

*Usefulness of Incentives Provided by
Rubber Board to the Rubber Growers of
Kottayam Taluk*

By

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Dissertation

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DECLARATION

I hereby declare that this dissertation entitled "Usefulness of incentives provided by Rubber Board to the rubber growers of Kottayam taluk" is a bonafide record of research work done by me and that this dissertation has not previously formed the basis for award to me of any degree, diploma or other similar titles of any other University or Society.

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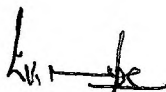


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CERTIFICATE

Certified that this dissertation entitled "Usefulness of incentives provided by Rubber Board to the rubber growers of Kottayam taluk" is a record of research work done independently by Smt.Ponnamma V. John under our guidance and supervision and that it has not previously formed the basis for the award of any degree or diploma to her.

We the undersigned members of the Advisory Committee of Smt.Ponnamma V. John, a candidate for the Post Graduate Diploma in Natural Rubber Production, agree that the dissertation may be submitted by her in partial fulfilment of the requirements of the diploma.



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I bow my head before the God Almighty, whose blessings are always with me, enabling me to undertake this venture successfully.

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A handwritten signature in black ink, appearing to read 'Ponnamma V. John', with a stylized, cursive script.

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CONTENTS

Sl.No.	Title	Page Number
1	INTRODUCTION	1
2	REVIEW OF LITERATURE	3
3	MATERIALS AND METHODS	6
4	RESULTS AND DISCUSSION	12
5	SUMMARY AND CONCLUSION	33
	REFERENCES	
	APPENDICES	

LIST OF TABLES

Table No.	Title	Page No.
1	Class wise area and clone used by subsidy availed and unavailed growers	13
2	Planting materials used by the selected growers	14
3	Manuring, plant protection and irrigation adopted by subsidy availed and not availed units	16
4	Establishment of leguminous cover crop in subsidy availed and unavailed units	19
5	Soil and moisture conservation measures adopted in subsidy availed and unavailed units	20
6	Extent of retention of other trees in subsidy availed and unavailed units	23
7	Extent of intercropping in subsidy availed and unavailed units	25
8	Expenditure incurred for processing of latex by growers who possess and did not possess roller	27
9	Quality of sheets produced by the growers who possess and did not possess smoke house	29
10	Plant girth and yield of dry rubber as influenced by subsidy availed and unavailed units	31

LIST OF FIGURES

Fig. No.	Title
1	Percentage of different soil and water conservation measures adopted by subsidy availed group
2	Percentage of different soil and water conservation measures adopted by those who did not avail subsidy
3	Girth of plants under subsidy availed and not availed groups
4	Difference in yield of plants under subsidy availed and not availed units

LIST OF APPENDICES

Appendix No.	Title
1	Map of Kottayam taluk
2	The weather data of Kottayam taluk
3	Questionnaire used for the survey
4	The list of growers selected for the study

Introduction

INTRODUCTION

The rubber tree, Hevea brasiliensis is the most important perennial plant species commercially exploited for the natural rubber which is a versatile vegetable produce used for the manufacture of multitude of products of human dependence.

Though the first commercial rubber plantation in India was started as early as 1902, the systematic development of rubber plantations commenced only during 1955 by the launch of the Indian Rubber Board. The main objective of the Rubber Board is to promote by such measures as it thinks fit the development of the rubber industry, which include the undertaking, assisting or encouraging scientific, technological or economic research.

The Indian rubber industry has registered tremendous growth in terms of area, production and productivity since 1950 (Rubber Board, 1994). During 1950-51 the total area under rubber in India was only 74,915 ha which was increased to 5,10,000.ha in 1993-94. The production has also registered the same trend during the period, with an increase from 15,830 tonnes to 4,35,000 tonnes. Such a notable increase in production could be achieved possibly due to the increase in productivity (284 kg/ha to 1215 kg from 1950-51 to 1993-94). Kerala is the largest rubber producing state in the country. Kottayam taluk with 10,069 ha registered area under rubber (18.64% of total geographical area of the taluk), plays a predominant role in the production of rubber in the state.

The Rubber Board is implementing many schemes aiming at the development of rubber plantation industry by way of increasing production and productivity, improving/refining the processing methods and strengthening marketing power of small holders. From 1957 onwards, a variety of development schemes such as Replanting Subsidy Scheme, New Planting Subsidy Scheme, Maintenance Loan Scheme and Rubber Plantation Development Scheme were in operation. The aforesaid schemes had a very good impact on overall production as well as productivity of rubber in the country. However, no systematic assessment of the schemes so far implemented has yet been made. Therefore, the investigations reported herein, were undertaken in order to evaluate the usefulness of incentives provided by the Rubber Board to the rubber growers of Kottayam taluk, which represent the most potential rubber growing area in the state.

Review of Literature

REVIEW OF LITERATURE

With the advent of high yielding varieties and modern methods of vegetative propagation in rubber, the Rubber Board took special interest to replant all the old unproductive seedling plantations. In the early stages, a special consideration was given to the growers who started planting very early and who registered the rubber estate with the Rubber Board. So, in order to increase the production, the growers were encouraged to replace the low productive materials with advanced planting materials. The Replanting Subsidy Scheme launched in 1957 was for the benefit of the replanters only. Later on, in 1979, New Planting Subsidy Scheme was also introduced.

Inspired by the unprecedented success of the New Planting Subsidy Scheme, an integrated scheme for Rubber Plantation Development (RPD) was introduced in 1980. It replaced the Replanting and New Planting Subsidy Schemes. Since the launch of the scheme there was tremendous increase in area, production and productivity of rubber in the country.

No systematic study has been conducted so far to evaluate the usefulness of the various incentives provided by the Rubber Board to the rubber growers.

Chithrangadan (1985) reported that under the various schemes, 114496 permits were issued and replanting/new planting were carried out in 116368 ha during 1957-1984 period.

Eventhough, only 116368 ha were covered under the various schemes, the influence of the schemes and activities of Rubber Board were reflected in the area, production and productivity of rubber. In 1948-49 the total area under rubber plantation was only 65376 ha which shot up to 35,0000 ha in 1984-85. So also, the productivity had increased to 890 kg/ha in 1984-85 which was only 320 kg/ha in 1948-49. Moreover the total production of natural rubber in 1948-49 was only 15314 tonnes which went up to 1,86,450 tonnes in 1984-85. The various schemes implemented by the Rubber Board might have considerably contributed towards those achievements.

Small holder sector occupies a dominant position in the natural rubber industry of India. The share of small holdings in the total area under rubber had increased from 63 per cent in 1961 to 83 per cent in 1990 (Rubber Board, 1991). The other factors such as exemption from land ceiling legislation and promotional schemes of the government etc. promoted the small growers to cultivate rubber extensively (George et al., 1988).

Financial incentives were provided by the Replanting Subsidy Schemes 1957. However, the New Planting Subsidy Scheme started during 1979 were finally merged with the Replanting Subsidy Scheme and an Integrated Rubber Plantation Development Scheme was started in 1980. But, the resultant increase in area under natural rubber cultivation and production between 1955-56 and 1989-90 could not meet the steadily increasing internal demand leading to dependence on import of natural rubber.

It is in this back drop that the Rubber Board introduced a scheme of input subsidies in 1986-87 with a short term objective of increasing production and productivity in the dominant small holding sector by modifying the prevailing cultural practices. During the first year of operation (1986-87) the scheme covered nine major items consisting of chemical fertilizers, fungicides, pest protection materials and plastic cups (George, 1992).

There has been a wide spread feeling though not backed up by authentic data that a sizable section of the small holding sector of the rubber planting community is not taking advantage of the various aid schemes of the Rubber Board. The results of a survey conducted by the Rubber Board in Palai area have revealed that out of the 401 holders selected for the study, only 215 utilised the subsidy which cover 54 per cent of the total (Pillai, 1974).

Materials and Methods

MATERIALS AND METHODS

The present study was conducted in Kottayam taluk during the period from April, 1994 to June, 1994 with the main objective of evaluating the usefulness of various subsidy schemes (like cash subsidy, subsidy schemes for roller, smoke house, irrigation etc.), with reference to its impact in maximising the production and productivity of natural rubber and also in the promotion of rubber planting. The study also envisaged the identification of the constraints if any so as to streamline the execution of the schemes accordingly.

