RAINGUARDING IN SMALL HOLDINGS OF MUVATTUPUZHA TALUK

BY

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Dissertation

Submitted in partial fulfilment of the requirement for the post graduate diploma in

NATURAL RUBBER PRODUCTION

FACULTY OF AGRICULTURE
KERALA AGRICULTURAL UNIVERSITY

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VELLANIKKARA
THRISSUR
1991

ACKNOWLEDGEMENT

I express my deep sense of gratitude to **Dr. P.A. NAZEEM**, Associate professor, Department of Plantation Crops and Spices, College of Horticulture, Vellanikkara for her inspiring guidance and encouragement in the preparation of the dissertation. I also wish to express my gratitude to **Dr. K.R. Vijayakumar**, Deputy Director, Plant Physiology,Rubber Research Institute of India, Kottayam who has rendered me all help for conducting the studies and collecting the details available from the various divisions of the Research Institute for the preparation of the dissertation. My sincere thanks is expressed to **Dr. G. Sreekandan Nair**, Professor and Head, Department of Plantation crops and spices College of Horticulture, and **Dr. Luckins C. Babu**, Associate Professor, College of Forestry, for their valuable guidance and advice. I am grateful to the Associate Dean, Kerala Agricultural University for providing facilities to undertake the studies. My sense of gratitude is expressed to **Shri. P.C. Cyriac I.A.S.**, the former Chairman, Rubber Board, **Smt. J. Lalithambika I.A.S**, the present Chair person, Rubber Board and **Shri. P. Mukundan Menon**, Rubber Production Commissioner, Rubber Board for granting my study leave.

The assistance and help received from **Shri. M. Basheerkutty** Development Officer and members of Staff, Rubber Board Regional Office, Muvattupuzha are also thankfully acknowledged.

The co-operation rendered by the small holders and Rubber Producers Societies in Muvattupuzha Taluk. **Shri. P.V. Geevarghese**, and

Shri. K.N. Haridas, Field Officers, Rubber Board Regional office, Muvattupuzha during the course of the survey work is also acknowledged with gratitude.

Vellanikkara,

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DECLARATION

I hereby certify that this dissertation entitled "**RAINGUARDING IN SMALL HOLDINGS OF MUVATTUPUZHA TALUK**" and submitted in partial fulfilment of the course Post Graduate Diploma in Natural Rubber production of Kerala Agricultural University is a bonafide record of research work done by me and that the dissertation has not previously formed the basis of the award to me of any degree, diploma, associateship, fellowship or other similar type of any university or society.

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CERTIFICATE

This is to certify that the dissertation entitled "**RAINGUARDING IN SMALL HOLDINGS OF MUVATTUPUZHA TALUK**" and submitted in partial fulfilment of the requirement for the Post Graduate Diploma in Natural Rubber Production of Kerala Agricultural University is a record of bona-fide study carried out by Shri. T.B. Sasidharan under our supervision and guidance, and no part of this dissertation has been submitted for any other degree or diploma to him.

We, the undersigned, members of the Advisory Committee of Shri. T.B. Sasidharan, candidate for the P.G. Diploma in Natural Rubber Production agree that the dissertation entitled "RAINGUARDING IN SMALL HOLDINGS OF MUVATTUPUZHA TALUK" may be submitted by Shri. T.B. Sasidharan in partial fulfilment of the requirement of the Diploma.

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INTRODUCTION

INTRODUCTION

In India, Rubber Plantation Industry came into existance, in 1902, when the first commecial plantation was started at Thattakad near Kothamangalam. Since then, the Rubber Plantation Industry has shown tremendous development. The total area under rubber plantation at the end of 1989-90 is 4.4 lakh hectares as against 0.06 lakh hectares of 1950-51. Similarly the tappable area of 0.05 lakh hectares has gone to the level of 2.89 lakh hectares. Increase in production has tuned to the level of 2.97 lakh tonnes in 1989-90 as from 0.15 lakh tonnes in 1950-51. Kerala holds the lion's share of the Indian Rubber Plantation Industry. The small holders here are the backbone of the Rubber Plantation Industry. The Rubber Board has played vital role in the development of the Rubber Plantation Industry.

With the intention to uplift the small holders, the Board has conducted intensive and massive campaign programmes on all technical aspects from planting to processing. In 1989, the Rubber Board launched a campaign on "Short term methods to increase rubber production". In this campaign among many other aspects, use of rainguards during rainy season to prevent loss of tapping days was given prime importance. The small holders have started to practice the system, which was a monopoly of the estate sector.

The present study was taken up to assess the effectiveness of rainguarding in improving the production and productivity with the following objectives.

i. To assess the influence of rainguarding on the number of tapping days, peak yield, summer yield and total yield.

ii. To compare the different types of rainguarding adopted.

iii. To study the influence of rain guarding in girth increment and brownbast incidence.

iv. To evaluate the influence of Rubber Producers' Societies, Rubber Board and other agencies on popularising rainguarding.

v. To evaluate the extent of area rainguarded in Muvattupuzha Taluk through the Rubber Producers' Societies during 1989-90 and 1990-91

REVIEW OF LITERATURE

REVIEW OF LITERATURE

The climatic factors have been found to influence the growth and yield of rubber. Rainfall is the most important element that influences rubber trees.

For optimum growth and yield rubber trees require an evenly distributed rainfall of 2000 to 3000 mm. The areas where rainfall is less it has been observed that the trees become stunted in growth with crooked stems and lower branches. But excess rainfall is not desirable as it favours soil erosion and loss of nutrients through leaching. High rainfall also reduces number of tapping days. Moreover under high rainfall conditions incidence of fungal disease is reported to be very high. Rainfall also influences relative humidity and temperature reigmes. Diurnal variations in rainfall pattern is also an important factor. Sunny forenoons with evening rainfall is reported to be conducive for healthy growth and uninterrupted tapping of rubber. No detailed and systematic study has been carried out to elucidate the role of low temperature on growth and yield of rubber. The inter-relationship among relative humidity evapotranspiration, tugor pressure and yield of latex have been considered in selecting the early hours of morning for tapping (Pushpadas and Kavlickalkulyamma, 1980)

Incidence of disease on tapping panel is found to be the highest during rainy season. The black stripe and mouldyrot are the two main panel diseases reported to occur during rainy season (Pillai, R.P.N. and George, 1980)

Rainguards help to carry out tapping throughout the rainy season without interruption. In India though skirt type and shade type of

rainguarding are practised, the skirt type is more popular. Channel rainguarding is under experimentation. (Sethuraj and George, 1980)

About 30 to 45 additional tapping days could be obtained by rainguarding the rubber trees under the alternate daily system of tapping. It is mainly recommended in areas where the annual yield exceeds 700 Kg per hectare and where normally more than 25 tapping days are lost by rains. As the chances of panel diseases are high in rainguarded areas systematic application of panel protectants is necessary at frequent intervals (Sethuraj and George, 1980)

Chang et al. (1969) have reported a simple polystyrine rainguard. This consists of a narrow polystyrine, glued around the tree with latex.

