CHAPTER I
INTRODUCTION AND DESIGN OF THE STUDY

INTRODUCTION

India has been the land of choicest spices and the best aroma breezes from its soil from time immemorial. The rarest spices and condiments of this nation lured many voyagers from around the world and they were fascinated by the sweet fragrance, pungent tastes and oleoresin qualities of the spices like cardamom, pepper, nutmeg, saffron, and the like. India abounds in such varied natural treasures as its legends, myths and mysteries. Even the British imperialists and other colonists extended physical connectivity’s like rail roads, rope ways and other means of transportation to tape such spice resources with great zeal. They carried these spices to their countries and the perfumes of these spices permeated all across the seven seas.

The spices are horticultural crops adapted to varied tropical and sub-tropical conditions, providing employment opportunities to millions of skilled and unskilled labourers in their production, processing, marketing and value addition. Spices and herbs are used in flavouring, seasoning and imparting aroma in food items, beverages, pharmaceuticals and in cosmetics. They stimulate the appetite, add zest to food, enhance the taste and delight the gourmet.

The use of spices is on the constant increase today in the fast food culture, various system of medicines and cosmetic preparations. The concept of flavour in spices comprises a range of olfactory and tastes perceptions. The constituents responsible for these sensations are the volatile essential oil and oleoresins. They are wide range of different natural organic chemicals and generally have little or no nutritional value. Oils and oleoresins are preferred to the whole or ground spices for the preparation of certain products.

Spices in trade consist of different plant parts like fruits/seeds/berries, rhizomes, bulbs, barks, flower buds and leaves. Major fruit/seed/berry spices are allspice (pimento dioica), black pepper, cardamom, nutmeg, coriander, cumin, fennel,
fenugreek, poppy and cassia; flower spices are clove and saffron, and leaf spices are marjoram, mint, rosemary and thyme.

The story of Indian spices dates back to 7000 years into the past. They had been causes for wars, voyages and expeditions and for romantic affairs too. The rare spices of this land allured traders from many, European countries which ultimately led as one of the factors for colonization also. The colonists established physical connectivity to the spices growing tracts as a priority for bringing down to produce and for carrying them to their destinations. Within the past one decade, the international trade in spices has grown by leaps and bounds. An estimated 5,00,000 tonnes of spices and herbs valued at 1500 million US dollars are now imported globally every year. An impressive 48 per cent of this supply comes from India. India’s exports of spices extracts have shown spectacular growth attaining over 50 per cent of the global market within a short span.

The primary producers of the spices include India, Guatemala, Tanzania, Sri Lanka, El Salvador, Vietnam, Laos, Cambodia and Papua New Guinea. Since, spices are always in demand in the industrial world, export of these basic agricultural commodities by developing countries can be relied upon to earn valuable foreign exchange to major importing countries like the USA, Europe, Japan, East Asia, and Middle Eastern countries.

India is the biggest producer, consumer and exporter of spices, with a 48 per cent share by volume and 24 per cent share by value in the world market. The Indian spice export basket consists of around 50 spices in whole form and more than 80 products in value added form. However, a few spices and their value added forms constitute a major segment of the country’s total export earnings. Similarly the export basket of spices has a lot of potential for widening. Recent additions are cardamom, garcinia, and herbal spices.

4. Ibid.
The earliest reference to cardamom is a clay tablet from the ancient city of Nippur Sumeria, dated 2000 BC. Cardamoms are reportedly described in the Ayurvedic literature in India – 3rd BC where they were recommended for stomach and urinary disorders. Cardamom was an article of trade between India and Greece during the 4th century BC. Inferior grades were known as amomum superior ones as Kardamomum but it is still not clear whether both the names refer to the same cardamom.

Labour plays a vital role in cardamom plantation industry. Nearly 1,00,000 employees are engaged in the cardamom plantation industry for carrying out various kinds of manual works involved in the process of production of cardamom. Cardamom is one of the highest priced and most expensive spices after saffron and vanilla. The seeds have a pleasant aroma and a characteristic warm, slightly pungent taste. There are two kinds of cardamom found in the spices world namely large cardamom and small cardamom. It is a shade-loving plant usually cultivated under forest trees at altitudes between 700 – 1500 meter above sea-level.

