

**IMPACT OF "NATURAL RUBBER PROCESSING
CAMPAIGN, 1992" OF THE RUBBER
BOARD ON SMALL GROWERS IN
PALAKKAD DISTRICT, KERALA**

By

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DISSERTATION

Submitted in partial fulfilment of the
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Faculty of Agriculture

Kerala Agricultural University

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DECLARATION

I hereby declare that this ^t dissertation entitled "IMPACT OF NATURAL RUBBER PROCESSING CAMPAIGN, 1992 OF THE RUBBER BOARD ON SMALL GROWERS IN PALAKKAD DISTRICT, KERALA" is a bonafide record of original work done by me during the course of placement/training and that this dissertation has not formed the basis for award of any degree, diploma, associationship or other similar titles of any other University or Society.

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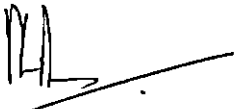


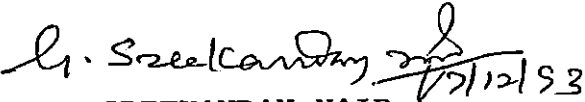
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CERTIFICATE


Certified that this dissertation entitled "Impact of Natural Rubber Processing Campaign, 1992 of the Rubber Board on Small growers in Palakkad District, Kerala" is a record of research work done independently by Mr.R.M.SHANMUGHAM under our guidance and supervision and that it has not previously formed ^{the basis} for the award of any degree or diploma to him.

We, the undersigned members of the Advisory Committee of Mr.R.M.SHANMUGHAM, a candidate for the Post Graduate Diploma in Natural Rubber Production, agree that the dissertation entitled "Impact of Natural Rubber Processing Campaign 1992 of the Rubber Board on Small growers in Palakkad District, Kerala" may be submitted by Mr.R.M.SHANMUGHAM in partial fulfilment of the requirement of the diploma.


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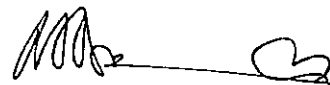
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A handwritten signature in black ink, consisting of several loops and a long horizontal stroke ending in a small flourish.

R.M. SHANMUGHAM

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Introduction

I. INTRODUCTION

The rubber tree (para rubber), Hevea brasiliensis (Willd ex A.de Juss) Muell.Arg. is the only commercially exploited species of genus Hevea of family Euphorbiaceae. It is a perennial; the rubber being extracted in the form of latex from its bark. About 80 percent of latex is collected from the trees in the form of latex and the rest as field coagulum. Latex obtained from H. brasiliensis can be processed into various marketable forms like Ribbed Smoked Sheets (RSS), amoniated field latex, latex concentrate, crepe rubber and technically specified block rubber.

Latex tapped from the tree is potentially a premium grade product. Nevertheless, the quality of rubber marketed by small holders falls below that of estates. Down grading of the product may start right from the latex that flows down a tapping spout till the rubber sheets are smoked. The rubber sheets are subject to degradation, due to dirt, moisture, rust (by yeast and bacteria), bubbles, blisters, mould (by fungal growths) and off colour (with stain or spots).

The RSS is visually graded into six grades based on the absence of physical impurities and marketed, with difference in price between 2 grades varying from 5 to 10 per cent of the value. But in India, crop of the small holder to a larger extent is marketed as ungraded or as lot rubber, since it contains rubber inferior to RSS 4. The reason is not far to seek. It is due to slackness and ignorance of correct procedure in the processing on the part of small holders and tappers as well and the growers grew content with the low price that it fetches.

With advancement in technology and competition from synthetic rubber, natural rubber is gradually moving from the conventional 'seller market' to the 'buyer market', where the choice of buyers prevails. So it is at prime necessity to educate the small growers and tappers the improvement in making quality rubber sheets, lest they would lag when situation warrants. Normally a major share of the rubber is in the form of RSS, and a major portion of RSS is traded as ungraded.

'The Rubber Board', constituted under Rubber Act-1947, by the Govt. of India is playing pivotal role in overall development of Rubber Plantation Industry in India in the traditional and non-traditional areas. One of the major functions of the Rubber Board is "the supply of technical advice to the rubber growers". In line with this the Rubber Board is implementing various advisory measures now and then, through its Rubber Production wing. From 1989 onwards, the Rubber Board took massive extension programmes every year during April/May, on a chosen subject by way of group contacts as per pre-scheduled programmes. Though such large scale extension works were done to the larger farming communities during these years, the knowledge obtained and the extent to which the knowledge was put to practice was not scientifically analysed and evolved.

The subject taken for the present study is the Natural Rubber processing campaign conducted by the Rubber Board during May 1992. The reason to take this subject is that the subject was taught to the growers in 1991 and 1992, and that it was the latest one where knowledge and adoption could be studied without any memory bias on the part of the respondents.

There exist no valid data to enlighten how far the growers who have attended the campaign have been

benefitted with the technical knowledge and what is the lacuna if they do not translate the knowledge into action. Hence the study would help to know how far the growers have changed the processing procedures in the right direction and if not, the constraints in that respect. Based on these, appropriate strategies can be formulated to overcome these constraints.

Review of Literature

II. REVIEW OF LITERATURE

A perusal of the available literature is of great help in gaining insight into various aspects related to the subject of research study. The works done on rubber processing and impact of training programmes are briefly discussed hereunder.

2.1 PROCESSING ASPECTS

Unny and Jacob (1972) reported that most of the small holders market their produce in the form of smoked sheets and the price realized by them therefore depends mainly on the quality of sheets produced.

Gopalakrishnan et al (1977) reported that in India Rubber fetches low price and most of it goes to the market as low grade rubber. To improve the quality of the rubber, small holders should be advised to follow standard procedures.

Blencowe (1989) observed that degradation of the product started from the collection of latex with the use of contaminated spouts, cups and other vessels, implying that cleanliness is the important step in processing quality sheets.

2.2 DEFECTS IN SHEET RUBBER

Many defects in sheet rubber were traced to pre-coagulation of latex, too long a dripping time, worn out and hand operated machineries and inadequate smoking and drying (Karunaretna 1967). Bubbles formed in sheet rubber is considered as a defect in the rubber sheets. (RRIM, 1962). Rust, a brownish deposit which becomes visible when sheet is stretched, can be prevented with the use of para-nitro-phenol (PNP), which can also prevent mould growth (RRIM, 1962). Discoloured sheets fetch low price, though the colour of the sheets is by no way concerned with any technical properties. It can be prevented by the use of sodium-bi-sulphite which undergoes preferential oxidation (Peries, 1970). Pre-coagulation is one of the reasons for lowering the quality of the sheets. Very few farmers use sodium sulphate or sodium-bi-carbonate as anti-coagulants. (Tillekeretna and Coomaraswamy, 1983). Thickness of sheet is another factor that determines quality. Thin sheets produced by more intense machining are not only easier

to dry but are also less susceptible to bubbles and blister formation (RRIM, 1960).

Drying of sheets in a smoke house has distinct advantage. It is quicker than sun drying and there is no oxidation by ultra-violet radiation (Thomas, 1971).

Mohanani (1991) studied the processing aspects of the latex produced by the small farmers of Kidangoor village (Kerala) and reported two reasons for the inferior quality sheets produced by the small growers. Proper cleanliness was not found maintained in the various stages of processing. Lack of technical know-how in the case of farmers as well as tappers was another factor that limited the production of high quality rubber.

2.3 ORIGIN OF CAMPAIGN

Ribbed smoked sheets are visually graded as per the international standard of quality and packing natural rubber grades (The Green Book). The sheets are graded into six grades as RSS-1x, RSS-1, RSS-2, RSS-3,

RSS-4 & RSS-5, RSS-5 being the most inferior. The rubber is considered as of good quality when it is graded from RSS-4 and above. Generally, grade RSS-1x and RSS-1 are produced in most hygienic conditions by well maintained estates. It is not hard to produce RSS-3 and RSS-4 with facilities available in small holdings.

With a view to educate small farmers on improved methods of latex processing, the Rubber Board launched an intensive educational drive during April and May 1991, among the growers of Kerala state, Kanyakumari and Mangalore Regions. Since the above campaign met with only a modest degree of success when launched during 1991, it was again conducted in 1992 with the full involvement and active support of the Rubber Producers' Societies in order to impress upon everybody the immediate need for a qualitative change in processing operations of small holders rubber. (Narayanan, 1992).

2.4 IMPACT OF VARIOUS TRAINING PROGRAMMES

2.4.1 KNOWLEDGE:

There are several studies conducted to know if there was gain of knowledge owing to training and

they were all positive. Some of them are referred hereunder.

Kamelsen (1971) reported that there was a significant increase in knowledge about high yielding varieties in farmers by attending one day farmers training camp.

Sanjeev (1987) reported that trained farmers had significantly higher knowledge on improved paddy cultivation practices than the other farmers.

2.4.2 ADOPTION:

After reviewing several research studies in diffusion and adoption of innovations, Rogers and Shoemaker (1971) observed that knowledge of the improved technology might act as strong motivation for its adoption among farmers.

In a study conducted by Muthiah et al. (1978), it was found that 56 percent of the participants in training adopted full doses of fertilisers, 30 percent adopted partially and 14 percent did not adopt at all.

Joshy and Thorat (1984) revealed that nutrition training had positive impact on respondents with regard to knowledge. He further affirmed that there was statistically significant association between training and adoption index of production aspects of nutritious food.

