5.0	0.0	8.5	42.3	4.29	42.9	
May 2	A/B	1.00	1.01	3.62	5.0	0.0	8.6	51.9	3.43	34.3	
May 3	B	1.00	1.08	3.65	5.0	0.0	8.6	45.0	4.15	41.5	
Jun 1	B	1.00	1.20	3.71	5.0	0.0	8.7	37.5	4.97	49.7	
Jun 2	B/C	1.00	1.25	3.63	5.0	0.0	8.6	30.2	5.61	56.1	
Jun 3	C	1.00	1.30	3.90	5.0	0.0	8.9	28.5	5.04	60.4	
Jul 1	C	1.00	1.30	4.15	5.0	0.0	9.2	26.9	6.46	64.6	
Jul 2	C/D	1.00	1.21	4.03	4.1	0.0	8.2	25.2	5.63	56.3	
Jul 3	D	1.00	1.00	3.46	2.4	0.0	5.9	25.2	3.38	33.8	
Aug 1	D	1.00	0.75	2.70	0.3	0.0	3.0	7.4	2.31	6.9	
Totals				378	469	180	1032	350	682		

Rice Evapotranspiration and Irrigation Requirements

Climate : a:maw Station: MAWARELLA
 Crop : PADDY Date of Transplant : 10 October
 If P(m) < 40 mm then Effective Rainfall = .245 * P(m) -- 1.38 mm (monthly values).

If P(m) > 40 mm then Effective Rainfall = .693 * P(m) -- 20 mm (monthly values).

Month	Stage	Area	Coeff	ETcrop	Perc.	LPrep	RiceRq	EffRain	IRReq.	IRReq
Decade		%		mm/day	mm/dy	mm/dy	mm/day	mm/dec	mm/day	mm/dec
Sep 3	N/L	0.30	0.84	0.89	1.5	9.0	11.4	19.0	9.49	94.9
Oct 1	LP	0.75	0.94	2.69	3.8	9.0	15.4	52.1	10.23	102.3
Oct 2	A	1.00	1.00	4.01	5.0	0.0	9.0	75.3	1.45	14.5
Oct 3	A	1.00	1.00	3.47	5.0	0.0	8.5	78.4	0.63	6.3
Nov 1	B	1.00	1.05	2.87	5.0	0.0	7.9	84.2	0.00	0.0
Nov 2	B	1.00	1.15	2.52	5.0	0.0	7.5	88.6	0.00	0.0
Nov 3	B	1.00	1.25	3.10	5.0	0.0	8.1	78.5	0.25	2.5
Dec 1	C	1.00	1.30	3.69	5.0	0.0	8.7	68.4	1.85	18.5
Dec 2	C	1.00	1.30	3.98	5.0	0.0	9.0	58.2	3.16	31.6
Dec 3	C	1.00	1.30	4.15	5.0	0.0	9.2	49.5	4.20	42.0
Jan 1	C	1.00	1.30	4.32	5.0	0.0	9.3	39.5	5.37	53.7
Jan 2	D	1.00	1.20	4.15	4.0	0.0	8.1	30.1	5.14	51.4
Jan 3	D	1.00	1.00	3.71	2.5	0.0	6.2	28.0	3.40	34.0
Feb 1	D	1.00	0.80	3.22	0.8	0.0	4.0	12.0	2.77	13.9
Totals				452	571	180	1228	762		466

Rice Evapotranspiration and Irrigation Requirements

Climate : a:maw Station: MAWARELLA
 Crop : PADDY Date of Transplant : 10 April
 If P(m) < 40 mm then Effective Rainfall = .245 * P(m) -- 1.38 mm (monthly values).

If P(m) > 40 mm then Effective Rainfall = .693 * P(m) -- 20 mm (monthly values).

Month	Stage	Area	Coeff	ETcrop	Perc.	LPrep	RiceRq	EffRain	IRReq.	IRReq
Decade		%		mm/day	mm/dy	mm/dy	mm/day	mm/dec	mm/day	mm/dec
Mar 3	N/L	0.30	0.84	0.90	1.5	9.0	11.4	15.0	9.91	99.1
Apr 1	LP	0.75	0.94	2.47	3.8	9.0	15.2	39.8	11.24	112.4
Apr 2	A	1.00	1.00	3.41	5.0	0.0	8.4	56.2	2.79	27.9
Apr 3	A/B	1.00	1.01	3.51	5.0	0.0	8.5	60.3	2.48	24.8
May 1	B	1.00	1.08	3.82	5.0	0.0	8.8	66.5	2.18	21.8
May 2	B	1.00	1.20	4.32	5.0	0.0	9.3	71.6	2.15	21.5
May 3	B/C	1.00	1.28	4.32	5.0	0.0	9.3	66.5	2.67	26.7
Jun 1	C	1.00	1.30	4.01	5.0	0.0	9.0	61.3	2.88	28.8
Jun 2	C	1.00	1.30	3.69	5.0	0.0	8.7	56.2	3.07	30.7
Jun 3	C/D	1.00	1.21	3.64	4.1	0.0	7.5	48.8	2.89	28.9
Jul 1	D	1.00	1.00	3.21	2.4	0.0	5.6	39.4	1.71	17.1
Jul 2	D	1.00	0.75	2.51	0.3	0.0	2.9	9.3	1.92	5.8
Totals				381	469	180	1026	591		446

