

**AN ANALYSIS OF THE PROCESSING
PRACTICES OF RUBBER LATEX
BY THE SMALL HOLDERS
IN ALATHUR TALUK**

By

M. K. SASI

DISSERTATION

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Department of Plantation Crops and Spices
COLLEGE OF HORTICULTURE
KERALA AGRICULTURAL UNIVERSITY
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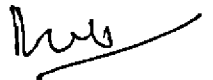


DECLARATION

I hereby declare that this dissertation entitled "An analysis of processing practices of rubber latex by the small holders in Alathur Taluk" is a bonafide record of research work done by me and that this dissertation has not formed the basis for award to me, of any degree, diploma, associateship, fellowship or other similar title of any other university or society.

Vellanikkara,

29-10-1994.



M.K. SASI

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M.K.Sasi

CERTIFICATE

We, the undersigned members of the Advisory Committee of Shri.M.K.Sasi a candidate for the Postgraduate Diploma in Natural Rubber Production, certify that this dissertation entitled "An analysis of the processing practices of rubber latex by the small holders in Alathur Taluk" is a record of research work done independently by Sri.M.K.Sasi under our guidance and supervision and that it has not previously formed the basis for award of any degree, diploma, associateship or fellowship to him.

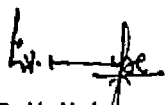
We also agree that this dissertation may be submitted by him in partial fulfilment of the requirement of Diploma.



Dr.V.S.Sujatha
Assistant Professor
Department of Plantation Crops &
Spices, College of Horticulture
Kerala Agricultural University
(Chairperson)



Dr.N.M.Mathew
Deputy Director
R.C.P.T. Division
Rubber Research Institute
of India, Kottayam
(Co-chairman)



Dr.E.V.Nybe
Associate Professor & Head i/c
Department of Plantation Crops &
Spices, College of Horticulture
Kerala Agricultural University
(Member)



18/12/94

Dr.P.A.Nazeem
Associate Professor
Department of Plantation Crops &
Spices, College of Horticulture
Kerala Agricultural University
(Member)

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Introduction

INTRODUCTION

Natural rubber has been found in the latex of over 895 species of plants belonging to 311 genera of 79 families. The most important commercial source of rubber is *Hevea brasiliensis*. *Hevea*, a native of Brazil was introduced to tropical Asia in 1876.

The first commercial planting of rubber in India was done by European planters in 1902, at Thattekkad near Kothamangalam. Some enterprising planters took initiative to plant rubber in Goa during 1906. The UPASI showed key interest in rubber cultivation and carried out research on various aspects which helped in further development of commercial plantation.

Unlike other rubber growing countries, the remarkable feature of the Indian rubber plantation industry is the existence of small holdings with less than 2 hectares. Small holdings have a share of 85 per cent in area as well as in production.

The crop obtained from *Hevea brasiliensis* is a white milky liquid called latex. Unlike other crops, the latex should be processed into a marketable form by the growers themselves. Ribbed smoked sheets, ammoniated field latex, latex concentrate, crepe rubber and technically specified block rubber are the marketable forms of natural rubber. As the easiest processing method is the production of ribbed smoked sheets small rubber growers are mainly following this processing method. An internationally accepted grading

system is being followed in India also for grading of sheet rubber. Sheets are visually examined by holding them against sunlight. The defects which lower the quality of sheets are discolouration, presence of bubbles, specks, blisters, dirt, stickiness, mould growth, rust etc. The various grades designated in India are RMA 1, 2, 3, 4, and 5 (Rubber Board, 1991). The sheets produced by small holders are generally inferior in quality as compared to large growers due to defective processing methods. Usually dealers purchase different grades of sheets from farmers as ungraded lot, paying a lower price than deserving.

The present investigation aims at gathering information on various methods adopted by the small rubber holders of Alathur taluk for processing the latex produced in their holdings into a marketable form. The extent of adoption of scientific methods of sheet rubber production by the small growers in Alathur taluk will be evaluated. The study also envisages to elucidate the problems faced by them in this regard and suggest possible solutions for improving the quality of sheets.

The finding of this study is expected to help the Rubber Board and other agencies engaged in the development of rubber industry in refining the existing scheme or formulating new ones.

Review of Literature

2. REVIEW OF LITERATURE

As in any other crops, the important factors influencing production, productivity and quality of rubber produced are depending on the adoption of recommended package of practices. There are several factors which influence the adoption of recommended package of practices.

Small farmers were either low adopters or medium adopters of improved technology (Mohanani, 1991, Thankappan, Achary, 1993). Age of farmers did not have any relationship with the extent of adoption of new technology (Surendran, 1982).

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

Gopalakrishnan *et al.* (1977) in their study concluded that, small holder rubber in India fetches a low price and most of it goes to the market as low grade rubber, due to presence of impurities like dirt, fungi etc. They emphasized the necessity of following the standard procedure to achieve uniformity in processing and to improve the quality of rubber.

One major defect noted on rubber sheet is rust. The colour of rust varies from dark, white or light yellow. Rust is formed due to the action of micro-organism. The attack of rust on sheets can be prevented by maintaining dry conditions which do not allow the growth of micro-organism. The phenomenon can also be controlled by killing

the microbes using chemicals like paranitrophenol (RRIM, 1962). Paranitrophenol also controls mould growth on stored sheet surface. The quantity of PNP required is 0.1 per cent on drc and it has to be added to latex as 1 per cent solution (Barney, 1968).

Discolouration is also one of the major defect noticed in sheet rubber. As visual system of grading prevails, discoloured sheets fetch a lower price. The discolouration is due to yellow pigmentation, enzymatic darkening, deposition of fuel combustion products, temperature effects during drying and microbial action (RRIM, 1962).

Pre-coagulation is one of the reasons for lowering the quality of sheets, mostly during rainy season. A very few percentage of farmers in Sri Lanka are using sodium sulphite and sodium carbonate as anticoagulants (Tillekaretne and Coomarasamy, 1983).

Smoke house drying of sheets has certain definite advantages. It is quicker than sun drying and free from oxidation by ultra-violet radiation (Thomas, 1971). A survey conducted by Nair (1984) revealed that only about 10 per cent of the small holdings have smoke house facilities. Rest of the farmers were drying partially in sun and partially in kitchen chimney. Another study conducted in Madappally village has revealed that sheets are mostly sold as lot (ungraded) to local private dealers (Nair, 1988).

The processing of field latex to ribbed smoked sheets involves several interconnected steps (Thomas *et al.*, 1980, Kuriakose and Sebastian, 1980, Morris, 1989).

