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**SOCIO ECONOMIC STATUS OF NATURAL RUBBER GROWERS IN KANYAKUMARI DISTRICT**

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**Dr. B REVATHY** M. Com., M.Phil., B.Ed., Ph.D., DCA.,M.B.A.,  
**Professor & Head**, Department of Commerce,  
Manonmaniam Sundaranar University, Tirunelveli - 627 012

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**Mrs. B. FELIX FRANCY M.Com, SET., MBA**  
Assistant Professor in Commerce, St. John's College,  
Palayamkottai 627 002

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**Introduction**

Natural Rubber is obtained from the milky white fluid called latex, found in many plants. NR is nature's most versatile vegetable product. It is the only natural material that is truly elastic, a property that allows it to be soft yet tough. Rubber gently but firmly holds everything together and absorbs bumps and shocks' to make our lives so much more comfortable. This special property has made rubber virtually indispensable and products made from rubber, now number in tens of thousands. NR is a stretchy, flexible and waterproof, hydrocarbon polymer which is derived from latex and drawn by incising into the bark of the rubber tree. It is refined into the usable rubber. The British planters introduced the commercial cultivation of NR. Rubber is a vital product in the life of every human being in the contemporary era. It supports the life of the mass through its diverse benefits. This material has multifarious uses and there are hardly any segments of society, which do not use rubber and based products. The use of rubber products has made the life of human beings in the modern age more comfortable. Right from the simple eraser to the wheels of the vehicles of all size, airplanes, and space shuttle, use of rubber is made in one form or other. From everyday articles such as rubber bands and shoes to mattresses, tyres and windshield wipers, rubber is so much a part of our lives that we take it for granted and assume that rubber has been with us for a very long life.

**SAMPLE DESIGN**

The present study is an attempt to examine the socio-economic conditions of the rubber tappers, rubber producers and the marketers of the rubber products

The sample comprises of natural rubber growers, distributors and rubber tappers in Kanyakumari District. In Kanyakumari district, there are 12 Rubber markets available for the rubber growers. For the present study, 150 rubber tappers, 300 producers and 150 marketers are selected.

In Tamilnadu rubber and clove are cultivated only in Kanyakumari District. The quality of rubber produced in Kanyakumari is one of the best in the world and the yield per acre is also very high compared to other parts of Tamilnadu. In Kanyakumari District, natural rubber is grown in about 35000 hectares and the estimated annual production is about 25000 tonnes. Rubber plantations are located in the northern part of the taluks namely Kalkulam, Vilavancode and Thovalai. The total numbers of samples were 550 from rubber producers, tappers, wholesalers and retailers by adopting purposive sampling. From the total sample of the study, 300 respondents are selected among the rubber producers (cultivators), 150 respondents are selected among rubber tappers, and remaining 100 respondents are selected among distributors. Thus, equal importance is given to the production and marketing of natural rubber.

**DISTRIBUTION OF SAMPLE RESPONDENT BY AGE**

Age is one of the decisive factors which decide the nature of rubber growers, distributors, and vendors. Age gives less inducement to the virtues of thrift and hard work and thereby hinders development. The following table explains the different age group of the respondents.

**Table 1**  
**Age wise classification**

Taluk	Age wise classification					Total
	20-30	30-40	40-50	50-60	above 60	
Kalkulam	10 (7.1)	50 (35.7)	40 (28.6)	25 (17.9)	15 (10.7)	140 (100)
Vilavancode	15 (13.6)	20 (18.2)	25 (22.7)	30 (27.3)	20 (18.2)	110 (100)
Thovalai	5 (10)	15 (30)	10 (20)	10 (20)	10 (20)	50 (100)
<b>Total</b>	<b>30</b> <b>(10)</b>	<b>85</b> <b>(28.3)</b>	<b>75</b> <b>(24.9)</b>	<b>65</b> <b>(21.6)</b>	<b>45</b> <b>(14.9)</b>	<b>300</b> <b>(100)</b>

Calculated  $\chi^2$  Value 35.4 < Table  $\chi^2$  Value 3.84 at 5 % level.