Kottayam taluk which is situated at the western corner of Kottayam district has a total area of 54002 ha (Appendix-I). Of this, 18.64 per cent is under registered rubber units. Due to its proximity to the Rubber Board and the Rubber Research Institute of India, most of the growers in the taluk are well aware of the latest scientific technologies of crop production and processing and are adopting those to a greater extent. Almost all the growers depend on the Rubber Board for technical advice.

Agroclimatic conditions prevailing in the locality is highly suitable for rubber cultivation. The weather data of the region for the last five years is furnished in Appendix-II. The soil in the region is of lateritic type. Occasionally, few rocky patches are also seen here and there. The soil is acidic in reaction with a pH range of 4.5 to 6.0. Eventhough, soil is poor

in plant nutrients, its physical condition is well suited for rubber cultivation. The soil has good aggregate stability which facilitates good aeration and free drainage. The terrain of the land is flat and undulating with gentle slope.

One hundred small grower units from Kottayam taluk were selected at random from the list available at the Rubber Board Regional Office, Kottayam, which comprised 20 growers who have availed the subsidy under RPD schemes and 15 farmers each for the scheme for promotion of irrigation, construction of smoke house and purchase of sheeting rollers. As control, 20 farmers, who have planted rubber but have not availed the subsidy, five farmers each of whom did not have roller, smoke house and irrigation facilities were also selected. In the case of RPD scheme, units planted between 1980-84 were selected. For other schemes, farmers who have availed the subsidy during 1990-92 were selected. The required information was gathered directly from the growers by personal interview using a pretested questionnaire (Appendix-III). The list of selected growers is also furnished in Appendix-IV. The factors behind their motivation to take up rubber planting, adoption of scientific methods of cultivation, upkeep processing of the crop etc. were ascertained. The mean values of the data collected were tabulated to find out the extent to which Board's schemes have enabled them to adopt scientific cultivation.

The observation such as details of the holder and holding, management practices, details of cash subsidy availed,

growth performance of plant, yield and quality aspect, method of processing and disposal were recorded as detailed below:

3.1. Details of the holder and holding

For this, name and address of the farmer, year of planting, extent planted and planting material used were recorded. The units were grouped into different categories ranging from 0.1 to 2.0 ha in the case of subsidy availed and 0.05 to 0.80 ha in the case of subsidy unavailed. The relative share of units coming under each class were also worked out.

3.2. Management practices

With respect to the management practices, details on the cultural operations, plant protection and soil conservation methods adopted were recorded.

Details of the planting materials used by the selected growers were noted. For this the planting materials were grouped into three ie. polybagged plants, budded stumps and field budded ones. The number of units were separately grouped according to the planting material used and the respective percentages calculated separately for the subsidy availed and unavailed groups.

With respect to manuring, the subsidy availed and subsidy-not-availed farmers were grouped into two and in each group they were again subgrouped into two based on the method of fertilizer application (discriminatory and general). The percentage of the units under each group was also computed.

In the case of plant protection (spraying), the subsidy availed and subsidy-not-availed units were grouped into two according to spraying done or not done and from each unit, the percentage worked out.

With respect to irrigation, the subsidy availed and subsidy-not-availed units were grouped into two and the units planted during 1990 (4 year old) were selected in both the cases. Under each group ten plants were selected at random and the girth measured at a height of 50 cm from the bud union and average girth calculated.

With respect to the establishment of leguminous cover crop, three classes were formed according to the stage of establishment, such as leguminous cover well established, present in patches and not planted.

For the collection of data on soil and water conservation in rubber plantation, five groups were formed according to the method used (edakayyala, terraces, mulching, silt pit and no method adopted). Subsidy availed and subsidy-not-availed farmers were separately grouped into two and in each group the percentage adoption of each practice was calculated.

With respect to maintenance of the soil and moisture conservation structures the subsidy availed and subsidy-not-availed units were grouped into two. Depending on the extent of maintenance based on visual assessment, they were again grouped as

"satisfactory", "average" and "poor". The percentage of each group was also worked out.

Regarding the retention of other trees also, the subsidy availed and subsidy-not-availed units were grouped into two. According to the presence of other trees they were grouped into "above limit", "normal" and "below limit" following the norms prescribed by the Rubber Board and the percentage for each unit was calculated.

In respect of the extent of adoption of intercropping in rubber plantation, they were grouped according to the types of intercrops (tapioca, banana, ginger, other crops and no intercropping) and the relative percentages calculated.

3.3. Growth performance of plant

To find out the growth performance of the plants, 20 trees (RRII 105) under tapping from each holding were selected at random and the girth measured at a height of 50 cm from the bud union. The girth of plants at different years of planting (ie. 10th to 14th year old) were tabulated separately.

3.4. Yield

The yield data (dry rubber) were collected from the records maintained by the farmers. Mean yield per hectare was computed and expressed as average production per year in kilograms.

3.5. Processing of latex

Method of processing of the latex, adopted by each farmer was noted. The data on the extent of utilisation of roller and smoke house were gathered and recorded as per the interview schedule.

With respect to processing of the latex, the subsidy availed and subsidy-not-availed units were grouped into two and according to the utilisation they were again grouped into two ie. "own use alone" or "rented out". The method of payment of roller charges by the growers who did not own the roller was observed and recorded. The data were separately computed and the percentages worked out.

According to the utilisation of the smoke house, the units (for those who have own smoke house) were grouped into four ie. "improvement in quality", "no improvement in quality", "additional benefit received" and "not received". For those who have no smoke house, the units were grouped into three according to the quality of sheet and value realised for the product.

Results and Discussion

RESULTS AND DISCUSSION

The data collected during the course of investigation are systematically arranged, mean values worked out and presented in various tables. The results of the study are discussed here-under:

4.1. Size of holding

The data on area and the clone used are presented in Table 1. From the information gathered, it is seen that in general, the units selected come under the small size class, both in the case of those who availed subsidy and those who have not availed subsidy (40% in the former and 35% in the later group). Irrespective of the size of units, in the case of subsidy availed growers, the planting material used was the same, that is, RRII 105. However, in the other case 85 per cent of units were planted with RRII 105, 10 per cent with RRII 300 and remaining 5 per cent units with RRII 203. The actual area representing the subsidy availed group worked out to 9.22 ha and in the case of those who have not availed subsidy, the planted area was only 6.68 ha. In all the cases only improved clones recommended by Rubber Board were used.

4.2. Planting material

The data presented in Table 2 give an idea about the type of planting material used by the growers selected for the study. Out of the 20 units which availed subsidy, 50 per cent

Table 1. Class wise area and clone used by subsidy availed and unavailed growers

Size class (ha)	Area		Clone			
	Actual area (ha)	No. of units	% of total units	RRII 105 % of total units	RRII 300 % of total units	RRII 203 % of total units
<u>A. Subsidy availed</u>						
1) 0.10 to 0.25	1.71	8	40	40	-	-
2) 0.26 to 0.40	1.88	6	30	30	-	-
3) 0.41 to 0.80	2.42	4	20	20	-	-
4) 0.81 to 2.00	3.21	2	10	10	-	-
Total	9.22	20	100	100	-	-
<u>B. Subsidy not availed</u>						
1) 0.05 to 0.20	1.07	7	35	30	5	-
2) 0.21 to 0.30	1.20	4	20	15	-	5
3) 0.31 to 0.45	2.51	6	30	25	5	-
4) 0.46 to 0.80	1.90	3	15	15	-	-
Total	6.68	20	100	85	10	5

Table 2. Planting materials used by the selected growers

Planting material	Subsidy availed		Subsidy not availed	
	No. of units	Percent-age	No. of units	Percent-age
1. Polybagged plants	10	50	3	15
2. Budded stumps	10	50	15	75
3. Field budding	--	--	2	10
Total	20	100	20	100

each were planted with polybagged plants and budded stumps. However, in the case of farmers who have not-availed the subsidy, three units were planted with polybagged plants (ie. 15%), 15 units with budded stumps (ie. 75%) while two resorted to field budding (10%).

It could be seen that most of the growers who have availed subsidy had gone for high quality planting material. One of the contributing factors for the same may be that, while using polybagged material for planting, subsidy at the rate of Rs.6/- per plant will be received as per the scheme. The cost of the budded stumps are lower than that of the polybagged plants. So also, field budding is usually done in order to reduce the expenditure on planting material. From the survey it was revealed that most of the rubber growers whether they avail subsidy or not, are well aware of quality planting material. But high cost for such material was the only limiting factor.

