CHAPTER II

METHODOLOGY, CONCEPTS AND CHARACTERISTICS
OF SAMPLE RESPONDENTS

2.1 Methodology

This chapter is devoted to present a detailed description of the methodology which includes choice of the study area, period of study, sampling procedure, collection of data, method of analysis, tools of analysis, measurement of variables and concepts used in the study. It also includes a description of the characteristics of the sample farmers selected for the present study.

2.1.1 Choice of the Study Area

The area selected for the present study is Kanyakumari district situated at the southern most tip of Tamil Nadu. It is predominantly an agricultural district. 58.8 percent of its working population is anchored in agriculture and its allied activities. This district stands first in area under cultivation among the districts in Tamil Nadu. The total area under rubber cultivation was 18979 hectares and the production was 23291 tonnes in
2007-2008. 97.8 percent of the total area of rubber and 97.7 percent of the production of rubber in Tamil Nadu was from this district.

Rubber is grown in 3 taluks of the district namely Kalkulam, Vilavancode and Thovalai. Adequate attention has not been paid to develop a stable marketing system that would benefit the producer and the consumer. This dissertation is a comprehensive study of production and marketing of rubber to consolidate the scope for development.

2.1.2 Period of Study

Primary data were collected from the rubber cultivators and merchant middlemen. The survey was conducted during January to March 2009. Secondary data relating to area under cultivation of rubber, production, consumption, export and import were collected for a period of 15 years from 1993-94 – 2007-08.

2.1.3 Sampling Procedure

At the time of conducting survey there were 20334 registered growers in Kanyakumari district. Among them 15014 were smallholders and 5320 were estates. Due care has been taken while choosing the sample from small holders and estate holders. It was decided to consider 1 percent as sample from the small holders and estate holders. Thus 150 small rubber holders and 50 from the estate holders were selected at random by adopting the lottery method. Data were collected from 150 small rubber
holders and 50 estate holders totally 200 respondents. The sampling plan is presented in Table 2.1.

**TABLE No. 2.1**

**SAMPLING PLAN FOR SMALL HOLDERS AND ESTATE HOLDERS**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Type of Rubber holdings</th>
<th>Total</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Small holders</td>
<td>15014</td>
<td>150</td>
</tr>
<tr>
<td>2.</td>
<td>Estate holders</td>
<td>5320</td>
<td>50</td>
</tr>
</tbody>
</table>

*Source: Records of Rubber Board, Kottayam.*

In order to analyze the marketing cost, marketing margin and price spread 20 intermediaries 10 in each category namely village traders and wholesalers, the most common market intermediaries in the study area were randomly selected. The selected respondents were contacted individually and the required information was collected from them.

**2.1.4 Collection of Data**

The present study is based on both the primary and the secondary data. The primary data were collected from the growers through personal interview method. Based on physical, cultural and socio-economic environment of cultivation in the region, the interview schedule was designed, pretested and finalized. While interviewing the growers the objectives of the study, the questions and the statements in the interview
schedule were explained by the interviewer to the respondents to elicit information from them.

Detailed information was collected from the rubber growers on cropping pattern, labour utilization, age of trees varieties, number of trees per acre and other aspects relating to overall objectives of the study.

Information regarding fixed capital, cost of cultivation of rubber and details about establishment and maintenance costs and returns were collected to estimate the cost of rubber production, particulars regarding the disposal of rubber and problem in marketing were collected to know about the existing marketing practices in the study area. Even though the farmers did not maintain adequate farm records and accounts, they were able to furnish the particulars on the strength of their long association with farming. However to minimize recall bias, suitable cross checks and rechecks were carried out.

The data required for the study of marketing were also generated by interviewing different market intermediaries using another well-structured and pretested schedule. Information was collected from the intermediaries on marketing cost, marketing margin, price spread and problems in marketing.

Price of rubber, area, production, export, import and other secondary data were collected from various journals, books and rubber statistics published by Rubber Board, Kottayam. The other sources of
secondary data are journals such as Rubber Asia, Yojana, Indian Journal of Agricultural Marketing, Economic and Political Weekly, Kisan World, Commerce, Productivity, Business and the Hindu Survey of Indian Agriculture and newspapers like Economic Times, Financial Express and The Hindu. Also the publications of association such as All India Rubber Industries Association (AIRIR), United Planters Association of Southern India (UPASI) and Planter’s Chronicle have been used to obtain the relevant data for the study.