1. Mixing of the latex from different fields
2. Sieving the field latex
3. Determination of dry rubber content
4. Dilution of field latex to bring down the drc to 12.5 per cent
5. Addition of chemical to prevent surface darkening
6. Sedimentation
7. Transfer of 4 litres of diluted latex to clean aluminium pans for coagulation
8. Addition of specific quantity of dilute acid with good stirring
9. Removal of froth
10. Sheeting the coagulum by passing through smooth and grooved rollers
11. Washing the sheets in pure water
12. Dripping and drying
13. Visual examination and grading the sheets

Mohanani (1991) in his study on the processing of latex produced by the small rubber farmers of Kidangoor village reported that 95 per cent of the small group of farmers preferred RR11 105 as planting material. He also found that there was a preference among small holders for alternate daily tapping. Another finding was that, the small holders were unaware of using the chemicals to prevent surface blackening or the treatment to prevent pre-coagulation. He found that 32 to 37 per cent of the planters were not sieving the latex before coagulation. His study also revealed that 88 per cent of farmers adopt drying the sheets in sun followed by kitchen drying.

Nair (1992) in his study on "Adoption of scientific methods

of cultivation of rubber by small growers in Mavelikkara taluk" reported that most of the planters adopted alternate daily tapping.

Thankappan Achary (1993) in his study on "the extent of adoption of scientific tapping and processing techniques by rubber growers of Vaikom taluk" has found that alternate daily tapping was commonly practiced. Pre-coagulation treatment was not much prevalent among the planters studied. He also reported that the percentage of adoption of certain important operations required for the production of high quality sheets, like bulking, standardisation of latex, sedimentation, dilution of acid to the correct level, washing of coagulum and use of PNP were not followed. He also found that, majority of farmers were interested to produce high quality sheets, if they were assured of a premium price according to the grade. A surprising fact observed was that the good grade sheets produced were about 50 per cent, in the case of processing ~~was~~ done by the farmers themselves. It is due to the careful handling of the crop and general cleanliness, when it is done by owners themselves. The study revealed that, the minimum requirement for the production of at least RMA-4 sheets are cleanliness, sieving of latex with 40 mesh sieve, washing of wet sheets in clear water, drying of sheets either in smoke house or in chimney.

Shanmugham (1993) in his study on the impact of natural rubber processing campaign, 1992 of the Rubber Board on small growers in Palakkad District, Kerala, found that, their gain in knowledge was limited in the use of chemicals such as anti-coagulants, bleaching agents and in respect of acid concentration for coagulation and bulking practices. The study further revealed that the participants

have improved their adoption level, but not in proportion to the knowledge gained. In his study it was found that, the non-adoption of major practices was found to be due to disinclination rather than ignorance, while poor adoption in use of chemicals was more out of ignorance.

He also found that, the major constraints in the adoption of modern techniques were economic, 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.

Materials and Methods

3. MATERIALS AND METHODS

Alathur taluk of Palakkad district, Kerala (Appendix-I & II) was chosen for the present study. Altogether there were 6392 rubber units in the taluk comprising an area of 5433 hectares. The average size of a holding was 0.85 hectares. There are seventeen villages in the taluk. With a view to get proper geographical representation from all villages, holdings were selected from each village. Number of samples selected from each village represented the total geographical area of the village and also total number of rubber holdings in that village. Thus the number of samples selected from the villages were:

Village	Number of samples
1. Alathur	6
2. Pazhampalacode	6
3. Tharur	2
4. Puthucode	2
5. Kavassery I	1
6. Kavassery II	1
7. Erumayoor	3
8. Chittilanchery	5
9. Melarcode	3
10. Vandazhy	12
11. Mangalam Dam	11
12. Kizhakkenchery I	10
13. Kizhankkenchery II	9
14. Kannambra I	8

15. Kannambra II	8
16. Vadackenchery I	7
17. Vadackenchery II	6

Total	100
	====

Thus a total of ~~100~~ hundred samples were studied.

Each holding was visited personally and information required as per the questionnaire (Appendix-III) ~~were~~ collected by interviewing the owner as well as the tapper.

Questionnaire was prepared by taking care of all aspects of processing from the collection of latex to the marketing of the processed sheets. To have a comparative assessment, one holding having an area of more than 2.00 hectare was also included. Details such as planting materials used, method of tapping, different steps adopted in processing, storage of processed products, marketing etc. were collected. The data obtained were critically analysed and tabulated for drawing up conclusions.

Results and Discussion

4. RESULTS AND DISCUSSION

4.1 Salient features of holdings

The extent of the holdings selected for the study ranges from 0.20 to 4.00 hectare. Hundred sample units were selected for the study. Based on the size, the holdings were grouped (Table 1) as (1) holdings upto 0.50 ha - 23 per cent, (2) between 0.50 to 1.00 ha - 34 per cent, (3) between 1.01 to 2.00 ha - 42 per cent and (4) more than 2.00 ha - 1 per cent.

4.2 Planting materials

The study revealed that, the most popular planting material among the selected planters of Alathur taluk is RRII 105 (Table 2). Out of the 100 cases studied, 80 holdings were planted exclusively with RRII 105. In four holdings planting was done exclusively with RRIM 600 and in three holdings with GT 1 alone. It is also noted that, there is a preference for mixed planting of different clones among planters of larger size group. Preference for RRII 105 was also reported by Mohanan (1992) in the case of small farmers of Kidangoor village.

4.3 Tapping system

Majority of planters are following S/2 d/2 system of tapping (Table 3). Among the planters coming under the size group of upto 0.50 ha - 5.88 per cent are following S/2 d/1 system, 94.12 per cent

Table 1. Salient features of sample holdings

Sl. No.	Size group of holdings	No. of holdings	Percentage	Total area under rubber (ha)	Area under tapping (ha)	Average size of holding (ha)
1	Upto 0.50 ha	23	23	7.61	7.30	0.33
2	0.51 to 1.00 ha	34	34	26.89	26.89	0.79
3	1.01 to 2.00 ha	42	42	65.37	63.37	1.56
4	> 2.00 ha	1	1	4.00	4.00	4.00
Total		100	100	103.87	101.56	1.03

Table 2. Planting materials used

Sl. No.	Size group	Total No. of holding	RRII 105 planted holding	Percent- age	RRIM planted holding	Percent- age	GT1 planted	Percent- age	Others	Percent- age
1	Upto 0.50 ha	23	22	95.65	-	-	1	4.35	-	-
2	0.51 to 1.00 ha	34	24	70.59	3	8.82	2	5.88	5	14.71
3	1.01 to 2.00 ha	42	33	78.57	1	2.38	-	-	8	19.05
4	> 2.00 ha	1	1	100.00	-	-	-	-	-	-

Table 3. Tapping system followed

Sl. No.	Size group of holding	No. of holding	Percentage of farmers who follow		
			S/2 d/1	S/2 d/2	S/2 d/3
1	Upto 0.05 ha	23	5.88	94.12	-
2	0.51 to 1.00 ha	34	-	100.00	-
3	1.01 to 2.00 ha	42	-	97.61	2.39
4	Above 2.00 ha	1	-		100.00

are following S/2 d/2 system of tapping. Under this size group no one is following S/2 d/3 system of tapping. In the size group between 0.50 ha and 1.00 ha, all are following S/2 d/2 system of tapping. Planters coming under the size group 1.01 to 2.00 ha, 97.61 per cent are following S/2 d/2 system of tapping and 2.39 per cent are following S/2 d/3 system of tapping. In the holding selected for the study with more than 2.0 ha, S/2 d/3 system is followed. The study showed that inspite of the advise from the Rubber Board to follow S/2 d/3 system for high yielding clones like RRII 105, majority of farmers, especially small holders are still adopting S/2 d/2 and some even S/2 d/1 system of tapping. Popularity of S/2 d/2 system among small holders of Kerala was reported earlier also (Achary, 1993). Hence more concentrated efforts have to be made to popularise the S/2 d/3 system of tapping for high yielding clones.