Source: Computed from Primary data

Note: Figures in parentheses indicate the percentage to total

The table reveals that the respondents who are below 60 years are 255 respondents and above 60 years, are 45 respondents. Majority of the respondents are in the age group between 30-40 years. There are 190 respondents belonging to the age group of 20-50 years distributed as 100 from Kalkulamtaluk, 60 from Vilavancodetaluk, and 30 from Thovalaitaluk. There are 110 respondents belonging to the age group of above 50 years distributed as 40 from Kalkulamtaluk, 50 from Vilavancodetaluk, and 20 from Thovalaitaluk.

To establish and measure the existence of the association between the three taluks like Kalkulamtaluk, Vilavancodetaluk, and Thovalaitaluk.

**Ho:** There is no significant relationship between the Agewise classification and three taluks.

**H1:** There is significant relationship between the Agewise classification and three taluks.

The calculated value is (35.4) more than the table value is (3.84). Hence, the hypothesis is rejected. Therefore, it is concluded that there is significant relationship between the agewise classification and three taluks.

#### DISTRIBUTION OF SAMPLE RESPONDENT BY SEX

Sex includes male and female. It is a determining factor of both employments and unemployment. Family includes more working class people, since their earning capacity is high. The following table explains the sexwise classification and three taluk.

**Table 2**  
**Sexwise Classification**

Sex	Kalkulam	%	Vilavancode	%	Thovalai	%	Total	%
Male	90	64	80	73	40	80	210	70
Female	50	36	30	27	10	20	90	30
<b>Total</b>	<b>140</b>	<b>100</b>	<b>110</b>	<b>100</b>	<b>50</b>	<b>100</b>	<b>300</b>	<b>100</b>

Calculated  $\chi^2$  Value 48.6 < Table  $\chi^2$  Value 3.84 at 5 % level.

Source: Computed from Primary data

Note: Figures in parentheses indicate the percentage to total

The above table shows that the total respondents are 300 of which male respondents are 70 per cent (210) and female respondents are only 30 per cent (90). Majority of the respondent are male. They are dominating NR cultivation.

Among the male respondents are 64 per cent (90) belongs to Kalkulam taluk, 73 per cent (80) respondents are belongs to Vilavancode taluk and 80 per cent (40) belongs to Thovalai taluk.

. Among the female respondents are 36 per cent (50) belongs to Kalkulam taluk, 27 per cent (30) respondents are belongs to Vilavancode taluk and 20 per cent (10) belongs to Thovalai taluk.

Chi-square test was employed to examine the,

**Ho:** There is no significant relationship between the sexwise classification and three taluks.

**H1:** There is significant relationship between the sexwise classification and three taluks.

The calculated value is (48.6) more than the table value is (3.84). Hence, the hypothesis is rejected. Therefore, it is concluded that there is significant relationship between the sexwise classification and three taluks.

**DISTRIBUTION OF SAMPLE RESPONDENT BY LITERACY**

Education is the apprenticeship of life. Education is more powerful tool for shaping and moulding every person’s life. It is basic necessity for social awareness. Education brings out a better society. Lack of education prevents social and economic enrichment. The educational status of the sample respondents are depicted in the following table.

**Table 3**  
**Educationwise classification**

Source: Computed from Primary data

Literacy	Kalkulam	%	Vilavancode	%	Thovalai	%	Total
Upto elementary	50	36	45	41	15	30	110
Higher secondary	34	24	25	23	13	26	72
Graduate	30	21	15	13	7	14	52
Technical	11	9	5	5	5	10	21
Professional	5	3	8	7	3	6	16
Illiterate	10	7	12	11	7	14	29
<b>Total</b>	<b>140</b>	<b>100</b>	<b>110</b>	<b>100</b>	<b>50</b>	<b>100</b>	<b>300</b>

Note: Figures in parentheses indicate the percentage to total

The respondents who are the upto elementary level are 110, higher secondary level are 72, graduate are 52, technical level are 21, professional level are 16 and illiterate are 29 in the total sample size. The majority of the respondents have educational level ranging from primary to graduate. In Kalkulam taluk 130 respondents are educated, and few 10 are illiterate. Vilavancode taluk 98 respondents are educated, and remaining 12 are illiterate. Thovalai taluk 43 respondents are educated, and rest of them 7 are illiterate.