Sanjeev (1987) reported that there was significant difference between trained and untrained farmers in their adoption of improved cultivation practice in paddy cultivation.

2.4.3 CONSTRAINTS:

Varma (1982) listed the constraints in implementing programmes under three main heads, ie. Credit, Organizational factors and Infra-structures.

Ashok Kumar et al. (1987) found Capital as one of the important factors influencing adoption of modern technology.

Kunchu (1989) observed that, out of seven constraints experienced by the cardamom farmers, the monopolistic nature of cardamom market figured the

second major constraint, next only to the constraint of lack of 'pattayam'.

Mohanan (1991) found absence of proper marketing system which ensures gradewise purchase of rubber sheets from the small farmers at village level as a constrained factor.

Materials and Methods

III. MATERIALS & METHODS

This study is intended to know the impact of rubber processing campaign conducted by the Rubber Board, during 1992 among the small growers in Palakkad District. The aim of the study is to critically assess how far the small growers have benefitted from the campaign in respect of knowledge and adoption and what are the constraints experienced by them. This is the first attempt to know the effect of the advisory campaign under-taken by the Rubber Board. The methodology followed in the study is detailed in the following pages.

3.1 DETAILS OF CAMPAIGN:

It was conducted during May 1992 for 20 working days in the rubber growing tracts of Kerala state and in the regions of Mangalore and Kanyakumari. The campaign was conducted as a one day programme in the form of method demonstration. The venue was one of the rubber holdings of the participants. The programme was conducted by competent technical officials of the Rubber Board. Details of the campaign and list of classes conducted are given as Annexure 1 and 2.

3.2 JURISDICTION OF THE STUDY:

The survey was conducted among growers in Palakkad District where 149 such classes were held in the taluks of Palakkad, Mannarghat, Ottapalam, Chittur and Alathur, with an attendance of 1599 growers and 1205 tappers.

3.3 SELECTION OF THE RESPONDENTS:

The study was intended to interview 100 growers who were exposed to the campaign. In addition, 30 growers who were not exposed to the campaign were also interviewed. The selection of growers was made at random, by visiting different premises where classes were held, to get the address of the participants of each premises. After contacting the farmers, only those who were small growers (having less than 5.00 ha rubber area) and who produced rubber in the form of RSS were selected. The sites selected for the survey is shown in the map attached as annexure-3.

3.4 CONTENTS OF THE SURVEY:

Informations were collected from the respondents by using a structured interview schedule.

The questions in the schedule were arranged as of General, Knowledge, Adoption and Constraints. The details of the proforma are given in Annexure 4.

3.4.1. GENERAL INFORMATION:

Information on age, education, size of the unit, annual income in general and from rubber, profession, the one who did processing, reading the magazine 'Rubber', and receipt of subsidy were collected and the details collected were classified as shown in Table-1.

3.4.2. KNOWLEDGE:

Knowledge was measured by allocating scores to the answers of the respondents. Totally, 25 questions covering 10 practices of processing were

TABLE 1

Classification of the general information about the respondents

PARTICULARS		CLASS I	CLASS II	CLASS III	CLASS IV
1	Age (Years)	Upto 30	31-50	Above 51	
2	Education	Upto primary	Upto High School	College & above	
3	Yield area (ha)	0.5	0.51 -1	1.01 - 2	2.01 - 5
4	Annual Income (Rs)	Upto 20,000	20,000-40,000	Above 40,000	
5	% of Income from Rubber (%)	0 - 50	51 - 75	76 - 100	
6	Profession	Farmer	Tapper	Others	
7	Processing by whom	Respondent	Family member	Tapper	

TABLE 1 (continue)

	PARTICULARS	CLASS I	CLASS II	CLASS III	CLASS IV
8	Experience (years)	10	11 to 12	Above 21	
9	Reader of Rubber magazine	Regular	Occassional	Never	
10	Subsidy receipients (Rs)	Nil	3,000	3,001-10,000	Above 10,001

asked and each question carried a score of 2 for correct answer, a score of 1 for partially correct answer and no score for incorrect answer. All the 25 questions carried equal marks, irrespective of their strength on their role in producing quality sheets.

3.4.3. ADOPTION:

In the same way as above for measuring the extent to which the practices were adopted, there were 25 questions under the 10 practices of processing, each question carrying score 2, 1 and 0 for the answers correct, partially correct and incorrect, respectively. Here also all the 25 questions carried equal marks irrespective of their strength on their role in producing quality sheets.

The mean of the individual scores from the exposed groups and the unexposed groups under knowledge

and adoption were found. In the same way, mean of the total scores obtained under each practice of processing were found. The comparative analysis of knowledge as well as adoption between participants and non-participants were statistically tested using 't' test.

The frequencies of low and high (=>of mean) categories on the basis of knowledge and adoption between classes of independent variables were statistically tested using chisquare test.

3.4.4. CONSTRAINTS:

A set of constraints was presented to the respondents and awarded scores of 1,2 and 3 for least important, important and most important, respectively. The results of mean scores were expressed in percentage by the formula of $(y/x)100$. (y=individual score, x=total score).

The data collected were tabulated, presented and discussed with a view to assess the impact of the Rubber Processing Campaign on the participants in

respect of knowledge and adoption in processing and constraints, that they experienced.

3.5 LIMITATIONS OF THE STUDY

Though the study has attempted to make an overall assessment of the impact created by the processing campaign among small planters in producing quality sheets, it had a few limitations due to a variety of factors.

The time and resources was limited at the disposal of the researcher to complete the study within the period of two months. Since the information was collected from the respondents much after the campaigns were conducted, there would have been little memory bias.

Due to the constraints of the projects design, the level of knowledge and adoption of the participants were not measured before they were exposed to the campaign, and hence only comparative analysis with another set of people unexposed to the campaign was made.

Results and Discussions

IV. RESULTS AND DISCUSSION

This chapter describes the major finding of the study under appropriate heads that consist of:

a) The knowledge level of those exposed to the rubber processing campaign and of those unexposed.

b) The extent to which the practices were adopted by the exposed and the unexposed groups in rubber processing.

c) Comparison of both the groups in terms of knowledge and adoption in processing.

d) The impact of the campaign on the participants.

e) The constraints expressed by both the groups in their order of importance and

f) The association of personal and socio-economic variables with the knowledge and adoption of the participants.

4.1 KNOWLEDGE:

4.1.1. Distribution of respondents according to their knowledge of different practices in rubber processing:

The distribution of the participant respondents

and of the non-participants according to their level of knowledge in processing, with respective mean scores are presented in Table 2. The level of knowledge obtained under these practices indicates that the group exposed to the campaign was, in general, superior to the unexposed group in knowledge about correct way of processing. The mean score obtained by the exposed group was found to be higher than that of the unexposed group in all spheres. Exposed group was found to have better high frequencies as compared to that of the unexposed group, indicating that in most of the practices, the exposed group gained better knowledge.

The teaching during the Campaign was for an improved method in the processing. As such, even the group unexposed to the Campaign could possess a fair amount of knowledge in the basic ways of the processing.

That is why there is no wide gap between the two groups in terms of knowledge in basic practices such as cleanliness, sheeting and smoking. Regarding the use of chemicals for anti-coagulation, bleaching and preventing mould growth (use of PNP), the unexposed group was quite

TABLE 2

Distribution of respondents according to their knowledge of different practices in processing

S.NO.	PRACTICES	PARTICIPANTS (n-100)			NON-PARTICIPANTS (n-30)			
		FREQUENCY	SCORE		FREQUENCY	%	SCORE	
			MEAN	MAX			MEAN	MAX
1	Cleanliness Low	36	3.40	4.00	14	46.66	3.40	4.00
	High	64			16	53.33		
2	Anticoagulant use Low	56	1.00	4.00	28	93.33	0.13	4.00
	High	44			2	6.66		
3	Sieving the latex Low	30	3.39	4.00	18	60.00	2.37	4.00
	High	70			12	40.00		
4	Latex standardization Low	53	4.63	8.00	18	60.00	2.43	8.00
	High	47			12	40.00		

TABLE 2 (Continued)

S.NO.	PRACTICES		PARTICIPANTS (n-100)			NON-PARTICIPANTS (n-30)			
			FREQUENCY	SCORE		FREQUENCY	%	SCORE	
				MEAN	MAX			MEAN	MAX
5	Bleaching	Low	61	1.34	4.00	29	96.66	0.13	4.00
		High	39			1	3.33		
6	Coagulation	Low	54	5.39	8.00	17	56.66	3.37	8.00
		High	46			13	43.33		
7	Pan placement	Low	18	3.80	4.00	11	36.66	2.60	4.00
		High	82			19	63.33		
8	Sheeting	Low	60	4.40	6.00	15	50.00	3.07	6.00
		High	40			15	50.00		
9	Use of PNP	Low	60	1.39	4.00	28	93.33	0.17	4.00
		High	40			2	6.66		
10	Smoking	Low	32	2.94	4.00	11	36.66	2.97	4.00
		High	68			19	63.33		

Low :- < mean

High ==> mean

ignorant. In these respects, the exposed group gained knowledge, though to limited extent. The knowledge gained by the participants in the practices as a whole was found impressive (Table 2). So, it is normal to expect that the campaign was successful in imparting knowledge.