4.3. Manuring, plant protection and irrigation

The data on fertilizer application, plant protection (spraying) and irrigation are tabulated in Table 3. Among the subsidy availed growers (20 Nos.), five (25%) had applied fertilizer by adopting discriminatory method ie. based on soil and foliar nutrient analysis, where as 15 farmers (75%) had followed only general recommendations by the Board. But in the case of those who did not avail the subsidy, all of them had resorted to general recommendations.

Table 3. Manuring, plant protection and irrigation adopted by subsidy availed and not availed units

Particulars	Fertilizer application		Spraying		Irrigation	
	No. of units	Percent-age	Particulars	No. of units	Percent-age	No. of units
						Plant girth at 4th year (cm)
<u>A. Subsidy availed</u>						
Discreminatory	5	25	Done	8	40	15
General recommendation	15	75	Not done	12	60	Nil
Total	20	100		20	100	29
<u>B. Subsidy not availed</u>						
Discreminatory	-	-	Done	2	10	Nil
General recommendation	20	100	Not done	18	90	5
Total	20	100		20	100	19

Those who are availing subsidy from Rubber Board usually get adequate information regarding the benefits of discriminatory fertilizer application from the Rubber Board Officers who visit the field frequently, whereas those who do not avail the subsidy may not be well aware of the advantages of the discriminatory fertilizer application which resulted in the non-adoption of the same.

With respect to the adoption of timely plant protection, 40 per cent of the subsidy availed growers have done the spraying operation. Whereas, in the case of those who have not availed the subsidy the same was only ten per cent. Most of the farmers have planted with RR11 105 clone which has a great degree of tolerance to abnormal leaf fall disease. This unique character of this particular clone might have influenced the growers to refrain from the spraying operations even in the case of subsidy availed growers. The low rate of adoption in the other case may be due to the high expenditure involved.

The data on irrigation presented in Table 3 reveal the positive response of the crop to irrigation. When irrigated plants put forth an average girth of 29 cm by fourth year whereas the unirrigated plants attained only 19 cm girth. The farmers who availed subsidy for irrigation have purchased pumpset and irrigated the land which in turn resulted in attaining an increased girth of 10 cm as compared to the non-irrigated area. The non-adoption of irrigation may be mainly due to scarcity of water

during summer months. However, finance was also found to be a limiting factor at installation stage.

4.4. Establishment of leguminous cover crop

In the area planted by availing subsidy, leguminous cover crop was well established in 10 units (50%) and in the remaining 10 (50%) the cover crop was established only in patches (Table 4). In the case of subsidy not availed, only in two units (10%) the leguminous cover was well established, in three (15%) it was found established in patches and in 15 units (75%) leguminous cover crop was not planted at all.

In subsidy availed cases, the farmers are aware of the advantages of growing cover crop with respect to soil and moisture conservation and control of weed growth. Moreover, establishment of cover crop in rubber plantation during the fourth year is a pre-requisite for getting the subsidy. Those who do not avail subsidy may not be particular in growing cover crops. They may resort to intensive intercropping too, so as to thrive over their financial constraints at immaturity period.

4.5. Soil and water conservation

The data on soil and water conservation are furnished in Table 5 and depicted in Fig.1 and 2. Different methods were being adopted at varying degrees by the farmers in different groups. One or the other method was adopted by the subsidy availed farmers. Majority (75%) of the subsidy availed farmers

Table 4. Establishment of leguminous cover crop in subsidy
availed and unavailed units

Particulars	Subsidy availed		Subsidy not availed	
	No. of units	Percent- age	No. of units	Percent- age
1. Well established	10	50	2	10
2. Present in patches only	10	50	3	15
3. Not planted at all	--	--	15	75
Total	20	100	20	100

Table 5. Soil and moisture conservation measures adopted in subsidy availed and unavailed units

Particulars	Subsidy availed		Subsidy not availed	
	No. of units	Percent-age	No. of units	Percent-age
Edakayyalas	15	75	8	40
Terraces	3	15	3	15
Mulching	--	--	--	--
Silt pits	2	10	7	35
No method adopted	--	--	2	10
Total	20	100	20	100

Maintenance of the soil and moisture conservation structures

Satisfactory	20	100	-	--
Average	--	--	14	70
Poor	--	--	6	30
Total	20	100	20	100

SUBSIDY AVAILABLE

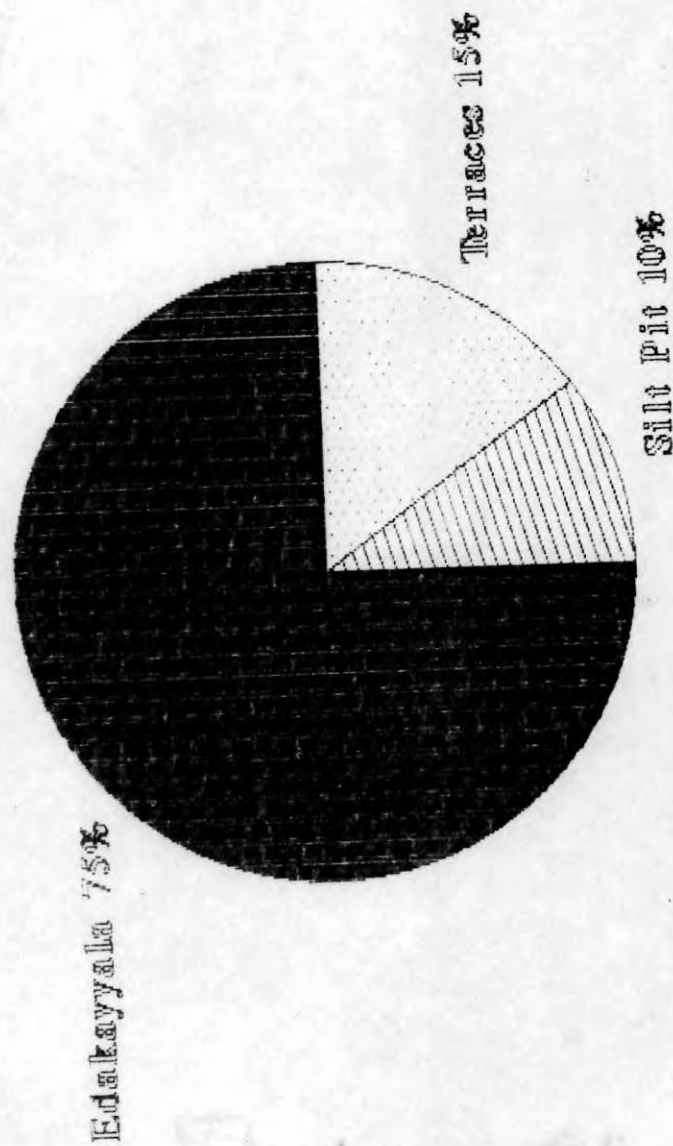


Fig.1. Percentage of different soil and water conservation measures adopted by subsidy available group

SUBSIDY NOT AVAILABLE

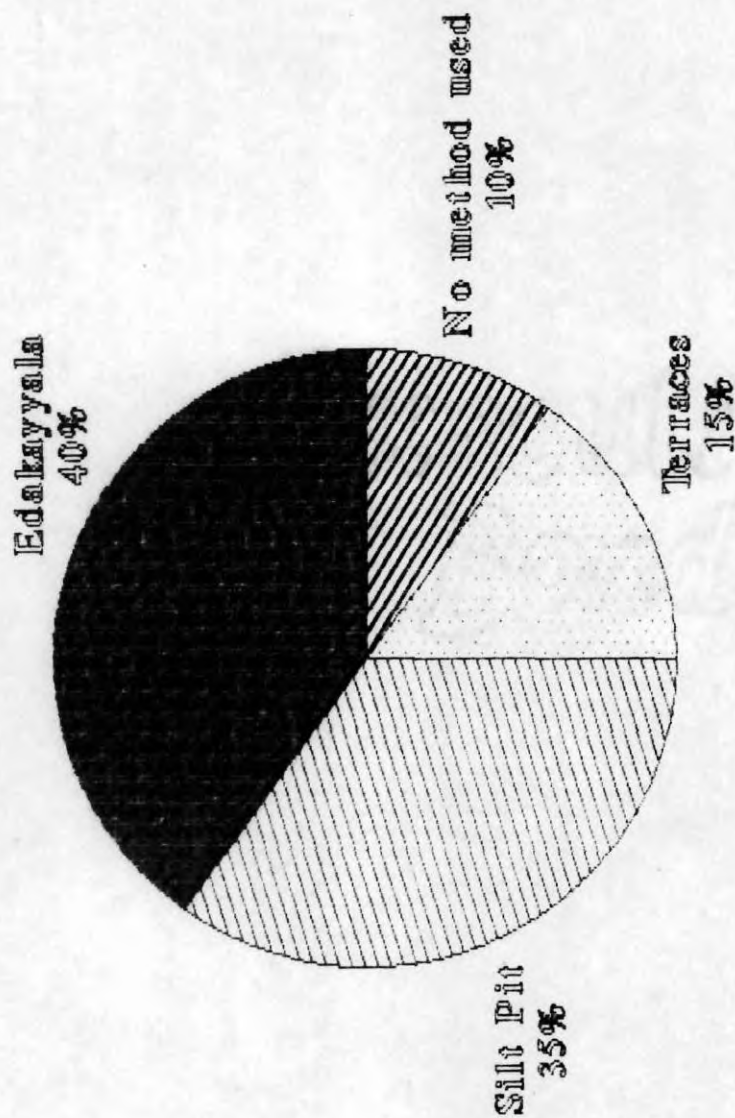


Fig.2. Percentage of different soil and water conservation measures adopted by those who did not avail subsidy

had constructed edakayyalas for soil and moisture conservation.