4.4 Method of processing

Out of 100 units studied, 98 per cent processed their crop into ribbed smoked sheets and 2 farmers sold their field latex as such (Table 4).

Smoked sheets continued to be the common method of processing among the farmers. However, it is realised from the discussion with farmers that, they have a preference to sell latex as such. This is because the high cost of firewood and the extra labour required in the processing of latex into ribbed smoked sheets. Most of the farmers, sold their produce as ungraded sheets which fetched a lower price. The problems in transportation of liquid latex to far away

Table 4. Mode of processing

Sl. No.	Mode of processing	No. of holdings	Percentage
1	Ribbed smoked sheets	98	98
2	Crepe	-	-
3	Latex as such	2	2
4	Latex concentrate	-	-
5	Other	-	-
Total		100	100

collection centres is forcing them to continue with sheet rubber processing. The step taken by RPS to collect latex from growers and supplying it to registered traders is encouraging in this regard which should be given adequate support from the Board.

4.5 Pre-coagulation

Sometimes, especially during rainy season, partial coagulation takes place on the tapping channel, inside the collection cup or in the collection bucket etc. This coagulation which occurs before it is actually desired is called pre-coagulation. The phenomenon is also known as spontaneous coagulation which takes place due to the action of micro-organisms like bacteria which feed on carbohydrates present in latex. Pre-coagulation results in loss of rubber as scrap and also it deteriorates the quality of sheets produced.

In the present study, the holding have been calssified into 4 groups viz., (1) units ~~where~~ latex is collected within 1 hour after tapping, (2) between 1 and 2 hours after tapping, (3) between 2 hours and 3 hours after tapping and (4) more than 3 hours after tapping (Table 5). maximum pre-coagulation was observed in the case of hold-ings where the time lapse between tapping and collection of latex is two hours and above whereas in the case of holdings where latex is collected within one to two hours, after tapping pre-coagulation is not at all observed.

In five units, the interval between tapping and collection of latex exceeded 3 hours and in two cases only pre-coagulation was noticed (40%). It appears that cleanliness of collection cups, spouts

Table 5. Pre-coagulation

Sl. No.	Time lapse between tapping and latex collection	Units in which pre-coagulation			
		Observed		Not observed	
Period	No. of holdings	No. of units	Percentage	No. of units	Percentage
1. Less than 1 hr	6	-	-	6	100.00
2. 1 to 1½ hrs	70	-	-	70	100.00
3. 2 to 2½ hrs	19	5	26.32	14	73.62
4. 3 hrs	5	2	40.00	3	60.00

etc. were also important factors that influenced pre-coagulation.

Chemicals like sodium sulphite, ammonia, formalin etc. are recommended to prevent pre-coagulation. None of the farmers interviewed in the study were found to use any chemical to prevent pre-coagulation. Majority of farmers are not aware of the chemicals or the use of the same. Non use of anticoagulants among small holders of Kerala has been reported earlier also (Mohanam, 1991 and Achary, 1993). Tillekaretne and Coomarasamy (1983) also have reported that in Sri Lanka, non-use of anticoagulants is one of the reasons for lowering the quality of sheets as it results in pre-coagulation especially during rainy season. Hence efforts are to be made to educate the growers to popularise the use of anticoagulants.

4.6 Sieving of latex

Usually the field latex will contain foreign matters like shavings of barks, sand particles and other impurities. To remove these impurities sieving the field latex first through 40 mesh and then through 60 mesh sieves is required.

From the study it was found that 13 per cent planters did not sieve their latex at all. Majority of growers (54%) are sieving their latex using strainers of mesh size below 40 i.e., 10 to 20 mesh only. No one was found to use 60 mesh sieves, while 32 per cent of planters were using 40 mesh sieves. One planter has used coconut fibre for the purpose of sieving (Table 6).

The quality of sheets produced by small holders could be

Table 6. Sieving of latex prior to processing

Sl. No.	Materials used for sieving	No. of units	Percentage
1	60 mesh sieve	Nil	-
2	40 mesh sieve	32	32
3	Below 40 mesh sieve	54	54
4	Coconut fibre	1	1
5	No sieving	13	13
	Total	100	100

improved to a great extent by properly sieving the field latex through sieves of the specified mesh size alone. Rubber Board is now distributing stainless ~~steel~~ sieves of mesh size 40 to small holders through the Rubber Producers Societies at subsidised rate as an encouragement to the growers to sieve the latex properly. Effective steps are to be taken to popularise the use of the sieves of mesh size 40 and 60.

4.7 Mode of dilution

The dilution of latex with water before coagulation is to maintain the drc at 12.5 per cent. In addition to this, dilution would also help (1) to increase the rate of sedimentation of heavier impurities, (2) the production of soft coagulum, (3) to make rolling easier and (4) to remove water soluble constituents like carbohydrates, proteins, decomposition products, mineral matter etc.

The present study showed that invariably in all the holdings, dilution of field latex is being practised. But the mode of dilution is different. According to the quantity of water added, the holdings were grouped in to 5 (Table 7). It was found that in 59 per cent of holding 1 : 1 dilution was followed which was fairly close to the recommended dilution. In 29 holdings, growers followed less than 1: 1 dilution, which was under dilution. 1 : 2 dilution was followed by one grower while 2 : 3 dilution which gave a dilution nearest to the recommended one was followed by only 2 growers. Lack of awareness appears to be the major reason for improper dilution of latex by small growers.

Table 7. Mode of dilution of field latex for preparation of sheet rubber

Sl. No.	Mode of dilution Latex : water	No. of farmers following	Percentage
1	2 : 1	29	29.59
2	1 : 1	59	60.20
3	2 : 3	2	2.04
4	1 : 2	1	1.02
5	Others	7	7.15
Total		98	98.00

Two farmers sold their latex as such

4.8 Coagulation

For coagulating the latex, it is transferred to specially made pans. All are using pans made of aluminium for this purpose. Eventhough Rubber Board is advising to produce sheets of 500 g dry weight, only 2.04 per cent of growers were found to produce sheets of dry weight between 500 to 750 g while 64.28 per cent holders produced their sheets at a dry weight of above 750 g (Table 8).