Gan et al. (1985) reported that Eboreeave can significantly reduce panel wetting from rain during the previous night or early morning and this largely prevent loss of tapping days and late tapping.

Sethuraj (1985) reported that in general there is relation between the girthing and tapping rest.

Tomes et al. (1988) conducted a survey to study the impact of rain guarding in Pala and Thodupuzha regions of Kottayam and Idukki districts respectively. The result of the study indicated that initial cost to be incurred for shade type of rainguarding is too high. Skirt type of rainguarding was found to be cheaper among the two types studied. In the rainguarded areas 30 to 45 additional tapping days were obtained. According to them 20 per cent increase in yield could be expected through rainguarding.

Reports from Malaysia indicate corrugated Aluminium foil rainguards with a sealant having trade name YUSIL to be more efficient than polythene rainguarding (Hussin, 1988).

Hong et al. (1990) studied the effectiveness of three types of rainguards RRIM GUD, Eboreeaves and A.A. rainguards in Malaysia and reported A.A. rainguards to be the best type. RRIM GUD is a ready to use crenulated Aluminium foil sealed with a solid rubber polymer, marketed by Rubber Research Institute of Malaya. Eboreeaves is a hooded cap made of bituminous material and mounted with both an adhesive and sealant. This is produced by Sime Darby. No description is given about A.A. rainguards in the literature. According to this report rainguards were not found to reduce tree dryness due to recovery tapping which is undertaken after the peak rainy season.

MATERIALS AND METHODS

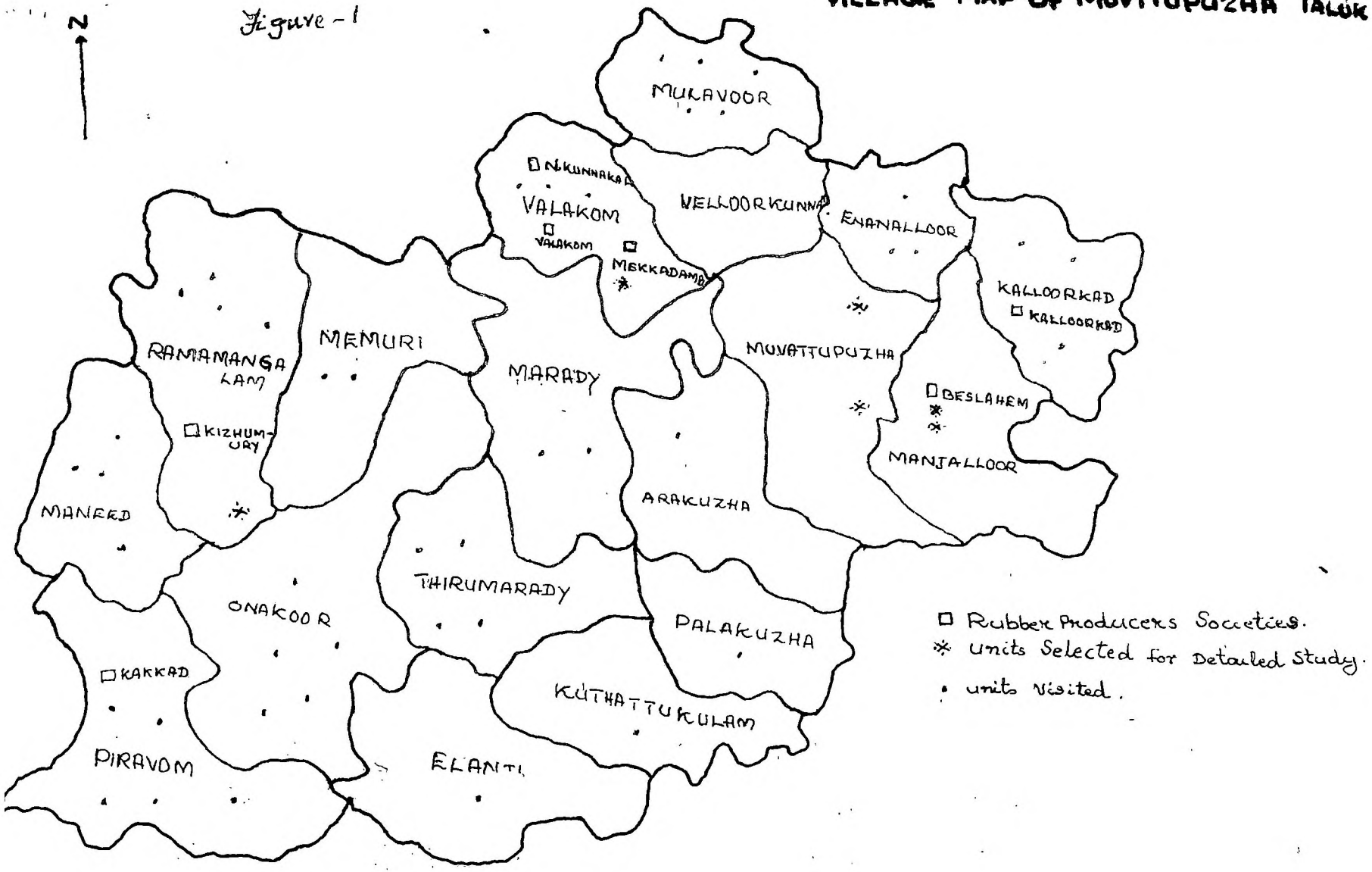
MATERIALS AND METHODS

Details regarding distribution of rainguarding materials from the Regional Office, Muvattupuzha during 1989-90 and 1990-91 to the Rubber Producers Societies in the region were collected from the records maintained there. As the study conducted was mainly to compare yield, girthing and incidence of brownbost, the plots selected had to be identical in all respects such as year of planting, planting materials and tapping system. After visiting about 50 plots in different parts of Muvattupuzha Taluk three units under each category were selected for the study. The name and address of the unit holders selected for the survey are given in Annexure I. All the six units selected did not practice rainguarding during 1989-90. The locations of the units and the Rubber Producers Societies are given in Figure 1. The units were planted in 1982 with RRII-105 and followed ½s d/2 6d/7 tapping system.