Forty per cent (8 units) farmers who did not avail the subsidy, also had constructed edakayyalas. It becomes inevitable when cultivation is done in sloppy areas. Stone is available in plenty in that locality. Usefulness and better durability of the method as compared to others may also be a factor that led to the higher adoption of that practice irrespective of subsidy availed or not.

With respect to terracing, the method was followed only in 15 per cent of the units both in subsidy availed and not availed groups. It was observed that in subsidy availed units, the platforms were later joined to make complete terraces. However, in subsidy-not-availed cases separate terraces for individual plants were formed. The continuous terrace with uncut earth in between plants will help to check the surface run off to a great extent.

Mulching, eventhough a very effective practice of soil and moisture conservation was not seen adopted in any of the units. One of the reasons may be that mulching is more effective in younger plantations rather than in mature plantations. (The non-availability of mulching materials in sufficient quantity may also be another constraint for the non-adoption of the practice). Further more, the deciduous nature of rubber trees provide sufficient natural mulch on the soil surface.

Regarding digging of silt pits which is another effective method of soil as well as moisture conservation, the practice was followed in 10 per cent and 20 per cent respectively in subsidy availed and subsidy-not-availed cases. The low level of adoption of this practice in subsidy availed units may be due to the higher adoption of other practices like formation of edakayyalas or terraces. In subsidy-not-availed cases, sometimes this operation might have become necessary due to the sloppy topography of the land.

When we consider the maintenance of the soil conservation structures it could be seen that in the case of subsidy availed units, the maintenance was satisfactory. Whereas, in the case of growers who did not avail the subsidy, the extent of maintenance was only average or poor.

4.6. Retention of other trees

The results of the study on the retention of other trees furnished in Table 6 reveal that in majority of the subsidy availed units (75%), the stand of other trees permitted by the Rubber Board was normal. However, in five units (25%) the actual stand was even below the limit prescribed. On the contrary, in the case of growers who have not availed the subsidy, all the units surveyed had other trees at above the limit. The presence of other trees will naturally affect the growth and development of rubber by way of posing competition for moisture, nutrient and solar energy. The high population

Table 6. Extent of retention of other trees in subsidy availed and unavailed units

Particulars	Subsidy availed		Subsidy not availed	
	No. of units	Percent-age	No. of units	Percent-age
Above limit	--	--	20	100
Normal	15	75	--	--
Below limit	5	25	--	--
Total	20	100	20	100

density may also aggravate the pests and disease problems in the plantation. The facts being the above, the farmers who were not in receipt of subsidy might have knowingly retained the other trees in excess, mainly on account of the expected additional income from other trees, without taking into consideration the adverse effect on the main crop in the long run. In the case of those who availed the subsidy, the removal of excess trees is a pre-requisite for getting the subsidy and hence 100 per cent adoption of the recommendation.

4.7. Intercropping

The data on the extent of intercropping are furnished in Table 7. It was observed that intercropping was done by all the growers who have not availed the subsidy. But in the case of subsidy availed planters 25 per cent of the units were not intercropped with any of the intercrops. Tapioca (30% unit) was found to be the most prominent intercrop in the units without any subsidy. Whereas, banana and ginger were the most common intercrops in subsidy availed units.

In the case of plantations raised without availing subsidy, 25 per cent units were utilised for raising rubber nursery and pineapple. Intercropping with tapioca was not seen practiced in any of the units which received the subsidy. In a sizable area without subsidy, tapioca was found to ^{be} a main intercrop, may be due to the higher returns from that intercrop, of course, at the expense of the main crop. Cultivation of tapioca also

Table 7. Extent of intercropping in subsidy availed and
and unavailed units

Particulars	Subsidy availed		Subsidy not availed	
	No. of units	Percent- age	No. of units	Percent- age
Tapioca	--	--	6	30
Banana	8	40	5	25
Ginger	7	35	4	20
Other crops	--	--	5	25
No intercropping	5	25	--	--
Total	20	100	20	100

attract rodents which may damage the root of rubber. It could be seen that the intercrops grown by the farmers availing subsidy are all beneficial in one way or other to the growth of the main crop. The ginger improves the organic matter status of the soil and thereby the physical properties. The rubber plant may also get benefited by the large quantity of fertilizers applied to the ginger crop. Banana, in addition to improving the organic matter content of the soil also helps in the moisture conservation in the plantation. The ignorance of the farmers (in the subsidy-not-availed group) regarding the effect of intercrops on rubber might have led to the practice of following unscientific crop combination. The higher return during the early period may be another factor behind the motivation. However, in the case of subsidy availed growers there is no choice other than following the intercropping with the intercrops recommended by the Board.

4.8. Processing of latex

The data on processing are tabulated in Table 8. In the case of those who were having rubber roller, 53 per cent of the farmers (8 units) were using the roller for own use alone while 47 per cent of the growers (7 units) had also rented out the roller realizing an amount of Rs.2730.00 per year.

In respect of those who did not possess the roller, an additional amount of Rs.1950.00 per year need be spent on account of rent for sheeting outside. About 40 per cent of the

Table 8. Expenditure incurred for processing of latex by growers who possess and did not possess roller

Particulars	Number of units	Percentage	Amount received/paid
<u>Having own roller</u>			
Own use alone	8	53	--
Rented out	7	47	+2730.00
Total	15	100	+2730.00
<u>Having no roller</u>			
Rent alone paid	3	60	-1350.00
Rent for sheeting outside	2	40	- 600.00
and additional wages paid and sheeting outside			- 250.00
Total	5	100	-2200.00

farmers in that group had also expended an amount of Rs.250.00 per year towards the additional wages to the tapper for sheeting outside. So, a total loss of Rs.2200.00 was sustained per year by those who were not having roller, on account of rent as well as additional wages for sheeting outside. The possession of roller is always beneficial in terms of reducing cost of processing. The initial investment for the purchase of roller is high and the subsidy is only Rs.1000.00. This may be the reason for not purchasing the roller eventhough most of the farmers are aware of the beneficial effects of having a roller. The smallness of the holding may be another possible reason for nonpossession of roller in the surveyed area.

4.9. Smoke house

The data on the beneficial effects of having smoke house are given in Table 9. The results of the survey had revealed that a definite improvement in quality of sheet could be achieved by having own smoke house. Though there was quality improvement in all the units (15 Nos.) having smoke house only in 87 per cent (13 units) of the cases, the additional benefit in terms of higher prices (Rs.21865 per year) for the product could be realized. In the remaining 13 per cent of the units (2 Nos.) higher price was not obtained for better quality. During the survey, it could be observed that due to non-availability of superior grade sheet in sufficient quantity, the dealers in the locality are purchasing the sheet as a single lot without grading.

Table 9. Quality of sheets produced by the growers who possess and did not possess smoke house

Particulars	Number of units	Percentage	Amount
<u>Having own smoke house</u>			
Improvement in quality	15	100	---
No improvement in quality	--	--	---
Total	15	100	---
<u>Additional benefit</u>			
Received	13	87	21865.00
Not received	2	13	
Total	15	100	21865.00
<u>Having no smoke house</u>			
Deterioration in quality	3	60	---
Additional benefit received	2	40	---
Reduction in price	--	--	5000.00
Total	5	100	5000.00

However, in the case of those who have not availed the subsidy or those who do not possess smoke house, there was deterioration of quality of the produce in 60 per cent of the units. The remaining 40 per cent farmers were getting good quality sheet and additional benefit for the same. Due to deterioration of quality the loss suffered was to the tune of Rs.5000.00 per year by three units (60%).

