ECONOMIC EVALUATION OF VANILLA CULTIVATION IN UTTARA KANNADA DISTRICT OF KARNATAKA

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# CONTENTS

<table>
<thead>
<tr>
<th>Chapter No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
<td>INTRODUCTION</td>
</tr>
<tr>
<td>II.</td>
<td>REVIEW OF LITERATURE</td>
</tr>
<tr>
<td>III.</td>
<td>METHODOLOGY</td>
</tr>
<tr>
<td>IV.</td>
<td>RESULTS</td>
</tr>
<tr>
<td>V.</td>
<td>DISCUSSION</td>
</tr>
<tr>
<td>VI.</td>
<td>SUMMARY AND POLICY IMPLICATIONS</td>
</tr>
<tr>
<td>VII.</td>
<td>REFERENCES</td>
</tr>
</tbody>
</table>
## LIST OF TABLES

<table>
<thead>
<tr>
<th>Table No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>District-wise area under vanilla cultivation in Karnataka during (2001-02)</td>
</tr>
<tr>
<td>3.2</td>
<td>Taluk-wise area under vanilla cultivation in Uttara Kannada district</td>
</tr>
<tr>
<td>3.3</td>
<td>Village-wise area under vanilla cultivation in Sirisi and Yellapur taluks (2003-04)</td>
</tr>
<tr>
<td>4.1</td>
<td>General information about the sample farmers growing vanilla</td>
</tr>
<tr>
<td>4.1a</td>
<td>Classification of farmers based on number of vines</td>
</tr>
<tr>
<td>4.2</td>
<td>Age-wise classification of respondents</td>
</tr>
<tr>
<td>4.3</td>
<td>Educational status of the respondents</td>
</tr>
<tr>
<td>4.4</td>
<td>Existing family system for irrigated and rainfed farmers in Uttara Kannada</td>
</tr>
<tr>
<td>4.5</td>
<td>Establishment cost of vanilla as an intercrop</td>
</tr>
<tr>
<td>4.6</td>
<td>Annual cost of vanilla as an intercrop</td>
</tr>
<tr>
<td>4.7</td>
<td>Annual cost of vanilla as an intercrop (large farmer)</td>
</tr>
<tr>
<td>4.8</td>
<td>Yield and returns from vanilla as an intercrop (small farmer)</td>
</tr>
<tr>
<td>4.9</td>
<td>Yield and returns from vanilla as an intercrop (large farmer)</td>
</tr>
<tr>
<td>4.10</td>
<td>Establishment cost of vanilla as pure crop</td>
</tr>
<tr>
<td>4.11</td>
<td>Annual cost of vanilla as pure (small farmers)</td>
</tr>
<tr>
<td>4.12</td>
<td>Annual cost of vanilla as pure (large farmers)</td>
</tr>
<tr>
<td>4.13</td>
<td>Yield and Returns from vanilla as pure crop (small farmers)</td>
</tr>
<tr>
<td>4.14</td>
<td>Yield and Return from vanilla as pure crop (large farmers)</td>
</tr>
<tr>
<td>4.15</td>
<td>Processing cost of green bean of vanilla</td>
</tr>
<tr>
<td>4.16</td>
<td>Cost and returns from vanilla as an intercrop (small farmers)</td>
</tr>
<tr>
<td>4.17</td>
<td>Cost and returns from vanilla as an intercrop (large farmers)</td>
</tr>
<tr>
<td>4.18</td>
<td>Economic feasibility of growing vanilla as an intercrop</td>
</tr>
<tr>
<td>4.19</td>
<td>Break-even output in vanilla production as an intercrop</td>
</tr>
<tr>
<td>4.20</td>
<td>Cost and returns from vanilla grown as pure crop (small farmers)</td>
</tr>
<tr>
<td>4.21</td>
<td>Cost and returns from vanilla grown as pure crop (large farmers)</td>
</tr>
<tr>
<td>4.22</td>
<td>Economic feasibility of growing vanilla as an intercrop</td>
</tr>
<tr>
<td>4.23</td>
<td>Break-even analysis in vanilla production as pure crop</td>
</tr>
<tr>
<td>4.24</td>
<td>Comparison of growing vanilla as an intercrop and pure crop</td>
</tr>
<tr>
<td>4.25</td>
<td>Marketing cost of green vanilla bean</td>
</tr>
<tr>
<td>4.26</td>
<td>Problems faced by vanilla farmers on different aspects of production processing and marketing</td>
</tr>
</tbody>
</table>
**LIST OF FIGURES**

<table>
<thead>
<tr>
<th>Fig. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Map of Karnataka showing the study area</td>
</tr>
<tr>
<td>2.</td>
<td>Cost of vanilla as an intercrop (yearwise of small farmers)</td>
</tr>
<tr>
<td>3.</td>
<td>Cost of vanilla as an intercrop in arecanut plantation (yearwise of large farmers)</td>
</tr>
<tr>
<td>4.</td>
<td>Marketing cost of fresh unprocessed vanilla beans</td>
</tr>
</tbody>
</table>
## LIST OF PLATES

<table>
<thead>
<tr>
<th>Plate No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Vanilla flower</td>
</tr>
<tr>
<td>2.</td>
<td>Pollination of vanilla</td>
</tr>
<tr>
<td>3.</td>
<td>Vanilla beans</td>
</tr>
<tr>
<td>4.</td>
<td>Vanilla as a pure crop</td>
</tr>
<tr>
<td>5.</td>
<td>Vanilla grown under artificial shade</td>
</tr>
<tr>
<td>6.</td>
<td>Vanilla as an intercrop</td>
</tr>
</tbody>
</table>
I. INTRODUCTION

HISTORY AND IMPORTANCE OF VANILLA

Vanilla is an important commercial spice crop grown in India and is the most expensive spice after saffron. The name vanilla has been derived from two Spanish words ‘Vaina’ means pod and ‘illa’ means small i.e., a vine yielding small pods. Vanilla is an orchid that has been grown widely as a climber in the forests of South East Mexico, Gutemala and parts of Central America (Krishnamurthy and Melanta, 2002).

Vanilla was used as early in 1510 by the Spain Kings for offering a cocoa drink mixed with vanilla as vanilla was impressed for its taste and flavour.

Coleman Higgins a coffee planter cultivated cardamom and vanilla in Heggau valley near Shringeri in Chikmagalur district of Karnataka. In 1835 Britishers introduce to it to India, East India Company started cultivation of vanilla in their spices garden at Kurtallum (Tamil Nadu), Kolkata (West Bengal), Waynd (Kerala), Pondicherry and Assam. Preliminary scientific work on cultivation and processing of vanilla was started in 1960s at Regional Research Station, Ambalawayal, in Waynd district of Kerala state. A few enterprising farmers/planters in Kerala, Karnataka and Tamil Nadu knew the secret of growing vanilla as a profitable commercial crop. However, their experience was not shared with other farmers for a long time. Therefore, the success story of vanilla cultivation remained as secret preserve (Suryanarayana, 2004).