**DISTRIBUTION OF SAMPLE RESPONDENT BY MARITAL STATUS**

Rubber growers also depend upon marital status. Married women with children enjoy some privileges’ in the family than others. In recent times, there has been a trend towards nuclear families, which means that the young married women are no longer under the direct control of their in-laws. Hence, an attempt is made to classify the sample respondents based on their marital status. The following table gives the marital status of the respondents.

**Table 4**  
**Marital status wise classification**

Status	Kalkulam taluk		Vilavancode taluk		Thovalai thovalai		Total
	Respondent	%	Respondent	%	Respondent	%	
Married	85	61	70	64	30	60	185
Unmarried	35	24	25	23	15	30	75
Others	20	15	15	13	5	10	40
<b>Total</b>	<b>140</b>	<b>100</b>	<b>110</b>	<b>100</b>	<b>50</b>	<b>100</b>	<b>300</b>

**Calculated  $\chi^2$  Value 104 < Table  $\chi^2$  Value 5.99 at 5 % level.**

Source: Computed from Primary data

Note: Figures in parentheses indicate the percentage to total

The table 4 depicts that 62 percent (185) of the respondents are married 25 per cent (75) of the respondents are unmarried and 13 per cent (40) of the respondents are widows and divorce. Majority of the respondents are married, they have more responsibility and influence to do for earnings.

Among the **Kalkulam taluk**, 61 per cent (85) of the respondents are married, 24 per cent (35) of the respondents are unmarried, and 15 per cent (20) of the respondents are others. In **Vilavancode taluk** 64 per cent (70) of the respondents are married, 23 per cent (25) of the respondents are unmarried, and 13 per cent (15) of the respondents are others. In **Thovalai taluk**, 60 per cent (30) of the respondents are married, 30 per cent (15) of the respondents are unmarried, and 10 per cent (5) of the respondents are others.

**Chi-square test** was employed to examine the

Ho: There is no significant relationship between the marital status and three taluks.

H1: There is significant relationship between the marital status and three taluks.

The calculated value is (104) more than the table value is (5.99). Hence, the hypothesis is rejected. Therefore, it is concluded that there is significant relationship between the marital status and three taluks.

**DISTRIBUTION OF SAMPLE RESPONDENT BY CATEGORIES**

Based on the Natural Rubber cultivation, the cultivators are classified into full time cultivators and part time cultivators. The information regarding categories of rubber cultivators are given below.

**Table 5**  
**Categories wise classification**

Category	Kalkulam taluk	Percentage	Vilavancode taluk	Percentage	Thovalai taluk	Percentage	Total
Full time	90	64	75	68	35	70	200
Part time	50	36	35	32	15	30	100
Total	140	100	110	100	50	100	300

Source: Computed from Primary data

Note: Figures in parentheses indicate the percentage to total

The above table reflects that 66 per cent (200) respondents are full time cultivators and other 44 per cent (100) comes under the category of part time cultivators. It reveals that Majority of the respondent is full time cultivators and their earnings are depending on NR cultivation.

Among the 200 respondents are full time Cultivators. 64 per cent (90) belongs to Kalkulamtaluk, 75 per cent (68) respondents are belongs to Vilavancodetaluk and 70 per cent (35) belongs to Thovalaitaluk. Among the 100 respondents are part time cultivators. 36 per cent (50) belongs to Kalkulamtaluk, 32 per cent (35) respondents are belongs to Vilavancodetaluk and 30 per cent (15) belongs to Thovalaitaluk.

**DISTRIBUTION OF SAMPLE RESPONDENT BY USING TYPE OF FERTILIZER**

The continuous application of fertilizers was that it removed the primary nutrients from the soil and wide multi-nutrient deficiencies. Therefore the combined use of non-organic, organic and bio-fertilizers to maintain soil fertility. The fertilizer requirements of rubber, vary considerably during the three important stages of growth, namely nursery, immature and mature stages. The following table explains by the respondents using type of fertilizer.

**Table 6**  
**Type of fertilizer**

Taluk	Fertilizer			Total
	Organic	Non-organic	Both	
KALKULAM	40 (28.6)	30 (21.4)	70 (50.0)	140 (100)
VILAVANCODE	30 (27.3)	25 (22.7)	55 (50)	110 (100)
THOVALAI	15 (30)	10 (20)	25 (50)	50 (100)
Total	85 (28.3)	65 (21.6)	150 (49.5)	300 (100)

Source: Computed from Primary data

Note: Figures in parentheses indicate the percentage to total

The above table shows that 50 per cent (150) of the respondents are using both types of fertilizers, 28 per cent (85) are using organic, and rest of 65 respondents (22) are using non-organic fertilizers for cultivation of rubber.