Each of those units were visited and details such as number of tapping days, yield obtained per month, expense incurred etc. were collected from the records available with the growers. The details were also collected through personal interviews. The questionnaire form prepared for the purpose is given in Annexure II. The present girth of trees and the present height of panel on which tapping is being done were also recorded from the field. Total number of trees, number of trees under tapping, number of trees affected with brownbast etc. were also recorded. Intensity and percentage of brownbast were also evaluated. Trees were also examined for the incidence of panel diseases. The general maintenance of the areas was also evaluated.

Figure - 1

VILLAGE MAP OF MUVATTUPUZHA TALUK



The comparison of shade type of rainguarding and skirt type of rainguarding (Figure 2) was done in the units of Shri. Louis J. and Shri. V.V. Ulahannan respectively. The unrainguarded unit of Shri. Mathai Paily was considered to compare girthing, bark consumption, incidence of brownbast and disease, as the owner could tap the trees only for two months during 1989-90.

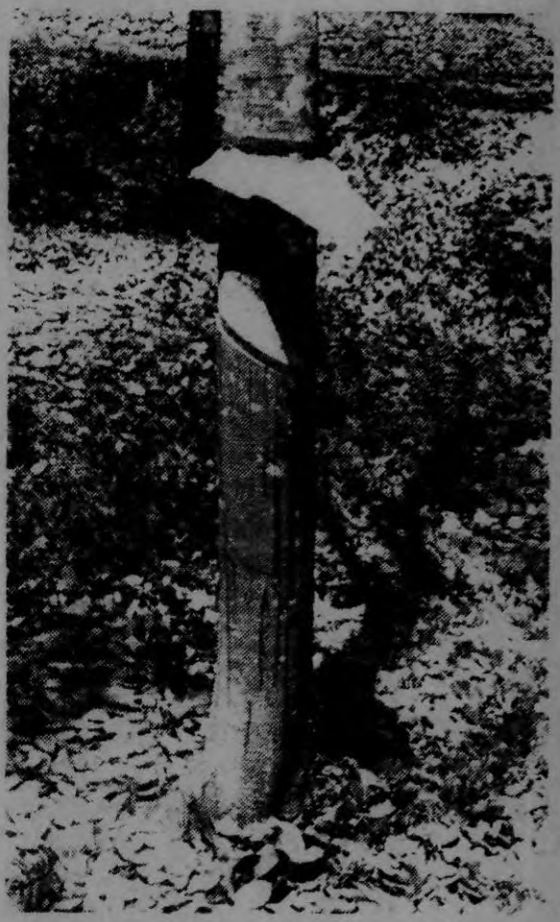
The data collected from the field were computed, tabulated and processed to draw the final results of the study.

The members, Board of Directororthe Presidents of the following Rubber Producers Societies were also interviewed during the course of survey work to observe their views and suggestions about rainguarding.

i) Rubber Producers Society, Kizhumury
ii) Rubber Producers Society, Mekkadampu
iii) Rubber Producers Society, Valakom
iv) Rubber Producers Society, North Kunnackal
v) Rubber Producers Society, Kakadu
vi) Rubber Producers Society, Beslahem
vii) Rubber Producers Society, Kalloorkad

FIGURE 2

Skirt



Shade.

RESULTS AND DISCUSSIONS

RESULTS AND DISCUSSIONS

In all the six units selected for the study, planting was undertaken in 1982. The planting material used was exclusively RRII 105. The tapping system adopted in all the units was ½S d/2 6d/7. The other details regarding area, planting density, girth and height of tapping panel are presented in Table I.

The units selected were small holdings, having an area of less than one hectare. The planting density adopted by most of the growers were found to be relatively higher than that of the package of practices recommendations. The present position of the tapping cut is at a higher level in the unwaintained holdings due to loss of tapping days during rainy seasons.

Data on rainfall in the months of May to August for 10 years (1980 to 1990) is given in Table II. The details of average rainfall and number of rainy days from April '89 to August '90 are given in Table III. These were collected from the Malankara Estate, Thodupuzha. Thodupuzha is the neighbouring taluk of Muvattupuzha. The agro climatic conditions are more or less same in both these taluks. Moreover this is the nearest place where rainfall data were available.

Very high rain fall is experienced in the region during the South west monsoon. Total rainfall received from June to August is around 2240 mm with monthly mean of around 745 mm. The mean rainfall in the month of May is around 318 mm. This is mostly received as pre-monsoon showers after mid day. Rainfall received during June-August totally

Table I - DETAILS REGARDING AREA, PLANTING DENSITY, GIRTH & PRESENT PANEL HEIGHT OF THE TREES IN THE SELECTED UNITS

Name of Unit holder	Area	Number of trees	Trees Under tapping		Present girth of trees	Height at which panel was opened	Present panel height
			1989-90	1990-91			
Rainguarded							
Louis. J.	0.75 Ha	353 (470)	300	340	60.0 cm	125 cm	90 cm
Abraham Raju	0.23 ,,	120 (521)	120	110	55.0 cm	125 ,,	85 cm
V.V. Ulahannan	0.46 ,,	270 (586)	200	200	60.0 cm	125 ,,	92 ,,
Unrainguarded							
Cherian James	0.24 ,,	130 (541)	110	110	68.0 cm	125 ,,	107 ,,
Mathai Paily	0.99 ,,	380 (383)	350	360	60.0 cm	150 ,,	125 ,,
Jose John	0.60 ,,	340 (566)	300	315	66.5 cm	125 ,,	97 ,,

Figures in paranthesis are planting density.