The subsidy could bring out the importance/necessity of having smoke house for getting better quality sheet and thereby providing additional income to the growers. In this context it may be worth noting that the subsidy scheme has helped a lot in the production of quality sheet.

4.10. Impact of subsidy schemes on plant growth and yield

The impact of subsidy scheme on the growth of rubber in terms of girth as well as the yield per hectare is furnished in Table 10 and Fig.3. With regard to the girthing of plants, irrespective of the age, all the plants coming under the units which received subsidy, a higher girth was observed as compared to those units which did not receive subsidy. The difference in girth varied from 78 cm to 60 cm between 1980 planting (14 year old) and 1984 planting (10 year old). The percentage increase in girth being 34 in 14 year old plants and 25 in 10 year old plants. In general, the average increase in girth was 29 per cent.

Table 10. Plant girth and yield of dry rubber as influenced by subsidy availed and unavailed units

Year/age	Number of units	Average girth (cm)	Percentage increase	Average production (kg/ha)	Percentage increase
<u>1980/14</u>					
Subsidy	5	78	34	2375	115
No subsidy	3	58		1100	
<u>1981/13</u>					
Subsidy	4	73	30	2150	99
No subsidy	2	56		1080	
<u>1982/12</u>					
Subsidy	1	70	29	1900	95
No subsidy	2	54		970	
<u>1983/11</u>					
Subsidy	5	65	27	1730	92
No subsidy	9	51		900	
<u>1984/10</u>					
Subsidy	5	60	25	1600	88
No subsidy	4	48		850	
<hr/>					
Mean					
Subsidy	-	69	29	1951	98
No subsidy	-	53		980	

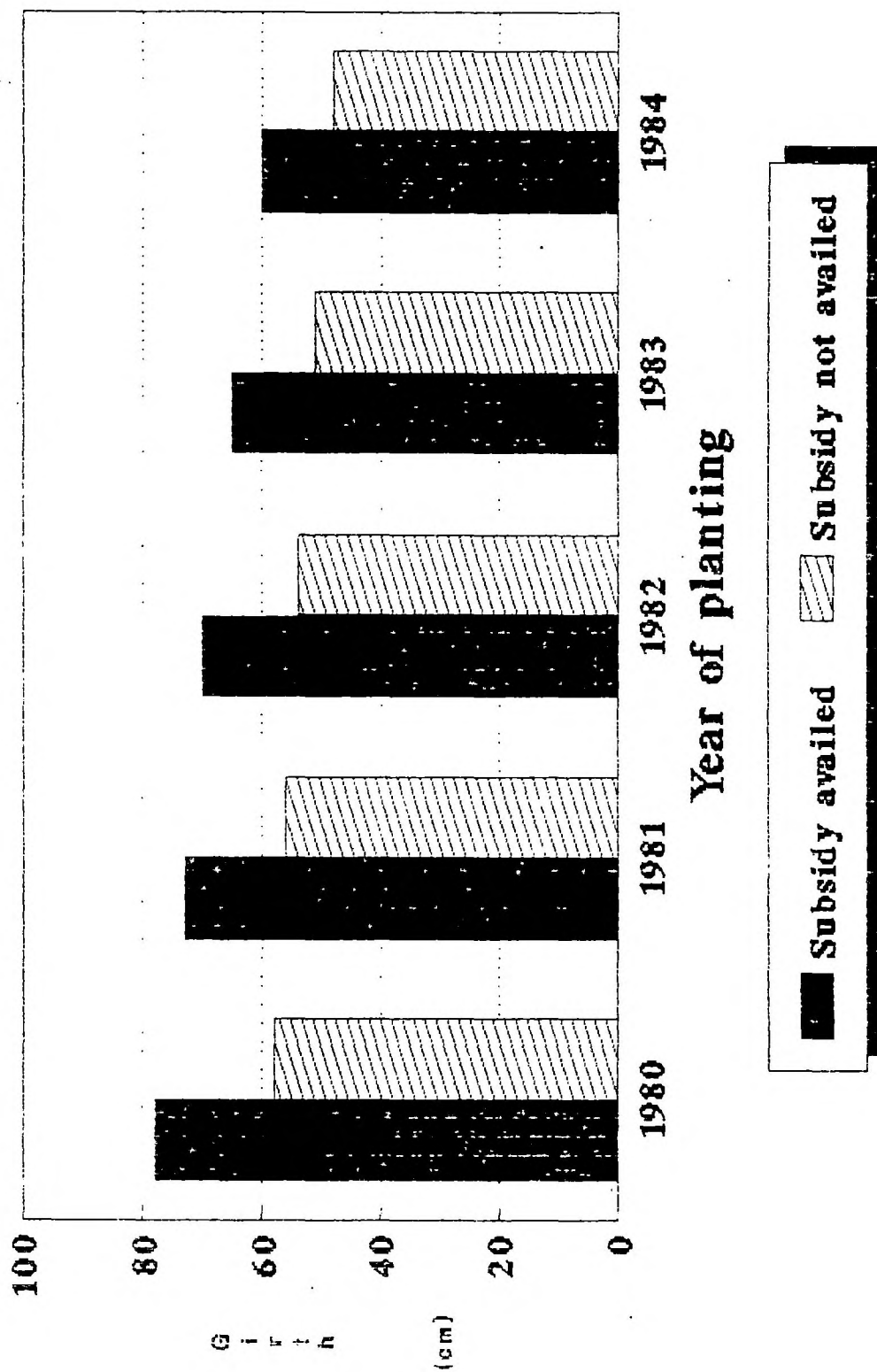


Fig.3. Girth of plants under subsidy available and not available groups

In the case of production also the same trend was observed. There was a reduction in yield in the case of units which have not availed subsidy as compared to those which have availed subsidy (Fig.4). The percentage increase in production as influenced by subsidy scheme was to the extent of 115 per cent during 1980 (14 year old) and 88 per cent in 1984 planting (10 year old). In general, the average increase in production was 98 per cent.

The data furnished in Table 10 also reveal that the percentage increase in plant girth and dry rubber yield per hectare registered a steady increase with increasing age.

The increased production may be as a result of the higher growth rate contributed by a number of factors like scientific management, timely and effective plant protection etc. In the case of growers those who have availed the subsidy are bound to follow the scientific management practices recommended by the Rubber Board and will be subjected to periodic evaluation by the Board. But in the case of those who have not availed the subsidy, most of the growers may not be following the improved production technologies to a great extent. This may be either due to the non-availability of finance in time or due to the lack of awareness about the beneficial effects of scientific cultivation. The impact of the subsidy schemes in increasing the productivity and production of quality rubber products in Kottayam taluk is clearly evident from the results of the present investigations.