Among the **organic fertilizers** are used by the respondents which constitute 28.6 per cent, 27 per cent, and 30 per cent belongs to Kalkulam taluk, Vilavancodetaluk, and Thoivalaitaluk.

Among the **non-organic fertilizers** are used by the respondents which constitute 21 per cent, 23 per cent, and 20 per cent belongs to Kalkulam taluk, Vilavancodetaluk, and Thoivalaitaluk.

It signifies that, among the both fertilizers are used by the respondents which constitute 50 per cent for all taluks in this district.

#### **DISTRIBUTION OF SAMPLE RESPONDENT BY THE PREFERENCE FOR NR CULTIVATION**

There are so many reasons for prefer NR cultivation. The factors include self interest, climate, land family cultivation, unemployment, easy marketable, attractive price etc., if the absence of NR cultivation, without exist many business like tyre, slippers, cloves, lays, rubber ball, rubber band, condoms' these product manufacturing will be suffer. The following table explain the preference for NR cultivation.

**Table 7**  
**Preference for NR Cultivation**

Taluk	Preferences					Total
	Self interest/ climate	Family cultivation/ Land	Unemployment	Easy marketable	Attractive price	
Kalkulam	10 (7.2)	40 (28.6)	30 (21.4)	20 (14.3)	40 (28.6)	140 (100)
Vilavancode	10 (9)	40 (36.3)	30 (27.3)	20 (18.2)	10 (9.1)	110 (100)
Thoivalai	4 (8)	15 (30)	11 (22)	6 (12)	14 (28)	50 (100)
Total	24 (7.8)	95 (31.5)	71 (23.6)	46 (15.3)	64 (21.3)	300 (100)

Source: Computed from Primary data

Note: Figures in parentheses indicate the percentage to total

The above table reveals that the opinion given by the five categories of NR Growers for the cultivation of rubber. Out of them 32 per cent (95) of growers' opinion that family

cultivation/availability of land. Rubber crop is give employment opportunity to unemployment candidate, according to 23.6 per cent (71) of growers, 21 per cent (64) of growers opinion that attractive price, 15 per cent (46) of growers opinion that easy marketable, and the remaining 8 per cent (24) of the growers opinion that self interest/climate are the next suggestion. Most of the respondent feels that the preference for rubber cultivation is being availability of land and family cultivation.

**DISTRIBUTION OF SAMPLE RESPONDENT BY NAME OF INTERCROPPING**

Rubber is planted at a wide spacing and hence sufficient land and light is available in the interred areas during the initial years for intercropping. Intercrops should be selected based on the land, light availability in the plantation and marketability. The following table explains the most common intercrops are listed

**Table 8**  
**Kinds of Intercropping**

Taluk	Intercropping				Total
	Vegetables	Fruits	Flowers	Spinach	
Kalkulam	30 (21.4)	60 (42.9)	15 (10.7)	35 (25.0)	140 (100)
Vilavancode	25 (22.7)	55 (50.0)	10 (9.1)	20 (18.1)	110 (100)
Thovalai	3 (6)	15 (30)	25 (50)	7 (14)	50 (100)
Total	59 (19.6)	130 (43.3)	50 (16.6)	62 (20.6)	300 (100)

Source: Computed from Primary data

Note: Figures in parentheses indicate the percentage to total

The above table exhibits that 43 per cent (130) have fruits, 21 per cent (62) respondents have spinach 19 per cent (59) have vegetables and least 17 percent (50) have flowers as intercrops to rubber trees. It is understood that the Majority of the respondent are preferred intercrops as fruits.

Among the **Kalkulamtaluk**, 43 per cent (60) have fruits, 25 per cent (35) respondents have spinach 21 per cent (30) have vegetables and least 11 percent (15) have flowers as intercrops to rubber trees. Among the **Vilavancodetaluk**, 50 per cent (55) have fruits, 23 per cent (25) respondents have spinach, 18 per cent (20) have vegetables and least 9 percent (10) have flowers as intercrops torubber trees. Among the **Thovalaitaluk**, 50 per cent (25) have fruits, 30 per cent (15) respondents have spinach, 14 per cent (7) have vegetables and least 6 percent (3) have flowers as intercrops to rubber trees.