4.1.2. Distribution of the respondents according to their knowledge:

The data regarding the class intervals of the group exposed to the campaign and unexposed group, according to their total scores obtained in knowledge about processing is presented in Table 3. 5.3
Fifty three per cent of the respondents from the exposed group got scores more than 30 out of maximum score 50, whereas only 6.66 per cent of the respondents from the unexposed group could get their score past 30. This wide variation makes it amply clear that there was an appreciable gain in knowledge consequent to the campaign, in line with the expectation.

TABLE 3

Distribution of group of respondents according to
their knowledge in processing

S.NO.	CLASS INTER- VALS SCORE MAX - 50	PARTICIPANTS (n=100)		NON-PARTICIPANTS (n=30)	
		f		f	%
1	Score 0-10	Nil		1	3.33
2	Score 11-20	9		16	55.33
3	Score 21-30	38		11	36.66
4	Score 31-40	34		1	3.33
5	Score 41-50	19		1	3.33

TABLE 4

Comparison of mean knowledge scores of participants and
and non-participants

S.NO.	CATEGORIES OF RESPON- DENTS	MEAN SCORE	STANDARD DEVIATION	VARIANCE	t VALUE
1	Participants (n=100)	31.64	8.18	60.98	**
2	Non-Partici- pants(n=30)	20.63	6.28	39.41	6.7846

** - Significant at 0.01 level

4.1.3. Comparison of mean knowledge scores of participants and non-participants:

Table 4 throws light on how far the variation in the mean score is validated by statistical analysis. When the total sum of scores obtained by the participants and non-participants were 't' tested, the result obtained was significant at 0.01 level indicating that the participant acquired better knowledge in processing.

4.2 ADOPTION

4.2.1. Distribution of respondents according to their adoption of different practices in processing:

The contents of Table 5 provided the result of distribution of participant and non-participant respondents in their adoption pattern in each step of processing. The extent to which the practices were adopted is given in ten stages of processing as in the case of knowledge.

There was substantial improvement in adoption of practices among participants, as judged by the mean score obtained by them in all stages, though the extent to which they are ahead of the non-participants varied.

One of the important aspects in the processing is cleanliness right from the tapping till the rubber is smoked. Here the adoption level of the participants was not upto the expectation. The standard of cleanliness (mean scores) employed by the participants and non-participants did not vary much (Table 5). This tendency seems to be due to want of motivation.

The use of anti-coagulant is warranted only occassionally and as such it is not a serious measure responsible for degradation of sheets for all the time to come. So the adoption level in this respect was poor, and almost none of the participants did resort to this practice.

Another important measure in the processing is the straining of latex. Finer the mesh of the sieve better will be the quality of the product. Conventional practice is either not to do straining or if at all through the sieve of coarse mesh around 10 as against mesh 40 recommended. Consequent to the campaign there was creditable

improvement in using 40 mesh sieve among the participants, as compared to the non-participants as judged by the mean scores (Table 5). Sieves of 40 mesh were supplied through Rubber Producers' Societies and not available in ready market. There were few respondents who did not adopt this practice mainly for want of the mesh in the market.

Latex-standardization involves dilution of latex with right amount of water, depending upon dry rubber content of latex. In addition, the subsequent measure is bulking of latex before distribution to individual coagulation pans. But conventional practice is to pour latex directly to the coagulation pan without bulking the latex in a common vessel and add a little amount of water. A serious phenomena noticed is that all of the unexposed group and overwhelming population of the exposed group dispensed with the process of bulking, and continued to do in the conventional way. That is why the participants' score was not encouraging and was only 3.34 out of score 6. The reasons for reluctance on the part of the participants to switch over to the

bulking process were added work, procurement of suitable big vessel, besides no apprehension of deterioration of quality in not following this practice.

As for bleaching, it is not a conventional practice. Its function is to prevent discolouration of the sheets. The chemical is not freely available. The use of it is only a contributory factor for better quality. So, low level of knowledge coupled with low level of adoption was found in both the groups though the unexposed group showed more ignorance (Table 5).

Coagulation is the step that includes dilution of acid (formic acid-common use), mixing acid with latex, increase of acid by 10% in case of employment of anticoagulant/bleaching agent and removal of froth that forms on adding acid with latex.

The recommended procedure was to use 1 per cent acid in place of 4 per cent acid in conventional usage. From the study it is observed that only very limited participants adopted the improved practice and others

like unexposed group followed the usage in vogue. The reason is observed that non-adopters were not aware of advantage in smooth coagulation by using 1 per cent acid, that they felt inconvenienced to store and handle large volume of 1 per cent acid in place of 4 per cent acid.

The care to be taken in placing dishes of latex on level ground for coagulation is a simple process which many adopted in both the groups but the practice of covering the entire dishes with the cloth or plastic sheet was not done by any as recommended. The reason for not doing this simple technique is nothing but ignorance of consequence. Even those who produced quality sheets did not cover the dishes of latex. That is why the participants could not achieve better grade even in this simple technique.

The measures taught under sheeting were pressing of the coagulum by means of a ruler, rolling the sheet to a thickness of 3 mm, washing the sheet to drain of acid, and producing of 500 gm sheets. Here the participants' adoption level was not found upto

expectation (Table 5). No one used ruler to press the coagulum as it was not catching them. Only a very few produced 500 gm sheets, whereas the others made 700 gm to 1 kg sheets mainly to save the usage of dishes or to avoid handling of many dishes for sheeting. Those who got rubber sheeted from neighbours on rent also made sheets as big as possible, to cut short rent per piece. Because of oversize, rolling the sheet to 3 mm thickness was not adhered to in many cases. Washing of the sheets is forgone either due to scarcity of water at disposal or nature of complacency on the part of men at work (Table 5).

The score obtained in use of para-nitro-phenol also was poor at 1.16 out of maximum score of 6, not to say of non-participants who scored least at 0.20. The reason for poor adoption may be want of knowledge, non-availability of chemicals locally, and that it was highly essential only during rainy season.

As regards smoking, most of the respondents smoked their rubber sheets in smoke house

TABLE 5

Distribution of respondents according to their adoption of different practices in processing

S.No.	Category	Participants (n=100)			Non-participants (n=30)			
		f	Score Mean	Max	f	%	Score Mean	max
1	Cleanliness	44	1.54	2.00	23	76.66	1.23	2.00
		56			7	23.33		
2	Anti-Coagulation	81	0.54	4.00	30	100.00	--	4.00
		19			0	--		
3	Sieving	39	1.34	2.00	19	63.33	0.63	2.00
		61			11	16.66		
4	Latex St.dization	58	3.34	6.00	13	43.33	2.37	6.00
		42			17	56.66		
5	Bleaching	86	0.49	4.00	29	96.66	0.13	4.00
		14			1	3.33		

TABLE 5 Continue.

S.No.	Category	Participants (n=100)			Non-Participants (n=30)				
		f	Score Mean	Max	f	%	Score Mean	Max	
6	Coagulation	Low	47	5.66	10.00	19	63.33	3.27	10.00
		High	53			11	36.66		
7	Panplacement	Low	47	3.25	4.00	14	46.66	2.50	4.00
		High	53			16	53.33		
8	Sheeting	Low	41	3.86	8.00	14	46.66	2.37	8.00
		High	59			16	53.33		
9	Use of PNP	Low	79	1.16	6.00	29	96.66	0.20	6.00
		High	21			1			
10	Smoking	Low	51	2.51	4.00	20	66.66	2.27	4.00
		High	49			10	33.33		

Low - <mean

High - ≥mean

or in their kitchen, and others sun dried them. There was no appreciable difference in the level of adoption in smoking practice between the two groups, mainly because they did not find any economical advantage to have smoke house on extra investment with additional expenditure on fuel.

In a nut shell, the data of Table 5 indicated that adoption level of the participants had improved in general in the operations of sieving and latex standardization and coagulation, where-as there was wide gap in use of chemicals. Further it implies that non-adoption in the case of major practices, is due to disinclination, except in the involvement of chemicals, wherein ignorance played its part.

4.2.2. Distribution of respondents according to their adoption in processing:

Table 6 present the data regarding the class intervals of the group exposed to the campaign and the unexposed group according to their scores obtained in adoption in processing. Maximum score being 50, 57 per cent of the exposed group got scores more than 20 out of 50, whereas only three percent of

TABLE 6

Distribution of group of the respondents according to their adoption in processing

S.No.	Category	Participants (n=100)	Non-Participants n=30)	
		f	f	%
1	Score 0-10	1	4	13.33
2	Score 11-20	42	23	76.66
3	Score 21-30	36	2	6.66
4	Score 31-40	14	1	3.33
5	Score 41-50	7	-	
Total		100	30	

TABLE 7

Comparison of mean adoption scores of participants and non-participants

S.No.	Category	Mean Score	Stand. Variation	Variance	t Value
1	Participants(n=100)	23.69	8.70	75.63	**
2	Non-participants (n=30)	14.97	5.23	27.34	6.7553

** - Significant at 0.01 level.

the group unexposed to the campaign managed to get their score past 20. This wide gap is a clear indication that level of adoption of the exposed group is extremely high. Distribution of participants and non-participants according to the scores obtained with respect to knowledge & adoption is presented in Fig.1.