For the coagulation of latex acids like formic acid (HCOOH), acetic acid (CH_3COOH) and catalyst AC could be used. In all the sample cases studied the acid used to coagulate was found to be HCOOH . Formic acid is more popular because of its easy availability, anti-bactericidal property etc. Cost is also a favourable factor for its wide acceptance.

4.9 Dosage of acid

Formic acid recommended for a sheet of 750 g dry weight for same day, sheeting is 3 ml and for next day sheeting is 2.25 ml. The quantity of acid used in the surveyed units was found to range from 0.8 to 12 ml per sheet of 750 g. The sample units were classified into three groups (Table 9) based on the quantity of acid used.

The study showed that 36.73 per cent of planters were using acid close to the recommended dose.

4.10 Acid dilution

To obtain maximum result in uniform mixing and coagulation

Table 8. Weight of dry sheets

Sl.No.	Weight of dry sheets	No. of units	Percentage
1	Below 500 gm	Nil	-
2	500 gm	2	2.04
3	500 - 750 gm	33	33.68
4	Above 750 gm	63	64.28
	Total	98	100.00

Table 9. Dosage of acid

Sl. No.	Quantity of formic acid used per sheet of about 750 gms dry weight	No. of units	Percentage
1	Close to the recommended dose (2.5 to 3.5 ml)	36	36.73
2	< 2.5 ml	47	47.96
3	> 3.5 ml	15	15.36
Total		98	100.00

of latex in the pan the acid (HCOOH) should be diluted to a concentration of 0.5 per cent. But in this study none of the planters were found to have been using acid at a concentration below one per cent (Table 10). 12.24 per cent of planters used acid at a concentration ranging from 1.01 to 3 per cent, 60.21 per cent planters used acid at a concentration between 3.01 to 6 per cent and 27.55 per cent planters used acid at a concentration more than 6 per cent.

The results showed that small rubber growers still do not have a clear idea about the quantity of acid to be used per sheet and the concentration of the same. From the field survey it was realised that, planters dilute the acid in convenient bottles and test the concentration by tasting. Quantity of acid added was also not uniform everyday. Sometimes due to scarcity of water, farmers resort to a lower dilution of latex and in such cases proportionate reduction in the quantity of acid added was not made.

If the quantity of acid is in excess, hard coagulum will be the result which is difficult for machining and drying and too little acid results in a milky serum, with considerable loss of rubber and resulting sheets of inferior quality. If the acid used is more, stickiness is also noticed. So acid should be added as per recommendation to get, a final product of good quality.

The results of the study show the necessity to educate the farmers on the correct dosage and concentration of acid.

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Table 10. Concentration of acid

Sl.No.	Concentration of acid	No. of units	Percentage
1	Upto 1 per cent	-	-
2	1.01 to 3 per cent	12	12.24
3	3.01 to 6 per cent	59	60.21
4	More than 6 per cent	27	27.55
	Total	98	100.00

4.11 Sheeting

Out of 100 planters, 98 processed their crop into sheet rubber. Fifty growers possessed their own rollers for sheeting and others used hired rollers for the purpose (Table 11). This was a better picture when compared with Vakathanam village where it was reported that only four per cent rubber growers possessed rollers of their own (Nair, 1984) and in Kidangoor village, the percentage was 36.21 (Mohanam, 1991). The subsidy scheme for purchase of rubber rollers introduced by the Rubber Board recently has encouraged more farmers to acquire own rollers.

4.12 Washing of sheets

By washing the freshly machined sheets, several impurities could be removed such as serum, excess acid and other water soluble impurities. Providing water supply above the rollers through pipes will enable washing of the coagulum along with sheeting. But this arrangement was not found existing in any of the rollers in the surveyed holdings. None of the farmers covered by this study practised washing of their sheets after sheeting. By washing, the quality of sheets could be improved to a great extent and the process is least expensive. This point has to be impressed upon planters through intensive efforts.

4.13 Paranitrophenol treatment

Treatment with paranitrophenol is to prevent mould growth over the dry sheets exposed to humid conditions. For this purpose,

Table 11. Rolling of sheets

Sl. No.	Size group of holding	No. of holding	Roller owned	Percentage	Hired by	Percentage
1	Upto 0.50 ha	23	4	17.39	19	82.61
2	0.51 to 1.00 ha	34	15	44.12	18	52.94
3	1.01 to 2.00 ha	42	30	71.43	11	26.19
4	> 2.00 ha	1	1	100.00	-	-

the sheets are to be soaked in a 0.1 per cent solution of parani-trophenol for about 10 to 15 minutes before dripping and drying. It could also be conveniently added to the diluted latex as 1 per cent solution at a concentration of 0.1 per cent on drc. None of the farmers interviewed for this survey used PNP. Education of farmers about this aspect is needed to improve the quality of small holder sheets.

4.14 Drying of sheets

In ribbed smoked sheets, as the name denotes drying of sheets is done by smoking in specially designed smoke houses at temperature in the range of 45 to 60°C. It takes 4 to 5 days for drying of the sheets in a smoke house. Apart from drying of sheets, smoking would also prevent mould growth to a great extent by the deposition of creosotic materials, on the sheets. Out of the cases studied, 17.35 per cent possessed own smoke house, 59.18 per cent farmers were resorting to partial drying in sun and then kitchen hearth while 23.47 per cent farmers were drying their sheets only in sun. Complete sun drying may cause surface oxidation of sheets due to exposure to ultraviolet radiation (Table 12).

It was also observed that while sun drying, some farmers exposed their sheets on the ground which causes contamination with sand and other dirt thereby lowering the quality of sheets.

An awareness has to be created among the small farmers to keep the sheets clean and dry them properly.

Table 12. Drying of sheets

Sl.No.	Type of drying	No. of units	Percentage
1	Complete sun drying	23	23.47
2	Partial sun drying followed by kitchen smoking	58	59.18
3	Partial sun drying followed by smoke house	17	17.35
	Total	98	100.00

4.15 Grading and marketing

Grading of sheets is done by the dealers instead of growers because farmers lack the expertise for grading. Some small growers are not even aware of the practice of grading. In the present study it was found that only in 22.4 per cent cases, the dealer has graded the sheets brought to him for sale by the farmers. 77.6 per cent of the farmers sold their products as ungraded rubber (Table 13).

Percentage of graded sheets produced reduced from 100 per cent in size group > 2.00 hectare to 4.34 per cent in size group upto 0.50 hectare. A reduction was noticed in the percentage of graded sheets produced from larger holdings to smaller holdings.