Rice Evapotranspiration and Irrigation Requirements																			
Climate : charl				Station: Denagama															
Crop : PADDY				Date of Transplant : 20 October															
If $P(m) < 40$ mm then Effective Rainfall = $.245 * P(m) - 1.38$ mm (monthly values).																			
If $P(m) > 40$ mm then Effective Rainfall = $.693 * P(m) - 20$ mm (monthly values).																			
Month	Stage	Area	Coeff	ETcrop	Perc.	LPrep	RiceRo	EffRain	IRRreq.	IRRreq									
Decade	%			mm/day	mm/dy	mm/day	mm/day	mm/dec	mm/day	mm/day	mm/dec								
Oct 1	N/L	0.30	0.84	0.96	1.5	9.0	11.5	11.9	10.27	102.7									
Oct 2	LP	0.75	0.94	2.84	3.8	9.0	15.6	32.8	12.31	123.1									
Oct 3	A	1.00	1.00	3.47	5.0	0.0	8.5	48.2	3.65	36.5									
Nov 1	A	1.00	1.00	2.74	5.0	0.0	7.7	55.4	2.19	21.9									
Nov 2	B	1.00	1.05	2.31	5.0	0.0	7.3	61.3	1.18	11.8									
Nov 3	B	1.00	1.15	2.86	5.0	0.0	7.9	52.4	2.62	26.2									
Dec 1	B	1.00	1.25	3.55	5.0	0.0	8.6	42.7	4.28	42.8									
Dec 2	C	1.00	1.30	3.98	5.0	0.0	9.0	33.5	5.64	56.4									
Dec 3	C	1.00	1.30	4.15	5.0	0.0	9.2	28.7	6.28	62.8									
Jan 1	C	1.00	1.30	4.32	5.0	0.0	9.3	23.6	6.96	69.6									
Jan 2	C	1.00	1.30	4.49	5.0	0.0	9.5	18.2	7.67	76.7									
Jan 3	D	1.00	1.20	4.43	4.0	0.0	8.4	17.2	6.71	67.1									
Feb 1	D	1.00	1.00	4.00	2.5	0.0	6.5	15.6	4.94	49.4									
Feb 2	D	1.00	0.80	3.42	0.8	0.0	4.2	7.1	3.46	17.3									
Totals				458	571	180	1213	449		764									

Rice Evapotranspiration and Irrigation Requirements																			
Climate : charl				Station: Denagama															
Crop : PADDY				Date of Transplant : 20 April															
If $P(m) < 40$ mm then Effective Rainfall = $.245 * P(m) - 1.38$ mm (monthly values).																			
If $P(m) > 40$ mm then Effective Rainfall = $.693 * P(m) - 20$ mm (monthly values).																			
Month	Stage	Area	Coeff	ETcrop	Perc.	LPrep	RiceRo	EffRain	IRRreq.	IRRreq									
Decade	%			mm/day	mm/dy	mm/day	mm/day	mm/dec	mm/day	mm/day	mm/dec								
Apr 1	N/L	0.30	0.84	0.89	1.5	9.0	11.4	7.9	10.60	106.0									
Apr 2	LP	0.75	0.94	2.43	3.8	9.0	15.2	21.3	13.05	130.5									
Apr 3	A	1.00	1.00	3.48	5.0	0.0	8.5	31.9	5.29	52.9									
May 1	A/B	1.00	1.01	3.57	5.0	0.0	8.6	36.7	4.90	49.0									
May 2	B	1.00	1.08	3.88	5.0	0.0	8.9	40.8	4.80	48.0									
May 3	B	1.00	1.20	4.05	5.0	0.0	9.1	37.2	5.33	53.3									
Jun 1	B/C	1.00	1.28	3.95	5.0	0.0	9.0	33.7	5.59	55.9									
Jun 2	C	1.00	1.30	3.68	5.0	0.0	8.7	30.1	5.68	56.8									
Jun 3	C	1.00	1.30	3.91	5.0	0.0	8.9	26.5	6.26	62.6									
Jul 1	C/D	1.00	1.21	3.90	4.1	0.0	8.0	22.3	5.79	57.9									
Jul 2	D	1.00	1.00	3.35	2.4	0.0	5.8	18.4	3.95	39.5									
Jul 3	D	1.00	0.75	2.62	0.3	0.0	3.0	5.6	2.41	7.2									
Totals				379	469	180	1032	312		719									

Rice Evapotranspiration and Irrigation Requirements

Climate : charl Station: CHARLEY-MOUNT
 Crop : PADDY Date of Transplant : 20 April
 If $P(m) < 40$ mm then Effective Rainfall = $.245 * P(m) - 1.38$ mm (monthly values).