The plantation system in India was the legacy of the then British ruler. The system was firstly introduced to cultivation of tea and then gradually expanded to coffee and other crops particularly to spices. The most important features of plantations are its capacity to generate more employment opportunities. The plantations constitute the largest employer in the organised industrial sector, which is responsible for the basic income and living standard of people directly and indirectly engaged in.

**Economic Importance of the product**

The cardamom planters earn better income from their fields than the other cash-crop planters. Workers on cardamom holdings earn more and have steadier employment than those in other agricultural sectors. In cardamom producing areas, the crop provides a livelihood to the majority of the population. Even with a minimum percentage of export, cardamom fetches sizable export earnings to the exchequer of the nation. Moreover, cardamom grows under the shade of trees requiring the preservation of forests which are essential for ecological balance and bio-diversity.
Varieties of Cardamom

The name cardamom is used for species within three genera in the Ginger family (Zingiberaceae), *Elettaria*, *Amomum* and *Aframomum*. Among these, *Aframomum* is widely cultivated in Africa and Madagascar, whereas *Amomum* mainly grows in a few places of Asia and Australia. These two varieties are considered as inferior substitutes for *Elettaria cardamom*, the true cardamom that is distributed from India to western Malaysia. For the purpose of present study the *Elettaria cardamom*, which is also known as **Small cardamom, Green cardamom, or cardamom** is considered. In India it is popularly known as **elaichi**.

It is a pungent aromatic spice and medicinal herb. It is a perennial plant that can grow between six and twelve feet height. Cardamom grows well in humid and moderately cool climate, filtered sunlight through the tree canopy, humus rich soil, well-distributed rainfall and protection from heavy winds.

Common Grades: In general, the weight in grams per liter and the color are decisive in determining quality. The proportion of burst fruit pods [“open pods”] also determines quality, as do color [green or yellow] and drying method [mechanical or sun].

The following definitions refer to different grades of common Indian Cardamom:

- **Bold** is a popular export grade where 90 percent of the cardamom pods have a diameter of 6.5mm or above. The product has a mature green coloration with a weight in grams per liter of 415 grams.
- **Super Bold** is a high quality variety where all pods should have a diameter of 8mm or above. The product has a mature green coloration with a weight per liter of over 450 grams.
- **Extra Bold** is also a popular export grade where all pods will have a diameter of 7 mm or above. The product has a mature green coloration with a weight in grams per liter of 435 grams.

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• **Bulk** is also a cardamom that has not been graded. It contains all sizes, both mature and immature capsules in the form of black, yellow and or split cardamom.

• **Small** is a grade with pods that measure between 5.5 mm and 6.5 mm in diameter. The weight in grams per liter is approximately 385 grams.
  **Open/Splits** is a lower quality cardamom where over 60 percent of the pods are “open” [i.e. seeds exposed] and the color of the pods may be greenish / pale yellow. All pods will be mature with a diameter of 6.5 mm or above.

• **Seeds** are the black/brown seeds of the cardamom pods [i.e. husk fully removed]. The weight in grams per liter is typically 550 to 600 grams.

• **Fruit** are generally over matured pods with slight yellowish in color. The weight in grams per liter is 425 grams or above.

**Uses of Cardamom**

A stimulant and carminative, cardamom is not used in Western medicine for its own properties, but forms as a flavouring agent and a basic ingredient in medicinal preparations for indigestion and flatulence using other substances, entering into a synergetic relationship with them. The Arabs attributed aphrodisiac qualities to it (it features regularly in the Arabian Nights) and the ancient Indians regarded it as a cure for obesity. It has been used for indigestion since ancient times. A medicinal (perhaps aphrodisiac) concoction can be prepared by macerating seeds in hot water⁷.

Cardamom oil is a precious ingredient in food preparations, perfumery, health foods, medicine and beverages. A good portion is consumed for chewing or as a masticator item. In medicine, it is used as powerful aromatic, stimulant, carminative, stomachic and diuretic, but rarely used alone. It also checks nausea and vomiting, helps in combating digestive ailments. Herbal lore on this spice suggests it can be used to refresh the breath and support smooth digestion⁸.