The commercially important species are Vanilla pompona, Vanilla plantifolia and Vanilla tahitensis. Of these three species, Vanilla planifolia is the most popular and is cultivated for its pods (beans) which are subjected to curing process to produce the characteristic aroma. The substance responsible for the unique fragrance and flavour of the vanilla bean is Vanillin ($C_8H_8O_3$).

Vanilla cultivation as a commercial proposition

Vanilla today constitutes the world’s most popular flavouring agent for numerous sweetened foods. “Vanilla sugar” is used in the manufacture of chocolates. In USA, most of the vanilla flavours are marketed in the form of pure vanilla extract. It is widely used as a flavouring for excellence in ice creams, soft drinks, chocolate, confectionary, candy, tobacco, baked foods, puddings, cakes, cookies, liquors and as fragrantly tenacious ingredients of perfumery and as a masking agent in pharmaceuticals. Therefore, the demand for natural vanillin is increasing in the world.

Initiative steps have been taken by Spice Board, Department of Horticulture, Government of Karnataka and Private Institutions like Vanilla Development Trust, Hiriyadka in Udupi district Karnataka for the rapid expansion of area under vanilla. Establishment of export zone for vanilla is expected to give further impetus to vanilla cultivation in the country.

The global production of vanilla beans in 2001 was estimated at 5,598 tonnes from an area of 41,025 hectares. India ranks sixth in production in the world with 60 million tonnes (2001). In India, Vanilla is cultivated in Karnataka, Kerala, Tamil Nadu, Lakshadweep, Andaman and Nicobar Islands. India occupies the largest area (1465) under vanilla cultivation in India, followed by Kerala (812 ha) and Tamil Nadu (268 ha) (www.spizes.com).

In Karnataka, Vanilla is cultivated as intercrop as well as pure crop in the districts, like Chikmagalur, Udupi, Shimoga, Hassan, Mysore, Kodagu, Dakshina Kannada and Uttara Kannada. The exporting countries of vanilla are Madagascar, Indonesia, Comoros, Uganda and India. The countries export 742, 426, 83 and 192 million tonnes of vanilla, respectively. The importing countries are USA, France, Germany, Japan and Canada. These countries imports 1310.75, 440.89, 134.38, 113.32, 71.97 million tonnes respectively in the year 2003.

The crop has economic significance in the Indian economy and has significant demand in the international market. The income from the crop has increased by 10 per cent every year. Vanilla is a labour intensive crop. Therefore, it offers immense employment opportunities in rural areas.
VANILLA CULTIVATION

Vanilla is the only genus in the family orchideacae to produce edible fruits and is cultivated commercially. It is a perennial crop starting yielding from third year after planting and continues to give commercial yield for 12 to 15 years. Vanilla grows better in the areas having an annual rainfall of 150 to 300 cm and a temperature ranging between 25°C to 32°C. Areas that receive rainfall for 8 to 9 months with dry climate for the remaining 3 to 4 months are ideal for growing vanilla. Loamy and laterite soils with plenty of organic matter and proper drainage are essential conditions for the proper growth.

Vanilla is mainly propagated through shoot cuttings. The vine starts flowering from third year onwards and economic yield starts from fourth year onwards. Flowering starts from December to April and peak flowering is found in April. The matured beans/pods are harvested during October – November.

VANILLA AS AN INTERCROP

Vanilla is grown as an intercrop in arecanut plantation. Arecanut (Areca catechu) is an important perennial commercial crop in India and its kernel is used mainly for chewing. The cultivation of arecanut in Karnataka, is concentrated in the districts of Dakshina Kannada, Shimoga, Uttara Kannada, Chikmagalur, Hassan and Udupi.

Returns from arecanut are obtained only during harvesting season i.e., September to December. This situation led the farmers to take intercrops in areca garden with their crops like vanilla, betel vine, banana, pepper and cardamom.

Vanilla is grown as an intercrop in the arecanut plantation as its maintenance is easy, less expensive and can be maintained by the family members. The returns from vanilla intercrop is higher when compared to other perennial intercrops in the study area.

VANILLA AS A PURE CROP

Vanilla is grown under artificial shade provided by shade nets. Shade net houses constructed with stone pillars, provide 50 per cent shade and galvanized iron wire inserted in LDPE (Low density polypropylene ethylene) pipes tied between the pillars on which the vine is trained.

NEED FOR STUDY

Vanilla bean/pod develops a pleasant aroma after curing. Hence, the sale of green beans and processed beans fetches good prices in the market. Large number of farmers took vanilla cultivation with great enthusiasm when there was a sudden spurt in the prices of vanilla during 2001-02. But subsequent fall in the price during 2004 has upset farmers to great extent causing a severe set back in vanilla cultivation. Being commercial crop which has income earning potential from exports, there are no comprehensive studies on economics of vanilla cultivation. So the study is taken up to assess the economic viability of vanilla cultivation both as an intercrop and pure crop at the existing prices.

Vanilla plantation requires large investment and returns are spread over a period of 15 years. Therefore, it is essential to evaluate the investment in vanilla to study the economic feasibility and financial soundness which will be useful to farmers and policy makers.

Vanilla growing farmers are facing several problems in cultivation, processing and marketing of vanilla. Therefore, this motivated the researcher to study the problems of vanilla with regard to production, marketing and processing to suggest appropriate measures. Hence, the present study was undertaken in Karnataka state with the following specific objectives.
SPECIFIC OBJECTIVES OF THE STUDY

1. To assess the financial viability of vanilla plantation
2. To examine the costs of and returns from production and processing of vanilla in the study area
3. To study the marketing channels, marketing costs and price spread and
4. To identify the constraints in production, processing and marketing of vanilla and to suggest appropriate measures

HYPOTHESES OF THE RESPECTIVE OBJECTIVES ARE

1. Cost of establishing pure vanilla plantation in higher than vanilla intercrop is high
2. Investment in vanilla cultivation is financially viable
3. Cost of cultivation is higher in large garden than small gardens
4. Processing of vanilla increases the market value
5. Vanilla marketing through development trust is more remunerative compared to other channels.

PRESENTATION OF STUDY

The study is presented in six chapters. In the initial introductory chapter I, history and importance of the present study and also the specific objectives of the study have been clearly indicated. Chapter II comprehensively presents a review of the relevant research work done on the related topics. Chapter III outlines the features of the study area, sampling design-followed, collection of relevant data and analytical tools used in the study. Chapter IV is devoted to represent the main findings of the study through tables.

Chapter V presents the discussion of the results of study. Chapter VI summarizes the results of the study and brings out the policy implications and recommendations to improve vanilla cultivation as an intercrop and also as pure crop.