Table II - DETAILS OF RAINFALL FOR 10 YEARS

Year	Month and Rain fall in mm				Total
	May	June	July	August	
1980	170.20	835.20	899.90	625.30	2530.60
1981	128.80	1061.00	909.30	94.70	2193.80
1982	224.30	620.30	572.30	563.10	1980.00
1983	49.30	522.20	712.00	708.40	1991.90
1984	667.30	973.80	811.80	410.50	2863.40
1985	291.80	1046.00	683.80	500.60	2552.40
1986	161.80	719.80	471.90	593.60	1947.10
1987	124.00	715.00	300.50	704.30	1843.80
1988	427.70	659.90	794.00	763.50	2644.40
1989	211.86	916.11	980.90	441.60	2550.47
1990	727.48	514.50	859.40	427.70	2529.08
Mean	318.38	858.38	799.58	583.38	2559.67

Table III DETAILS OF RAIN FALL APRIL 1989 TO AUGUST 1990

Month		Total Rainfall in mm	Average Rain fall in mm per day^{-1}	Rainy days
April	89	104.64	8.72	12
May	89	211.86	11.77	18
June	89	600.20	31.59	19
July	89	980.90	36.33	27
August	89	441.60	19.20	23
Sept	89	304.80	24.04	21
Oct	89	443.70	24.63	18
Nov	89	84.70	9.41	9
Dec	89	1.33	1.33	1
Jan	90	0.27	0.27	1
Feb	90	0.05	0.05	1
Mar	90	14.90	2.49	6
April	90	28.30	4.04	7
May	90	727.50	27.98	26
June	90	514.50	20.58	25
July	90	859.40	31.83	27
August	90	427.70	19.44	22

hampers tapping operations and latex collection as there is no definite diurnal pattern.

The data presented in the table III shows abnormally high rainfall in May 1990 with 26 rainy days. This was mainly due to early onset of South West monsoon. There were 100 rainy days during May-August period in 1990. But in 1989 number of rainy days during the same period was 87.

4.1 EFFECT OF RAINGUARDING ON NUMBER OF TAPPING DAYS

The details of monthly yield tapping days obtained are given in Tables IV and V. The unit holders who practised rainguarding during 1990-91 could obtain 22 to 54 additional tapping days compared to unrainguarded units. The number of tapping days obtained by the unrainguarded unit holders were lesser than the tapping days obtained in the previous year. This may be due to the increased overnight or morning showers in 1990-91 when compared to 1989-90 and because of the early start of South West monsoon. One of the unrainguarded unit holder Shri. Mathai Paily recorded more number of tapping days during 1990-91 than in 1989-90. This is because of the fact that even though he marked the trees in 1989 the tapping was delayed. Hence he could obtain only 22 tapping days in 1989-90. Details regarding number of tapping days obtained in peak rainy season (May to August) is presented in Table Vl. The rainguarded unit holders could obtain 40 to 70 per cent increase in tapping days compared to the tapping days in the peak rainy season of the unrainguarded previous year (1989-90). Thus

Table IV MONTHLY YIELD OF DRY RUBBER (KG) IN RAINGUARDED AND UNRAINGUARDED HOLDING DURING 1989-90 AND 1990-91

Rainguarded

Month	Louis. J		Abraham Raju		V.V. Ulahannan	
	89-90	90-91	89-90	90-91	89-90	90-91
May	88.20	100.80	24.00	33.00	33.00	39.50
June	--	189.00	--	29.40	--	91.00
July	29.20	138.60	38.40	67.20	--	108.00
August	63.00	176.40	48.00	72.00	82.00	73.50
September	50.40	176.40	27.00	36.00	49.50	105.00
October	112.00	107.80	30.00	38.40	70.00	110.00
November	182.00	137.20	39.00	33.60	80.00	106.00
December	210.00	147.00	36.00	38.40	95.00	136.00
January	210.00	156.80	--	19.20	81.00	86.00
February	33.60	11.20	16.80	--	27.00	96.00
March	33.60	84.00	36.00	--	--	60.00
April	201.60	224.00	28.00	36.00	72.00	53.50

Unrainguarded

Month	Cherian James		Mathai Pally		Jose John	
	89-90	90-91	89-90	90-91	89-90	90-91
May	16.20	12.00	--	60.75	75.60	43.20
June	14.40	16.80	--	--	--	--
July	3.60	4.80	--	--	10.80	--
August	9.00	7.20	--	60.75	64.80	--
September	7.20	7.20	--	67.50	54.00	54.00
October	14.40	14.40	--	219.50	96.00	48.00
November	27.00	14.40	--	202.50	144.00	120.00
December	30.60	14.40	--	253.00	180.00	168.00
January	12.60	--	--	253.00	156.00	180.00
February	--	--	--	108.00	124.80	115.20
March	--	--	121.50	135.00	72.00	93.60
April	27.00	--	175.50	67.50	86.40	64.80

All the holdings were unrainguarded during 1989-90

Table V - MONTHWISE DETAILS OF NUMBER OF TAPPING DAYS OBTAINED IN RAINGUARDED AND UNRAINGUARDED HOLDINGS DURING 1989-90 AND 1990-91

Rainguarded

Month	Louis. J.		Abraham Raju		V.V. Ulahannan	
	89-90	90-91	89-90	90-91	89-90	90-91
May	7	8	10	11	11	12
June	-	15	-	7	-	15
July	2	11	8	14	-	15
August	5	14	10	15	15	13
September	4	14	9	15	9	15
October	8	11	10	16	14	15
November	13	14	13	14	16	14
December	15	15	15	16	19	13
January	15	16	rest	8	18	15
February	3	1	7	rest	6	14
March	3	8	15	rest	rest	14
April	18	20	12	15	16	13
Total	93	147	109	131	124	168

Unrainguarded

Month	Cherian James		Mathai Paily		Jose John	
	89-90	90-91	89-90	90-91	89-90	90-91
May	9	15	-	9	7	4
June	8	7	-	-	-	-
July	2	2	-	-	1	-
August	5	3	-	9	6	-
September	4	3	-	10	5	5
October	8	6	-	13	8	4
November	15	6	-	12	12	10
December	17	6	-	15	15	14
January	7	rest	-	15	13	15
February	rest	rest	-	8	13	12
March	rest	rest	9	10	10	13
April	15	rain	13	5	12	9
Total	90	38	22	106	102	86

All holdings were unrainguarded during 89-90

rainguarding was found to have profound influence in increasing the number of tapping days during the monsoon period.