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Cardamom was a special favorite in countries that traded in spices, since it had not only culinary but medicinal uses too. By 1500 BC, Egyptians were using cardamom and other spices in medicine, cosmetic ointments, perfumes, aromatic oils, cooking, fumigation and embalming\textsuperscript{9}.

Later, in ancient India, it was prescribed, along with cinnamon, ginger and turmeric, to remove fat and cure urinary infections, piles and jaundice. The Indian Ayurvedic system of medicine, based on the earliest Brahmanic texts, recommended that spices such as cloves and cardamom be wrapped in betel-nut leaves and chewed after meals to increase the secretion of saliva and it helps digestion and eliminates bad breath. Besides cooling the body and settling the stomach, cardamom coffee is sometimes also marketed as a sexual stimulant, especially among the older generation.

The pods can be used whole or split when cooked in Indian substantial meals, such as pulses. Otherwise, the seeds can be bruised and fried before adding main ingredients to the pan, or pounded with other spices as required. The pod itself is neutral in flavour and not generally used. Cardamom is used in Dutch ‘windmill’ biscuits and Scandinavian-style cakes and pastries. Cardamom is included in Indian sweet dishes and drinks. At least partially because of its high price, it is seen as a ‘festive’ spice. It flavours custards, and some Russian liquors. Cardamom is also chewed habitually where freely available, as in the East Indies, and in the Indian masticory betel pan. It is a flavouring agent for Arab and Turkish coffee, which is served with an elaborate ritual. Middle East countries use cardamom mostly in the preparation of 'Gahwa' - a strong cardamom-coffee concoction without which no day is complete or no hospitality hearty for an Arab\textsuperscript{10}.

\textsuperscript{9} Web site: http://www.theepicentre.com/index.html
\textsuperscript{10} Ibid
STATEMENT OF THE PROBLEM

The Indian cardamom has a place of pride and pre-eminence owing to its pungent taste, oleoresin quality and its alluring green colour. It has its domestic market and earns a sizable foreign exchange to the national exchequer.

However, unprecedented factors like erratic rain pattern, failure to fetch remunerative returns, unsecured minimum floor prices for the produces, lack of labourers, migration of labourers, failure to follow integrated farm management practices, failure to introduce modern technologies to augment production pose a serious threat to cardamom cultivation. It is becoming more challenging and involves huge expenses with less return.

Moreover, Guatemala has become the largest producer of cardamom and it has become a keen competitor to Indian cardamom. Many Indian cardamom markets abroad have been seized upon by Guatemala. Many other countries like Tanzania, Sri Lankan, El Salvador, Vietnam and Laos also taken up cardamom cultivation today and consequently India will have to face stiff challenges in the years to come.

To withstand such challenges India has to intensify cardamom cultivation. The internal markets also need to be strengthened because there is large scope for domestic consumption of cardamom.

To strengthen the cardamom industry, the Government of India and the Spices Board have been making many serious initiatives to intensify cardamom cultivation and establish market strategies with effective channels of distribution. The Indian Cardamom Research Institute and the Indian Institute of Spices Research have improved the planting material and developed many high yielding and disease resistant varieties. Use of fertilizers, pesticides, and irrigation is wide spread, development of improved electric dryers and rub cleaning machines are also advanced. However, the production and productivity levels in India are not encouraging due to the fact that more number of farmers are yet to be oriented and motivated to take up cardamom cultivation and more extent of land to be brought under cardamom cultivation. Hence, there is a need for identifying the factors that hinder the growth of cardamom cultivation in the country. Further the unorganised and fluctuating market structures with greedy intermediaries discourage and dissuade
the otherwise enthusiastic farmers to take up cardamom cultivation on a large scale. India had lost its Middle East market to Guatemala, where the cost of production is reported to be half of that in India without compromising the quality leading to wide price fluctuation.

This challenging situation with regard to cardamom cultivation and marketing in India therefore needs an in-depth analysis. The marketing of cardamom in Indian context needs to be strengthened for sustenance and stability. A study in this direction, it is hoped, will help the policy makers at the helm of affairs to formulate suitable policies for further expansion of cultivation and strengthening of the market structure of the queen of spices, cardamom to motivate and encourage people to take up cardamom cultivation newly or increase the existing area of cultivation. Also assessment of problems and prospects in the area of production, marketing and so on faced by the growers will help to take measures to overcome it.