If $P(m) > 40$ mm then Effective Rainfall = $.693 * P(m) - 20$ mm (monthly values).

Month	Stage	Area	Coeff	ETcrop	Perc.	LPrep	RiceRo	EffRain	IRReq.	IRReq
		Decade	%	mm/day	mm/day	mm/day	mm/day	mm/dec	mm/day	mm/dec
Apr 1	N/L	0.30	0.84	0.88	1.5	9.0	11.4	9.4	10.45	104.5
Apr 2	LP	0.75	0.94	2.41	3.8	9.0	15.2	27.0	12.46	124.6
Apr 3	A	1.00	1.00	3.46	5.0	0.0	8.5	44.7	3.99	39.9
May 1	A/B	1.00	1.01	3.56	5.0	0.0	5.6	57.4	2.52	28.2
May 2	B	1.00	1.08	3.88	5.0	0.0	4.9	68.2	2.06	20.6
May 3	B	1.00	1.20	4.05	5.0	0.0	9.1	59.4	3.11	31.1
Jun 1	B/C	1.00	1.28	3.95	5.0	0.0	9.0	50.0	3.96	39.6
Jun 2	C	1.00	1.30	3.68	5.0	0.0	8.7	40.8	4.60	46.0
Jun 3	C	1.00	1.30	3.91	5.0	0.0	8.5	37.1	5.20	52.0
Jul 1	C/D	1.00	1.21	3.90	4.1	0.0	8.0	32.7	4.75	47.5
Jul 2	D	1.00	1.00	3.35	2.4	0.0	5.8	28.6	2.93	29.3
Jul 3	D	1.00	0.75	2.62	0.8	0.0	3.0	9.0	2.07	6.2
Totals				378	469	180	1034	444	570	

Rice Evapotranspiration and Irrigation Requirements

Climate : charl Station: CHARLEY-MOUNT
 Crop : PADDY Date of Transplant : 10 October
 If $P(m) < 40$ mm then Effective Rainfall = $.245 * P(m) - 1.38$ mm (monthly values).

If $P(m) > 40$ mm then Effective Rainfall = $.693 * P(m) - 20$ mm (monthly values).

Month	Stage	Area	Coeff	ETcrop	Perc.	LPrep	RiceRo	EffRain	IRReq.	IRReq
		Decade	%	mm/day	mm/day	mm/day	mm/day	mm/dec	mm/day	mm/dec
Sep 3	N/L	0.30	0.84	0.89	1.5	9.0	11.4	15.0	9.89	98.9
Oct 1	LP	0.75	0.94	2.69	3.8	9.0	15.4	43.8	11.06	110.6
Oct 2	A	1.00	1.00	4.01	5.0	0.0	9.0	65.9	2.42	24.2
Oct 3	A	1.00	1.00	3.47	5.0	0.0	8.5	62.6	2.22	22.2
Nov 1	B	1.00	1.05	2.87	5.0	0.0	7.9	59.9	1.88	18.8
Nov 2	B	1.00	1.15	2.53	5.0	0.0	7.5	56.9	1.84	18.4
Nov 3	B	1.00	1.25	3.11	5.0	0.0	8.1	48.7	3.24	32.4
Dec 1	C	1.00	1.30	3.70	5.0	0.0	8.7	40.4	4.66	46.6
Dec 2	C	1.00	1.30	3.78	5.0	0.0	9.0	32.1	5.77	57.7
Dec 3	C	1.00	1.30	4.15	5.0	0.0	9.2	26.8	6.47	64.7
Jan 1	C	1.00	1.30	4.32	5.0	0.0	9.3	20.8	7.23	72.3
Jan 2	D	1.00	1.20	4.14	4.0	0.0	8.1	15.2	6.62	66.2
Jan 3	D	1.00	1.00	3.71	2.5	0.0	6.2	14.1	4.80	48.0
Feb 1	D	1.00	0.80	3.22	0.8	0.0	4.0	6.1	3.36	16.8
Totals				452	571	180	1205	508	698	

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*Parc Modulopolis H 1 Zone Euromédecine
Montpellier 67.52.20.05*