2.1.5 Method of Analysis

The data collected from the various sources have been classified, tabulated and analysed by applying appropriate mathematical and statistical techniques. 200 sample growers were stratified into two categories namely small holdings and estates. As per the Rubber Act 1947, small holdings means a rubber area aggregating 20 ha or less under single ownership and estate means land more than 20 ha planted with rubber under a single ownership. But in the study area there are only a few estates producing rubber in the form of sheets. So for the purpose of the study an area with less than 10 hectares is treated as small holdings and an area with more than 10 hectares is treated as estates. Out of the 200 sample respondents, 150 cultivators came under the category of small holdings and the remaining 50 fell under the group of estates.
2.1.6 Tools of Analysis

To study the trend in area cultivated, production and productivity of rubber simple regression equation has been used.

To find out the growth rate in area, production and productivity, compound growth rate has been calculated using semi-log or exponential function.

To study the magnitude of variability in the area, production and productivity of rubber co-efficient of variation has been computed.

Cobb-Douglas type of production function is fitted to identify the factors influencing the rubber yield.¹

To find out resource use efficiency of factor inputs, marginal value productivities of each of the input variables for small holdings and estates were equated with the acquisition cost.²

Garrett’s Ranking Technique was adopted in order to rank the problems faced by the cultivators in production and marketing of rubber respectively.³

To assess capital productivity involved in the investment in rubber cultivation, pay back period, benefit cost ratio, net present value and internal rate of return have been calculated.⁴

² Ibid., p.69.
To measure the marketing efficiency of various channels in the marketing of rubber Shepherd’s formula was used.5

Using multiplicative model time series analysis has been carried out to study temporal variation in prices of rubber.6

Price spread analysis works out the share of different market functionaries in the consumer rupee and would often throw light on the relative efficiencies of alternate channels of marketing. Price spread is measured by using concurrent margin method where margin is derived as the difference between the price paid by the ultimate consumer and price received by the producer.7

2.1.7 Measurement of Variables

2.1.7.1 Rental Value of Land

The Directorate of Economics and Statistics imputed rental value for owned land at the existing rate of rent prevailing for similar lands in the village. In the case of leased land, the actual rent paid was taken.8

In the present study all the sample growers were owner operated. Therefore the rental value prevailing in the adjoining areas was taken as the rental value.

2.1.7.2 Labour

Karnam Lokanathan in his study “An Economic Analysis of Areca Nut Plantation in Coimbatore District” treated hired labour and family labour alike. The women and the juvenile were standardized into manday equivalent in proportion to their wage rate prevailing in the locality.⁹

2.1.7.3 Manures and Fertilizers

The farm produced manure was valued at the market price prevailing in that area. The purchased farm yard manures and fertilizers were valued at their purchase price in addition to the cost of transport.

2.1.7.4 Plant Protecting Chemicals

Plant protection chemicals were charged at the rates, actually paid by the rubber cultivators.

2.1.7.5 Planting Material

Poly bag plants of RRII 105 clone was planted in majority of the rubber farms. Market price of planting material was considered.

2.1.7.6 Land Revenue

The prevailing land revenue as per the Government rate was charged.

2.1.7.7 Depreciation

Depreciation was charged to meet the loss due to wear and

tear on fixed assets. Here depreciation was calculated under straight line method. It was done separately for farm building, machinery, tools and equipment and material. Depreciation was charged at the rate specified below.\footnote{10 Studies on Economics of Management in Coimbatore District, Tamil Nadu, Directorate of Economics and Statistics, 1971-72, New Delhi, p.240.}

<table>
<thead>
<tr>
<th></th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm Building</td>
<td>2 percent</td>
</tr>
<tr>
<td>Machinery</td>
<td>10 percent</td>
</tr>
<tr>
<td>Tools and Equipment</td>
<td>25 percent</td>
</tr>
<tr>
<td>Material</td>
<td>50 percent</td>
</tr>
</tbody>
</table>

2.1.7.8 Total Establishment Cost

This refers to the cost incurred in the establishment of rubber farms up to commercial bearing stage, which is of 7 years. This included rental value of land, cost of land, manures and fertilizers, plant protection chemicals, labour involved in various operations of the farm, interest on working capital and other costs such as interest on fixed capital, depreciation and repairs and maintenance.

2.1.7.9 Annual Share of Net Establishment Cost

The value of yield of rubber during the establishment period was deducted from the total establishment cost to arrive at the net establishment cost. These costs were spread over to the remaining economic life span of rubber tree which was taken as 23 years. The annual
share of net establishment thus arrived at was used in estimating the cost of rubber production.

2.1.7.12 Farm Building

It refers to the shed used for the storage and the processing of rubber and for keeping the implements and the machinery.

It refers to the rollers and the sprayers owned by the growers.

2.1.7.13 Tools and Equipment

This refers to shovels, spades, crowbars, hammer, sledge hammers, and sickles owned by the growers.

2.1.7.14 Material

This includes the tapping/processing accessories like the marking equipment, spouts and hangers, plastic/coir thread, tapping knife, collection crops, scrap baskets, bucket and dishes.