4.2.3. Comparison of mean adoption scores of participants and non-participants:

To confirm whether mean adoption scores obtained by both the groups were significantly different; 't' test was applied and the value obtained is provided in Table 7. The result indicated that the variation was highly significant at 0.01 level. Figure 2 depicts the difference in mean scores of participants and of non-participants about their knowledge and adoption.

4.3 IMPACT OF THE RUBBER PROCESSING CAMPAIGN:

The data listed in Table 8 are the mean knowledge and adoption scores obtained by the participants and non-participants in ten stages of

Figure II

Mean scores of participants and of non-participants about their knowledge and adoption:

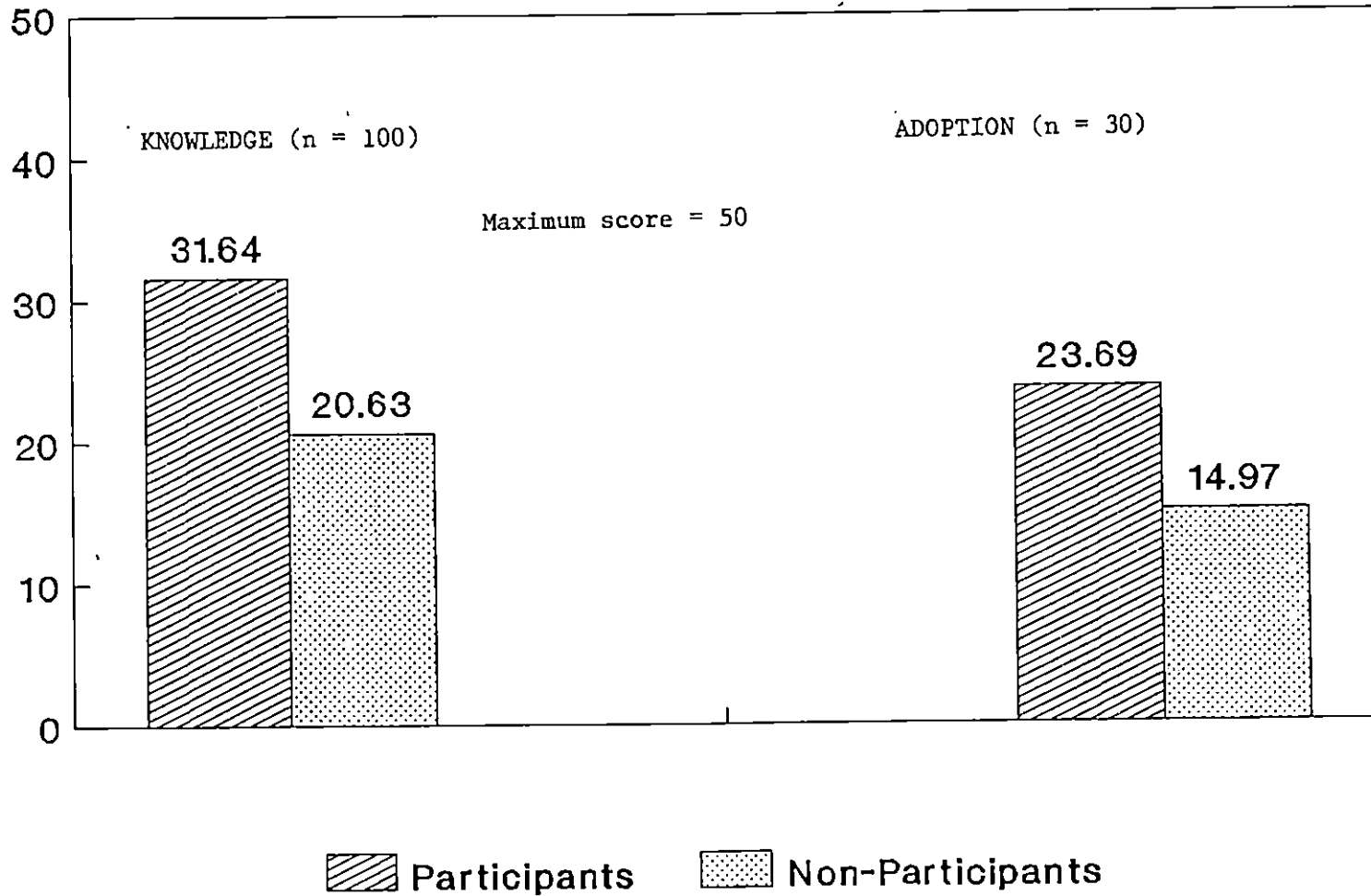
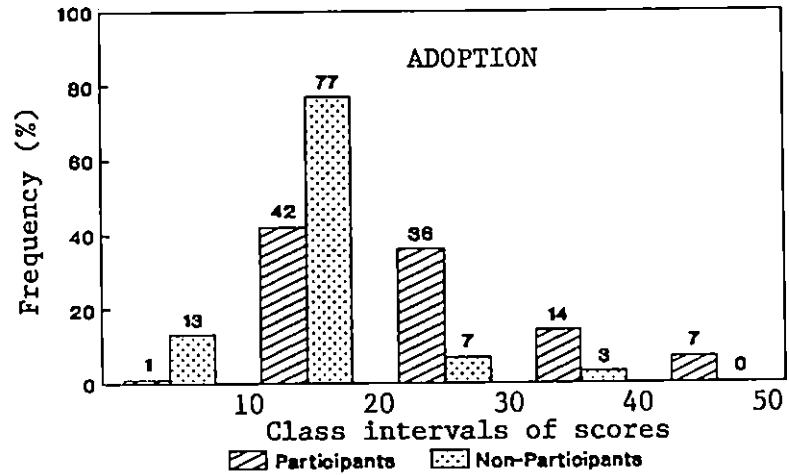
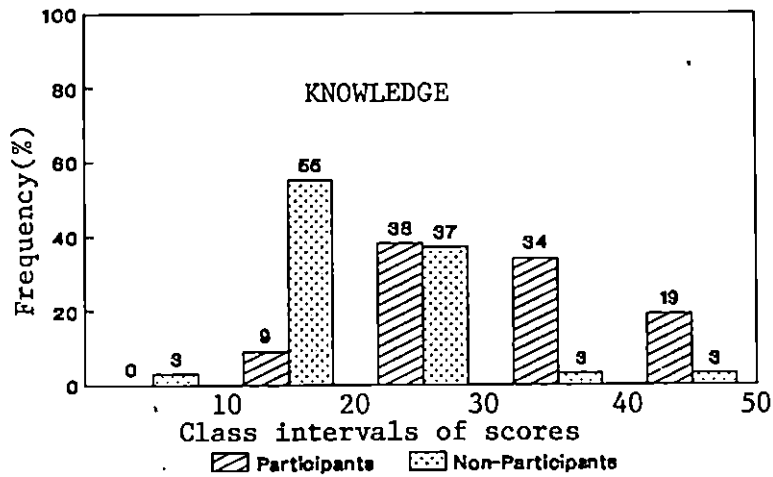


Figure I

Distribution of participants and non-participants according to the scores obtained with respect to knowledge and adoption.



rubber processing. As far as cleanliness, the level of knowledge of the both groups was the same though in adoption level the unexposed group trailed, which indicates that the growers had general awareness about the cleanliness. In the practice of using chemicals such as anti-coagulant, bleaching agent and para-nitro-phenol, the knowledge of the participant groups was far from desired extent and yet can be construed as a gain when compared with the knowledge of the unexposed group which was virtually nil (3 to 4%). Adoptionwise also, participant's group got scores of 13, 12 and 19 per cent in the use of anti-coagulant, bleaching agent and PNP respectively while the corresponding figures were 0, 3 and 4 per cent for their counterparts. So, whatever knowledge gained, and the extent to which it was adopted were by and large due to the effect of the campaign, as it seems.

Another good impact the campaign could make among small holders, was the use of standard sieves, which is reflected from the scores obtained by both the groups in knowledge as well as adoption in

processing (Table 8). Since this is an important practice in producing quality sheets the people would have heeded enough in this aspect.

The knowledge gained and level of adoption in latex standardization and coagulation by the group who benefited from the campaign was higher than that of the other group as the data in Table 8 reveal. In both practices, scores of adoption go close to that of knowledge in the case of participants. However, the level at which participants have gained knowledge and adopted these practices was little above that of the non-participants.

Since the campaign brought only some improvement in the conventional practices in processing, both groups could score fairly in the knowledge and adoption of sheeting, pan placement and smoking. So, the campaign did not imbue with better knowledge in these aspects. But in adoption level, the scores of the participants were higher than that of

TABLE 8

Impact of Rubber Processing Campaign

S.No.	Practices	Participants n=100				Non-Participants n=30			
		Knowledge		Adoption		Knowledge		Adoption	
		Mean Score	% to max.	Mean Score	% to max.	Mean Score	% to max.	Mean Score	% to max.
1	Cleanliness	3.40	85	1.54	75	3.40	85	1.23	63
2	Anti-coagulant	1.00	25	0.54	13	0.13	3	0	0
3	Sieving	3.39	85	1.34	67	2.37	59	0.63	31
4	Latex standardization	4.63	58	3.34	56	2.43	31	2.37	40
5	Bleaching	1.34	34	0.49	12	0.13	3	0.13	3
6	Coagulation	5.39	67	5.66	57	3.37	42	3.27	33
7	Pan-placement	3.80	94	3.25	81	2.60	65	2.50	63
8	Sheeting	4.40	73	3.86	48	3.07	51	2.37	30
9	Use of PNP	1.40	35	1.16	19	0.17	4	0.20	4
10	Smoking	2.90	74	2.51	63	2.87	72	2.27	57

the non-participants. This reveals the better conviction prevailing among participants on this new method.