4.2 COMPARISON OF EXPENSE FOR DIFFERENT TYPE OF RAINGUARDING

Table VII gives the comparison of expenditure per hectare for shade type and skirt type of rainguarding. As the planting density was too high in the holding selected for study per tree expenditure for rainguarding was calculated from actual exenditure incurred. Later per hectare expenditure for rainguarding the area having 300 trees was calculated, as normaly the planting density per hectare in a tappable area in the estate sector would be limited to around 300. For shade type of rainguarding per hectare expenditure comes to Rs. 2072.00 as against Rs. 1032.00 for the skirt type of rainguarding. Thus an increase of 100.7 per cent in expenditure was found for shade type of rainguarding than skirt type of rainguarding. In this particular case where shades were used, 97 per cent were found to be in reusable condition during 1991-92. The increase in the initial expenditure for using shade and subsidy for polythene sheet are the main reasons for small holders to prefer skirt type of rain guarding.

4.3 INFLUENCE ON TOTAL YIELD AND NET INCOME

Table VIII furnishes a comparison of total yield and returns realised in all the six units during 1989-90 and 1990-91. In the rainguarded units an increase in total yield and income during 1990-91 were seen when compared to unrainguarded previous year and the unrainguarded units. Table IX presents per hectare yield, expenditure, net income

Table VI Details of tapping days obtained in the rainguarded and unrainguarded holdings from May to August during 1989-90 and 1990-91

Name of unit holder	No. of tapping days		Difference	Percentage of difference
	1989-90	1990-91		
RAINGUARDED				
Louis. J.	14	48	+34	+70
Abraham Raju	28	47	+19	+40
V.V. Ulahannan	26	55	+29	+52
NOT RAINGUARDED				
Cherian James	24	17	-7	-29
Mathai Paily	No tapping	18	Exeptional case	-
Jose John	14	9	-5	-35

All the holdings were unrainguarded 1989-90

Table VII

Cost Comparison of skirt type and shade type rainguardings (expenditure @ 300 trees per hectare)

	Skirt Rs. Ps.	Shade Rs. Ps.
Cost of Rainguarding regarding	717.00	1452.00
Transporting	15.00	20.00
Labour	300.00	600.00
	1032.00	2072,00

Difference in total expenditure Rs.1040.00
Percentage of difference 100.70

Table VIII Yield (Kg) and return (Rupees in paranthesis) realised in rainguarded & unrainguarded areas during 1989-90 and 1990-91

Name of Unit Holder	1989-90			1990-91		
Rainguarded	Sheet	Scrap	Total	Sheet	Scrap	Total
Louis. J.	1209.60 Kg	362.88 Kg	1572.48 Kg	1649.20 Kg	329.94 Kg	1979.14 Kg
	(23708.16)	(27242.72)	(28062.72)	(36282.40)	(3598.08)	(39880.48)
Abraham Raju	324.00 Kg	81.00 Kg	405.00 Kg	403.20 Kg	65.10 Kg	468.20 Kg
	(6350.40)	(972.00)	(7322.40)	(8870.40)	(845.10)	(9715.50)
V.V.Ulahannan	589.50 Kg	50.00	639.50	1065.50	61.00	1126.50 kg
	(11790.00)	(500.00)	(12290.00)	(23341.00)	(732.00)	(24073.00)
Unrainguarded						
Cherian James	162.00 kg	32.28	194.28	91.00	18.24	109.24
	(3175.20)	(322.80)	(3498.00)	(2002.00)	(237.12)	(2239.12)
Mathai Paily*	297.00 Kg	27.90 Kg	324.90 Kg	1427.50 Kg	137.30 Kg	1564.80 Kg
	(5865.75)	(334.80)	(6200.55)	(31405.00	(1647.60)	(33052.60)
Jose John	1064.40 Kg	153.00 Kg	1217.40 kg	886.80 Kg	139.0 Kg	1025.80 Kg
	(20862.25)	(1836.00)	(22698.25)	(19509.60)	(1677.00)	(21186.60)

All the units were unrainguarded during 1989-90

* Shri. Mathai Paily could obtain only 22 days tapping in 1989-90 as he has started tapping only very late. In 1990-91 he got 106 number of tapping days. Hence the increase in yield and income

Table IX Per hectare yield income, expenditure, net income and difference in net income.

1989-90 1990-91

Name of Unit holder	Yield (Kg)	Income Rs.	Expenses Rs.	Net profit Rs.	Yield (Kg)
RAINGUARDED:					
Louis J.	1612.80	36323.63	7674.65	28648.98	2198.93
Abraham Raju	1408.70	31836.00	10741.70	21094.30	1753.04
V.V.Ulahannan	1281.50	26717.40	12602.05	14115.35	2316.30
NOT RAINGUARDED					
Cherian James	675.00	14575.00	8555.40	6019.60	380.00
Mathai Paily*	300.00	6263.20	4108.15	2155.05	1441.91
Jose John	1774.00	6263.20	8464.40	29366.00	1478.00

1990-91

Name of Unit holder	Income Rs.	Expenses Rs.	Net profit Rs.	% yield	% net profit
RAINGUARDED:					
Louis. J.	53173.95	15697.65	37476.30	+36.3	30.8
Abraham Raju	42240.85	13363.05	28877.80	+24.4	36.89
V.V. Ulahannan	52550.00	16952.40	35593.60	+80.75	+152
NOT RAINGUARDED					
Cherian James	9329.60	5025.85	4303.75	-43.7	-28.50
Mathai Paily*	33386.45	9848.65	2353.80		
Jose John	35311.00	8209.10	27101.90	-16.66	-7.71

All the units were unrainguarded during 1989-90

* Shri. Mathai Paily could carryout tapping only for 2 months in 1989-90. The increase in yield and income in 1990-91 noted as there were more number of tapping days during 1990-91

for 1989-90 and 1990-91 in all the six units. Itemwise break up of per hectare expenditure is furnished in Annexure III. In rainguarded units an increase of 36 to 80 per cent in yield and 39 to 152 per cent in net income were found in 1990-91 when compared to unrainguarded 1989-90. In the unrainguarded units decrease in per hectare yield @ 16 to 43 per cent and in per hectare income @ 7 to 28 per cent were found. This is due to the lesser number of tapping days during 1990-91 when compared to 1989-90.

Data on per tree yield, income, expenditure, net income and percentage changes are given in Tables X and XI. In the rainguarded holdings per tree yield also showed 20 to 80 per cent increase when compared to the unrainguarded previous year. Increase in per tree net income was 10 to 152%. In the case of unrainguarded holdings data of Shri. Jose John can be considered as typical. In this holding there was a reduction of 20.50 per cent in yield and 11.50 percent in net income in 1990-91.