2.2 Concepts Used in the Study

The concepts reviewed in this section relate to production, growth rate, cost and returns, resource use efficiency, marketing margin, marketing cost, marketing efficiency, price spread and the like.

2.2.1 Concepts Related to Production

2.2.1.1 Production

According to Kohlas and Damey, production can be defined as the creation of utility in the process of making useful goods and
Production covers the activities of changing the form of goods at any stage from raw material into finished goods, changing the situation of goods, changing the position of goods in time and the provision of some kind of services such as retailing, banking, entertaining and the like. Production in the economic sense implies working on raw material or natural resources in such a fashion that causes change in their form, change in their chemical or physical capacities, to store them until their desire for them has become more urgent.

In the present study, production represents the output of rubber sheet resulting from the application of different inputs.

### 2.2.1.2 Production Function

According to Hardt, R.W., and Mandac, A.M., the production function has been defined as the function that describes the greatest possible output from a given combination of inputs. Therefore failure to operate on the production function reflects technical inefficiency.

Bekanayaka, S.A., and Jayasurya, S.K., opined that production function could be defined and identified as an envelope of the entire range of relationship in a unique best practice of input-output

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correspondence.¹⁵

In the words of Jhingan, M.L., production function expresses a functional relationship between quantities of input and output. It shows how and to what extent output changes with variation in inputs during a specified period of time.¹⁶

Ferguson, C.E., defined production function as a schedule showing the maximum amount of output that could be produced from any specified set of inputs, given the existing technology or state of art.¹⁷

In the present study, production function is defined as the technological relationship between the output of yield and the input namely fertilizer, labour, experience, processing cost, pesticides and the number of rubber trees per acre.

2.2.1.3 Growth Rate

The normal statistical procedure to obtain a measure of growth rate in area and production of crops over a period is to postulate a hypothetical function, which would adequately describe the series of area and production over time and to estimate its parameters which would offer a measure of growth over the period growth rate can either be arithmetic (simple) or geometric (compound). The simple growth rate is expressed

either in absolute term or in relative term, while geometric growth rate is
normally expressed in percentage terms.\textsuperscript{18}

According to Mohan and George, growth rate of variable is
defined as the rate of change per unit of time, usually a year. The growth
rate is measured statistically by estimating different functional form of
growth over time such as linear, semilog, gompertz curve, logistic curve
etc.\textsuperscript{19}

According to Prokopenco, J., productivity can also be defined
as the relationship between results and the time it takes to accomplish
them. Time is often good denominator since it is a universal measurement
and it is beyond human control. The less time taken to achieve the desired
result, the more productive the system.\textsuperscript{20}

Gupta, N.L., and Singh used Cobb-Douglas type of
production function to measure the productivity of factors like labour and
capital.\textsuperscript{21}

In the present study, growth rate is used to describe the
growth in area, production and productivity of rubber.

\textbf{2.2.1.4 Productivity}

According to Gowar, productivity measures the efficiency

with which the inputs are transformed into outputs. Swaminathan, M.S., defined productivity as output value divided by input value multiplied by changes in environmental capital stock.

Kargoanker indicated productivity as the ratio of output to input.

In the present study productivity is used as the quantity of output termed out per acre in the study area.

2.2.1.5 Marginal Value Productivity

The MVP of a particular resource represents the expected addition to the total output caused by an addition of one unit of that resource, while other inputs are kept constant. The most reliable and perhaps the most useful estimate of MVP is obtained by taking the resources (Xi) as well as output (Y) at their geometric means.

The MVP was computed by multiplying the regression coefficient of the given resources with the ratio of the geometric mean of the output to the geometric mean of the given resources. For example MVP of \( X_i \) would be

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\text{MVP}(X_i) = \beta_i \frac{\bar{Y}}{\bar{X}_i}
\]

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The Marginal Value Product (MVP) to factor cost (opportunity cost) ratio is the measure of resource use efficiency. Equality of MVP and factor cost (MVP/MFC=1) indicates the optimum resource-use efficiency of a particular input. Inequality of MVP and factor cost (MVP = MFC # 1) indicate the degree of resource use inefficiency.

In the present study, the marginal value productivity is estimated by using the above formula.

2.2.1.6 Resource-use Efficiency

Resource use efficiency is governed by factors such as size of firm, use of family labour and the cropping pattern. Technical efficiency measures are related to land use efficiency, labour efficiency and machinery efficiency whereas economic efficiency measures are concerned with the analysis of cost ratios, capital ratios and income ratios.