Under this environment, the researcher considered it necessary to take up a study to analyse the cost and return of cardamom cultivation and to assess the problem and prospects in cultivating and marketing the produce. Hence, the present study was undertaken with the below mentioned objectives in mind.

OBJECTIVES OF THE STUDY

The following are the main objectives of the study.

1. To analyse the trend and growth in area, production and productivity of cardamom cultivation during the study period.
2. To ascertain and compare the cost and return structure of small, medium and large sample farmers of cardamom cultivation in the area chosen for the study.
3. To study resource-use efficiency and to compute returns to scale in cardamom cultivation.
4. To highlight the problems associated with production and marketing of cardamom growers in the study area.
5. To suggest policy measures for achieving higher production and productivity and increasing the area of cardamom cultivation.
SIGNIFICANCE OF THE STUDY

Cardamom is the most important spice produced and traded in India. The product enjoys huge demand in the domestic market. The cardamom cultivators enjoy comparatively better prospects in terms of profit for their investment and efforts and cardamom cultivation has become a beacon of light and a lantern of hope to them. Above all, cardamom has also an enviable overseas market owing to its use in the modern fast food culture which has become indispensable now. Cost is no bar to one when the question of enhancing the quality of the products with the magical fragrance of the beans to allure the consumers. Thus, cardamom is an important produce with potential for earning substantial amount of foreign exchange. It also acts as a good provider of employment opportunities in hilly and rural areas where it is cultivated. A study to improve the opportunity to control cost of cultivation, improving the market conditions, expressing the prospects for the product will help the stakeholders to improve the condition of cultivating and marketing the product thereby helping the country to grow.

IMPLICATION OF THE STUDY

A study in this direction, it is hoped, would help the policy makers at the helm of affairs to formulate suitable policies for further expansion of cultivation and strengthening of the market structure of the queen of spices, cardamom. Hence the present study.

OPERATIONAL DEFINITIONS

Variable cost

Expenses that will vary in proportion to the area under cultivation and those vary in proportion to number of cardamom saplings are considered variable cost in this study.

i. Labour

Among various components of variable cost, expenditure on human labour is the major item in cardamom cultivation. The cost of labour includes the expenses incurred in using the labour to clean the land, digging of pits for planting seedlings and standards, planting of cuttings, application of manures and fertilizers, weeding, shade regulation, harvesting and other related agricultural operations. Though a slight
variation of wages is found between male and female workers and also among cardamom growing states, an average cost of labour has been considered for the purpose of the present study.

ii. Manures and Fertilizers

Cost of dried organic leaves, dried cow dung, vermi compost, bone meal and neem cake along with necessary fertilizers come under this category of expense.

iii. Mulching Materials

Mulching at the base of each plant with easily degradable organic materials is inevitable for conserving both moisture and soil structure and also add to the fertility of the soil when it disintegrates. Hence, the cost of dried organic matter, leaves, weeds, coconut leaves / husks and the like are taken into consideration in the study.

iv. Plant Protection Chemicals

Conditions such as poor nutrition availability, excessive shading or the lack of it will damage roots and stems. Overcrowding of seedlings, excessive use of manures and fertilizers, excessive moisture due to poor drainage facilities and the like very often lead to pests and disease problems in cardamom cultivation. For the effective control of pests and diseases, appropriate preventive measures are undertaken and the cost of chemicals used for this is treated as an expense in the study.

v. Tieing Materials

This includes the cost of tieing the cardamom sapling with the stakes using coir thread.

vi. Irrigation

A proper and adequate irrigation facility is a pre-requisite for effective cultivation of cardamom. Hence, the cost of well irrigation, natural spring and canal irrigation or modern methods of irrigation like using sprinkler, drip irrigation and mist irrigation used for watering of cardamom plants is treated as an expense in the study.

Fixed Cost

Generally the cost which does not vary with number of seedlings and acreage of cultivation is considered fixed cost. It includes the following;
i. Land Revenue

Land revenue collected by the respective state governments is a fixed cost. For the purpose of the present study, average of land revenue paid by sample respondents during the period of survey has been taken into account.

ii. Rental Value of Land

Rental value of land is another major item of fixed cost in case of tenant-cultivation. As far as cardamom farm operated by the owner is concerned the prevailing rental value for similar crop of the land was taken the rental value of cardamom farms.

iii. Other Fixed Costs

It includes interest on fixed capital, depreciation on farm assets and repairs and maintenance cost. Depreciation is charged to meet the loss due to wear and tear on fixed assets used in farms. Here depreciation was calculated under straight line method for farm building, machinery, tools and equipment and material at the rate specified below\textsuperscript{11}.