4.16 Marketing channel

Seventy three per cent of the farmers marketed their produce to local private dealers. Twenty three per cent through Co-operative Rubber Marketing Society and one per cent each through Rubber Producers societies and large dealers in the town (Table 14).

4.17 Price realisation

The price published in newspapers was fully realised in the case of 31.63 per cent farmers while 68.37 per cent growers were getting 15 to 50 paise less per kg than the news paper price (Table 15).

It has been observed that 22 farmers who produced a higher proportion of better quality sheets and obtained the newspaper price,

Table 13. Grading of sheets

Sl. No.	Size group of holding	Total No. of holding	RMA IV		RMA V		Ungraded	
			Units	Percentage	Units	Percentage	Units	Percentage
1	Upto 0.50 ha	23	-	-	1	4.34	22	95.66
2	0.51 to 1.00 ha	33	4	12.12	4	12.12	25	75.76
3	1.01 to 2.00 ha	41	8	19.52	4	9.75	29	70.73
4	> 2.00 ha	1	-	-	1	100.00	-	-
5	Total units under each group	98	12	12.20	10	10.20	76	77.60

Table 14. Marketing channel

Sl. No.	Marketing channels	No. of holdings	Percentage
1	Local private dealers	73	74.49
2	Large dealers in the town	1	1.02
3	Co-operative/rubber marketing societies	23	23.47
4	Rubber producers societies	1	1.02
	Total	98	100.00

Table 15. Price of rubber obtained to the farmer

Sl. No.	Price obtained for sheet	No. of units	Percentage
1	Newspaper price	31	31.63
2	More than paper price	-	-
3	Less than paper price	67	68.37
Total		98	100.00

were undertaking all the processing operations neatly and also were drying the sheets without contamination.

4.18 Type of labour

In rubber plantations tapping and processing are done either by family members or by hired labour. Engagement of family labour for tapping and processing was found to be maximum (26.09 per cent) in the smallest size group of holdings upto 0.50 hectares (Table 16) and maximum in the size group of 1.01 to 2.10 hectares. In the smallest size group, the number of trees to be tapped was very less and their financial status not adequate to employ a tapper. The income from his farm is his only means of livelihood. Non-availability of tapper for tapping small areas on alternate daily basis, which does not provide him full time employment, may be another reason for the use of family labour. Similar observations have been made by Mohanan (1991) and Achary (1993).

4.19 Educational qualifications

The study revealed that literacy was 100 per cent in the holdings surveyed in Alathur taluk. Out of the 100 cases studied one grower was postgraduate, 10 growers were graduates, 9 were pre-degree holders. Twenty two growers were SSLC holders while 58 growers were having only school education (below SSLC). But there was no correlation noticed between the adoption of scientific techniques in processing and the farmers educational status. From the discussion and personal interview with farmers it was revealed that, even growers with primary school education were interested to improve the quality

Table 16. Type of labour

Sl. No.	Size group of holding	Total No. of holding	Hired labour engaged for tapping & processing		Family labour engaged	
			No. of units	Percentage	No. of units	Percentage
1	Upto 0.50 ha	23	17	73.91	6	26.09
2	0.51 to 1.00 ha	34	28	82.35	6	17.65
3	1.01 to 2.00 ha	42	38	90.48	4	9.52
4	> 2.00 ha	1	1	100.00	-	-

of sheets they produced by adopting new scientific techniques, provided they were assured of a higher price according to the grade.

4.20 RPS Membership

In the cases studied only 29 per cent growers were members of the Rubber Producers Societies. Rubber Producers Society is a voluntary association of village level small holders, functioning as a link between the Rubber Board and growers. Rubber Board has constituted such an organization for the effective transfer of technology by group approach. But in the study, it was revealed that only a few RPSs in the taluk are functioning actively. Therefore efforts have to be taken to ensure effective functioning of existing RPSs and to organise new RPSs in the unrepresented areas. Through RPSs, participation of farmers in rubber processing campaigns could be improved and there is better dissemination of new technology.

4.21 Subscription of rubber magazine

A Malayalam monthly 'Rubber' is published as a guidance to the large number of rubber growers who are not conversant with modern scientific methods of rubber cultivation and processing. This study revealed that, the popularity of rubber magazine among small holders was very poor. Only 6 per cent of the farmers are subscribing to the magazine. Hence concerted efforts have to be made to popularise the subscription of the magazine among small holders.

4.22 Preference of inputs

This study revealed that the most preferred input subsidy was smoke house subsidy (52%) and roller subsidy (13%) followed by others (Table 17).

Table 17. Preference of inputs

Sl. No.	Preference of input	No. of farmers showed preference
1	Smoke house	52
2	Roller	13
3	Others	2
4	No opinion	33
Total		100

Summary and Conclusion

5. SUMMARY AND CONCLUSION

A study was conducted among small holders of Alathur taluk to understand the extent of adoption of scientific processing techniques by the rubber growers. One hundred holdings, representing different geographical regions in the taluk and different size groups were selected and the farmers as well as the tappers were interviewed with the help of a questionnaire.

The study revealed that the most popular planting material among small growers was RRII 105. Preference for the planting material RRII 105 was maximum (95.65%) among the smallest group of planters who own less than 0.50 hectare. It was noted that there was a tendency for mixed planting with different clones among large growers. Alternate daily tapping was more prevalent among the holdings surveyed. S/2 d/3 system has to be popularised especially for clones like RRII 105 which is susceptible to brown bast.

From the study it was found that farmers have a preference to sell latex as such because it is more economical and convenient than the preparation of sheets.

The majority of small rubber growers were not aware of the use of chemicals like sodium sulphite to prevent pre-coagulation, paranitrophenol to control surface blackening and sodium bisulphite to improve the colour of sheets. The use of these chemicals have to be popularised among small rubber growers.

From the study it has been observed that 13 per cent small growers did not sieve their latex before coagulation. Even when sieving was done, the mesh size of the sieve used was below standard.

In the case of coagulant, only 36 per cent farmers were using coagulants near to the recommended dose.

In the case of dilution, only 2.04 per cent farmers were following the recommended extent of dilution of latex, while 60.20 per cent farmers were following very near to the recommended ratio. Fifty per cent growers owned their own rollers. Others were using hired rollers for sheeting their coagulum. Seventeen farmers had their own smoke house for smoking the sheets where as 23 per cent growers were drying their sheets completely in sun and remaining partial sun drying followed by smoking in kitchen hearth.

Seventy seven per cent growers sold their produce as ungraded sheet at a lower price. Only 31.63 per cent farmers got price as published in newspapers while 68.37 per cent got price at a rate less than that published in newspapers. Engagement of hired labour for tapping and processing were more in the larger size group of holdings.

The study showed that good quality sheets could be produced by the farmers by maintaining cleanliness at all stages of processing and drying of sheets. In the present condition, a small quantity of higher grade rubber produced by the small farmers goes to the dealers who in turn sell it gradewise to the large dealers.