Suryanarayana worked out the farm production function to estimate the returns in Telengana farms for wet, dry and mixed type farms separately and for all farms. The gross returns were treated as a function of land, labour and capital per farm and these factors, were found to be highly significant.26

Sundararaj, K., examined the nature of returns to scale and analysed the resource use efficiency in the cultivation of chillies with the

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help of marginal value product using Cobb-Douglas Production Function.\textsuperscript{27}

Elsamma Joy and Mukundan worked out a linear production function to evaluate the influence of a set of factors on the yield of rubber. The factors considered were the age of plantation, the labour days, the quantity of fertilizer, the cost of plant protection and the holding size.\textsuperscript{28}

In the present study, Cobb Douglas type production function is fitted to estimate the resource returns, returns to scale and resource use efficiency. Resource use efficiency refers to the efficiency use of factor inputs namely labour, fertilizer and processing cost in the production of rubber sheet. The efficiency of resource use is studied with the help of MVP/MIC using Cobb-Douglas production function.

\textbf{2.2.1.6 Cost Structure}

The right decision on investment in farming activities can be taken only when valuable information on cost and returns are available. Such information will be very useful to improve cropping pattern as well as efficiency through the least cost combination resources.

Mittal and Saxena defined fixed costs in agriculture as those which were independent of the level of production whereas the variable costs vary with the level of output.\textsuperscript{29}

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According to Jayaraman, the total cost of production consists of fixed cost and variable cost. Fixed cost includes annual share of total establishment cost, land revenue, interest on fixed capital, depreciation on fixed assets and rental value of land. Variable cost reflects the annual maintenance cost which includes labour involved in various operations, manuring watch and ward and plant protection chemicals.  

Shyam Sundar et al., included cost of seeds, farm yard manure, fertilizer, plant protection chemicals, covering material, cost of irrigation, human labour, bullock labour and interest on working capital in the variable cost and rental value of land, land revenue, depreciation and interest on capital in the fixed cost.

In the present study, the total cost of production is classified into fixed cost and variable cost. Fixed cost includes land revenue, rental value of land, annual share of net establishment cost, depreciation on fixed assets, repairs and maintenance and interest on fixed capital, excluding land.

Variable cost includes annual operation and maintenance cost which includes cost incurred on labour, fertilizers, plant protecting chemicals, processing cost and interest on working capital.

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2.2.1.7 Capital Productivity

George and Joseph in their study on cost benefit analysis of investment in tree crops, evaluated financial feasibility of investments in tree crops, using Payback period, Net present value technique, Benefit cost ratio and Internal rate of return.\(^{32}\)

Santhosh evaluated the economics of investment in the production of rubber using four indicators namely Pay-back period, Net present value, Benefit cost ratio and Internal rate of return.\(^{33}\)

In the present study, economic viability of investment in rubber cultivation has been determined by using Pay-back period, Net present value, Benefit-Cost Ratio and Internal Rate of Return.

2.2.1.8 Returns

The estimation of returns from farm enterprises in its proper perspective is essential as it helps in assessing the efficiency of farm business as a whole and also the efficiency of resource use in farms.

According to Murugadoss, gross income is the actual amount realized on the sale of the produce and he arrived at the net income by deducting the cost of cultivation from the gross income.\(^{34}\)

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Reddy et al., defined gross income as gross value of output sold and net income was the residue of gross income after deducting the total cost.\(^{35}\)

In the present study, the gross return on rubber production is the value realized on the sale of total output after deducting the marketing cost. Contribution has been calculated by deducting variable cost from the gross returns. The net profit is arrived at by deducting fixed cost from contribution.

2.2.2 Concepts Relating to Marketing

2.2.2.1 Marketing

Marketing is the process of planning and executing the conception, pricing, promotion and distribution of ideas, goods, services to create exchanges that satisfy individuals and organizational goals.\(^{36}\)

Philip Kotler and Armstrong define marketing as a social and managerial process by which individuals and groups obtain what they need and want through creating and exchanging products and value with others.\(^{37}\)

Marketing is the performance of business activities that direct the flow of goods and services from the producer to the consumer.\(^{38}\)

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Marketing is the economic process by which goods and services are exchanged between the maker and the user and their values determined in terms of money prices.\textsuperscript{39}

In the present study marketing is defined as all business activities that direct the flow of rubber sheet from the primary producer to the industrial user.

National Commission on Agriculture stated that agricultural marketing is a process which starts with a decision to produce a saleable farm commodity and it involves all aspects of market structure or system both functional and institutional based on technical and academic consideration and includes pre and post-harvest operations, assembly, storage, transportation and distribution.\textsuperscript{40}

The study of agricultural marketing comprises all the operations and agencies conducting them, involved in the movement of farm-produced foods, raw materials and their derivatives such as textiles, from the farm to final consumers and the effects of scale of operations on farmers, middlemen and consumers.\textsuperscript{41}

In the present study, agricultural marketing includes all business activities that help in the flow of rubber sheet from the point of initial production until it reaches the industrial consumers.