- Farm building : 2 per cent
- Machinery : 10 per cent
- Tools and Equipment : 25 per cent
- Material : 50 per cent

Total Establishment Cost

This refers to the cost incurred in the establishment of cardamom farms up to the commercial bearing stage, which is of 3 years. This included rental value of land, cost incurred on cardamom seedlings, stakes, tieing material, 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.

Annual Share of Net Establishment Cost

The value of yield of cardamom 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 economic life span of cardamom seedling, which was taken as nine years, to estimate the cost of cardamom production.

Cardamom Farm

It is the area of cardamom crop raised by a single grower and situated within the sample village limits.

Farm Building

It refers to shed used for storage and processing of cardamom and for keeping implements.

Machinery

It refers to sprayers, dusters and pumps owned by a grower.

Tools and Equipment

This refers to shovel, spades, crowbar, hammer, sledge hammer, sickle, mat and ladders owned by a grower.

Material

This includes gunny bags, knife, buckets and tarpaulin possessed by a grower for his farm.

Small Farmers

They are, farmers cultivating cardamom up to five acres of land.

Medium Farmers

Farmers who are cultivating cardamom in more than five acres and up to 10 acres of land.

Large Farmers

They are, farmers cultivating cardamom in more than 10 acres of land.
RESEARCH METHODOLOGY

Data collection

The present study is based on survey method. Thus, the study depended on primary data which were collected from the growers with the help of suitable interview schedule. A draft interview schedule was constructed after reviewing related studies, discussion with cardamom growers, experts in the field of cardamom cultivation by incorporating their views. This interview schedule was pre tested with a sample of 50 cardamom growers. In the light of their opinions, suggestions and modifications the present interview schedule was changed and finalised. (Vide Appendix). The schedule includes questions on cropping pattern, labour utilisation and age and the yielding capacity of the cardamom plants, variety and number of cardamom plants planted in an acre along with the personal details of the cardamom growers of the selected area.

Data regarding price of cardamom, area, production, export and other secondary data were collected from various journals, books, Spices statistics published by Spices Board, Cochin and websites.

Area of the study and sampling design

The states of Kerala, Karnataka and Tamil Nadu are the major producers of cardamom in India. The State of Kerala accounts for 74 per cent of cardamom production, Karnataka accounts for 18 per cent and Tamil Nadu accounts for the remaining 8 per cent of cardamom production.

Based on the largest area of production of cardamom, the revenue district of Idukki in Kerala has been selected for the study. The district consists of four taluks namely Devikulam, Thodupuzh, Udmpamchola, and Peermedu each having 5, 9, 20 and 10 villages respectively. From each taluk a sample size of 25 per cent villages were selected through proportionate stratified random sampling method. Thus, one village in Devikulam, two in Thodupuzha, five in Udmpamchola and two in Peermedu taluk totaling 10 villages form part of sample villages.

There were 19,121 farmers engaged in cultivation of cardamom in Idukki district at the time of survey as per the records of the Spices Board. In the study area, the total number of farmers engaged in cardamom cultivation was 7,668. A sample size of 10 per cent is considered reasonable and hence 767 farmers were chosen by
adopting stratified simple random sampling method. The number of cardamom farmers in each Village of the respective taluk and the number of respondents chosen for the study are presented in Table 1.1.