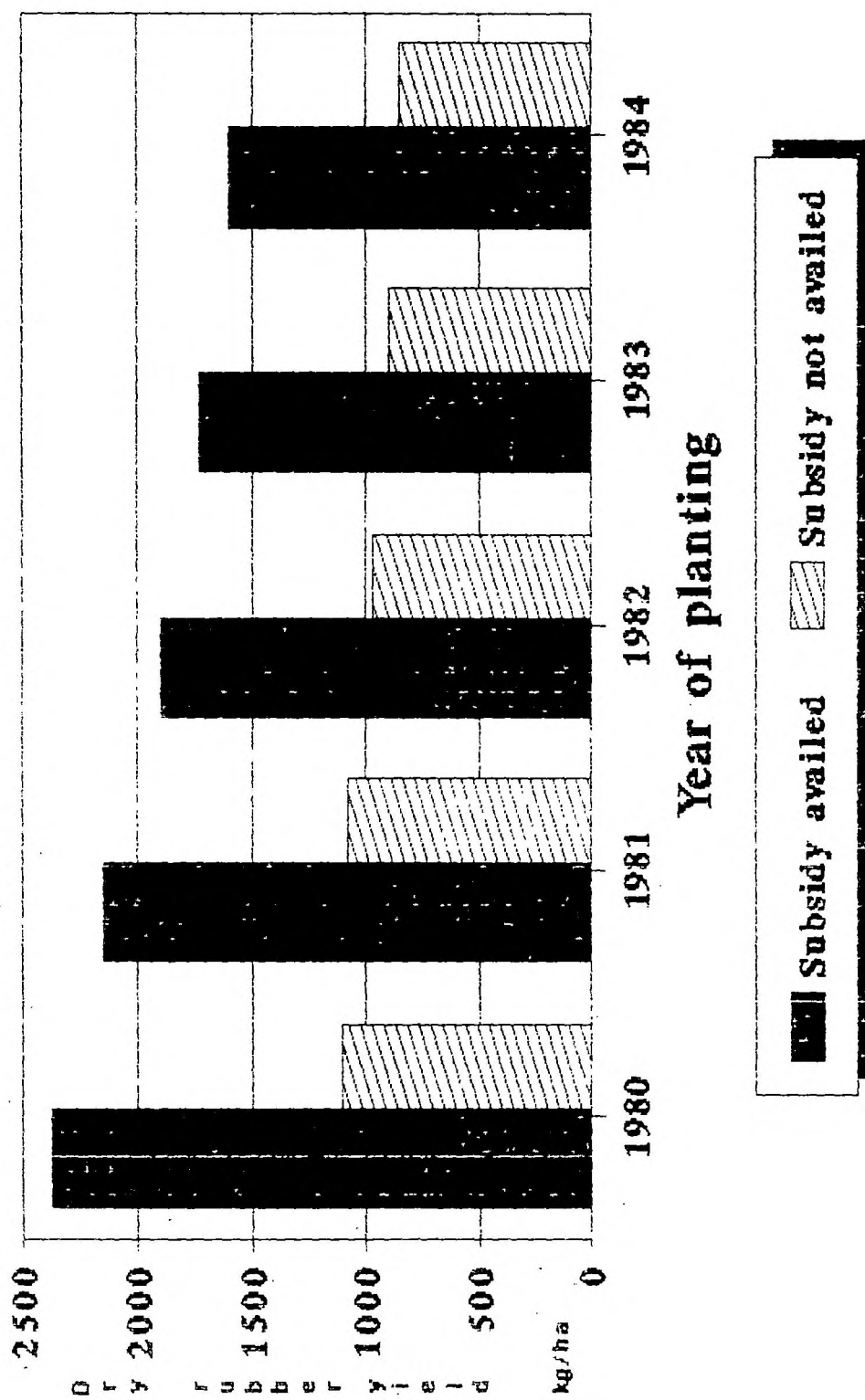


Fig.4. Difference in yield of plants under subsidy availed and not availed units

Summary and Conclusion

SUMMARY AND CONCLUSIONS

Rubber industry which is one of the most important enterprises in the agriculture sector receiving great attention by the Central as well as the State Governments through numerous development schemes implemented by the Indian Rubber Board. Kottayam taluk, a potential rubber growing area is receiving a considerable amount for the development of rubber plantation. However, systematic studies to assess the impact of the various schemes launched by the Rubber Board is very meagre. Under this circumstances, efforts were made to explicit the usefulness of the various incentive provided by the Rubber Board to the rubber growers of Kottayam taluk. One hundred small growers consisting of those who have availed and unavailed the various subsidy schemes of the Rubber Board were selected at random for the study. The impact of the schemes were assessed by collecting the relevant details by personal interview with the farmers by using a pretested questionnaire. The salient results emanated from the investigation are summarised below:

A unique feature observed during the survey was that irrespective of the size of the holding or receipt of the subsidy, majority of the farmers have used RRII 105 as the planting material. Those farmers who availed subsidy have used poly-bagged plants as well as budded stumps in equal proportion, whereas, in the case of those who have not availed the subsidy, majority (75%) of them resorted to budded stumps.

With regard to the fertilizer application, the subsidy availed growers had a discriminatory approach where as the others have followed only general recommendation. Since majority of the units were planted with RR II 105, spraying against abnormal leaf fall was not found to be followed in a judicious manner both by the subsidy availed and not availed groups.

In the case of farmers those who have adopted irrigation (during the immature period) motivated by the relevant subsidy scheme, profound increase in the girth of the plants could be observed and the increment being 10 cm during fourth year. Leguminous cover was well established in 50 per cent of the subsidy availed units and in the remaining 50 per cent units cover crop was established in patches only. However, in the case of subsidy not availed units majority of the holdings were not cover cropped.

Construction of edakayyalas as a means of soil and moisture conservation was done in most of the holdings irrespective of subsidy availed or not availed cases. However, mulching was not found to be followed in any of the rubber holdings surveyed. The soil conservation structures either edakayyalas, terraces or silt pits were maintained satisfactorily in the subsidy availed holdings. But in the case of growers who did not avail the subsidy, the extent of maintenance was only average or poor.

Regarding the retention of other trees in rubber plantation, in majority (75%) of the subsidy availed units, the stand was

normal and in 25 per cent of the cases it was even below the actual limit prescribed by the Board. On the contrary, in the case of holdings without subsidy the presence of other trees was above the limit prescribed. 1e

Intercropping was done by all growers who have not availed subsidy but in the case of those who have availed subsidy 25 per cent of the units were not intercropped. Tapioca, a soil depleting crop was found to be the dominant intercrop in the units without subsidy but in the plantations raised availing subsidy, banana was observed to be the major intercrop (40%).

Majority of the growers (53%) who are having rubber roller under the subsidy scheme, utilized the same for their own use alone while the remaining 47 per cent have rented out also fetching a considerable amount annually. However, in the case of those who have no roller, additional amount was spent on account of rent as well as additional labour for sheeting outside.

The results of the study also revealed that the presence of a smoke house can definitely improve the quality of the sheet thereby the income of the farmer substantially. The subsidy scheme, in general, has helped in augmenting the production of quality rubber sheets in Kottayam taluk.

With regard to the growth of plants measured in terms of girth, irrespective of the age, all the plants under the subsidy availed units registered a higher girth compared to those in the subsidy

not availed units. The percentage increase in girth ranged from 25 to 34 cm during tenth year and 14th year, respectively.

As in the case of plant growth, the same trend was observed with regard to the production also. The extent of increase in production in the subsidy availed units was 88 per cent during tenth year which steadily increased and reached 115 per cent during 14th year.

The major constraint expressed by the growers was the insufficient financial support for the purchase of roller and for the construction of smoke house. Regarding the crop production aspects no serious constraints could be recorded.

Farmers response to the various development schemes implemented by the Rubber Board was found to be encouraging. The schemes in general have been instrumental in registering big heights in production and productivity of rubber in surveyed area.

The highly innovative nature of the rubber growers coupled with cent per cent literacy have also played a dominant role in accelerating the phase of adoption of improved technologies in Kottayam taluk.