\textsuperscript{39} Ibid.
\textsuperscript{40} Report of the National Commission on Agriculture, Part XII, Supporting Services and Incentives, Government of India, Ministry of Agriculture and Irrigation, New Delhi, 1976, p.110.
2.2.2.2 Market Structure

George and Singh refer market structure to those features of the organization of a market which influence the nature of competition and pricing in the market and affect the conduct of business firm.42

Lele refers market structure to the various market channels, the intermediaries and the traders involved in moving the produce from the producers to the consumers.43

In the present study market structure includes the domestic market channels, the intermediaries such as village traders, wholesalers, co-operative societies and commission agents who are engaged in the trade channel.

2.2.2.3 Marketing Channel

According to Philip Kotler, marketing channels are sets of interdependent organizations involved in the process of making a product or service available for use or consumption by the consumer or business user.44

Rasid and Srivastava define the marketing channel as the ways through which the produce passes on to the ultimate consumer.45

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Richard Kohls and Damey describe marketing channel as the path over which a commodity passes as it moves from the farmer to the hands of the consumer.46

In the present study, marketing channel refers to the collection of agencies and movements associated with the exchange of goods and services from the primary producer to the industrial user.

**Middlemen**

Kohls and Vhl are of the view that middlemen are those individuals who specialize in performing various marketing functions involved in purchase and sale of goods as they are moved from producer to consumer.47

Middlemen are used in marketing of agricultural produce, because most farmers are too small to handle their own distribution efficiently and the main growing areas are often geographically away from large markets. In the present study, middlemen are classified according to the place which they occupy in the marketing process and according to services they render. The different types of middlemen identified in the case of rubber marketing are listed below.

**Village Traders**

They operate at village level and have direct control with the

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small growers. They buy small holders sheet rubber without grading at a price ranging from 10 to 20 paise per kg less than the market price of ungraded rubber of major rubber markets. The extent of reduction is more during a declining trend in prices and comparatively low during periods of upward movement in prices.

**Wholesalers**

They operate at taluk headquarters. All are licenced dealers. They buy from the village traders, the small growers and the estate holders, without grading and packing once in a week or a fortnight depending on the stock and market situation. The actual grading of sheet rubber starts only at this level.

**Co-operative Societies**

The entry of co-operatives was mainly to regulate the dominant of the intermediaries. They procure rubber from the members and arranges for its successful sale with the industrial consumers. In the study area the share of co-operative sector in the total market continues to be negligible. They fail to ensure proper infrastructural development in the processing and marketing of rubber mainly due to financial and technological problems.

**2.2.2.4 Marketing Cost**

According to Subrahmaniam, marketing cost refers to the cost incurred in the marketing of agricultural commodities. It is directly
incurred by the producers for loading and unloading and for transportation, weighment, commission charges, market fee, storage and personal expenses especially on travel and refreshment for collecting the sale proceeds and the like.\footnote{Subrahmaniam, K.V., “Marketing Finance for Horticultural Crops: Its Need and Requirements”, \textit{Indian Journal of Agricultural Marketing}, Vol.4, No.1, 1989, pp.27-33.}

According to Jain, marketing costs are the actual expenses incurred in bringing the goods and services from the producer to the consumer. The expenses are incurred by all those who are engaged in the process of marketing from producer to retailers.\footnote{Jain, S.C., “Principles and Practice of Agricultural Marketing and Price Policies”, Vorslo Publishers Pvt. Ltd., Bombay, 1971, p.3.}

Peter and Wang divide the marketing costs into fixed marketing costs and variable marketing costs. Fixed costs refer to the elements such as tax, water, electricity, storage, correspondence, sales, outlet, marketing facilities and permanent employees.\footnote{Peter H. Calkins and Hai-Mei Wang, “Improving Marketing of Perishable Commodities”, \textit{Asian Vegetable Research Centre}, Taiwan, 1980, p.33.}

In the present study the marketing cost is the sum of actual costs incurred by each agency involved in the marketing channel for performing its functions.

\textbf{2.2.2.5 Marketing Margin}

Ramamoorthy defined marketing as the margin of the income to the marketing agencies who might themselves have paid out most of the cost to cover their own expenses, the price they paid for labour, equipment
and the like in carrying out the marketing functions, bearing a portion as a reward for management of the enterprise and risk.  

Raha and Beten observe that the marketing margin is the difference between the price paid by the ultimate consumers and the price received by the grower sellers.  

According to Venkatraman, the marketing margin is the difference between the price paid by the ultimate consumer and price received by the producers often in the market.  

In the present study, marketing margin is the profit received by the different marketing agencies in carrying out their marketing functions.

2.2.2.6 Price Spread

Singh and George defined price spread as the marketing cost incurred and marketing margin earned on the costs in the movement of the produce from the primary source to the ultimate consumer.  