**TABLE 1.1**

SAMPLE SIZE OF THE RESPONDENTS

<table>
<thead>
<tr>
<th>TALUK &amp; VILLAGES</th>
<th>NO. OF CARDAMOM CULTIVATORS</th>
<th>SAMPLE SIZE (10 %)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. UDUMPANCHOLA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vandannettu</td>
<td>1,499</td>
<td>150</td>
</tr>
<tr>
<td>Santhanpara</td>
<td>1,152</td>
<td>115</td>
</tr>
<tr>
<td>Rajakumari</td>
<td>1,109</td>
<td>111</td>
</tr>
<tr>
<td>Kattappana</td>
<td>1,083</td>
<td>108</td>
</tr>
<tr>
<td>Udumbanchola</td>
<td>948</td>
<td>95</td>
</tr>
<tr>
<td><strong>TOTAL (A)</strong></td>
<td>5,791</td>
<td>579</td>
</tr>
<tr>
<td><strong>B. PEERMEDU</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vagamon</td>
<td>451</td>
<td>45</td>
</tr>
<tr>
<td>Periyar</td>
<td>417</td>
<td>42</td>
</tr>
<tr>
<td><strong>TOTAL (B)</strong></td>
<td>868</td>
<td>87</td>
</tr>
<tr>
<td><strong>C. DEVIKULAM</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KDH</td>
<td>470</td>
<td>47</td>
</tr>
<tr>
<td><strong>TOTAL(C)</strong></td>
<td>470</td>
<td>47</td>
</tr>
<tr>
<td><strong>D. THODUPUZHA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Idukki</td>
<td>393</td>
<td>39</td>
</tr>
<tr>
<td>Kanjikuzhy</td>
<td>146</td>
<td>15</td>
</tr>
<tr>
<td><strong>TOTAL(D)</strong></td>
<td>539</td>
<td>54</td>
</tr>
<tr>
<td><strong>Gross Total A+B+C+D</strong></td>
<td>7668</td>
<td>767</td>
</tr>
</tbody>
</table>

*Source: Records available in the office of Spices Board, Cochin.*

The individual sample was chosen from the list of farmers of each taluk using Tippet random number table. Data were collected from all these persons through interview schedule. On final verification, it was found that 65 interview schedules
were incomplete and contradictory and hence rejected. Finally 702 respondents formed part of sample size.

**Frame work of Analysis**

Following statistical tools were used for analysing the data collected through interview schedule so as to obtain meaningful inferences.

**Trend Analysis**

To study the trend in production, productivity and export of cardamom simple regression equation of the following form was used.

\[ Y = a + bt \]

Where \( Y \) = Production in the year ‘t’

\( a \) = Constant

\( b \) = Regression co-efficient

\( t \) = Time in years

**Growth Performance and Magnitude of Variability**

In order to estimate the growth rate in area, production and productivity in cardamom cultivation, compound growth rate was calculated on the basis of semi-log or exponential function.

\[ \log Y = a + bt \]

Where \( Y \) = Production in quantity

\( t \) = time periods

‘a’ and ‘b’ are the parameters to be estimated.

Compound Growth Rate = \((\text{Antilog } b - 1) \times 100\)

The extent of variation in production, productivity and export of cardamom was calculated with the following formula:

\[ \text{Co-efficient of variation} = \frac{SD}{\bar{x}} \]

\( SD \) = Standard Deviation

\( \bar{x} \) = Arithmetic mean
Cobb-Douglas type Production Function

In order to analyse determinants of cardamom yield and return to scale, the Cobb-Douglas type production function was used. The function in log form is,

\[ \log Y = \log b_0 + b_1 \log x_1 + b_2 \log x_2 + \ldots + b_6 \log x_6 \quad \text{(1)} \]

Where, \( Y \) = Yield of cardamom in kilograms per acre

\( X_1 \) = Labour cost per acre in year ‘t’

\( X_2 \) = Expenses of manures and fertilizers per acre in year ‘t’

\( X_3 \) = Expenses of mulching materials per acre in year ‘t’

\( X_4 \) = Expenses of plant protection chemicals per acre in year ‘t’

\( X_5 \) = Expenses of irrigation per acre in year ‘t’

\( X_6 \) = Age of the plants per acre in year ‘t’

Where, ‘t’ is the actual year (age) of the crop at the time of collection of data.

\( b_0, b_1, \ldots, b_6 \) are the parameters to be estimated.

\( b_0 \) = Regression constant.

\( b_1, b_2, \ldots, b_6 \) = Partial elasticity of yield with respect to the factors

\( x_1, x_2, \ldots, x_6 \) respectively.