**Distribution of sample respondent by Mode of Cultivation**

Based on the cultivation and marketing of the rubber cultivators are classified into Full time cultivators and Part time cultivators. The information regarding categories of rubber cultivators are given below.

**Table 9**  
**Mode of Cultivation**

Taluk	Mode		Total
	Fulltime cultivator	Part-time cultivator	
Kalkulam	90 (64.3)	50 (35.7)	140 (100)
Vilavancode	75 (68.2)	35 (31.8)	110 (100)
Thovalai	35 (70)	15 (30)	50 (100)
Total	200 (66.6)	100 (33.4)	300 (100)

Source: Computed from Primary data

Note: Figures in parentheses indicate the percentage to total

The above table inferred that 66.6 per cent (200) of respondents are full time cultivators and remaining 33.4 per cent (100) are part time cultivators. It signifies that Majority of the respondents are cultivating as on full time basis because of they are educated but unemployment and cannot do or concentrate other.

In **Kalkulamtaluk** 64 per cent (90) are cultivating as NR on full time basis, and remaining 36 per cent (50) are as on part time basis. In **Vilavancodetaluk** 68 per cent (75) are cultivating as NR on full time basis, and remaining 32 per cent (35) are as on part time basis. In **Thovalaitaluk** 70 per cent (35) are cultivating as NR on full time basis, and remaining 30 per cent (15) are as on part time basis.

**Distribution of sample respondent by Quality of Natural Rubber**

People are always choosing for quality product. Quality is an important aspect to sell a product. Quality product will be preferred by all sectors of people. Here, quality of the product could be classified into three cases, like Very well, Normal, below normal. The information regarding quality of rubber based on the sample respondents are given in the following table.

**Table 10**  
**Quality of Natural Rubber**

Taluk	Quality of Natural Rubber			Total
	Normal	Very well	Below normal	
KALKULAM	40 (28.6)	80 (57.1)	20 (14.3)	140 (100)
VILAVANCODE	35 (31.8)	60 (54.5)	15 (13.6)	110 (100)
THOVALAI	40 (80)	7 (14)	3 (6)	50 (100)
Total	115 (38.2)	147 (38.9)	38 (12.6)	300 (100)

Source: Computed from Primary data

Note: Figures in parentheses indicate the percentage to total

The above table shows that the 38.9 per cent (147) are feels that quality of rubber is very well, 38.2 per cent (115) are feels that the quality of rubber is Normal, and rest are 38 (12.6) per cent feels that quality of rubber is below normal. It is signifies that the Majority of the respondent feels that the quality of rubber produced in Kanyakumari district is one of the best quality in the world and the yield per acre is also very well compared to the other parts of India.

Among the **Kalkulamtaluk**, 57 per cent (80) are feels that the NR is very well, 28.6 per cent (40) are feels that normal and rest of the respondents 20 (14.3) per cent feels as Below normal.

Among the **Vilavancodetaluk**, 54.5 per cent (60) are feels that the NR is very well, 31.8 per cent (35) are feels that normal and rest of the respondents 15 (13.6) per cent feels as below normal. Among the **Thovalaitaluk**, 80 per cent (40) are feels that the NR is very well, 14 per cent (7) are feels that normal and rest of the respondents 6 (3) per cent feels as below normal.

**Distribution of sample respondent by Methods of Drying**

Drying of the crumbs, pellets or granules produced in all the new processes is carried out at about 100 c. Drying time depends upon the size of particles. Usually 4 to 8 hours are required for complete drying. The tunnel drier commonly used consists of a movable tray fitted under a stationary hood which contains an air circulating duct fan and heat exchanger. The following table explain methods of drying of rubber sheets.