Sidhu and Ranji defined price-spread as the difference between the price paid by the consumer and the price received by the producer for an equivalent quantity of farm product.

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53 Venkatraman, L.S., op.cit., p.49.
Narappanovar and Waij define the price spread as the difference between the price paid by the consumers for one unit of the final product and price received by the farmer for the farm product for yielding one unit of final product.

In the present study, price spread is the difference between the price paid by the ultimate industrial consumer and the price received by the growers and it includes the costs and margins in the movement of the produce.

2.2.2.7 Marketing Efficiency

According to Ramamoorthy, efficiency is measured by the marketing margin received by each intermediary and its proportion to the consumer’s price.

Patel et al., state that marketing efficiency could be measured by input-output or by costs and benefits change that reduce input costs without reducing consumer service or satisfaction would be viewed as increasing efficiency. Conversely a change that increased input cost and not balanced by more consumer benefits would mean less efficiency in the marketing system.

According to Joshi and Sharma, economic efficiency of the market is usually measured by the minimization of price-spread. The larger

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57 Ramamoorthy, K., opsit page 58
the net price spread, the greater the inefficiency in the market system and vice versa.⁵⁹

2.3 Characteristics of the Sample Respondents

This study is based on survey method. So it is necessary to understand the particulars of the sample respondents such as their age, gender, education, occupation, way of becoming a rubber cultivator, age of the rubber tree, mode of drying, experience, variety of clones used and source of bud, so as to have a fair knowledge about them to make meaningful inferences.

2.3.1 Age-wise Classification

Age of the respondent has an important bearing on cultivation practices. It influences the pattern of cultivation and marketing. The age wise distribution of the sample growers is given in Table 2.2.

<table>
<thead>
<tr>
<th>Age (in Years)</th>
<th>Small holdings</th>
<th>Estates</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 30</td>
<td>3 (2.00)</td>
<td>-</td>
<td>3 (1.5)</td>
</tr>
<tr>
<td>30 – 40</td>
<td>40 (26.7)</td>
<td>-</td>
<td>40 (20.00)</td>
</tr>
<tr>
<td>40 – 50</td>
<td>65 (43.3)</td>
<td>15 (30.00)</td>
<td>80 (40.00)</td>
</tr>
<tr>
<td>Above 50</td>
<td>42 (28.00)</td>
<td>35 (70.00)</td>
<td>77 (38.5)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>150 (100)</strong></td>
<td><strong>50 (100)</strong></td>
<td><strong>200 (100)</strong></td>
</tr>
</tbody>
</table>

**Note**: Figures within the parentheses represent percentage to the column total.

**Source**: Primary data.

It is clear from Table 2.2 that the predominant age group of the respondents (i.e) 40 percent in the total sample ranges between 40-50. This age group is relatively higher in case of small holdings (43.3 percent) while it is only 30 percent in the case of estates to their respective total. The growers above 50 years form 38.5 percent. This age group is higher in the case of estates (70 percent). The growers below 30 years form only 1.5 percent. There is no estate holders with the age group of below 30 and 30-40 years.

2.3.2 Gender

A gender-wise distribution is desirable in a study. It is needless to say that males dominate the agricultural sector. A genderwise distribution of the respondents is shown in Table 2.3.

**TABLE No. 2.3**

<table>
<thead>
<tr>
<th></th>
<th>Holdings</th>
<th>Estates</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>142 (94.6)</td>
<td>50 (100)</td>
<td>192 (96.00)</td>
</tr>
<tr>
<td>Female</td>
<td>8 (5.3)</td>
<td>-</td>
<td>8 (4.00)</td>
</tr>
<tr>
<td>Total</td>
<td>150 (100)</td>
<td>50 (100)</td>
<td>200 (100.00)</td>
</tr>
</tbody>
</table>

**Note**: Figures within the parentheses represent percentage to the column total.

**Source**: Primary data.

It is evident from Table 2.3 that among the total sample 96.00 percent are males and only 4.00 percent are females.
2.3.3 Literacy Level

Literacy levels of the rubber growers influence the method of cultivating and marketing. The ability to adopt scientific methods of cultivation depends upon the level of education. Table 2.4 exhibits the sample respondents based upon their literacy level.