When the yield data of rainguarded and unrainguarded holdings for the year 1990-91 were compared the net income was again higher for the rainguarded holdings. On making the comparison, after eliminating the abnormally low yield figures from the holding of Shri. James, rainguarding is found to result in increased net income by about 29 per cent. In the holding where tapping shade was used even though higher expenditure incurred, the net income was high. This is mainly because of higher yield and lesser tapping days when compared to the holding of Shri. Ulahannan who got less yield with more tapping days. When the holding with skirt type of rainguarding only are compared with the unrainguarded holdings increase in net income due to rainguarding is found to be around 22 per cent.

Table X Per tree yield (Kg) and income (Rupees in paranthesis) from rainguarded and unrainguarded holdings during 1989-90 and 1990-91

RAINGUARDED

Name	1989-90			1990-91		
	Sheet	Scrap	Total	Sheet	Scrap	Total
Louis	4.03	1.20	5.23	4.85	0.97	5.82
	(79.03)	(15.12)	(94.15)	(106.71)	(10.58)	(117.29)
No. of tapping days			93			147
Abraham Raju	2.70	0.67	3.37	3.67	0.59	4.26
	(52.92)	(8.10)	(61.02)	(80.64)	(7.68)	(88.32)
No. of tapping days			109			131
Ulahannan	2.95	0.25	3.20	5.33	0.31	5.64
	(58.95)	(2.50)	(61.45)	(116.71)	(3.66)	(120.37)
No.of tapping days			124			168
		UNRAINGUARDED				
Cherian James	1.47	0.29	1.76	0.83	0.17	1.00
	(28.87)	(2.93)	(31.80)	(18.20)	(2.15)	(20.35)
No.of tapping days			90			38
*Mathai Paily	0.85	0.08	0.93	3.97	0.38	4.35
	(16.76)	(0.96)	(17.72)	(87.24)	(4.58)	(91.82)
No.of tapping days			22			106
Jose John	3.55	0.51	4.06	2.82	0.44	3.26
	(69.54)	(6.12)	(75.66)	(61.94)	(5.32)	(67.26)
No. of tapping days			102			86

All the holdings were unrainguarded during 1989-90

* Shri. Mathai Paily could tap the trees for 22 days only during 1989-90. Hence the increase is seen during 1990-91

Table XI Per tree yield, income, expenditure, net ioncome and difference in yield and net income during 1990-91 from rainguarded and unrainguarded holdings

	1989-90				1990-91				Difference in percentage during 1990-91	
	Yield (Kg)	Income (Rs)	Expend-iture (Rs)	Net income (Rs)	Yield (Kg)	Income (Rs)	Expend-iture (Rs)	Net income (Rs)	Yield	Income
RAINGUARDED										
Louis	4.03	94.15	19.19	74.96	4.85	117.29	34.65	82.64	+20.3	+10.2
Abraham Raju	2.70	61.02	20.59	40.43	3.67	88.32	27.94	60.38	+35.9	+49.3
Ulahannan	2.95	61.45	28.98	32.47	5.33	120.37	38.99	81.38	+80.7	+ 152
UNRAINGUARDED										
Cherian James	1.47	31.80	7.75	24.05	0.83	20.35	10.97	9.38	-43.5	-60.9
Mathai Paily *	0.85	17.72	11.62	6.10	3.97	91.82	27.08	64.74	--	--
Jose John	3.55	75.66	17.33	58.33	2.82	67.26	15.64	51.62	-20.6	-11.5

All the units were unrainguarded during 1989-90

* Shri. Mathai Paily got only 22 number of tapping days during 1989-90 and 106 number of tapping days during 1990-91. Hence increase is noticed during 1990-91

It can be concluded that rainguarding results in substantial increase in the total productivity. When rainguarded and unrainguarded holdings are compared the increase in yield is around 42 per cent. Net income is increased at least by 22 per cent.

4.4 INFLUENCE ON PEAK YIELD AND SUMMER YIELD

Data on annual per tree yield and on the monthly and annual mean per tap yield per tree are given in Table XII.

In the rainguarded holdings the per tree yield registered an increase when compared to the unrainguarded year. This increase was much less in the case of Shri. Louis in spite of highest number of tapping days. Examination of data on yield per tree per tap indicates very low yields in this holding especially during the post monsoon and pre-wintering periods, when compared to such yield in the previous year. This situation might have occurred either because of shallow tapping or due to disease incidence or low D.R.C. It would be better to study such units in more detail.

Among the unrainguarded units the one belonging to Shri. James showed very poor yield in all the months tapped and hence cannot be considered for comparison. In the holding of Shri. Mathai Paily the per tree yield was reasonably good during 1990-91 period. Among all the holdings studied (Rainguarded and unrainguarded) this holding had the highest yield per tree per tap. In the holding of Shri. Jose John annual per tree yield showed decline in 1990-91. This was mainly due to combined effect of lower number of tapping days and reduced

Table XII Mean monthly per tap yield per tree (gms) obtained during 1989-90 and 1990-91

RAINGUARDED

Month	Louis		Abraham Raju		Ulahannan	
	89-90	90-91	89-90	90-91	89-90	90-91
May	42.00	37.06	20.00	27.27	15.00	16.46
June	-	37.06	--	38.18	--	30.33
July	42.00	37.06	40.00	43.64	--	36.00
August	42.00	37.06	40.00	43.64	27.32	28.27
September	42.00	37.06	25.00	21.82	27.50	35.00
October	46.70	28.82	25.00	21.82	25.00	36.67
November	46.70	28.82	25.00	21.82	25.00	37.86
December	46.70	28.82	20.00	21.82	25.00	52.30
January	46.70	28.82	--	21.82	22.50	28.67
February	37.30	32.94	20.00	--	22.50	34.29
March	37.30	30.88	20.00	--	--	21.43
April	37.30	32.94	19.44	21.82	22.50	20.58
Average per tap per tree yield per year	43.35	33.00	24.77	27.98	23.77	31.71

UNRAINGUARDED

Month	Cherian James		Mathai Paily		Jose John	
	89-90	90-91	89-90	90-91	89-90	90-91
May	16.36	21.82	--	18.75	36.00	34.29
June	16.36	21.82	--	--	--	--
July	16.36	21.82	--	--	36.00	--
August	16.36	21.82	--	18.75	36.00	--
September	16.36	21.82	-	18.75	36.00	34.29
October	16.36	21.82	--	46.90	40.00	38.09
November	16.36	21.82	--	46.88	40.00	38.09
December	16.04	21.82	--	46.85	40.00	38.09
January	16.36	--	-	46.85	40.00	38.09
February	--	--	--	37.50	32.00	30.42
March	--	--	38.57	37.50	24.00	22.86
April	16.36	--	38.57	37.50	24.00	22.86
Average per tap per tree yield per year	16.36	21.82	38.57	37.41	34.78	32.74

per tap yield. Comparing the data from the rainguarded and unrainguarded holdings (1990-91), after eliminating the data from the holding of Shri. James, it can be seen that the yield per tap per tree is lower in the rainguarded holdings (12 per cent).