**Table 11**  
**Methods of drying rubber sheets**

Taluk	Methods				Total
	Sun drying	Partial sun drying	Kitchen drying	Smoke house	
Kalkulam	37 (26.4)	28 (20.0)	10 (7.1)	65 (46.4)	140 (100)
Vilavancode	30 (27.3)	18 (16.4)	8 (7.3)	54 (49)	110 (100)
Thovalai	10 (20)	7 (14)	12 (24)	21 (42)	50 (100)
Total	77 (25.6)	53 (17.6)	30 (10)	140 (46.5)	300 (100)

Source: Computed from Primary data

Note: Figures in parentheses indicate the percentage to total

The above table shows that 46.5 per cent (140) are used smoke house, 26 per cent (77) are used sun drying, and 18 per cent (53) are used partial sun drying and least, 10 per cent (30) are used kitchen drying for rubber sheets. Minimum number of respondent are using kitchen drying for rubber sheets, because of they are having less than 2 acres of land for cultivation of rubber.

Among the Kalkulamtaluk, 46 per cent (65) are using smoke house, 26 per cent (37) are used sun drying, 20 per cent (28) are used partial sun drying and least, 7 per cent (10) are used kitchen drying for rubber sheets.

Among the Vilavancodetaluk, 48 per cent (54) are using smoke house, 27 per cent (30) are using sun drying, 16 per cent (18) are using partial sun drying and least, 7 per cent (8) are used kitchen drying for rubber sheets.

Among the Thovalaitaluk, 42 per cent (21) are using smoke house, 20 per cent (10) are used sun drying, 14 per cent (7) are used partial sun drying and 24 per cent (12) are used kitchen drying for rubber sheets.

**Distribution of sample respondent for Tapping the Rubber Trees**

Latex is obtained from the bark of the tree by tapping. Tapping is a process of controlled wounding during which thin savings of bark are removed. The aim of tapping is to cut open the latex vessels of rubber trees tapped for the first time or remove the coagulum. The following table explains the tapping of rubber trees.



**Table 12**  
**Tapping by the Rubber Trees**

Taluk	Tapping				Total
	Yourself	Tappers	Family members	All	
Kalkulam	10 (7.1)	75 (53.6)	25 (17.9)	30 (21.4)	140 (100)
Vilavancode	10 (9.1)	55 (50)	20 (18.2)	25 (22.7)	110 (100)
Thovalai	10 (20)	15 (30)	14 (28)	11 (22)	50 (100)
Total	30 (9.9)	145 (48.2)	59 (19.6)	66 (21.9)	300 (100)

Source: Computed from Primary data

Note: Figures in parentheses indicate the percentage to total

The above table examine that the 48 per cent (145) are tapping the trees by tappers, 22 per cent (66) are tapping trees by all, 20 per cent (59) are tapping the trees by their family members and 10 per cent are tapping the trees by him/her.

Among the Kalkulamtaluk 53.6 per cent (75) are tapping the trees by tappers, 21.4 per cent (30) are tapping the trees by all, 17.9 per cent (25) are tapping the trees by their family members and 7.1 per cent (10) are tapping the trees by him/her.

Among the Vilavancodetaluk 50 per cent (55) are tapping the trees by tappers, 22.7 per cent (25) are tapping the trees by all, 18.2 per cent (20) are tapping the trees by their family members and 9.1 per cent (10) are tapping the trees by him/her.

Among the Thovalaitaluk 30 per cent (15) are tapping the trees by tappers, 28 per cent (14) are tapping the trees by all, 22 per cent (11) are tapping the trees by their family members and 20 per cent (10) are tapping the trees by him/her.

**Distribution of sample respondents by using Type of Vessels**

The latex (milky rubber) that flows out is channelled into an attached container. Coconut shells and polythene cups or both used as vessels most Indian NR cultivators. Latex collected in the cups is transferred to clean bucket two/three hours after taping. The following table explains type of vessels used for collection of latex by cultivators.

**Table 13**  
**Type of Vessels**

Taluk	Vessels			Total
	Coconut	Plastic cup	both	
Kalkulam	30 (21.4)	40 (28.6)	70 (50.0)	140 (100)
Vilavancode	30 (27.3)	55 (50)	25 (22.7)	110 (100)
Thovalai	15 (30)	30 (60)	5 (10)	50 (100)
Total	75 (24.9)	125 (41.6)	100 (33.3)	300 (100)

Source: Computed from Primary data

Note: Figures in parentheses indicate the percentage to total

The above table exhibits that the 41.6 per cent (125) are using plastic cup, 33.3 per cent (100) are using both the cups and 24.9 per cent (75) are using coconut shell for collection of latex from the rubber trees. It could be understood that majority of the respondents are using plastic cups, which are easily available in the market and has long usage.