**TABLE No. 2.4**

<table>
<thead>
<tr>
<th>Literacy Level</th>
<th>Small holdings</th>
<th>Estates</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illiterate</td>
<td>32 (21.3)</td>
<td>-</td>
<td>32 (16.00)</td>
</tr>
<tr>
<td>Up to VIII Standard</td>
<td>69 (46.00)</td>
<td>14 (28.00)</td>
<td>83 (41.5)</td>
</tr>
<tr>
<td>Higher Secondary School</td>
<td>43 (28.7)</td>
<td>26 (52.00)</td>
<td>69 (34.5)</td>
</tr>
<tr>
<td>Degree and above</td>
<td>6 (4.00)</td>
<td>10 (20.00)</td>
<td>16 (8.00)</td>
</tr>
<tr>
<td>Total</td>
<td>150 (100)</td>
<td>50 (100)</td>
<td>200 (100)</td>
</tr>
</tbody>
</table>

**Note**: Figures within the parentheses represent percentage to the column total.

**Source**: Primary data.

Table 2.4 reveals that 16 percent of the growers in the study area are illiterates but all the estate holders are literates. Those with education up to standard VIII are 41.5 percent followed by those with education up to higher secondary school are 34.5 percent and those with education up to degree and above are 8 percent of the total respondents. The number of growers with their education up to standard VIII is higher among small farmers (46.00 percent) than estates (28.00 percent) while in case of those education up to higher secondary and degree and above who
are estate holders have a higher percentage (52.00 and 20.00 percent) than
the small holders who have 28.7 percent and 4.00 percent

2.3.4 Occupation

The number of rubber growers have a secondary occupation
in addition to the primary occupation of rubber cultivation. They have
subsidiary occupation like employment and / or business. Therefore an
occupation wise analysis is considered necessary for having a clear idea
about the source of their main income. An occupation wise distribution is
shown in Table 2.5.

TABLE No. 2.5
OCCUPATION-WISE DISTRIBUTION OF THE RESPONDENTS

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Small holdings</th>
<th>Estates</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>87 (58.00)</td>
<td>46 (92.00)</td>
<td>133 (66.5)</td>
</tr>
<tr>
<td>Agriculture, Employment</td>
<td>63 (42.00)</td>
<td>4 (8.00)</td>
<td>67 (33.5)</td>
</tr>
<tr>
<td>and / or Business</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>150 (100)</td>
<td>50 (100)</td>
<td>200 (100)</td>
</tr>
</tbody>
</table>

Note: Figures within the parentheses represent percentage to the column
total.
Source: Primary data.

It is observed from Table 2.5 that 66.5 percent of the
respondents have agriculture as their main occupation and the remaining
33.5 percent of the respondents are simultaneously engaged in agriculture
and employment and / or business 92 percent of the sample estate holders
have agriculture as their primary occupation.
2.3.5 Ways of Becoming a Rubber Cultivator

The ways of becoming a rubber cultivator also influence the method of cultivation. Table 2.6 reflects the way in which the farmers have become rubber cultivators.

**TABLE No. 2.6**

**DISTRIBUTION BASED ON THE WAYS OF BECOMING RUBBER CULTIVATOR**

<table>
<thead>
<tr>
<th>Ways</th>
<th>Small holdings</th>
<th>Estates</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inheritance</td>
<td>56 (37.30)</td>
<td>28 (56.00)</td>
<td>84 (42.00)</td>
</tr>
<tr>
<td>Purchasing</td>
<td>33 (22.00)</td>
<td>22 (44.00)</td>
<td>55 (27.5)</td>
</tr>
<tr>
<td>Planted in fresh land</td>
<td>31 (20.70)</td>
<td>-</td>
<td>31 (15.5)</td>
</tr>
<tr>
<td>Removing other crops</td>
<td>30 (20.00)</td>
<td>-</td>
<td>30 (15.00)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>150 (100)</strong></td>
<td><strong>50 (100)</strong></td>
<td><strong>200 (100)</strong></td>
</tr>
</tbody>
</table>

**Note**: Figures within the parentheses represent percentage to the column total.

**Source**: Primary data.

Table 2.6 shows that 42 percent of the respondents have the inherited property. This percentage is higher in the case of estate holders (56.00 percent) than small holders (37.3 percent) in their respective total. 27.5 percent of respondents have purchased the rubber area. This percentage is also high in the case of estate holders (44.00 percent). 20.70 percent of the small holders have planted rubber in fresh land and 20 percent of growers have removed other crops and planted with rubber in the total small holdings.
2.3.6 Experience

The experience of respondents is one of the factors which decides the success of rubber production and marketing. Table 2.7 shows the classification of respondents on the basis of their experiences in cultivation.