LIMITATIONS OF THE STUDY

The present study mainly relied on the data collected through interview using a pre-tested schedule. Therefore, some amount of recall bias is bound to be associated with the collected data since the farmers did not have any record about the cultivation expenses, application of inputs and returns. However, efforts were made to minimize them through cross checks at the time of data collection.
II. REVIEW OF LITERATURE

There are not many studies available pertaining to the economics of the vanilla. However, a little information on earlier research work similar to the present study is provided in this chapter. A review of the past research helps in identifying the issues relevant to the study and in comprehending the problem more objectively. The reviews are presented under the following sub headings.

2.1 Costs and returns of vanilla and perennial crops
2.2 Costs and returns of vanilla processing
2.3 Financial feasibility of perennial crops
2.4 Marketing channels, marketing costs and price spread

2.1 COSTS AND RETURNS OF VANILLA AND PERENNIAL CROPS

Shivaram (1980) conducted a study on evaluation of investment in coffee estates in Coorg district of Karnataka. The costs were divided into establishment cost (upto 5th year) and maintenance costs (5-35 years). The two varieties of coffee viz., Arabica and Robusta were compared. He found that per hectare total cost of establishment was Rs. 32,272.24, Rs. 31,300.76 and Rs. 22,765.83 for small, medium and large Arabica gardens respectively. While for the Robusta estate the total cost was Rs. 23,607.34, Rs. 25,619.50 and Rs. 23,468.66 for small, medium and large gardens respectively. The average maintenance cost of Arabica estate was Rs. 5,390.90, Rs. 4,600.58 and Rs. 5,180.63 per hectare of small, medium and large estates, respectively and it was Rs. 3,959.07, Rs. 4,504.53 and Rs. 4,300.21 per hectare for small, medium and large Robusta estates, respectively. This study revealed that the Robusta estate fetched higher returns than that of Arabica.

Kalla et al. (1986) in their study on economic appraisal of ber cultivation in arid Rajasthan found that the maximum costs were on maintenance and watch and ward (35.4%) followed by harvesting. The cost of planting was minimum (0.13%). The distribution of cost indicated more costs toward labour employed (30.76%), the planting material accounted for relatively small proportion (19.24%) of the total expenditure over the planting horizon. Maximum (72.95%) returns were realized from ber fruits.

Sharma and Milapchand (1987) studied the costs and returns of orange and kinnow cultivation in Himachal Pradesh. The study showed that the establishment cost was accounted to Rs.333 per hectare in kinnow orchards at 1985-86 prices. About 42 per cent of the establishment cost was accounted for labour in both type of orchards. The per hectare net returns were greater in the case of kinnow as compared to orange due to better tree performance, fruit quality, yield and better prices for kinnow.

Sudha and Reddy (1988) studied the costs and returns of arid lime in Tottambad taluk of Chittor and Lakki reddyapalle taluk of Cuddapah district of Andhra Pradesh. Cost of establishment were Rs. 10,000 and Rs. 11,270 in Tottambad and Lakki reddyapalle taluks, respectively. Manuring, watering and cost of sapling accounted for the major chunk of these costs. Manuring accounted for 45 per cent of the total cost even in maintaining a bearing orchards accounted for 24 and 22 per cent, respectively in Tottambad and Lakki reddyapalle. Returns started from the fourth year after planting, but reached maximum in 11th to 15th years of the crop. The returns during 11th to 15th year crop period were Rs. 40,000 and Rs. 25,000 in Tottambad and Lakki reddyapalle taluks respectively.

Dalvi et al. (1991) studied the economics of production of cashewnut in Sindhurg district. The per hectare maintenance cost of cashewnut orchard (cost C) worked out to Rs. 4,382.26. The gross value of main and by product worked out to Rs. 7,027.61 per hectare. The net returns obtained were Rs. 2,645.35 per hectare. The output input ratio was 1.60. The cost per quintal of raw nuts worked out to Rs. 1433.36. Gross value of main and by product was Rs. 7,065.44 which was comparatively higher than that of local varieties per
hectare and net returns obtained were Rs. 5,632.08. The input-output ratio was 0.5 and cost per quintal worked out to Rs. 508.89.

Satithal (1993) studied the costs and returns of ber in Bijapur district, Karnataka, the results revealed that investment for establishing one hectare of ber orchard was Rs. 97,415 and Rs. 99,875 in large and small orchards, respectively. The share of material costs in the total investment was Rs. 48,218 in small orchards and Rs. 47,232 in large orchards. Recurring and maintenance cost during gestation period was Rs. 50,187 in large orchards while it was Rs. 49,659 in small orchards. Per hectare costs of cultivation during bearing period was relatively more in large orchards (Rs. 28,224) than in small orchards (Rs. 27,816). The net returns realized were high in large orchard (Rs. 77,404) as compared to small orchards (Rs. 66,991).

Chinnappa and Ramanna (1997) in their study on economic analysis of guava production revealed that per ha cost of establishment for the three year gestation period was Rs. 10592.075. The per acre cost of cultivation (4th to 25th year) was Rs. 14239.5. The main items of costs were labour costs (5%), fencing and Plant Protection chemical. The net return was worked out Rs. 6185.2 per year. This indicated returns to management and overall profitability of guava enterprises.

Madan (2004) studied the economics of vanilla cultivation. He worked out the establishment cost (upto 3rd year) and the maintenance cost (bearing period, after 3rd year onwards). The establishment cost was Rs. 116095 per acre and maintenance cost was Rs. 52711.125 per acre. The total cost of production per acre (700 vines) was Rs. 68856.125 and net return was Rs. 157331.38.

2.2 COSTS AND RETURNS OF VANILLA PROCESSING

Lalith (1978) studied economics of Tea in Nilgiris of Tamil Nadu and worked out the cost of manufacturing of Tea. He categorized the factories into the factories attached to large estates and the bought leaf factories. The bought leaf factories were further divided into cooperative factories and private factories. The results revealed that the excise duty formed the single largest item of expenditure in the manufacture in high grown areas accounting for 29.40 per cent, whereas in low grown area it was only 11.79 per cent of the total manufacturing cost. The out turn of the manufacture was 24.05 per cent, 25 per cent in high grown and low grown areas respectively. The out turn of the box area factories in high and low grown area almost same (about 25.50%). Fuel and electricity accounted for largest expenditure next to excise duty in (high grown area) tea factories attached to estates in high grown areas. The total cost of manufacture was Rs. 374.21 and Rs. 376.16 for high grown and low grown areas, respectively. Wages accounted for 7.87 per cent of total cost of manufacture in large factories of high grown areas and 9.41 per cent of the total in the low grown areas. Among the bought leaf factories the cost of manufacture of tea was Rs. 347.87 and Rs. 308.94 per kg in high grown and low grown areas respectively. Here also excise duty accounted for major portion of the manufacturing cost. Cost of packing materials was the major item of expenditure in bought leaf factories of low grown areas accounting for 15.25 per cent.