In the overall analysis of impact, it can be deduced that the campaign was more effective in terms of knowledge about the practices of sieving, latex standardization, coagulation, impressive in respect of knowledge of pan placement, sheeting and smoking. The response was less impressive in the case of knowledge about the use of chemicals. In respect of cleanliness the campaign had no impact at all.

4.4 COMPARISON OF PARTICIPANTS AND NON-PARTICIPANTS IN PRODUCING QUALITY SHEETS:

From Table 9 and Fig. 3 it can be observed that before exposure to the campaign, only 18 per cent people were producing quality sheets, and consequent to campaign another 31 percent of the respondents started making quality sheets while the remaining 51 per cent of the respondents chose to continue the practice of making ungraded sheets. If looked into the case of the non-participants, about 30

TABLE 9

Comparison of participants and non-participants in producing quality sheets

S.No.	Category	Participants (n=100)		Non-participants (n=30)	
		f	%	f	%
1	Those who produce quality sheets before exposed to Campaign	18	18	9	30
2	Those who started producing quality sheets consequent to the Campaign	31	31		
3	Those who remain producing ungraded sheets	51	51	21	70
	Total	100		21	

per cent of them were producing quality sheets. This is in line with the expectation that the campaign had positive effect. The effect would have been still more pronounced had there not been any constraints.

Thus, the basic concept that any training or for that matter a campaign will have positive impact upon the respondents in respect of knowledge as well as adoption gets reinforced by the findings of this study. The results are in conformity with the earlier findings of Kamalsen (1971), Muthiah (1978) and Joshy and Thorat (1984).

4.5 CONSTRAINTS:

As seen earlier there was considerable gap between knowledge and adoption in processing in the case of both groups. The main reason in most of the cases was unfavourable marketing system at village level for the purchase of gradewise rubber, besides other constraints, rather than mere lack of knowledge.

The data presented in Table 10 depict constraints under various heads. In the case of participants the most felt constraint was the inadequate price for the 'grade rubber', and this was closely followed by the constraint that 'the price difference between the graded rubber and ungraded rubber is not worth the effort involved in making quality sheets'. Yet the intensity is not alarming as the mean scores of these two constraints were only 61.3 per cent and 49 per cent respectively. But in the case of non-participants the major constraint was 'lack of facilities' (smokers, roller, etc.) and only of second importance came the constraint 'not getting due price for quality rubber'. Surprisingly, the fact that 'tappers' non-co-operation' could play a vital role was not felt so by either of the groups. It shows that relationship between the farmer and tapper was almost cordial. The least constrain in the case of participant was, the Procedure being technology oriented and in the case of non-participants it was the constraint 'Lack of finance' which was not at all considered as a constraint by any of the non-participants interviewed. Non-availability of chemicals was also considered as a constraint by many.

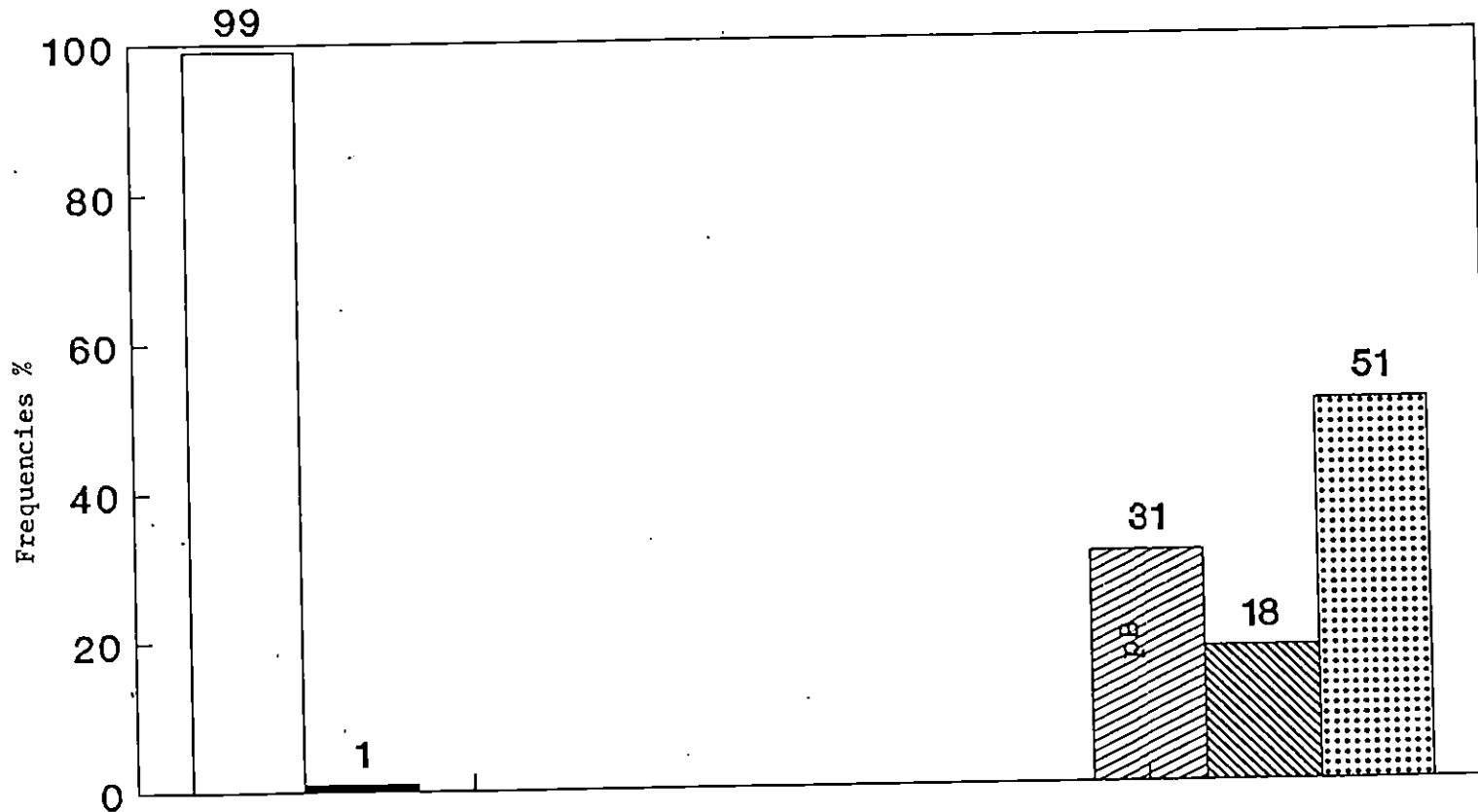
TABLE 10

Constraints expressed by the Participants and Non-participants in Adoption of processing quality sheets

S.No.	Name of Constraints	Participants n=100			Non-participants n=30		
		Mean Score	% to max.	RANK	Mean Score	% to MAX.	RANK
1	Procedure technology oriented	0.37	12.33	VIII	0.50	16.66	III
2	40 Mesh sieve not available	0.30	10.00	IX	0.40	13.33	IV
3	Chemicals not available	0.50	16.66	V	0.37	12.33	V
4	Tappers' non-co-operation	0.64	21.33	IV	0.20	06.66	VI
5	Not getting due price	1.84	61.33	I	0.80	26.66	II
6	Price difference not worth	1.47	49.00	II	0.40	13.33	IV
7	Last of time	0.45	15.00	VI	0.20	06.66	VI
8	Lack of finance	0.46	15.33	VII	-	-	VIII
9	Absentee management	0.21	7.00	X	0.10	03.33	VII
10	Lack of facilities (smoke house etc.)	0.78	26.00	III	1.47	49.00	I
11	Others	0.22	07.33	IX	0.40	13.33	IV

Figure III

Impact of campaign on participant respondents (n-100)



- 1) Campaign useful.
- 2) Campaign not useful.
- 3) Producing quality sheets after campaign.
- 4) Producing quality sheets before the campaign.
- 5) Not producing quality sheet after the campaign.

The nature of constraint under the head 'others' was found to be 'scarcity of water', 'smallness of produce' or 'sluughtering stage'. However, this assumed least importance in both the groups.

Hence it can be perceived that to a great extent, lack of marketing facilities for gradewise purchase was responsible for the poor adoption of the recommended practices of rubber processing, in majority of cases. The result is in conformity with the earlier findings (Mohanana, 1991).

4.6. DISTRIBUTION OF RESPONDENTS ACCORDING TO THEIR PERSONAL AND SOCIO ECONOMIC CHARACTERISTICS AND ASSOCIATION OF THESE CHARACTERISTICS WITH THEIR KNOWLEDGE AND ADOPTION:

Distribution of farmers both exposed to the campaign and others is presented in Table 11 to give a picture how wide they were distributed and how heterogeneous they were. In order to know how far and to what extent the differences in status of different characters have bearing on the level of knowledge and adoption, [] the Chisquare test was applied and the results are furnished in Table 12.

4.6.1: Age:

Middle age group dominated other age groups among participants and non-participants, probably because it was they who invariably attended the affairs of the farm either as head of the family or as deciding authority (Table 11).