Among **Kalkulamtaluk**, 21.4 per cent (30) are using coconut shell, 28.6 per cent (40) are using plastic cup and remaining 50 per cent (70) are using both the cups. Among **Vilavancodetaluk**, 27.3 per cent (30) are using coconut shell, 50 per cent (55) are using plastic cup and remaining 22.7 per cent (25) are using both the cups. Among **Thovalaitaluk**, 30 per cent (15) are using coconut shell, 60 per cent (30) are using plastic cup and remaining 10 per cent (5) are using both the cups.

**Distribution of sample respondent for the factors affecting production**

Rubber cultivation in India has been traditionally confined to narrow belt extending from Kanyakumari district of Tamilnadu, in the south to Dakshin Kannada and Kodagu district of Karnataka and lying in general west of the western Ghats. The climatic conditions in the rubber tract vary from region to region and from year to year depends on rainfall. There are so many factors affecting production of NR. The factors are classified into five like Maintenance cost, Rain/Strom, Lack of labour, tapping, and Lack of finance. The following table shows that the factors affecting production of rubber.

**Table 14**  
**Factors Affecting Production**

Taluk	Factors Affecting Production					Total
	Maintenance cost	Rain/storm	Lack of labour	Tapping	lack of finance	
Kalkulam	29 (21)	17 (12.1)	24 (17.2)	43 (30.7)	27 (19.3)	140 (100)
Vilavancode	25 (23)	12 (10.9)	35 (31.8)	20 (18.1)	18 (16.4)	110 (100)
Thovalai	11 (22)	7 (14)	12 (24)	12 (24)	8 (16)	50 (100)
Total	65 (21)	36 (12)	71 (24)	75 (25)	53 (17)	300 (100)

Source: Computed from Primary data

Note: Figures in parentheses indicate the percentage to total

The above table exhibits that 25 per cent (75) of the respondents feels that tapping, 24 per cent (71) of the respondents are feels that lack of labour, 21 per cent (65) are feels that maintenance cost, 17 per cent (53) are feels that lack of finance, and 12 per cent (36) are feels that rain/storm.

It signifies that, majority of the respondents are feels that lack of availability of skilled labour and tappers. These factors might be affecting the production of rubber. Hence, in modern days new technology is adopted for tapping and planting rubber trees. So the awareness and training should be given to them.

**Co-efficient of regression, for Age and sources of production**

In order to find out the factors that determine the age of NR growers, and the selected nine variables have been regressed on sources of production of NR by the growers' index. The following regression equation has been framed to ascertain the impact of the variables on awareness.

**Co-efficient of regression, for Age and sources of production**

$$G I = MOD + a + b_1 VC + b_2 TFU + b_3 OP + b_4 OM + b_5 NOI + b_6 MOC + b_7 QOR + b_8 TOVU + b_9$$

where,

- GI = Growers Index
- a = Intercept term
- VC = Varieties of cultivation
- TFU = Types of Fertilizers Used
- OP = Own Plantation
- OM = Own Machine
- NOI = Name of Intercropping
- MOC = Mode of Cultivation
- QOR = Quality of Rubber
- TOVU = Types of Vessels Used
- MOD = Methods of Drying

The results of the regression analysis are shown in Table 3.23 of the nine variables taken for consideration two variables namely, varieties of cultivation and own machine in Kalkulam taluk, for consideration one variable is types of fertilizer used in vilavancodetaluk and for consideration two variables types of vessels used and methods of drying in Thoivalaitaluk with Others are not found to be significant. The other variables that influence the sources of the production of NR are discussed in the following paragraphs.

**Table 15**  
**Age and Sources of production**

Sources of production	Kalkulam taluk		Vilavancode taluk		Thoivalai taluk	
	t-value	P value	t-value	P value	t-value	P value
varieties cultivation	.997	.321	-1.356	.178	2.978	.005
Type of fertilizers used	2.032	.044	.352	.726	1.663	.104
Own Plantation	-2.381	.019	4.229	.000	2.429	.020
Own Machine	.841	.402	3.191	.002	-1.741	.089
Name of Intercropping	4.502	.000	-1.484	.141	2.938	.005
Mode of Cultivation	-3.690	.000	2.460	.018	3.610	.000
Quality of Rubber	-1.318	.190	2.446	.018	-1.778	.083
Type of vessels used	-3.217	.002	-2.208	.030	.355	.724
Methods of drying	2.451	.016	2.068	.009	.257	.798
<b>ANOVA<sup>s</sup></b>	<b>152.757</b>	<b>.000</b>	<b>222.164</b>	<b>.000</b>	<b>98.897</b>	<b>.000</b>