**TABLE No. 2.7**

**DISTRIBUTION BASED ON EXPERIENCE**

<table>
<thead>
<tr>
<th>Experience</th>
<th>Holdings</th>
<th>Estate</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 10 years</td>
<td>29 (19.4)</td>
<td>10 (20.00)</td>
<td>39 (19.5)</td>
</tr>
<tr>
<td>10-20 years</td>
<td>104 (69.3)</td>
<td>27 (54.00)</td>
<td>131 (65.5)</td>
</tr>
<tr>
<td>Above 20 years</td>
<td>17 (11.3)</td>
<td>13 (26.00)</td>
<td>30 (15.00)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>150 (100)</strong></td>
<td><strong>50 (100)</strong></td>
<td><strong>200 (100.00)</strong></td>
</tr>
</tbody>
</table>

**Note**: Figures within the parentheses represent percentage to the column total.

**Source**: Primary data.

Table 2.7 reflects that 65.5 percent, 19.5 percent and 15.00 percent of the respondents have had experience of 10.20 years, up to 10 years and above 20 years. Among the small holders and estates, growers with greater than 10 years of experience constitute 80.6 percent and 80 percent respectively to their respective total.

2.3.7 Age of the Rubber Tree

The age of the rubber tree influences the yield of rubber. Table 2.8 exhibits the age of the rubber trees grown in cultivator’s land.
TABLE No. 2.8

DISTRIBUTION BASED ON THE AGE OF RUBBER TREE

<table>
<thead>
<tr>
<th>Age (year)</th>
<th>Small holdings</th>
<th>Estates</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 10</td>
<td>38 (25.3)</td>
<td>-</td>
<td>38 (19.00)</td>
</tr>
<tr>
<td>10-20</td>
<td>109 (72.7)</td>
<td>20 (40.00)</td>
<td>129 (64.5)</td>
</tr>
<tr>
<td>Above 20</td>
<td>3 (2.00)</td>
<td>30 (60.00)</td>
<td>33 (16.5)</td>
</tr>
<tr>
<td>Total</td>
<td>150 (100)</td>
<td>50 (100)</td>
<td>200 (100)</td>
</tr>
</tbody>
</table>

Note: Figures within the parentheses represent percentage to the column total.
Source: Primary data.

Table 2.8 shows that 64.5 percent of the trees are in the age group of 10-20. This age group is higher in the case of holdings (72.7 percent) and it is 40 percent in the case of estates to their respective total. The percentage of the trees above 20 years is low in small holdings (2 percent) and the percentage in the estate is 30 percent.

2.3.8 Variety of Clones

The variety of clones used for cultivation is an important factor which influences the yield of rubber and economic life of rubber trees. The variety of clones used by the sample growers is given in Table 2.9.
TABLE No. 2.9

VARIETY OF CLONES USED FOR CULTIVATION

<table>
<thead>
<tr>
<th>Variety</th>
<th>Small holdings</th>
<th>Estates</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hybrid</td>
<td>147 (98.00)</td>
<td>40 (80.00)</td>
<td>187 (93.5)</td>
</tr>
<tr>
<td>Old Variety</td>
<td>3 (2.00)</td>
<td>10 (20.00)</td>
<td>13 (6.5)</td>
</tr>
<tr>
<td>Total</td>
<td>150 (100)</td>
<td>50 (100)</td>
<td>200 (100)</td>
</tr>
</tbody>
</table>

Note: Figures within the parentheses represent percentage to the column total.

Source: Primary data.

Table 2.9 reveals that 93.5 percent of the growers use hybrid variety of clones for cultivation. 98 percent of the small holders and 80 percent of estate holders (to their respective total) use this variety. Growers who use old variety constitute only 6.5 percent.

2.3.9 Mode of Drying Rubber Sheet

The quality of rubber sheets depends upon the methods adopted for drying. Out of 200 sample growers, 198 growers dry their rubber sheets before marketing, the remaining 2 respondents sell the rubber sheets without drying. The mode of drying is exhibited in Table 2.10.
Table 2.10 shows that 87.9 percent of the growers adopt smokehouse drying. This method is followed by all the estate holders (100.00 percent) and 83.8 percent of the small holders to their respective total. Sun drying and kitchen drying are followed by 9.1 percent and 3 percent of the growers respectively.

2.3.10 Source of Bud

The source of buds also influences the cost of cultivation and methods of cultivation. Table 2.11 reflects the source of bud for small holders and estates.
Table 2.11 shows that 39.5 percent out of the total sample respondents, have their own nurseries which constitute 19.3 percent of the total small holders as well as all the estate holders. Whereas 80.7 percent of the total small holders purchase buds from other nurseries.

<table>
<thead>
<tr>
<th>Source</th>
<th>Small holdings</th>
<th>Estates</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Own source</td>
<td>29 (19.3)</td>
<td>50 (100.00)</td>
<td>79 (39.5)</td>
</tr>
<tr>
<td>Other source</td>
<td>121 (80.7)</td>
<td>-</td>
<td>121 (60.5)</td>
</tr>
<tr>
<td>Total</td>
<td>150 (100)</td>
<td>50 (100)</td>
<td>200 (100)</td>
</tr>
</tbody>
</table>

Note: Figures within the parentheses represent percentage to the column total.

Source: Primary data.