The association between age group and knowledge of the participant was significant at 5 per cent level (0.05). But there was no significant association in the case of adoption (Table 12).

4.6.2. Education:

Among participants the respondents with the level of education as up to primary, high school and college & above were well distributed whereas among non-participants people with college level figured only at 13 per cent.

There was no significant association between level of education and knowledge or adoption.

4.6.3. Size of the unit:

Except 16 per cent from the

participants and 3 per cent from the non-participants, all the respondents were petty holders of area less than two hectares, a clear revelation of the tiny nature of the rubber units in Kerala.

The association between size of the unit and knowledge as well as adoption was significant at 5 per cent (0.05) level.

4.6.4. Annual income:

Nearly two fifth of the respondents in the case of both groups had income less than Rs.20,000 per annum and only one fifth of the respondent had annual income above Rs.40,000.

Here also, annual income had significant relationship with knowledge at 1 per cent level (0.01) and with adoption at 5 per cent level (0.05).

4.6.5. Share of income from rubber:

It is pertinent to note that those wholly dependent on rubber for their livelihood were

in minority and others derived income from other source also by way of employment, business, pension or from other crops.

Here also in line with the total income, the percentage of income from rubber had direct bearing on knowledge at 0.01 level. Surprisingly, there was no significant relationship between the percentage of income from rubber and the level of adoption.

4.6.6. Profession:

Majority were farmers. Negligible were tappers. Others constituting 30 per cent of the participant and 47 per cent of the non-participants came under the category of profession such as employment, business, service, studentship and retirement.

There was significant relationship at 1 per cent level (0.01) between the profession and knowledge. But it was not so in the case of

adoption. The reason would be the impediments/constraints felt in transferring one's knowledge into practice.

4.6.7. One who processed:

Processing was done mostly by tappers and only where owners themselves perform tapping the processing was done by the owners or by their family members.

The person who did processing whether respondent, member of his family or the tapper/worker had also significant relation at 1 per cent level (0.01) with knowledge but not with adoption. This indicates a gap between knowledge and adoption, which is attributable to the constraints that might stand in the way.

4.6.8. Farming experience:

About half the people in both groups had experience in rubber cultivation less than a decade. From this it is possible to visualize that

rubber cultivation is of recent origin in Palakkad district.

Experience in farming and knowledge had significant association at 1 per cent level (0.01), with no such corresponding relation in the case of adoption.

4.6.9. Reading of the magazine:

Rubber Board is popularising a low priced monthly publication in regional language called 'Rubber'. In the case of participants 45 per cent of the people were regular readers of the magazine as against only 13 per cent in the case of non-participants. This dissimilarity implies that non-participants were much isolated from technical informations through public media.

It is heartening to note that there was highly significant (at 1% level) association between reading of magazine - 'Rubber' and knowledge as well as adoption. From this it becomes clear that increasing circulation of the magazine is a better way of extension.

4.6.10. Receipt of subsidy:

The important means of contact between the Rubber Board and the cultivators was frequent visits of the officials to the units for implementation of various subsidy schemes. It is pertinent to note that nearly 80 per cent of the respondents from both groups were beneficiaries of the subsidy from the Rubber Board, of which those who received subsidy above Rs.10,000 were also substantial at 28 per cent and 23 per cent in the exposed group and unexposed group respectively.

This indirectly indicates two things. One is economic status (income, size of unit etc.) and the other is occasion for frequent contacts by the grower with the officials of Rubber Board, paving the way for extension communication. Hence, naturally there existed a significant relation at 1 per cent level (0.01) between their variable and knowledge and adoption.

4.7. OPINION OF THE PARTICIPANTS ABOUT THE CAMPAIGN:

Data as to the number of people who opined that the class was useful and those who



TABLE 11

Distribution of respondents according to their personal socio-economic profiles

S.No.	Characters	Participants n=100		Non-participants n=30			
		f	Knowledge Max 50	Adoption Max 50	f	%	
1	Age	<30 years	11	29.58	21.08	4	13.33
		30 - 50	52	33.70	25.21	19	63.33
		>50 years	37	29.46	22.43	7	23.33
2	Education	< Primary	41	30.68	23.54	9	30.00
		upto High School	33	31.42	23.67	17	56.66
		> College	26	33.42	23.96	4	13.33
3	Size of Tapping unit	< 0.50 ha	21	28.62	23.14	13	43.33
		0.50-1.00 ha	33	21.79	21.00	10	33.33
		1.01-2.00 ha	30	34.25	26.43	6	20.00
		2.01-5.00 ha	16	34.76	25.24	1	31.33

TABLE 11 (continued)

S.No.	Characters		Participants n=100		Non-participants n=30		
			f	Knowledge Max 50	Adoption Max 50	f	%
4	Income	<Rs.20,000	38	30.54	24.06	12	40.00
		Rs.20,000-40,000	40	31.13	22.20	12	40.00
		> 40,000	22	34.00	25.56	6	20.00
5	Income % from Rubber	< 50%	53	30.95	24.11	21	70.00
		51-75%	23	30.30	22.04	5	16.66
		>76%	24	34.77	24.36	4	13.33
6	Profession	Farmer	62	31.80	24.28	15	50.00
		Tapper	8	29.00	22.75	1	03.33
		Others	30	32.00	22.77	14	46.66
7	Processing by	Respondent	15	29.73	22.67	9	30.00
		His Family	13	30.00	23.15	5	16.66
		Tappers	72	32.30	24.00	16	53.33

TABLE 11 (continued)

S.No.	Characters	Participants n=100		Non-participants n=30			
		f	Knowledge Max 50	Adoption Max 50	f	%	
8	Farming Experience	< 10 years	50	31.92	24.14	14	46.66
		11-20 years	33	31.84	23.84	11	36.66
		> 20 years	17	30.41	22.06	5	16.66
9	Rubber Magazine Reading	Regular	45	35.16	26.58	4	13.33
		Occasional	30	28.27	20.40	14	46.66
		Never	25	29.36	22.44	12	40.00
10	Subsidy Receipients	Nil	19	28.78	23.11	7	23.33
		< Rs.3,000	14	31.41	23.24	8	26.66
		3,001-10,000	39	31.55	23.55	8	26.66
		> 10,001	28	34.21	24.71	7	23.33

TABLE 12

Association of personal and Socio-Economic Characteristics of the participant respondents with their knowledge and Adoption

S.No.	Characteristics	Knowledge				Adoption			
		L	H	χ^2	df	L	H	χ^2	df
1	Age	<30 years	8	3	7.194025	8	4	2.716454	
		31-50 years	20	32		22	25	26	2
		>50 years	23	14	*	24	13	NS	
2	Education	<Primary	24	17	3.710751	28	13	3.275442	
		High School	17	16		16	17		2
		College	10	16	NS	13	11	NS	
3	Size of Tapping unit	<0.50 ha	15	6	10.05303	12	9	11.34054	
		0.51-1.00 ha	20	13		3	24	7	3
		1.01-2.00 ha	11	19	*	10	18	*	
		2.01-5.00 ha	5	11		8	9		

TABLE 12 (continued)

S.No.	Characteristics	Knowledge				Adoption				
		L	H	X ²	df	L	H	X ²	df	
4	Annual Income	<Rs.20,000	20	18	11.0175		21	14	7.646143	
		20,001-40,000	25	15		2	24	16		2
		>40,000	6	16	**		12	13	*	
5	% Income from Rubber	< 50%	30	23	17.28366		23	22	1.730876	
		51-75%	**	**		2	12	11		2
		> 75%	9	15	**		11	11	NS	
6	Profession	Farmer	31	31	584.3228		32	29	3.017683	
		Tapper	6	2		2	5	3		2
		Other Profession	14	16	**q		22	9	NS	

TABLE 12 (continued)

S.No.	Characteristics		Knowledge				Adoption			
			L	H	X ²	df	L	H	X ²	df
7	Processing by	Respondent	11	4	697.1253		8	7	0.2160855	
		Family	6	7		2	7	5		2
		Other tappers	34	38	**		43	30	NS	
8	Farming Experience	<10 years	26	24	766.9682		28	23	0.673174	
		11-20 years	16	17		2	17	15		2
		20 years	9	8	**		11	6	NS	
9	Exposure to Mass Media Reading of Rubber Magazine	Regular	15	30	978.3342		18	27	10.67919	
		Occasional	21	9		2	23	7		2
		Never	15	10	**		16	9	**	

TABLE 12 (continued)

S.No.	Characteristics	Knowledge				Adoption			
		L	H	X ²	df	L	H	X ²	df
10	Subsidy Receipt Nil	14	5	1020.35		11	8	13.01173	
	<Rs.3,000	6	8		3	9	8		3
	Rs.3,001-10,000	18	21	**		26	14	**	
	>10,000	13	15			13	13		

X² - Chisquare

df - Degrees of freedom

NS - Not significant

L - Low frequency (< Mean)

H - High frequency (=>Mean)

* - Significant at 0.05 level

** - Significant at 0.01 level

negatived are presented in Table 13. A most welcome sign was discerned as 99 out of the 100 participants expressed that the class was useful to them. It is the strongest proof that the farmers wanted such classes on various need based topics from the organization regularly.