Source: primary data 5% level of significance

The table 3.23 reveals that, the ANOVA value is found to be significant at five per cent level. This shows that the regression equation framed is a good fit. The ANOVA value of Kalkulam taluk indicates that around 152.757, Vilavancode taluk indicates that the value is 222.164 and Thoivalai taluk indicates that the value is 98.897 of the variations in sources of the NR production due to the selected variables.

Table 16  
Education and Sources of NR production by growers in Kanyakumari

Sources	Kalkulam taluk			Vilavancode taluk			Thovalai taluk		
	Chi-square	Kendall's tau-b	Spearman Correlation	Chi-square	Kendall's tau-b	Spearman Correlation	Chi-square	Kendall's tau-b	Spearman Correlation
Varieties of NR	4.227	.912	.957	3.371	.901	.944	1.435	.906	.952
Type of fertilizers	1.598	.807	.883	1.100	.745	.860	1.321	.861	.921
Own plantation	1.194	.647	.714	1.100	.633	.698	50.000	.614	.685
Own machine	1.400	.419	.463	42.778	.319	.352	15.27	.320	.287
Name of intercropping	3.507	.860	.902	2.400	.812	.858	79.39	.793	.874
Quality of rubber	2.141	.803	.855	1.643	.794	.846	57.143	.613	.685
Types of vessels used	1.367	.777	.862	1.633	.807	.861	81.111	.814	.884
Methods of drying	2.717	.848	.915	1.753	.819	.902	43.421	.674	.751
Tapping of the rubber trees	2.518	.835	.892	1.989	.834	.890	1.001	.881	.933

Source: Primary data

This study reveals that all sources include, Varieties of NR cultivation, Type of fertilizers used, Own plantation, Own machine, Name of intercropping, Quality of rubber, Types of vessels used, Methods of drying, and Tapping the number of rubber trees have results are more than 0.5 level, it is a highly positive correlation, except own machine, shows Kendall's tau-b results among three taluks are 0.419, 0.319, and 0.32 respectively. Whereas, Spearman Correlation results among three taluks are 0.463, 0.352, and 0.287 respectively, hence it is considered as a low positive correlation.

In case of Chi-Square test is used for the relationship between education and sources of NR growers in Kanyakumari district, the results shown as significant.

**Factors of NR Growers in Kanyakumari District**

The following table explains that the factors of NR growers in Kanniyakumari district based on three taluks. The factors include Types of fertilizers used, own machine, own plantation, Varieties of intercropping, Mode of cultivation, types of vessels used, Methods of drying, Tapping of rubber trees, Preference of rubber cultivation, Quality of rubber, and smoking.

**Table 17**  
**Factors of NR Growers (Kendall's co-efficient of Correlation)**

Factors	Kalkulam	Vilavancode	Thovalai
Types of fertilizers used	.825	.765	.829
Own machine	.395	.316	.273
Own plantation	.625	.609	.578
Varieties of intercropping	.908	.856	.849
Mode of cultivation	.727	.710	.746
Types of vessels used	.847	.863	.749
Methods of drying	.827	.898	.643
Tapping of rubber trees	.860	.833	.899
Preference of rubber cultivation	.788	.572	.921
Quality of rubber	.912	.605	.574
Smoking	.912	.509	.675

Source: primary data 5% level of significance

This study reveals that all the factors have the results of variables are more than 0.5 except own machine, shows results are .395, .316 and .273 respectively, so it is a highly positive correlation.

**SUMMARY OF NATURAL RUBBER PRODUCTION**

Kanyakumari district is selected as the study area. The rubber is a vital product in the life of every human being in the contemporary era. It supports the life of the mass through its diverse benefits this material has multifarious uses and there are hardly any segments of society, which do not use rubber and rubber based products. In our daily life, we are always involved with products made of rubber. Production of NR in India at present is below the domestic demand, forcing the country to import NR from other rubber producing countries.

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