The reasons for lowering the quality of sheets produced by the small growers of Alathur taluk are listed below:

1. Lack of proper cleanliness at all stages of processing
2. Lack of technical knowhow in the case of farmers as well as tappers for producing good quality sheets
3. Lack of proper marketing system which ensures gradewise purchase of sheets produced by the small farmers at village level

Rubber Board has been conducting village level campaign during May-June, in every year from 1991, to train small growers and tappers on correct techniques of production of quality rubber sheets.

The education given to small growers on quality improvement of sheets will have no meaning if gradewise purchase of sheets at the grassroot level in all the rubber growing centres is not ensured.

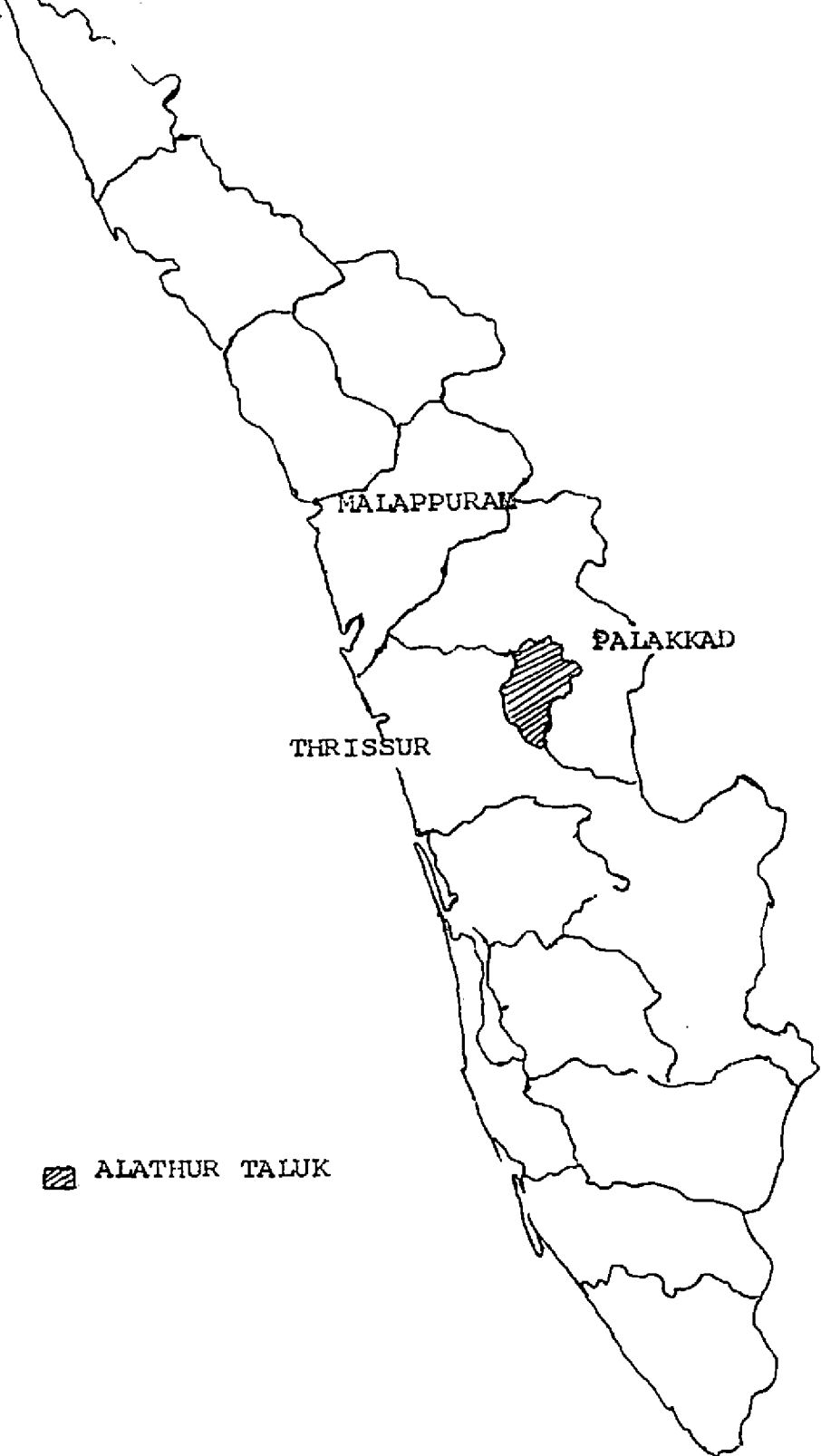
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Appendices