Sivanandam et al. (1980) worked out the cost of production per kilogram of cashew kernel in Pudukkottai district of Tamil Nadu. The authors revealed that the cost of raw materials was the major component in cost of production of cashewnut kernels constituting 73.22 per cent followed by wages for piece rate workers (12.10 per cent) and interest on working capital (7.28 per cent). Further it was noticed that the cost of production per kg of cashew kernel was Rs. 20.40 and out turn of kernels from one tonne of cashewnuts was 220.91 kg (22.07 per cent).

Raikar (1990) in his study on investment in production and marketing of cashew in Karnataka observed that the utilization of installed capacity depended on the volume of cashewnuts procured. The per quintal total cost of processing worked out to be Rs. 553.54. Interest on capital was the major component in the total cost of processing of cashewnuts, constituting 53.62 per cent of the total cost followed by wages for piece rate workers (20.36 per cent) and the cost of tins (11.71 per cent). The cost of production of kernels was Rs. 1,976.55 per quintal of raw nuts processed. It was found that raw material cost alone
formed 72 per cent of the total cost, remaining cost was shared by processing cost which constituted 28 per cent.

2.3 FINANCIAL FEASIBILITY OF PERENNIAL CROP

Krishna Raja (1981) examined the feasibility of investment in arecanut garden in Dakshina Kannada district by using discounted cash flow technique to work out the net present worth, benefit cost ratio, internal rate of returns and pay back period of the arecanut garden. The economic life of the arecanut garden was 50 years. The discount rate of 15 per cent was assumed as the opportunity cost of capital. The results revealed that net present worth was Rs. 18,164, Rs. 22,157.48 and Rs. 25,999.3 per hectare and benefit cost ratio was 1.43, 1.57 and 1.66 while the IRR were 26.28 per cent, 26.28 per cent and 27.53 per cent and pay back periods were 10, 11 and 10 years in small, medium and large gardens respectively. Hence, the investment in areca garden was found economically feasible.

Arun Kumar (1984) studied the economic evaluation of investment and problems in marketing of cocoa in Dakshina Kannada district, Karnataka. He reported that the per hectare establishment cost of cocoa garden during 1st year of establishment was lower in the case of large farmers (Rs. 5,635.79) than that of small farmers (Rs. 6,713.73). Whereas, per hectare gross returns realized by the small cocoa growers were higher by Rs. 5,672.07 than large cocoa growers (Rs. 5,613.13). However, the net returns realized per hectare over the operational cost was higher in the larger cocoa grower (Rs. 3,485.67) than the smaller grower (Rs. 3,022.20).

Sudha and Reddy (1988) in their study on economics of sweet orange cultivation in Cuddapah district of Andhra Pradesh applied the methods of projects evaluation and sensitivity analysis. The study finally concluded that sweet orange cultivation was highly profitable.

Patil et al. (1989) studied the economic viability of coconut production. They found that at an over all level Benefit Cost Ratio was 2.27, Net Present Value was Rs. 81,180.00 and profitability index was 4.32 at 10 per cent discount rate, Pay Back Period and Internal Rate of Return were 11 years and 22.06 per cent, respectively. Based on these parameters, they concluded that coconut plantation in Konkon region was economically profitable.

Koujalagi et al. (1990) evaluated financial feasibility of pomegranate orchard in Bijapur district of Karnataka. The study showed that the per ha net present value for the entire life period of the project was found to be Rs. 20709.525. The discounted benefit cost ratio (at 12 per cent discount) was 1.53. The pay back period was 6.56 years and internal rate of return was 15.55 per cent.

Hugar et al. (1991) examined the economic potentiality and viability of Guava cultivation under scientific management. The study revealed that the net present worth was Rs. 7,38,042 per hectare. The Benefit Cost Ratio, Internal Rate of Return and Pay Back Period were 3.88, 57.82 per cent and six years respectively.

Handiganur (1994) employed the discounted cash flow technique to evaluate the financial feasibility of tea plantation. The study revealed that the net present worth worked out to Rs. 13,11,886.23 and Rs. 17,39,381 for tea plantations not having factory and tea plantation having factory respectively. The benefit cost ratio in tea estate not having factory and tea estates having factory were 1.57 and 1.58 respectively. In tea estate not having factory and tea estate having factory, the pay back periods were 10 years and 11 years and internal rate of returns were 21.82 and 21.46 respectively where internal rate of return was higher than the opportunity cost of capital.

2.4 MARKETING CHANNELS, MARKETING COSTS AND PRICE SPREAD

Kochhar and Thakur (1971) reported that most common mode of marketing apples in Himachal Pradesh was through commission agents which accounted for about 85.63 per cent of the marketable surplus. The next important method of sale was through pre-harvest contractors that accounted for only 14.67 per cent of total marketable surplus.
George (1974) studied the marketing pattern of citrus fruit in Nagpur and Chaddapha. He found that farmers depended heavily on the pre-harvest contractors and other agents. They sold 48 per cent of their produce through pre-harvest contractors and 52 per cent by auction in the markets. Uncertainties in the wholesale market and its imperfections left the farmers with no other alternatives.

Dhar et al. (1976) stated that pre-harvest contract system was most common method of apple sale among small and medium orchards and sales through commission agent was more popular among large orchards. The marketing costs when sold through commission agent at the markets of Jammu, Amritsar and Delhi were to Rs. 11.88, Rs. 14.58 and Rs. 17.37 respectively. The major items of marketing cost were packing, transportation and commission charges. Further, analysis showed that commission agents accounted for more than 41 per cent of total marketing margins followed by transportation and handling charges.

Krishnamurthy et al. (1979) studied the economics of production and marketing of Coorg mandarin orange in Karnataka and found that the preharvest contractors made a net profit of Rs. 25.06 per thousand fruits and incurred expenses of Rs. 24.24. Commission charges of Rs. 10.71 per thousand fruits formed 44.18 per cent of the total marketing cost. Harvesting and transportation cost were the other important items of marketing cost. The grower received a price of Rs. 57.89 per thousand fruits.

Rajagopal (1987) in his study on marketing of apple, guava and mango fruits reported that the producer’s share in the consumer's price was the highest in apple crop, followed by mango and guava. The cost of marketing was higher in guava followed by mango and apple. The study revealed that apple cultivation was economically viable even to small growers. He recommended that direct sales and sales through Co-operative should be promoted to provide more share to the producers in the final price of fruit crop.

Koujalagi and Kunnal (1991) made an attempt to identify the marketing channels and estimated the marketing costs of pomegranate in Bijapur district. They had identified two channels.

Channel–I = Producer → Pre harvest contractor → Commission agent cum Wholesaler → Retailer → Consumer

Channel–II = Producer → Commission agent cum wholesaler → Retailer Consumer.

The total marketing cost incurred by pomegranate producing seller was Rs. 71.94 per quintal. The four items namely commission, transportation, packing material and harvesting charges together formed 95.88 per cent of total marketing cost. The other items namely labour charges and miscellaneous expenditure constituted the remaining part of marketing cost.