TABLE 13

Opinion of the participant respondents about the campaign

S.No.	Opinion about the campaign	f	%
1	Useful	99	99
2	Not useful	1	1
Total		100	100

V SUMMARY AND CONCLUSION

Rubber is a small holder crop in India. Ninety percent of rubber is grown in Kerala state and its neighbouring tracks. Latex obtained from rubber is largely processed to Ribbed smoked sheets (RSS) by small holders as it is a conventional and easy process. The RSS is marketed according to its physical purity by visual grade system ranging from RSS-1A to RSS-5, with RSS-5 being the most inferior grade. The market price of RSS varies from five to ten percent of value between two immediate grades.

The Rubber Board conducted extensive Rubber Processing campaign classes in the form of method demonstration in Kerala and neighbouring districts of Tamil Nadu and Karnataka during 1992 and taught fifty two thousand participants. (32 thousand farmers and 20 thousand tappers) spread over 3561 classes.

Summary and Conclusion

The present study^{was} intended to know the impact of the Rubber Processing Campaign, 1992 of the Rubber Board on the small growers in respect of knowledge and adoption in processing and to elicit information on constraints experienced by the respondents.

Palakkad district of Kerala state was taken as the sample area for study. One hundred small growers who attended the campaign and thirty small growers who had no participation in the campaign were contacted at random, and data were collected with the help of a structured interview schedule. The data collected from the respondents were analysed by statistical procedures such as percentage, mean frequency, 't' test and Chisquare test. The major findings of the study are summarised as follows.

Ninety nine per cent of the participants opined that the processing campaign was useful to them. Thirty one percent of the participants have started producing quality sheets

consequent to _____ campaign classes. The people who were producing quality sheets already were eighteen percent from the participants and thirty percent from the non-participants. So it implies that three fourth cultivators in general were producing ungraded rubber earlier to the campaign and that one third participants started producing good quality sheets.

The farmers have gained a fair amount of knowledge in various practices of processing, especially in proper straining of latex.

But they poorly understood the use of chemicals such as anti-coagulants, bleaching agents and mould growth preventives. Also their gain in knowledge was limited in majority of the cases, in respect of acid concentration for coagulation and bulking practices.

However, wide gap was found between the level of knowledge of participants and that of the non-participants in most of the practices emphasising the hypothesis that the impact of the

campaign in respect of knowledge was substantial with the mean score of the participants being at 31.64 out of 50 marks as against 20.63 scored by the non-participants. The supremacy of the exposed group was found more evident, when the means of both groups were statistically 't' tested, the result being significant at 0.01 level. Another aspect to be noted is that 53 per cent of the participants scored above 60 as against only 7 per cent for their counterparts.

The study further revealed that the participants have improved their adoption level in general, but not in proportion to the knowledge gained. A wide change was noticed in straining of latex. However most of them pursued the old practices in standardization of latex and coagulation. Failure in adoption in major practices was found to be due to disinclination rather than ignorance. But poor adoption in use of chemicals was more out of ignorance. However, there was an

appreciable improvement in adoption as judged by mean scores obtained by the participants and non-participants in adoption which were 23.69 and 14.97, respectively out of total score of 50. When the variances in the mean of both groups were statistically tested the result was significant at 0.01 level. So, the impact of the campaign in respect of adoption was also positive, though only to a limited extent.

Though a number of constraints were expressed by the participants in the adoption of improved practices, the two that ranked most important were those having economic implication namely not getting due price for grade sheet at village level and that 'the price difference prevailing between Grade 4 and ungraded rubber is not worth the efforts involved'. Surprisingly, another probable hypothesis of non-co-operation of tapper in the effort have assumed only the fourth rank.

Among the non-participants also, economic consideration was felt as a strong constraint, but not as strong as that expressed by the participants. However, the most felt constraint was 'the lack of facility'.

The chi-square analysis of personal and socio-economic profiles of the participants with their knowledge and adoption produced varying results.

As far as knowledge was concerned, factors like annual income, share of income from rubber, profession, processing person, experience, reading of magazine and the receipt of subsidy had significant relationship at 1 per cent level whereas age and size of unit had significant relationship at 5 per cent level. Education had no association with knowledge.

In the case of adoption, only exposure to reading of magazine and receipt of

subsidy had more significant relationship. The size of unit, and annual income bore significant relation while all the other factors such as age, education, share of income from rubber, profession, processing person, experience had no relationship at all.

Spread of knowledge in processing and its adoption will take its course of progress once the marketing of grade wise rubber improves further.

It is suggested that the Rubber Board may help marketing facilities improve at village level through the service of Rubber Producers Societies and make available locally chemicals and standard sieves with technical knowhow through RPS. It is recommended that the Rubber Board may deem it fit to make attractive the subsidy schemes of sheeting roller and smoke house, to cover more beneficiaries. Also it may increase circulation of the magazine 'Rubber', by making it more attractive.

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Annexure

ANNEXURE I

THE DETAILS OF THE RUBBER PROCESSING CAMPAIGN

The Practices that were taught during the Campaign

1. The holding selected should be accessible to all the growers of the batch and should have all the following facilities for successfully conducting the demonstration:-

- a) Adequate quantity of field latex and pure water
- b) Sieves of 40 mesh (stainless steel net)
- c) Bulking tank/large bucket for bulking the latex
- d) Measuring cups - 1 litre of 2 litre capacity
- e) Aluminium dishes (adequate number)
- f) Formic acid
- g) Ounce glass or millilitre jar for measuring acid
- h) Sodium bisulphate
- i) Para nitrophenol
- j) Rollers and smoke house

2. The steps involved in processing are:-

- a) Sieving the filed latex through 40 mesh sieve
- b) Bulking
- c) Dilution of latex by adding $1\frac{1}{2}$ times pure water
Sodium bisulphite added to the diluted latex @ 1 gm per 1 kg. of DRC in the latex.
- d) Transferring the latex to Aluminium dishes @ 4 litres per dish
- e) Addition of diluted Formic Acid

50 ml. Formic acid (85%) is added to 5 litres of water (i.e.100 times dilution). 200 - 225 ml. of this solution is added to each Aluminium dish carrying 4 litres of diluted latex if it is to be processed the same day, or 150 - 175 ml. of the diluted acid per dish. if it is to be processed the next day. Mix well with the acid and remove froth.

3. Keep the dishes containing diluted latex treated with formic acid solution in a level floor or surface and cover them with polythene sheet or some other material to prevent dirt falling into the dishes.

4. The coagulum is taken out of the dishes the same day or next day as the case may be and pressed between plain and ribbed rollers, soaked in Para nitrophenol solution. (1 gm per 1Kg. D.R.C. i.e., 1gm in 2 litres of water). Then drip dry the sheets in shade and transfer to smoke house for drying and curing.

5. The point to be emphasised to the trainees is that quality sheets can be produced if the utensils used for handling latex are kept scrupulously clean. Also care should be taken to use sieves of 40 mesh to strain the latex. Latex should be diluted by adding $1\frac{1}{2}$ times the quantity of fresh clean water. Dilution of the formic acid to the prescribed levels (50 ml. of acid in 5 litres of water) is also very important. If a bit of care is exercised, quality sheets could be processed without spending extra money, time and effort utilising the same facility available.

6. A detailed folder on rubber processing in Malayalam will be brought out and sent to each FO/JFO through the regional office, for free distribution to the participants of the campaign.

Source: Ref.59/92 - Ext. (Pub.) dated 27.03.1992 Calendar operations - Circular extract Rubber Board