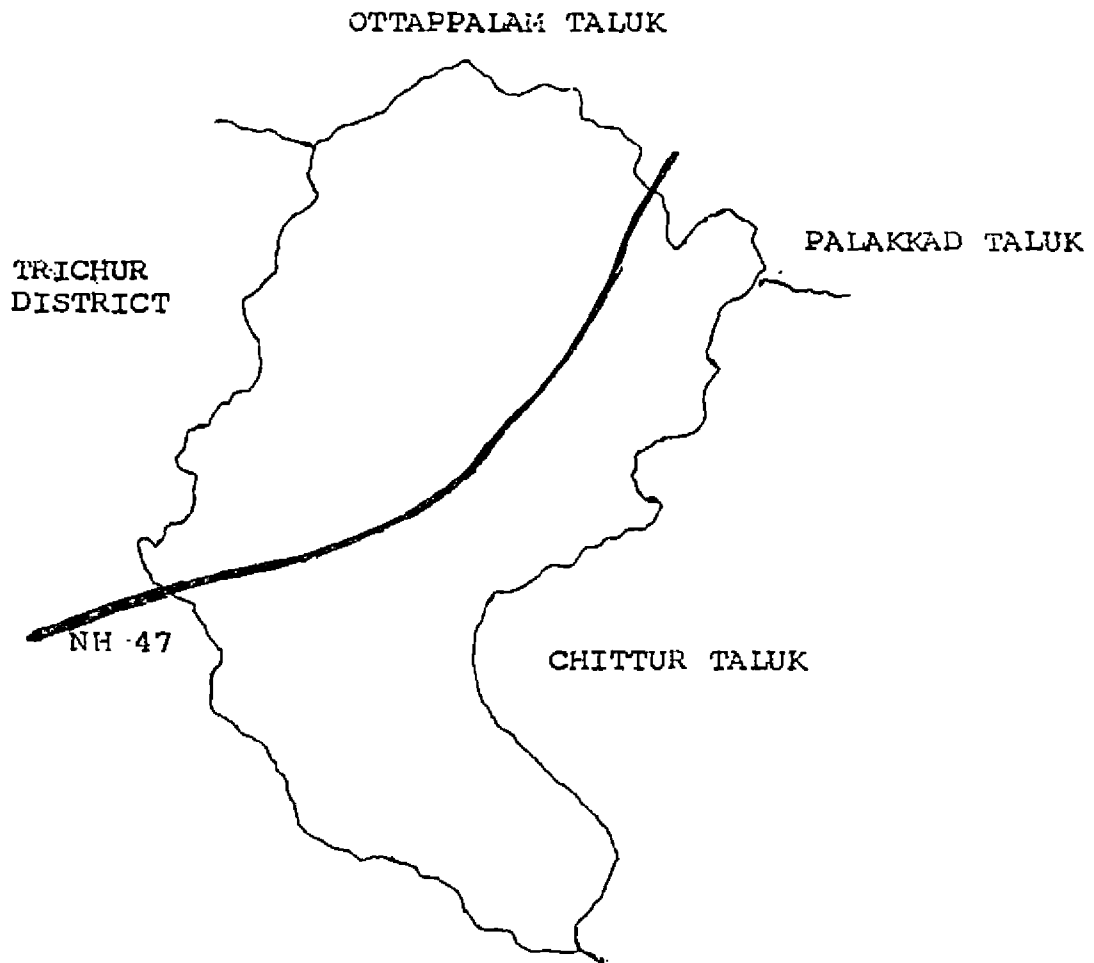
MALAPPURAM

PALAKKAD

THRISSUR

▨ ALATHUR TALUK

APPENDIX-II
MAP OF ALATHUR TALUK



1. Name and address of owner :
2. Registration number of the estate :
3. Total rubber area Year of planting
 - a) Area under tapping
 - b) Immature area
4. Clone/variety :
5. Tapping system :
6. Family labour/Hired labour :
7. Type of processing followed :
 - a) Sheet rubber :
 - b) Ammoniated field latex :
 - c) Field latex :
 - d) Any other form (specify) :
8. a) How many hours after tapping is the latex collected :
- b) Collected vessel used :
9. If latex is sold as such do you face any problem in transportation :
10. General cleanliness : Good/medium/low
11. If sheet rubber is produced please furnish the details :
 - a) Treatment to prevent pre-coagulation (if necessary) :

- b) Mode of estimation of latex :
 c) Mode of dilution of latex :
 d) Type of collection cup used :
 e) Whether sieving of diluted latex is done, mesh size of the sieve used :
 f) What type of coagulation pan you use (Aluminium/plastic) :
 g) How much diluted latex is taken in a pan to make one sheet :
 h) Are you following same day/next day sheeting :
 i) What is coagulant used concentration, quantity per sheet :
 j) Do you use sodium bisulphite to prevent surface blackening of coagulation/sheet :
12. a) Sheeting done by own/hired rollers :
 b) Specification of the roller used : Standard size/below standard
13. How sheets are dried
- 1) Sun drying/partial sun drying (specify how the sheets are exposed to sub) :
 2) Kitchen smoking :
 3) Smoke house drying : Own smoke house/
 community smoke house
 4) Source of fire wood :

14. How many days it take to get the sheets ready for sale :
15. Periodicity of marketing of sheets :
16. Whether grading is done at the time of sales? If yes, what is the percentage of each grade of sheets obtained :
- | | |
|----------|---------|
| RMA I | _____ % |
| RMA II | _____ % |
| RMA III | _____ % |
| RMA IV | _____ % |
| RMA V | _____ % |
| Ungraded | _____ % |
17. Specify the marketing channel:
- a) Local private dealers :
- b) Large dealers in the town :
- c) Co-operative/Rubber Marketing Societies :
- d) Rubber Producers Societies :
18. Do you get the price published the newspapers. If not what is the difference :
19. Are you interested in improving the quality of sheets produced, if you are assured of a price according to the grade :
20. What is the percentage of scrap you get in relation to the sheet and price realised :
21. In what way you think the quality of sheets can be improved :

22. Are you subscriber of Rubber Magazine :
23. Are you a member of any RPS :
24. What is your Educational qualifications :
25. Have you availed of subsidy from the Rubber Board, for constructing smoke house, purchase of Rollers, latex collection cups, sieves or chemicals (if not why?) :
26. Which type of input subsidy do you consider as most useful :

FARMER'S AWARENESS AND CONSTRAINTS

1. Interval between collection and coagulation of latex	30 min/1 hour/1½ hour	Non cooperation of tapper/Others if any
2. Dilution of latex	1:0.5/1:1/1:2/Others	Not remunerative/ scarcity of water/ non-cooperation of tapper/ignorance/ others
3. Mesh size of sieve used for sieving the latex	60/40/Coconut/Fibre/ Others	Non cooperation of tapper/ignorance/ others
4. Quantity and concentration of coagulant used	Recommended/above/ below	Ignorance/others if any
5. Whether thorough mixing is done with coagulant	Yes/No	Tapper's non cooperation/ Ignorance/ Others if any
6. Whether Sodium sulphite is used to prevent surface blacking	Yes/No	Not remunerative/ Ignorance/Other if any

7. Whether PNP is used to prevent mould growth	Yes/No	Not remunerative/ Ignorance/Others
8. Specification of Roller used	Standard size/Below Standard size	Non-availability of Roller/Tappers Non-cooperation
9. Weight of dry sheets produced	500gm/500-750gm/ Above 750gm	For saving the no. of coagulating pans/ tapper's non-cooper- ation/ignorance
10. Drying of sheets	Sun/Kitchen/Smoke house	Not remunerative/ small quantity of sheets produced/ others

APPENDIX-IV
LIST OF GROWERS INTERVIEWED

Sl. No.	Name and address	Extent (ha)
1	Varkey, Valiaparambi, P.O. Chittady	0.20
2	S.N.Chandran, Palathukalam, P.O. Nenmmara	0.34
3	M.V.Varghese, Mullanchira, Gomathy Estate, P.O. Chittlilancherry	0.29
4	Janaki, Pattayil, P.O.Chittilancherry	0.38
5	Antony, Kulangara, P.O.Alathur	0.20
6	George, Vayalappilly, P.O.Alathur	0.40
7	Sreedevi Antharjanam, Mudappillipatt Elom, P.O.Pazhampalacode	0.30
8	Sukumaran, Manakkat, P.O.Erattakulam	0.30
9	Jacob Mathew, Kadankavil, P.O.Mangalam Dam	0.30
10	Unnikrishnan, Elamkatt, P.O.Mangalam Dam	0.20
11	Kuriackose, Pulikkal, P.O.Panniyankara	0.33
12	K.J.Joseph, Kalapurackal, P.O.Panniyankara	0.40
13	K.R.Krishnan Ezhuthachan, Kizhakeveedu, P.O.Panniyankara	0.30
14	John K. Thomas, Koodemettathil, P.O.Vadakencherry	0.40
15	Scaria, Pulickal, P.O.Panniyankara	0.24
16	T.P.Varghese, Thadikulangara, P.O.Paruvassery	0.40
17	P.J.Babu, Padinjare House, P.O.Koreenchira	0.30
18	V.Vasu, P.O.Koreenchira	0.40
19	M.C.Joseph, Malampillal, P.O.Karimkayam	0.30
20	Mathai, Kaniad, P.O.Koreenchira	0.20
21	Marium, Kadampillil, P.O.Koreenchira	0.20