In order to test the significance of the estimated parameters, \( b_1, b_2, \ldots, b_6 \) the following formula was used.

\[ t = \frac{b_i}{SEb_i} \quad \text{(2)} \]

\( SEb_i \) = Standard error of \( b_i \)

The sum of all the production elasticity of factor inputs indicates returns to scale i.e.

\[ \Sigma b_i = 1, 2 \ldots 6 \]

If \( \Sigma b_i > 1 \) increasing returns to scale.

If \( \Sigma b_i < 1 \) decreasing returns to scale.

\( \Sigma b_i = 1 \) constant returns to scale.
Resource use Efficiency

The marginal value productivity (MVP) of resources and the cost of those resources would give an indication for the reallocation of resources to maximize returns. Optimization principle in resource allocation suggests that the application of a resource should be increased till the marginal value product of a factor equals its marginal cost. In the present study, marginal value product of the inputs such as X₁, X₂, . . . . . X₆ was calculated by using the following formula:

\[ \text{MVP}_j = b_j \frac{\bar{Y}}{\bar{X}_j} \bar{P} \]

Where
- \( \text{MVP}_j \) = marginal value product for input \( X_j \)
- \( b_j \) = estimated elasticity co-efficient of variable \( X_j \)
- \( \bar{Y} \) = geometric mean yield (kg.)
- \( \bar{X}_j \) = geometric mean value of variable \( X_j \)
- \( \bar{P} \) = mean net selling price of cardamom (Rs./Kg.)

for \( j = 1, 2, \ldots .6 \)

After computing MVP of various inputs, it was divided by marginal input cost or factor cost to arrive at the ratio of marginal value product to the factor cost.

Capital Productivity

To assess capital productivity of investment made in the cardamom cultivation Payback period, Benefit cost ratio, Net present value and Internal rate of return were calculated.

Choice Based Ranking Technique

‘Choice based ranking technique’ was used to assess the order of importance of the problems faced by the cardamom growers in cultivation and marketing of cardamom.
PERIOD OF STUDY

In order to collect primary data a survey was undertaken between May 2010 – February 2011 and information regarding area, age of plant, production and average selling price relating to the period from 2001-02 to 2010-2011 were collected from the sample farmers. Secondary data relating to area under cultivation of cardamom, production of cardamom, quantity and value of cardamom exported were collected for the period of 20 years from 1991 to 2010 at the world level and for a period of 16 years from 1995-96 to 2010-11 at India level.

LIMITATIONS OF THE STUDY

Generally the farmers including cardamom growers do not have the habit of maintaining regular records in respect of farm expenditures and income. The respondents answered to most of the queries from their memory and hence the data obtained from them are subject to recall bias. However, efforts were taken to minimise such recall bias through checks and cross checks. The data pertaining to area, production and productivity of cardamom cultivation were presented for 20 years at world level, whereas the researcher could collect such data at India level for sixteen years, owing to the fact that only during this period, there was active cardamom cultivation in India.

CHAPTER SCHEME

The present study comprised of seven chapters.

The first chapter entitled “Introduction and Design of the Study” introduced the topic and traces the development of cardamom trade. This chapter includes statement of the problem, objectives of the study, significance of the study, operational definition of the concepts used, research methodology, limitations of the study and chapter scheme.

The second chapter entitled “Review of Literature” discussed other earlier studies in the related area.

The third chapter namely “Profile of the sample area and an overview of cardamom cultivation” provides the profile of the study area, production of cardamom which analysed the compound growth rate, magnitude of variability and
trend values in area, production and productivity of cardamom in major cardamom producing countries including India.

The fourth chapter entitled “Analysis and Interpretation of Data” described the characteristics of the sample respondents and the cost of production and profitability in cardamom cultivation with regard to small, medium and large farmers.

The fifth chapter entitled “Input-Output Analysis” examined the resource use efficiencies and returns to scale in cardamom cultivation and also capital productivity techniques.

The sixth chapter entitled “Problems and Prospects of Cardamom Industry” highlighted the cultivation and marketing problems encountered by the sample cardamom growers as well as the positive trends in export of cardamom.

The seventh chapter entitled “Summary of Findings, Suggestions and Conclusion” emphasised the relevance of the study and presents major findings of the study. Necessary suggestions have been made in this chapter to increase productivity and better marketing strategies, so as to enable the cardamom farmers achieve higher returns.