Data on the mean monthly per tap yield per tree in 1990-91 in the unrainguarded holdings show that the period of peak yield is mainly from September to January. Similar data from the field of Shri. James is inconsistant. In the rainguarded holdings, in general an advancing of peak period is observed. In the holding of Shri. Louis per tap yield declined from October onwards, while in that of Shri. Raju the decline started from September. In the case of the holding of Sri.Ulahannan the decline started from January onwards. Thus in general the common notion that rainguarding results in very low yields during the peak yield period is only partly correct. In fact there is a shift in the peak yield period. Depletion of stored carbohydrates mgight be the reason for the failure to maintain high per tap yield till wintering.

4.5 INCIDENCE OF BROWNBAST

Data on the incidence of brownbast during 1989-90 and 1990-91 are presented in Table XIII. In general the incidence of brownbast in the first year was around 1.96 per cent. In the unrainguarded holding the rate of incidence of brownbast was same in both the years (1.33 per cent). In two out of the three holdings incidence of brownbast was not noticed at all. In the rainguarded holdings the mean rate of incidence of brownbast increased from 2.74 per cent in the unrainguarded

Table XIII Details showing incidence of brownbast

Name	Number of trees with brownbast incidence 1989-90	Number of trees with brownbast incidence 1990-91		Increase in No. of trees with complete dryness of tapping in the second year
		Complete tapping cut	Partial dryness (25.70 %)	
RAINGUARDED				
Louis J(Shade)	Nil	23 (6.76)	2	23 (6.76)
Abraham Raju (Skirt)	6	16 (14.55)	Nil	10(9.62)
V.V. Ulahannan (Skirt)	11	14 (7.00)	Nil	3 (1.59)
Total	17(2.74)	53(8.15)	2	36 (5.69)
UNRAIN GUARDED				
Cherian James	Nil	Nil	Nil	Nil
Mathai Paily	Nil	Nil	Nil	Nil
Jose John	10	20(6.35)	Nil	10(1.33)
Total	10 (1.33)	20(2.63)	Nil	10(1.33)

All the units were unrainguarded during 1989-90. Figures in paranthesis are percentage

first year to 5.69 per cent in the rainguarded second year. This indicates a positive correlation between the rate of incidence of brownbast and rainguarding. This can be attributed to the higher tapping stress for the rainguarded trees. However in one holding the incidence was less in the rainguarded year. Type of rainguarding does not appear to have any separate influence. Further detailed study is essential to ascertain the effect of rainguarding on the incidence of brownbast, particularly the long term effects on high yielding clones.

4.6 EFFECT OF RAINGUARDING ON GIRTHING.

Data on mean girth of trees in April 1991 are given in Table XIV. In general trees which got tapping rest during the rainy season attained higher girth by the end of second year tapping. This is mainly due to lower yield of dry rubber enabling the trees to divert more photosynthates to biomass production (Sethuraj, 1985).

Combined effects of rainguarded tapping on girthing and the yield performance of holding in the long run need to be studied well.

4.7 PANEL DISEASES

The details of the application of panel protectants are given in Table XV. No panel disease was noticed or reported in any of the rainguarded units at the time of survey. So, it is evident that by regular application of panel protectants the incidence of panel diseases can be prevented.

Table XIV Mean girth of trees in rainguarded and unrainguarded holdings

Name of Unit holder	Present mean girth (cm)
RAINGUARDED	
Louis. J.	60 cm
Abraham Raju	55 cm
V.V. Ulahannan	60 cm
UNRAINGUARDED	
Cherian James	68 cm
Mathai Paily	60 cm
Jose John	66 cm

Table XV Details of application of panel protectants during 1990-91

Name of Unit Holder	Brand	Dosage	Duration	Panel noted	Diseases if any
Louis. J	Emisan	10 gms in 4 litres of water	once in seven days		Nil - (shade type of RG)
Abraham Raju	Do	Do		Do	Do (Skirt type)
V.V. Ulahannan	Do	Do		Do	Do

4.8. EXTENT OF AREA RAINGUARDED THROUGH RUBBER PRODUCERS SOCIETIES

Table XVI presents the details of distribution of rainguarding materials from the Regional Office Muvattupuzha to the small holders through Rubber Producers Societies during 1989-90 and 1990-91. The extent of area rainguarded by small holders, procuring rainguarding materials from the Rubber Producers Societies during 1990-91 was 823.38 hectares as against 223.13 hectares during 1989-90. Increase of 269.02 per cent was seen during 1990-91. Thus the number of small holders who adopt the practice of rainguarding is increasing. Response from growers is found encouraging.

4.9 ROLE OF RUBBER PRODUCERS SOCIETIES AND RUBBER BOARD

About 50 small holders who have adopted the practice of rainguarding were contacted and interviewed during the course of survey. Most of them are members of Rubber Producers Societies. They have adopted the system due to the persuation by the concerned Rubber Producers Societies and the advisory service rendered by Rubber Board, through its own publications, mass media, campaigns and through Field Officers of the localities. Above all supply of materials at subsidised rate is also a very important factor. Most of them will continue the practice during 1991-92 also. The small growers and the rubber producers societies have opined that the response from their side would be more if the Board could arrange the completion of the distribtution of the rainguarding materials by the last week of March every year.

Table XVI Distribution of Rainguarding materials from Regional Office Muvattupuzha to the Rubber Producers Societies with extent of area rainguarded.

Materials	1989-90		1990-91	
	Quantity Supplied	Area Rainguarded	Quantity supplied	Area rainguard
LDPE Polythene sheet	2677.5 Kgs	Ha 223.125	3748.5 Kgs	Ha 312.375
HM HDPE Polythene sheet	Nil	Nil	3577 kgs	511.00
Total	2677.5 Kgs	223.125 Ha	7325.5 Kg	823.375 Ha

An area of 600.25 ha has been additionally rainguarded during 1990-91 through the Rubber Producers societies - percentage of increase in area during 1990-91 when compared with 1989-90 is 269.0196.