ANNEXURE I I

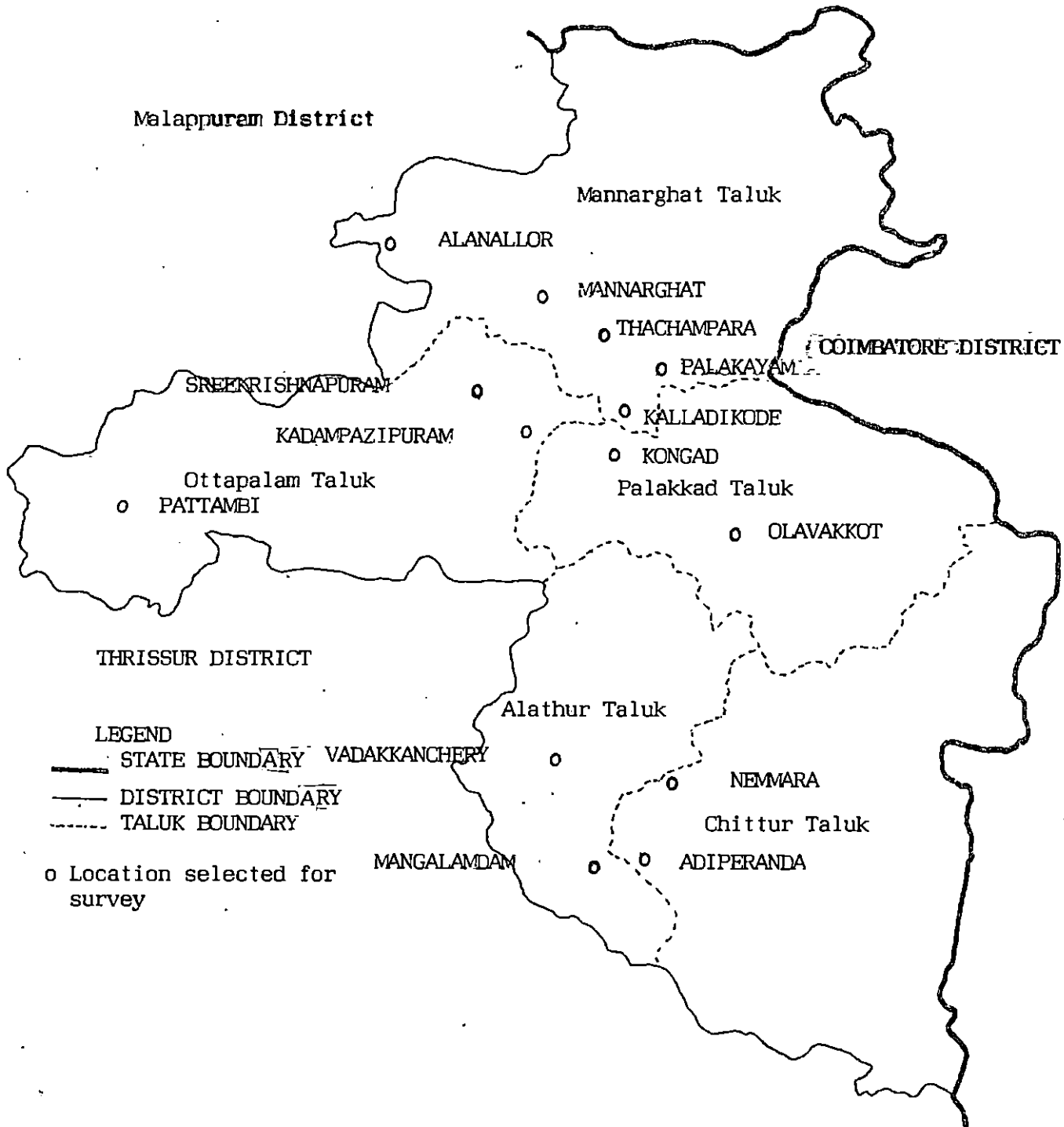
The list of Campaign class conducted by the Rubber Board during May 1992

S.No.	Name of the Regional Office of the Board	No. of Classes	Attendance		Total Attendance
			Growers	Tappers	
1	Nagercoil (Tamil Nadu)	20	224	305	529
2	Trivandrum	176	1258	1152	2410
3	Punalur	174	1163	981	2144
4	Adoor	109	1267	722	1989
5	Pathanamthitta	179	1461	737	2198
6	Changanachery	169	1162	638	1800
7	Kottayam	181	1646	1178	2824
8	Kanjirapally	186	1547	924	2471
9	Pala	232	2541	1181	3722
10	Erattupetta	118	774	429	1203
11	Thodupuzha	133	1637	742	2379

S.No.	Name of the Regional Office of the Board	No. of Classes	Attendance		Total Attendance
			Growers	Tappers	
12	Moovattupuzha	159	1202	912	2114
13	Kothamangalam	160	1433	822	2255
14	Ernakulam	191	1443	986	2429
15	Trissur	176	1521	1292	2813
16	Palakkad	144	1599	1205	2804
17	Nilambur	177	1345	1547	2862
18	Calicut	209	1442	894	2336
19	Thalisery	146	847	595	1442
20	Thaliparamba	286	4786	1532	6318
21	Kanhangadu	157	1011	884	1895
22	Mangalapuram	79	359	936	1295
Total		3561	31668	20564	52232

ANNEXURE III

Map of Palakkad District showing places of rubber cultivation selected for data collections



ANNEXURE IV

INTERVIEW SCHEDULE TO STUDY THE IMPACT OF NATURAL RUBBER
PROCESSING CAMPAIGN 92 IN PALAKKAD DISTRICT

I. GENERAL

1. Name and address of the person interviewed :

2. Age :

3. Education : Illiterate/Can read/Can read and write /upto/Primary/upto high school/College and above

4. Total Rubber Area owned :ha

5. Tapping area :ha

6. Total annual income of the family : Below Rs.10,000/ 20,000/30,000
40,000/50,000/Above Rs.50,000

7. Income from rubber in % of total income :%

8. Profession : Farmer/Tapper/Student/ Employed/
Business/Service, Others

9. Who does the processing : Self/family member/tapper/worker

10. Experience in Rubber cultivation :Years

11. Do you subscribe to magazine 'Rubber' : Yes/No

12. If yes, do you read : Regular/Occasional/never

13. Have availed any of the Rubber Boards subsidy : Yes/No

14. If yes, : Amount.....Rs. Year

15. Venue of the class :
attended
16. The Official who conducted :
the class
17. Did you process quality : Yes/No
rubber sheets before
attending the class
18. Have you started _____-doing : Yes/No
it after attending the class
19. Whether the class was useful : Yes/No

II. KNOWLEDGE

(Mark incorrect 0, Partly correct 1, correct 2)

1. Cleanliness

- a. Why should cleanliness be :
~~insisted upon in processing~~ 0-1-2
- b. What are the main utensils and
implements to be kept
clean : 0-1-2

2. Precoagulation

- a. Name an anti-coagulant : 0-1-2
- b. How is it applied : 0-1-2

3. Sieving

- a. Why should latex be
sieved : 0-1-2
- b. What is the mesh size of
sieves to be used: : 0-1-2

4. Standardization of latex

- a. Why should latex be
bulked : 0-1-2
- b. How long should it be
bulked : 0-1-2
- c. Why should latex be
diluted : 0-1-2

d. Extent of dilution for normal
drc latex : 0-1-2

5. Bleaching

a. What is the chemical to be
added to latex to prevent
blackening : 0-1-2

b. Concentration of chemical : 0-1-2

6. Coagulation

a. The amount of diluted latex
to be poured in each pan : 0-1-2

b. The concentration of
Formic/acetic acid : 0-1-2

c. The quantity of diluted
acid per pan for same or
next day : 0-1-2

d. What should be done with
froth that form in the pan
on adding acid : 0-1-2

7. Placement of Pans

a. Why should the pans be
stored on even floor : 0-1-2

b. How do you prevent foreign
particles falling on latex : 0-1-2

8. Sheeting

a. Why should coagulum be
pressed by means of stout
ruler instead of palms : 0-1-2

b. Why should sheets be rolled
as thin as possible : 0-1-2

c. Why should sheets be washed thoroughly : 0-1-2

9. Prevention of mould growth

a. What is the chemical used to prevent mould growth on the sheets, during humid period : 0-1-2

b. What is the concentration of the chemical : 0-1-2

10. Smoking

a. Why should sheets be smoked even if sun dried : 0-1-2

b. Why should reaper in the smoke house be cleaned frequently : 0-1-2

III. ADOPTION

Mark-Not adopted-0, partly adopted 1, adopted - 2)

1. Cleanliness

Do you keep clean tapping knives, spouts, shell bucket, sieves, mug, bulking tank, pan, processing shed : 0-1-2

2. Drc coagulation

a. Do you use anti coagulant when there is pre coagulation in the field : 0-1-2

b. Name of the chemical and its concentration : 0-1-2

3. Do you sieve the latex through 40 mesh : 0-1-2

4. Standardization of latex

- a. Do you add one and half times water to normal drc : 0-1-2
- b. Do you increase or decrease water ratio when drc increase or fall appreciably : 0-1-2
- c. Do you pour all latex in a bulking tank and bulk it for 10 to 15 minutes : 0-1-2

5. Bleaching

- a. Do you ~~use and sodium-bi-sulphate~~ to latex : 0-1-2
- b. Do you add it at 1% solution at 50 ml solution per pan : 0-1-2

6. Coagulation

- a. Do you pour 4 litre diluted latex per pan : 0-1-2
- b. Do you add Formic acid at 1% Acetic acid at 2% concentration : 0-1-2
- c. Do you add 200 to 225 ml diluted of Formic acid/ acetic acid same day or 150 to 175 next day : 0-1-2
- d. Do you add 25 ml more when sodium sulphite or sodium bisulphite is used : 0-1-2

- e. Do you remove froth completely from pan latex : 0-1-2

7. Placement of pans

- a. Do you keep the pans on clean even floor : 0-1-2
- b. Do you take care that they are covered against foreign particles : 0-1-2

8. Sheetings

- a. Do you press the pan coagulum evenly by means of ruler : 0-1-2
- b. Do you sheet it to a thickness of around 3 mm : 0-1-2
- c. Do you wash the sheet thoroughly : 0-1-2
- d. Do you produce around 500 gm sheet : 0-1-2

Prevention of mould growth

- a. Do you use para-nitro-phenol for soaking sheet : 0-1-2
- 2. Do you use it at 0.05 concentration : 0-1-2
- c. Do you use it at the rate of $\frac{1}{2}$ gram per sheet : 0-1-2

10. Smoking

- a. Do you smoke your sheets in the smoke house/kitchen : 0-1-2
- b. Do you keep clean the reaper off charcoal : 0-1-2

IV. CONSTRAINTS

What are the constraints (most important, important and least important) among the following

LI

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MI

- a. The Procedure is more technology intensive

- b. Non availability of sieves of the mesh locally :
- c. Non availability of chemical locally
- d. Lack of tapper willingness to do :
- e. Not getting market price for the grade at village level
- f. The difference in price realization is not worth the efforts involved :
- g. Lack of time .
- g. Lack of finance :
- i. Absentee management :
- j. Lack of facility :
- k. Others :

Place:

Date :