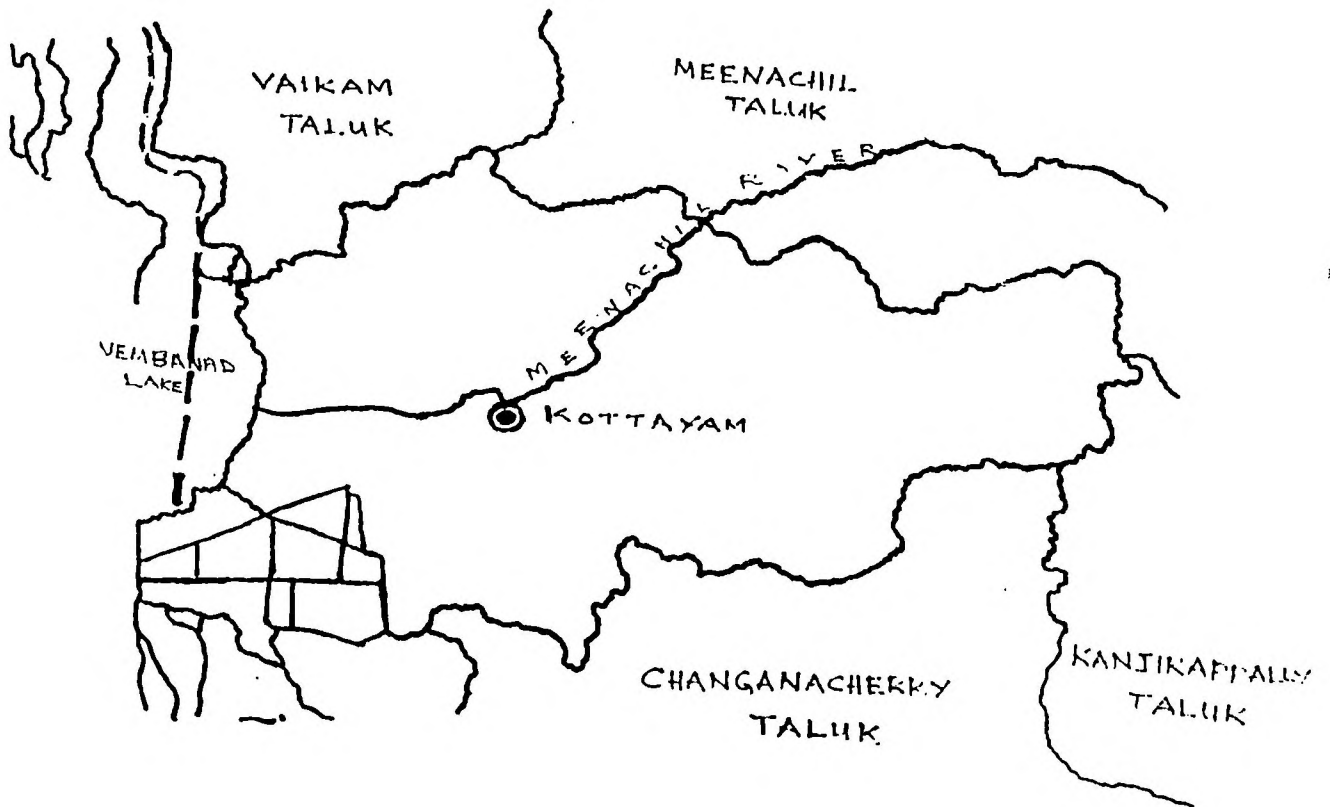
References

REFERENCES

- Chitrangadan, V.K. 1985. Studies on impact of Rubber Board's development schemes in the growth of rubber plantation industry in India. P.G. Diploma Dissertation, Kerala Agricultural University, Thrissur.
- George, T., Haridasan, V. and Sreekumar, B. 1988. Role of Government and structural changes in rubber plantation industry. Economic and Political Weekly, 23(48):148-158
- George, T. 1992. Input subsidy and changes in cultural practices : A case study of rubber small holdings in Kerala. Indian J. Nat. Rubb. Res. 5(1&2):100-106
- Pillai, K.R. 1974. Response of Small Growers of Rubber to the Aid Schemes of the Rubber Board. Rubber Board, Kottayam. pp.17
- Rubber Board. 1991. Indian Rubber Statistics, Vol.XIX. Rubber Board, Kottayam. pp.4-6
- Rubber Board. 1994. Rubber Statistical News, Vol.52(2). Rubber Board, Kottayam. pp.1

Appendices

APPENDIX-I
Map of Kottayam taluk



APPENDIX-II

The weather data of Kottayam taluk

Year	Rainfall (mm)	Temperature (°C)		Relative humidity (%)
		Maximum	Minimum	
1989	3074.0	31.1	22.6	75.0
1990	2789.6	31.6	22.9	75.3
1991	3564.6	31.9	23.3	77.3
1992	4080.7	32.0	22.7	77.5
1993	3576.9	31.7	23.6	79.0

Source: Meteorological Observatory, RRII, Kottayam

APPENDIX-III

USEFULNESS OF INCENTIVES PROVIDED BY RUBBER BOARD TO THE RUBBER GROWERS OF KOTTAYAM TALUK

QUESTIONNAIRE

1. Name and address of the farmer :
2. Year of planting :
3. Extent planted :
4. Planting material used :
5. Year in which subsidy availed :
6. Amount received :
7. Register No./Permit No. :

Motivation behind adoption

	Scient- ific aware- ness	Sub- sidy scheme	Other factors	Remarks
1	2	3	4	5
1. Use of high yielding planting material				
2. a. Use of polybagged plants				
b. Use of budded stumps				
c. Use of field budding				
3. Fertilizer application				
a. Discreminatory fertilizer application				
b. Based on general recommendation				
4. Spraying				
5. Establishment of leguminous cover crop				
Well established or not				

contd.

	1	2	3	4	5
6. Soil conservation					
a. Edakayyala					
b. Terraces					
c. Mulching					
d. Silt pits					
7. Retention of other trees					
a. Above limit					
b. Normal					
c. Below limit					
8. Intercropping					
a. Tapioca					
b. Banana					
c. Ginger					
d. Others					
9. a. Girth		:			
b. Yield		:			
10. Processing					
i. Sheeting					
a. Possession of roller		:	Yes/No		
Expense per annum as		:			
rent for utilizing roller					
b. Additional wages if any		:			
paid to tapper for					
sheeting outside					
c. Rent received from other		:			
farmers					
ii. Drying					
a. Own smoke house		:	Yes/No		
b. Quality deterioration if		:			
any due to lack of smoke					
house					

contd.

- c. Additional expenditure :
towards smoking outside
and transportation
- d. Reduction in price if :
any due to inferior
quality sheet
- e. Improvement in quality :
due to smoking
- f. Additional benefit if any :
due to smoking
- g. Rent realised :

11. Availability of irrigation
facilities

- a. Growth in relation to :
girthing

APPENDIX-IV
List of growers selected for study

Sl. No.	Name and address	Permit/register number	Area (ha)
<u>Subsidy availed growers</u>			
1	Mathai Scaria, Parampackathu, Kozhuvanal, P.O.	PD/KT/452/83	0.31
2	P.M.Mathew, Pottananickal, Chengalam, P.O.	PD/KT/2/83	0.24
3	P.M.Thomas, Pottananickal, Chengalam, P.O.	PD/KT/3/83	0.22
4	Antony Joseph, Parampackathu, Kozhuvanal, P.O.	PD/KT/421/83	0.27
5	Chacko Joseph, Makkeemattathil, Kozhuvanal, P.O.	PD/KT/28/83	0.26
6	Issac Abraham, Puranganal, Kozhuvanal, P.O.	PD/KT/598/82	1.19
7	Philip Chacko, Ollappally, Peroor, P.O.	PD/KT/989/81	0.20
8	Annamma Issac, Puranganal, Manalunkal, P.O.	PD/KT/158/81	0.73
9	Chinnamma Thomas, Kunnel, Chengalam, P.O.	PD/KT/422/81	0.20
10	Antony Thomas, Kunnel, Chengalam, P.O.	PD/KT/322/83	0.20
11	Ouseph Thomas, Thekkemuriyil, Edamula, Kalloorkulam, P.O.	KTM.8910	0.47
12	Mariamamma Korah, Chempakacheril, Kolladu, P.O.	PD/KT/624/84	2.02
13	T.M.Thomas and Rosamma, Thannickal, Kozhuvanal, P.O.	PD/KT/853/84	0.13
14	Kurian Varkey, Thottananiyil, Kanakary, P.O.	PD/KT/388/84	0.30
15	Harikumar and Radhamma, Keecheril, Lakkattoor, P.O.	PD/KT/131/84	0.40

Contd.

Appendix-IV continued

Sl. No.	Name and address	Permit/register number	Area (ha)
16	Avirah Ouseph, Palapulickal, Chengalam, P.O.	PD/KT/284/80	0.26
17	Mathai Joseph, Pothanamala, Moozhoor, P.O.	PD/KT/210/80	0.44
18	Annamma Abraham, Puranganal, Manalumkal, P.O.	PD/KT/723/80	0.78
19	Regi Thomas, Alumkalthazhe, Chengalam, P.O.	Part of KTM.8014	0.30
20	Mathai Thressia, Makkeemattom, Kozhuvanal, P.O.	PD/KT/85/80	0.30
<u>Subsidy unavailed growers</u>			
21	Joseph Varkey, Thekkemyladiyil, Kozhuvanal, P.O.	Unregistered	0.40
22	P.T.Mathai, Pallattu, Ettumanoor, P.O.	Unregistered	0.10
23	K.C.Devassia, Panachel, Ettumanoor, P.O.	KTM.1325	0.40
24	Thommen Scaria, Elavumkal, Chengalam	Unregistered	0.80
25	P.P.Korah, Puthenpurackal, Pathamuttom, P.O.	KTM.5622	0.45
26	Somasekharan Nair, Chamakalayil, Lakkattoor, P.O.	Unregistered	0.20
27	T.A.Mathai, Adukanil, Anicadu, P.O.	KTM.3820	0.45
28	Unnikrishnan, Kizhakkepallathu, Thiruvanchoor, P.O.	KTM.11263	0.16
29	Chacko Mathai, Pallathukalayil, Aruvikuzhi, P.O.	Unregistered	0.50
30	Lalithakumari, Chempeethara, Kooroppada, P.O.	Unregistered	0.20
31	P.M.Kamalamma, Kulangara, Kothala	KTM.11464	0.41
32	Ouseph, Thekkemuriyil, Kalloorkulam, P.O.	KTM.8930	0.28
33	Mary Chandy, Ullappally, Peroor, P.O.	KTM.15222	0.20

Contd.