Hiremath (1993) studied the economics of production and marketing of lime in Bijapur district, Karnataka and found that only one marketing channel existed in the study area, it is directly farmers to the wholesaler. Cost of marketing incurred by the producer seller, who sold at the district market were Rs. 27.78, Rs. 24.89 and Rs. 23.81 per bag in small, medium and large orchards respectively. The gross returns and net profit were Rs. 50917.43 and Rs. 41710.21 per hectare respectively.

Gummagolmath (1994) studied the marketing margins and price spread in the marketing of mango in Dharwad district. The results revealed that producer’s share in consumer’s rupee was 65.70 per cent in Channel-I (Producer –Commission agent - Retailer - Consumer) and it was 58.40 per cent in Channel – II (Producer Pre-harvest contractor cum Wholesaler-Retailer - Consumer).

Khirsagar et al. (2003) studied the marketing of mango in Konkan coastal region. The study revealed that the marketing channel that existed for vashi market is viz., Producer – Vashi market wholesaler – Mumbai retailer – Consumer. Most of the farmers followed this channel. Among the marketing cost, whole saler’s commission was the highest with Rs. 51.36 followed by cost of packing, transport cost and labour charges and overall level per crate marketing cost Rs. 142.69.
2.5 CONSTRAINTS IN PRODUCTION, PROCESSING AND MARKETING

Ajay kumar (1989) studied the adoption behaviour and information consultancy pattern of grape grower in Rangareddy district of Andhra Pradesh. The study revealed that the constraint as perceived by the grape growers in production of grapes were poor bud burst, non-availability of labour, micronutrient deficiency, lack of water for irrigation and problem of weed.

Shivalinge Gowda et al. (1990) reported that the level of adoption of selected practices in raising cardamom nursery that the lack of awareness, complexity and high cost practices which were the important constraints expressed by 87.77, 43.33 and 38.83 per cent of the cardamom growers, respectively.

Sreenivasa (1993) studied the crises management by coffee grower in Karnataka and observed that 47 per cent of the coffee growers were on high crisis level and constraints in cost of production and low price for the produce were the important crisis situation in coffee growing areas of Karnataka.

Vijay kumar (1997) studied on knowledge and adoption of improved cultivation practices among rose growers and he observed that the problems faced by rose growers of Bangalore urban district were lack of storage facilities, inadequate local market and exploitation by wholesalers.

Kumar (1998) studied on knowledge, adoption and economic performance of banana growers in Bangalore rural district of Karnataka. The study revealed that low prices for banana, high investment, high fertilizer cost, occurrence of pest and diseases, fluctuation in prices and inadequate irrigation facilities were the major problems faced by the banana growers.

Radhakrishnan et al. (1999) conducted a study on constraints faced by mango growers. The study revealed that the fore most problems faced by the mango growers were high cost of inputs i.e., grafts, fertilizers and pesticides, more than three-fourths (78.30 %) expressed this problem. High cost of inputs was a major economical constraint among the growers, more incidence of pests and diseases was the second major problem stated by (73.3%) the respondents.
III. METHODOLOGY

This chapter describes the procedure adopted in investigation of the various economic aspects of production and marketing of vanilla. The methodology is presented under the following subheads.

3.1 Description of the study area
3.2 Description of the crop
3.3 Sampling procedure
3.4 Nature and sources of data
3.5 Analytical techniques

3.1 DESCRIPTION OF THE STUDY AREA

3.1.1 Location and area

The study was undertaken in Uttar Kannda district which is situated roughly in the mid North Western part of the State. The district lies between 13°55' and 15°31' north latitude and between 74°9' and 75°10' eastern longitude. It is surrounded on the east by Dharwad and Haveri districts, on the south by Shimoga and Udupi districts, on the north by Belgaum district and Goa state and on the west by the great Arabian sea. The district is endowed with 144 km of coastal line running from Karwar to Bhatkal taluks.

Uttar Kannada district comprises of 11 talukas and total area of the district is 10291 sq. km consisting of 1348 villages.

3.1.2 Population and literacy

The population of the district is 1,353,644 of which 686,876 (50.74%) are male and 666768 (49.25) are female. Rural population comprises 965731 (71.3%) while, 387,913 (28.65%) is urban population. There are agriculture labours, 419342 marginal farmers are 97161, small farmers are 26587 and are farmers are only 430. Literacy percentage in the district is 76.5 per cent and literacy with respect to male is more (84.50%) compared to female (68.50%).

3.1.3 Topography, rainfall and climate

Uttar Kannada district is characterized by highly undulating topography of river basins, mountains, deep valleys and plains. The average elevation ranges from 25 to 619 meters MSL.

The district consists of dense forest area. Its major part is essentially highland, the low land being restricted to pockets along the course of rivers. A somewhat broken and irregular Sahyadri range of central hills with an average highest of 700 metre divides the district into two parts, the uplands or the regions above the ghat with an area of nearly 7770 sq km, which is 600 to 700 meters above sea level and the low lands covering about 3370 sq km. Except the shallow Karwar and Belekeri bays in the north, the 144 km of the Uttar Kannada coast stretch in a long nearly straight line to the south east. Though unbroken by deep bays or wide-mouthed esturies, the coast is varied and picturesque with rocky islands and rocky capes. There stretch rich winding valleys, waving woody hills and a wild background of high peaks behind the changing coast line. The district has three main and distinctive region; the coast lands, the Sahyadrian interior and the eastern margin.

The coastal lands are the best economically developed areas with a high density of population. It is in this region Karwar, Ankola, Kumta, Honnavar and Bhatkal taluks are situated. The Sahyadrian region is the forest and only the roads crossing the ghats sustain human activity, though the valleys have special significance as scenic antiquity. The eastern margin is an undulating land, partly under forest and partly cleared up for agriculture. It is a transitional zone between the forests proper and the cultivated uplands of the Dharwad.
Fig. 1: Map of Karnataka showing the study area

Fig.1 : Map of Karnataka Showing the study area
Parts of Haliyal, Yallapur and Mundgod taluks are plain, comparable with the western half of Dharwad district. Daily temperature touches around 20°C to 25°C in the coastal areas and around 12°C to 15°C in upghats and plains during winter months (December to February). During summer (March to May) it will be varying between 30°C to 38°C across the regions. The atmosphere is highly humid throughout the year and particularly during the southwest monsoon months (May to September).

Uttar Kannada district receives an average rainfall of 2741.7 mm of which around 80 per cent is received between June and August by South-west monsoon. The rainfall received from north-east monsoon is very less and it is not uniform and certain. Therefore, in most of the areas of the district the agricultural activities are concentrated only during kharif.