During 1989-90, 9125 Kgs of adhesives was supplied the quantity was increased to 28650 Kgs in 1990-91. Per ha. requirement of LDPE Polythene sheet is 12 Kgs and of HM HDPE 7 Kgs.

SUMMARY AND CONCLUSION

SUMMARY AND CONCLUSION

The survey was conducted to study the influence of rainguarding in the small holdings of Muvattupuzha Taluk. In addition to the general survey, three units each each of rainguarded and unrainguarded holdings were selected for detailed study. Details such as influence of rain guarding on total yield, peak yield, summer yield girthing, net income to the grower, incidence of panel disease etc. were evaluated and the following conclusions were arrived at.

i) Rainguarding was found to have profound influence in increasing the number tapping days during monsoon period.

ii) The small holders prefer skirt type of rainguarding to shade type of rainguarding because the former is less expensive when compared to the latter. None of the farmers contacted, re-uses the polythene during next year or sell it after use, but either throw away carelessly or use for other purposes. The shades are re-used.

iii) By adopting rainguarding an increase in total yield and net income could be obtained.

iv) An advancing of peak yield period was observed due to tapping in the rainy season using rainguards. The peak yield is not maintained upto the onset of wintering.

v) The incidence of brown bast found on trees may be due to the higher tapping stress. The incidence was found to be increased as a result of rainguarding.

vi) Increased girthing was also seen in the unrainguarded trees when compared to rainguarded trees.

vii) Regular application of panel protectants prevented disease incidences.

viii) Response from the small holders in adopting the practice of rainguarding is found to be encouraging.

ix) The Rubber producers Societies, officers of the Rubber Board and the publicity and public relations department of the Board have played important roles, in popularising rainguarding. Supply of rainguarding materials at subsidised rates by the Rubber Board had also profoundly influenced the small holders in adopting the practise.

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ANNEXURE I

NAME AND ADDRESS OF UNIT HOLDERS SELECTED FOR THE STUDY

Rainguarded holdings

1. Louis. J. Vamattam Vazhakulam. P.O.
2. Abraham Raju Kallumkal Ramamangalam.P.O
3. V.V. Ulahannan Vadakkathottathil Valakom.P.O

Unrainguarded holdings

1. Cherian James Vamattam Vazhakulam.P.O
2. Mathai Paily, Nellippillil, Kizhakkekkara, Muvattupuzha.P.O
3. Jose John, Vattamparambil, Anicadu, Avoly.P.O.

ANNEXURE II

QUESTIONNAIRE

1. Name :

2. Address :

3. Area under Rubber :

4. Area selected for study :

   a) :

   b) Year in which tapping started :

   c) Tapping system :

   d) No. of trees under tapping :

      (i) (ii)

5. Details of Rainguarding done :

6. Reasons for rainguarding :

7. Reasons for adopting this particular system :

8. Actual expenses :

   a) Cost of material :

   b) Cost of adhesive :

   c) Labour :

9. Details of rainguarding material kept for reuse if any :

10. Whether Rainguarding to be adopted during ensuing years :

11. Details of yield 1989-90 1990-91

    May

    June

    July

    August

		1989-90	1990-91
	September		
	October		
	November		
	December		
	January		
	February		
	March		
	April		

12. a) Increase in tapping days due to rainguarding

    b) Percentage of increase :

13. a) Increase in production due to rainguarding.

    Sheet Scrap

    b) Percentage of increase/decrease

    Sheet Scrap

14.	Price realised	1989-90	1990-91
	Sheet		
	Scrap		
	Total		
	Difference		

15. Expenditure

		1989-90	1990-91
	For marking :-		
	Marking Knife (price)		
	Template		
	Labour		
	Tapping knife		
	Spout		
	P. Guirdle		
	Cup Hanger		

Conditioning of Tapping knife

Bucket

Dish

Basket

Cup/Shell

Measuring cup

Tapping wages

Emisan

Hand sprayer

Acid

Roller

Sheeting charges

Smoking charges

Fire wood cost

Emisan application (Labour)

Manure cost

Transport

Labour cost

Weeding

Sprayig

Rainguarding

Other items including transportation of sheet for sale

Total

16. Net income :

17. Differnece :

18. Percentage of increase :

19. Yield per hectare

Sheet :

Scrap :

20. Percentage of increase/Decrease :

Sheet :

Scrap :

21. No. of trees affected with Brown-bast :

22. Present girth of trees :

23. Present height of tapping panel :

24. Yield difference

	1989-90	1990-91
Peak		
After Summer Wintering		

25. Percentage of differences :

26. General remarks :

Place :
Date :

Name of Investigating officer.

ANNEXURE III

ITEMWISE BREAK UP OF EXPENDITURE PER HA.

1989-90

Name of Unit Ho lder	Tapping	Cultural Operation	Plant Protection	Process	Others	Total
RAINGUARDED						
Louis. J.	3874.65	1320.00	--	345.45	2133.35	7674.65
Abraham Raju	6328.25	1586.95	--	602.60	2173.90	10741.70
V.V. Ulahannan	7657.60	1982.60	--	1070.55	1891.30	12602.05
Unrainguarded						
Cherian James	5458.35	1095.80	833.30	334.60	833.35	8555.40
Mathai Paily	2554.10	1111.10	--	190.55	252.50	4108.15
Jose John	4968.35	850.10	833.30	479.40	1333.25	8464.40

1990-91

Name of Unit Holder	Tapping	Cultural operation	Plant Protection	Process	Raingua- rding	Others	Total
RAINGUARDED							
Louis. J.	8430.00	1421.35	26.35	346.65	2206.65	3266.65	15697.65
Abraham Raju	7100.00	1587.10	47.80	628.15	1826.10	2173.90	13363.05
V.V. Ulahannan	8919.00	52173.90	114.25	1632.30	1483.70	2608.70	16952.40
UNRAINGUARDED							
Cherian James	1816.65	1095.85	833.35	238.35	--	1041.65	5025.85
Mathai Paily	4528.25	4528.30	--	2694.10	--	1515.15	9848.65
Jose John	4310.85	859.00	933.35	439.25	--	1666.65	8209.10