22	Varkey Kurian, Vattodikkunnei, P.O.Korechira	0.45
23	C.P.Paulose, Chennaden, P.O.Korechira	0.40
24	Annamma Mathew, Edattukunnei, P.O.Kodiyattoor, Thodupuzha	1.00
25	Padmavathy Amma, Nedumgatt House, P.O.Pazhampalacode	0.79
26	Paulose, Thekkumcherril, P.O.Panniyankara	0.60
27	Manon Mani, Churattupadam, P.O.Panniyankara	0.80
28	K.C.Narayanan, Punnackalkundu, P.O.Panniyankara	0.75
29	Krishnankutty Ezhuthachan, Kizhakkekara, P.O.Panniyankara	0.60
30	Mathew Sebastean, Perumalil, P.O.Panniyankara	0.60
31	P.G.Abraham, Puthiyedath, P.O.Panniyankara	0.90
32	P.N.Hassainar, Karapotta, P.O.Kannembra	0.73
33	V.Krishnan Nair, Vayyat House, P.O.Pazhampalacode	0.76
34	Venkadesan, Kundil House, P.O.Pattiparambu	0.80
35	Varghese, S/o.Ouseph, Esuvamkudiyil, P.O.Pazhampalacode	0.70
36	V.Madhavan, Vadakkethara, P.O.Anjumoorthy	1.00
37	Karunath, Puzhackal House, P.O.Mudappallore	0.81
38	Chellamani, Punnackal House, P.O.Panniyankara	0.77
39	Babychan, Vattankadu, P.O.Chittady	0.58
40	Kuttappan, Valayil, P.O.Chittady	0.60
41	Leelamma, Puthukkat, P.O.Mudappallore	0.82
42	V.J.Scaria, Valiathil, P.O.Chittady	1.00
43	Mary, Veliethil, P.O.Chittady	0.70
44	Vishnu Prakash, Nalanda Vihar, P.O.Vandazhy	0.80
45	Sasi, Pratheekshabhavan, P.O.Alathur	0.98
46	Gopinathan Nair, Pandacheril House, P.O.Erattakulam	1.00

47	K.C.Veelayudhan Ezhuthachan, Kizhakkeveetil, P.O.Kunnassery	0.89
48	Kuriackose, Kuzhikkadan, P.O.Karimkayam	0.60
49	Shiny George, Pulickapparambil, P.O.Koreenchira	0.69
50	George Philip, Pulickaparambil, P.O.Koreenchira	0.69
51	Paily Paily, Chennedan, P.O.Koreenchira	1.00
52	C.J.George, Chirakkal, P.O.Koreenchira	0.80
53	Kuriackose, Chirackal, P.O.Koreenchira	1.00
54	Tom George, Kizhakkeparambil, P.O.Koreenchira	0.80
55	T.C.Gheervarghese, Thannikkott, P.O.Koreenchira	0.70
56	Joy, Madathithottathil, P.O.Koreenchira	1.00
57	A.P.Poulose, Adukalil, P.O.Koreenchira	0.63
58	Sunny, Velliath, P.O. Chittady	2.00
59	Tomy, Veliethil, P.O.Chittady	2.00
60	James, Veliethil, P.O.Chittady	1.20
61	George, Veliathil, P.O.Chittady	1.20
62	Mathew, Veliathil, P.O.Chittady	2.00
63	Augustine Joseph, Velamkunel, P.O.Chittady	2.00
64	Tomy Joseph, Velamkunel, P.O.Chittady	1.92
65	C.P.Thomas, Pottathu, P.O.Elavumpadam	1.76
66	Joy, Kizhakkeparambil, P.O.Chittady	1.20
67	P.Kunchelan, Chirayil, P.O.Manjapra	1.56
68	Narayanan, Madappillatt Ellom, P.O.Pazhampalacode	1.20
69	Ardhanari Muthali, P.O.Pazhampalacode	1.89
70	C.T.Kuriackose, Chakkukulam House, P.O.Pazhampalacode	1.29
71	Mathewkutty, Mannarath, P.O.pazhampalacode	1.90

72	Narayanankutty, Mampatt, P.O.Pazhampalacode	1.20
73	N.D.Rugmini Amma, H.No.PP130, Manappadom Gramam	1.67
74	K.V.Narayanan, Korenchira	1.25
75	E.J.Joseph, Eroorickal, P.O.Korenchira	1.50
76	K.T.Thomas, Koodathil, P.O.Vadackencherry	1.59
77	Yosodha, Puzhaka1, P.O.Mudappallore	1.47
78	Mathew John, Parekkattil, P.O.Vadakkencherry	1.92
79	C.Ayyappan, Kolakodukalam, P.o.Vadakkencherry	1.20
80	Joseph, Karamkunel, P.O.Anchumoorthy	1.50
81	Alexander, Mangalam Estate, P.O.Anchumoorthy	2.00
82	R.Kandachami, Pazhamadangott House, P.O.Anchumoorthy	2.00
83	K.A.Thomas, Keechara, P.O.Chittilancherry	1.33
84	Jose, Veliath, P.O.Chittilancherry	1.40
85	Babu Thomas, Gomathy Estate, P.O.Chittilancherry	1.50
86	Ouseph Varghese, Arusseril, P.O.Chittilancherry	1.82
87	A.K.Velayudhankutty, Ampadi House, P.O.Kannabra	1.60
88	Beeran Sahib, Kochuveedanvilayil, P.O.Panniyankara	1.40
89	Sunil, Vadakkengramam, Puthucode	1.19
90	Vijayan, Cherukunel, P.O.Panniyankara	1.74
91	Sudarsanan, Alumpatti House, P.O.Kannabra	1.22
92	George Ipe, Panniyankara Estate	1.90
93	Jose P. John, Perumalil, P.O.Kannabra	2.00
94	C.C.Ramakrishnan, Punnachakkundu, P.O.Panniyankara	1.90
95	C.Raman, Padmavilas, Panniyankara	1.95
96	Thomas Antony, Vadakkal, P.O.Mangalam Dam	1.50
97	P.K.Hasin, Vezhumala, Alathur	1.90

98	K.R.Thankamma, Kattaparamba, Alathur	1.40
99	Madhavan, Alumpatti, P.O.Kannambra	1.60
100	Babu, Puthenpurayil, P.O.Elaumpadom	4.00

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