3.1.4 Soil type

The soils are mostly of lateritic origin which is reddish throughout the district except in coastal areas where only along the coastal belt up to an average distance of 3 km from sea, coastal alluvial beds are observed. Sandy loams are also seen along the river beds to certain distance. Two clear cut soil zones can be differentiated based on elevation, namely the coastal taluks and the up-ghats. Soils in Kumta, Honnavar, Bhatkal and Siddapur are derived from laterites, while some soils derived from granites occur in Ankola and Karwar taluks. Red loamy soils derived from mixed laterites and traps are found in parts of Supa, Haliyal and Mundgod taluks. In other parts of Mundgod, Haliyal and Supa taluks the soils are patches of black soil derived from trap rocks. There are also gazani lands which are saline sandy along the coast. The forest taluks like Sirsi, Siddapur, Yallapur, parts of Haliyal, Mundgod and Supa are covered with red loamy soils.

3.1.5 Agriculture

Of the total area, forest occupies 80.96 per cent (8299613 ha) followed by agricultural area 10.94 per cent (112121 ha). Remaining land is used for other purposes. Around 18300 ha are sown more than once and thus making gross cropped area to around 130400 ha (41.00%).

Around 21.07 per cent of the net sown area is net irrigated area. Tanks and other sources like small streams and brooks are major irrigation sources accounting for 40.98 per cent and 37.54 per cent respectively of total area irrigated.

With respect to major crops, paddy occupied the maximum area with 88956 hectares (68.21%). The other important field crop is groundnut occupying 5078 hectares. Though cotton is grown in about 4300 ha, its cultivation is concentrated only in the plains of Mundgod and Haliyal taluks.

Among horticultural crops, arecanut exists in an area of 8499 hectares (6.52%). The remaining area is under the other horticultural crops like coconut, mango, banana and cashew.

3.2 DESCRIPTION OF THE VANILLA CROP

Vanilla (Vanilla plantifolia Andrews or Vanilla fragrans Salisb.) is a herbaceous, perennial, climbing orchid belonging to the family Orchidaceae and order Orchidales. Vanilla is indigenous to Mexico of south America. Systematic cultivation of vanilla on a commercial basis began with the introduction of this crop to Madagascar, Java, Maritius, Tahiti, Seychelles, Zanzibar, Brazil, Indonesia, Comoro islands, India, etc.

Vanilla was introduced into India during 1835 by British rulers along with clove and nutmeg. In India it is grown in an area of 2545 ha with an average production of 92 tonnes. In India, vanilla is mainly grown in Karnataka, Kerala and Tamil Nadu. In Karnataka, it is grown in an area of 1465 ha with an average production of 54 tonnes. In Karnataka, it is mainly grown in the districts of Chikkamagalur, Shimoga, Uttara Kannada, Dakshina Kannada, Kodagu, Hassan, Mysore, Belgaum and Dharwad, and renewed in three months. This pure culture was used for further study.
3.3 SAMPLING OF LEAVES AND RHIZOSPHERE SOIL

The samples of leaves and rhizosphere soil of healthy tomato crop were collected from farmer’s fields covering transitional Zone of Dharwad. These samples were used to isolate phyllosphere and rhizosphere microorganisms respectively. Details of the locations from where these samples were collected are given in Table 3.3.1 Isolation of antagonists

Antagonistic microorganisms (Bacteria, Trichoderma and actinomycetes) were isolated from phyllosphere and rhizosphere of tomato following the dilution technique as mentioned below.

Ten grams of the leaf sample was transferred to 90 ml sterile water blank in a 250 ml flask and shaken for twenty minutes at 250 rpm in a rotary shaker (‘Certomat R’) to dislodge microorganisms adhering to the leaf surface. Similarly, 10 g of rhizosphere soil was shaken with 90 ml sterile water. Suitable dilutions of both rhizosphere and phyllosphere microorganisms were plated on Tryptic Soy Agar (TSA) medium (Palleroni, 1998) to isolate total bacteria, Trichoderma Selective Medium (TSM) to isolate Trichoderma spp. Anddd starch casein agar medium to isolate total actinomycetes. The plates were incubated at 30°C for 48 h for bacteria and one week for Trichoderma and actinomycetes.

Representative colonies on TSA plates, TSM plates and starch casein agar medium plates were picked up, purified and preserved in

Plate 1: Vanilla flower

Plate 2: Pollination of vanilla
3.3 SAMPLING PROCEDURE

The procedure adopted for sample study area, taluks, villages and final respondents are given under the following sub-heads.

3.3.1 Selection of study area

Uttar Kannada district was purposively selected for the study as can be visualized by the district wise area under vanilla cultivation which is having highest area under vanilla cultivation in North Karnataka is presented in Table 3.1.

3.3.2 Selection of a sample taluks

Sirsi was having highest area under the vanilla (144 ha) followed by Yallapur (72 ha) that can be seen by the Table 3.2. Hence, these two taluks having maximum area were purposefully selected for the study.

3.3.3 Selection of sample villages

A list of villages in Sirsi and Yallapur taluks with the area under vanilla cultivation were obtained from the Spices Board. The villages in each taluk were arranged in descending order of the area under vanilla crop. From each taluk, 5 villages having larger area under vanilla were selected and totally 10 villages were selected. The list of selected villages is presented in Table 3.3.

3.3.4 Selection of sample farmers

A list of vanilla growers from the selected villages was obtained from the Spices Board. Eight growers from each village were randomly selected for the purpose of the study. Further, the farmers were post-classified into two groups namely small and large based on the total number of vines grown. A farmer having less than 2000 vines as intercrop and 4000 vines as pure crop was considered as small and a farmer having more than 2000 vines as intercrop and more than 4000 vines as pure crop was classified as large farmer.

3.4 NATURE AND SOURCES OF DATA

The data for the study include both the primary and secondary. Primary data for the study was obtained from the sample farmers through personal interview method with the help of pre-tested questionnaire. The primary data collected from the farmer respondents related to details of total capital requirement for the establishment of vanilla as intercrop in areca garden and establishment of vanilla under artificial shade, details on maintenance cost of the
Table 3.1. Districts wise area under vanilla cultivation in Karnataka during (2001-02)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Districts</th>
<th>Area (ha)</th>
<th>Production (t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>Northern Karnataka</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Uttara Kannada</td>
<td>267</td>
<td>25.5</td>
</tr>
<tr>
<td>2.</td>
<td>Belgaum</td>
<td>125</td>
<td>16.0</td>
</tr>
<tr>
<td></td>
<td><strong>Sub-total</strong></td>
<td><strong>392</strong></td>
<td><strong>41.5</strong></td>
</tr>
<tr>
<td>B.</td>
<td>Southern Karnataka</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Dakshina Kannada</td>
<td>432</td>
<td>45</td>
</tr>
<tr>
<td>2.</td>
<td>Chickmagalore</td>
<td>510</td>
<td>55</td>
</tr>
<tr>
<td>3.</td>
<td>Udupi</td>
<td>245</td>
<td>30</td>
</tr>
<tr>
<td>4.</td>
<td>Shimoga</td>
<td>400</td>
<td>39</td>
</tr>
<tr>
<td>5.</td>
<td>Kodagu</td>
<td>220</td>
<td>25</td>
</tr>
<tr>
<td>6.</td>
<td>Hassan</td>
<td>175</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td><strong>Sub-total</strong></td>
<td><strong>1982</strong></td>
<td><strong>217</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>2374</strong></td>
<td><strong>258.5</strong></td>
</tr>
</tbody>
</table>