Appendix-IV continued

Sl. No.	Name and address	Permit/register number	Area (ha)
34	Geetha Mathew, Kochuparambil, Aruvikuzhy, P.O.	Unregistered	0.32
35	Kuriakose, Mattathil, Meenadam, P.O.	KTM.6823	0.14
36	Eapen, Kollettu, Pampady, P.O.	KTM.7274	0.30
37	P.N.Sivaraman Nair, Plakkathakadiyel, Kothala, P.O.	KTM.1748	0.07
38	K.S.Mathew, Kulamkuthiyil, Ettumanoor, P.O.	Unregistered	0.60
39	P.L.Thomas, Erupackattu, Elempally, P.O.	Unregistered	0.40
40	Prabhakaran, Chengalikunnel, Kalloorkulam, P.O.	Unregistered	0.30
<u>Growers having rubber roller</u>			
41	Mathew Joseph, Tholanickal, Kanjiramattom, P.O.	KTM.11991	1.06
42	Philipose Lukose, Erupackattu, Elampally, P.O.	PD/KT/660/83	0.77
43	Mani Chacko, Kottarathil, Manalunkal, P.O.	PD/KT/89/83	0.70
44	K.V.Antony, Kaithanal, Kalloorkulem, P.O.	KTM.12872	0.64
45	Mathai Joseph, Valavanal, Moozhoor, P.O.	KTM.13459	0.50
46	P.C.Thomas, Plathottathil, Karimani, P.O.	KTM.14267	1.21
47	Chandapillai, Elenjickal, Moolavattom	KTM.16044	0.61
48	K.P.Markose, Ramanamoolayil, Vadavathoor, P.O.	Unregistered	0.39
Contd.			

Appendix-IV continued

Sl. No.	Name and address	Permit/register number	Area (ha)
49	Parvathyamma, Kalapurackal Puthen Veedu, Arpookara, P.O.	KTM.6793	0.52
50	The Vicar, St.Peters C.S.I. Church, Arpookara, P.O.	PD/KT/881/85	0.37
51	P.T.James, Puthenpurackal, Kanjiramattom, P.O.	KTM.10794	0.21
52	P.J.Joseph, Pazhathottathil, Kanjiramattom, P.O.	KTM.12714	1.32
53	C.P.Prabhakaran, Chenyalikunnel, Kalloorkulam, P.O.	Unregistered	0.24
54	Gowriamma, Varickaplackal, Anicadu, P.O.	KTM.14584	0.59
55	Joy C. Makkathil, Vettimukal.	KTM.13047	0.42
<u>Growers without rubber roller</u>			
56	Varkey John, Kalarickal, Kanakary, P.O.	Unregistered	0.45
57	O.T.Thomas, Ozhukayil, Kanakary, P.O.	KTM.4102	0.32
58	O.T.Joseph, Ozhukayil, Ettumanoor, P.O.	Unregistered	0.30
59	K.A.Abraham, Kottarathil, Manalumkal, P.O.	Unregistered	0.40
60	Thommen Thommen, Eyyalel, Aruvikuzhy, P.O.	Unregistered	0.20
<u>Growers having smoke house</u>			
61	P.N.Raghavan Nair, Vaduthala Puthenparambil, Anicadu, P.O.	KTM.5699	1.22
62	C.N.Pankajakshan Nair, Choonattu, Aruvikuzhy, P.O.	KTM.7710	0.44

Contd.

Appendix-IV continued

Sl. No.	Name and address	Permit/register number	Area (ha)
63	M.N.Lekshmikuttyamma, Konnackal, Meenadom, P.O.	KTM.4322	0.47
64	Varkey Mathew, Peechathil, Vettimukal, P.O.	PD/KT/502/84	1.01
65	Uthup Kurian, Peringalethu, Peroor, P.O.	PD/KT/669/84	0.74
66	A.V.Thomas, Alumkalthazhe, Chengalam, P.O.	KTM.8014	0.50
67	Francline Joseph, Kaithathara, Chengalam, P.O.	KTM.14987	0.56
68	K.S.Thomas, Kodikulam, Karimpani, P.O.	KTM.4523	0.81
69	K.Jacob, Kannampuram, Pallom, P.O.	KTM.14265	0.56
70	K.C.Abraham, Koipurathu, Arumanoor, P.O.	PD/KT/151/86	1.33
71	Thommen Joseph, Vattakuzhickal, Anicadu, P.O.	KTM.1674	0.95
72	K.Kesavan Nair, Kesava Vilas, Aruvikuzhy, P.O.	KTM.31111	0.60
73	N.F.Chacko, Ullappally, Peroor, P.O.	PD/KT/970/81	0.20
74	P.T.Kuriakose, Parayil, Perumbaikadu, P.O.	PD/KT/282/80	1.00
75	Achamma Cherian, Eruthickal, Channanikadu, P.O.	PD/KT/265/83	0.50
<u>Growers without smoke house</u>			
76	V.M.Joseph, Vengalloor, Karimpani, P.O.	KTM.12031	0.43
77	E.P.Joseph, Edacheril, Thiruvachoor, P.O.	KTM.7257	0.74
78	K.R.Retnakaran, Thuruthimattathil, Kanjiramattom	KTM.13708	0.40
79	Chacko Mathew, Perumpathil, Amalagiri, P.O.	Unregistered	0.85

Contd.

Appendix-IV continued

Sl. No.	Name and address	Permit/register number	Area (ha)
80	Achamma Varkey, Kannampuram, Chingavenam, P.O.	KTM. 14573	0.55
<u>Growers having irrigation facilities</u>			
81	M.V.Thomas, Madukavil, Njandupara, P.O.	PD/KT/676/90	0.45
82	M.V.George, Madukavil, Njandupara, P.O.	PD/KT/677/90	0.45
83	Luka Jose, Thonakara Puthenpurackal, Kezhuvankulam, P.O.	PD/KT/357/89	0.37
84	K.C.Thomas, Kaduppil, Kongandoor, P.O.	PD/KT/601/91	1.09
85	Mariam Jacob, Valayil, Manarcadu, P.O.	KTM. 10626	0.69
86	K.M.Chacko, Puramattathu Kunnakuzhiyil, Areeparambu, P.O.	PD/KT/50/90	0.36
87	Mathew Joseph, Elamplakiyil, Pattiathanam, P.O.	PD/KT/749/90	0.09
88	N.I.Chellappen, Beena Nivas, Pattiathanam, P.O.	PD/KT/745/90	0.23
89	The Manager, Old Seminary, Chengum, Kottayam	PD/KT/953/89	4.70
90	K.L.Varkey, Kizhakkedom, Arpookara East, P.O.	PD/KT/889/88	0.20
91	K.N.Narayanan Namboothiri, Kaimuthkillum, Kuzhimattom, P.O.	PD/KT/653/90	0.24
92	M.C.Chummar, Madakal, Pallom, P.O.	PD/KT/834/91	0.20
93	Cyriae, Vellapally Archetech, 738/VIII, Good Shepherd, Kottayam	PD/KT/837/90	1.30
94	Joseph George, Thattaradilylilaya, Kothappattil, Velloor, P.O.	Unregistered	0.95
95	K.P.Markose, Ramanamoolayil, Vadavathoor, P.O.	Unregistered	0.20

Contd.

Appendix-IV continued

Sl. No.	Name and address	Permit/register number	Area (ha)
<u>Growers having no irrigation facilities</u>			
96	Mariamman Kurian, Varikamakel, Velloor, P.O.	PD/KT/331/92	0.95
97	P.J. John, Puthenpurayil, Pattithanam, P.O.	PD/KT/748/90	0.17
98	Varkey Chacko, Aryankalayil, Athirampuzha, P.O.	PD/KT/729/90	0.13
99	Kuravilla Chandy, Vazhapparambil, Amayanoor, P.O.	PD/KT/834/89	0.63
100	P.K. Kuriakose, Pallikaparambil, Kuzhimattom	PD/KT/758/87	0.20