Source : Department of Horticulture, Lalbhag

3.2. Taluk-wise area under vanilla cultivation in Uttara Kannada district

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Taluk</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Sirisi</td>
<td>144</td>
</tr>
<tr>
<td>2.</td>
<td>Yellapur</td>
<td>72</td>
</tr>
<tr>
<td>3.</td>
<td>Siddapu</td>
<td>50</td>
</tr>
<tr>
<td>4.</td>
<td>Mundgod</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>267</strong></td>
</tr>
</tbody>
</table>

Source : Department of Horticulture, Uttara Kannada
Table 3.3. Village wise area under vanilla cultivation in Sirisi and Yellapur taluk (2003-04)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Taluk</th>
<th>Name of the village</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Sirsi</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>Vanalli</td>
<td></td>
<td>35</td>
</tr>
<tr>
<td>b.</td>
<td>Kodangadde</td>
<td></td>
<td>32</td>
</tr>
<tr>
<td>c.</td>
<td>Kole Kallu</td>
<td></td>
<td>30</td>
</tr>
<tr>
<td>d.</td>
<td>Sala Kani</td>
<td></td>
<td>25</td>
</tr>
<tr>
<td>e.</td>
<td>Hegade Katta</td>
<td></td>
<td>22</td>
</tr>
<tr>
<td></td>
<td><strong>Sub total</strong></td>
<td></td>
<td><strong>144</strong></td>
</tr>
<tr>
<td>2.</td>
<td>Yellapur</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>Vajralli</td>
<td></td>
<td>18</td>
</tr>
<tr>
<td>b.</td>
<td>Kampli</td>
<td></td>
<td>17</td>
</tr>
<tr>
<td>c.</td>
<td>Yekan</td>
<td></td>
<td>14</td>
</tr>
<tr>
<td>d.</td>
<td>Hittalahalli</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>e.</td>
<td>Umachagi</td>
<td></td>
<td>11</td>
</tr>
<tr>
<td></td>
<td><strong>Sub total</strong></td>
<td></td>
<td><strong>72</strong></td>
</tr>
</tbody>
</table>

Source: Department of Horticulture, Sirsi and Yellapur

plantation during non-bearing and bearing stage, yield levels and returns etc were collected. The data pertained to the agricultural year 2004-05. The secondary data on area and production were collected from Spices Board and other agencies.

3.5 ANALYTICAL TECHNIQUES

The method of analysis is presented under the following sub headings.

3.5.1 Computation of costs and returns

3.5.2 Evaluation of investments

3.5.3 Marketing channels, marketing cost and price spread in vanilla

3.5.1 Computation of costs and returns

Vanilla is a perennial crop grown as intercrop and pure crop and can be cultivated economically for about 15 years. It starts yielding from the third year and economic yield starts only from the 4th year onwards. The costs incurred in the cultivation can be broadly classified as

3.5.1.1 Establishment cost
3.5.1.2 Maintenance cost

3.5.1.1 Establishment cost

It is the cost incurred during the first 3 years of the establishment of vanilla plantation. The costs incurred comprises costs of land preparation, digging of pits, planting material, fertilizer application, plant protection chemicals and all other aftercare operations.

3.5.1.2 Maintenance cost

It includes all the costs incurred annually for the maintenance of vanilla plantation during the productive period. It includes variable cost and fixed cost.

i) Variable costs

Variable costs are those costs which are incurred at the varied level of production which include cost on labour and materials as well as and interest on working capital.

- Labour cost: It is based on the actual wages paid by the growers. Hence a uniform wage rate was considered. In order to account for the family labour the prevailing local wage rate of hired labour was considered. The wage rates considered in the current study are Rs. 60 and Rs. 40 for men and women, respectively.
- Material costs: Material costs covered are expenditure on Farm Yard Manure (FYM) silt, plant protection chemicals and mulching materials. These costs were computed based on the actual prices paid by the growers.
- Interest on working capital: Interest on working capital is the interest on the variable cost and was calculated at 11 per cent.

ii) Fixed cost

The fixed costs are those costs which are incurred on the fixed assets. The fixed cost includes rental value of land, land revenue, depreciation, annual repairs, interest on fixed capital and apportioned establishment cost.

- Rental value of land: It was estimated on the basis of rent paid to similar land villages. The rental value was estimated on the area basis, even though the system was not prevailing in the study area.
- Land revenue: Land revenue paid by the farmers during the current year was considered for the study.
- Depreciation cost: The depreciation was calculated by straight-line method. That was worked out by dividing the purchase value of implements or machinery by its life span.
- Apportioned establishment cost: The total establishment cost was apportioned over a period of 15 years, as the plantations economic period is estimated to be 15 years.

3.5.2 Evaluation of investments

A discounted cash flow technique was used to evaluate the investments and to find economic viability of investment in vanilla plantation. The discounted cash flow method of evaluating long-term projects is based on the fact that a rupee investment today is worth more than a rupee in future years. It is a process of finding the present worth of an amount received (paid) in the future. This technique has an advantage that the future cash flows are reduced to a single sum at one specific point of time which facilitates comparison between alternative choices, if any.

The discounted cash flow measures used in the analysis were:

1. Net present worth/value (NPW or NPV)
2. Benefit Cost ratio (B:C ratio)
3. Internal Rate of Return (IRR)

Net present Value/Worth

The Net Present Value represents the discounting of the net cash inflows to the project. In the present study, a discount factor of 12 per cent was used to discount the net cash inflows representing the opportunity cost of capital. It is represented by

$$\text{NPV} = \sum_{i=1}^{n} Y_n (1+r)^{-n} - I_0$$

Where,

- $Y_n$ = The net cash inflows in the $n^{th}$ year
- $r$ = The discount factor (12%)
- $I_0$ = Initial investment
- $n$ = Economic life of the vanilla plantation

Benefit Cost ratio

Benefit Cost ratio was worked out by discounting the net returns during the life period of the orchard at a discount rate of 12 per cent. It was worked out as follows.

$$\text{B:C ratio} = \frac{\text{Per Present worth of benefits}}{\text{Present worth of cost}}$$

$$\text{B:C} = \sum_{i=1}^{n} \frac{Y_n (1+r)^{-n}}{I_0}$$

Where,

- $Y_n$ = Net cash inflow in the $n^{th}$ year
- $r$ = Discounted factor (12%)
- $I_0$ = Initial investment
- $n$ = Number of years

Internal rate of return (IRR)

Another way of using discounted cash flow for measuring worth of a project is to find that discount rate which makes the net present value worth of cash flow equal to zero. The discount rate is termed as internal rate of return in the sense that it represents the average earning power, used in the project over the project life. By this trail and error method one discount rate if found which is too low and leaves a positive networth and another discount rate is found which is too high and leaves a negative networth of cash stream. This brackets the internal rate of return which may be then estimated by interpolation. Interpolation is simple method of determining the intermediate value between two discount rates and the method of interpolation followed as under.

$$\text{IRR} = \frac{\text{Lower discount rate} \cdot \text{Difference between the two discount rates} \cdot \left( \text{Present worth of cash flow at lower discount rate} \right)}{\left( \text{Absolute differences between present worth of cash flow at two discount rates} \right)}$$

3.5.3 The break even point analysis

Break even point analysis was used to know the minimum level of production required to recover the total fixed capital employed in vanilla grown as intercrop and as pure
crop. This concept is important in any business as it indicates minimum amount of business necessary for operating the enterprise in the short-run without loss. The break even point can be calculated as follows.

\[ Q = \frac{FC}{P-VC} \]

Where,
- \( Q \) = Quantity of break even point production
- \( FC \) = Total annual fixed cost
- \( P \) = Price per unit
- \( VC \) = Variable cost per unit

### 3.5.4 Marketing channel, marketing cost and price spread

An attempt was made to study some aspects of marketing from viewpoints of vanilla producer seller. The aspects include the marketing channels, marketing costs and price spread.

Marketing channel refers to the alternate routes of product flow from the producer to final consumption. Vanilla is marketed in the form of green bean and processed bean. However in this study, the marketing channel is limited only upto the point of sale to local agents and Vanilla Development Trust.

Marketing cost is the cost incurred by the procedure seller during arrival of produce for sale. The cost per quintal was worked out by adding different components namely grading, packing, loading and unloading, packing material, transportation cost and commission charges paid.

Price spread : It was worked out by computing the difference between the sale price of local agents and net prices received by the producer.

\[ \text{Price spread} = P_p - P_f \]

Where,
- \( P_p \) = Price received by the local agent
- \( P_f \) = Price received by the farmer

The information on the problems faced by farmers during production, processing and marketing were tabulated formed into frequency tables and expressed in percentages against each item.
IV. RESULTS

The results of the analysis carried out for fulfilling the objectives of the study are presented under the following headings.

4.1 General information of sample farmers growing vanilla
4.2 Establishment cost of vanilla as intercrop
4.3 Annual cost of cultivation from vanilla as an intercrop
4.4 Establishment cost of vanilla as pure crop
4.5 Annual cost of vanilla as pure crop
4.6 Financial feasibility of vanilla as an intercrop
4.7 Break-even point analysis of vanilla as an intercrop
4.8 Financial feasibility of vanilla as pure crop
4.9 Break-even point analysis of vanilla as pure crop
4.10 Marketing of vanilla
4.11 Problems faced by vanilla growers in production, processing and marketing

4.1 GENERAL INFORMATION OF SAMPLE FARMERS GROWING VANILLA

The present study covered 80 farmers who were grouped into farmers growing vanilla as intercrop in areca garden (40) and farmers growing vanilla as pure crop under artificial shade (40). The general characteristics of sample farmers growing vanilla are presented in the Table 4.1. The classification of farmers based on number of vines is presented in Table 4.1a.

4.1.1 Age-wise classification of respondents

The age-wise classification of respondents is presented in Table 4.2. The farmers were classified into six groups based on age i.e., <20, 20-29, 30-39, 40-49, 50-59 and >60. In the case of intercrop, the least number of farmers aged between 20-29 i.e., six farmers which constitute 15 per cent, more number of farmers were in the age between 30-39 i.e., this group constituted 30 per cent. In the case of pure crop the least number of farmers were in the ages between 50-59 i.e., five farmers which constitute 12.5 per cent. More number of farmers were in the ages between 20-29 i.e., 15 farmers which constituted 37.5 per cent.

4.1.2 Education status of the respondents

Education status of the respondents is presented in the Table 4.3. The frequency and percentages were calculated and presented in the table. The farmers were classified into six groups based on education status of the respondent. In the case of intercrop, no illiterate respondents found in the study area and the least number of farmers had education i.e., five farmers which constitute 12.5 per cent. The highest number of farmers studied upto high school i.e., 15 farmers which constitute 37.5 per cent. In the case of pure crop, the least number of farmers had degree and above i.e., four farmers which constitute 10 per cent. The highest number of farmers were in pre-university i.e., 14 farmers which constitute 35 per cent.

4.1.3 Existing farming system for irrigated and rainfed farmers in Uttara Kannada district

The farming system followed by irrigated and rainfed farmer in the study area are presented in Table 4.4. The crops were taken under three seasons namely kharif, rabi and summer. The crops grown in kharif were paddy, arecanut + pepper, arecanut + pepper + cardamum, mulberry, coconut, arecanut etc. The crops taken under rabi season were
Table 4.1. General information about the sample farmers growing vanilla

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particular</th>
<th>Intercrop</th>
<th>Pure crop</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Small farmer</td>
<td>Large farmer</td>
</tr>
<tr>
<td>1.</td>
<td>Sample size (No.)</td>
<td>22</td>
<td>18</td>
</tr>
<tr>
<td>2.</td>
<td>Average size of farm holding (hectare)</td>
<td>2.64</td>
<td>9.16</td>
</tr>
<tr>
<td>3.</td>
<td>Average size of vanilla Plantation (hectare)</td>
<td>0.68</td>
<td>1.52</td>
</tr>
<tr>
<td>4.</td>
<td>Average number of vines per hectare.</td>
<td>1,959</td>
<td>2,340</td>
</tr>
<tr>
<td>5.</td>
<td>Range of bearing period (years)</td>
<td>1-5</td>
<td>1-5</td>
</tr>
<tr>
<td>6.</td>
<td>Average expected productive lifespan of plantation (year)</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>7.</td>
<td>Average family size of farmer (No.)</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 4.1a. Classification of farmers based on number of vines

<table>
<thead>
<tr>
<th>Type of crop</th>
<th>Type of farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vanilla as intercrop with arecanut plantation</td>
<td>Small farmer: &lt;2,000</td>
</tr>
<tr>
<td>Vanilla as pure crop under artificial shade</td>
<td>Small farmer: &lt;5,000</td>
</tr>
</tbody>
</table>
Table 4.2 Age-wise classification of respondents

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Vanilla as intercrop</th>
<th></th>
<th>Vanilla as pure crop</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Per cent</td>
<td>Frequency</td>
<td>Per cent</td>
<td>Frequency</td>
<td>Per cent</td>
</tr>
<tr>
<td>&lt;20</td>
<td>0</td>
<td>0.00</td>
<td>0</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>20-29</td>
<td>6</td>
<td>15.00</td>
<td>15</td>
<td>37.50</td>
<td>21</td>
<td>26.25</td>
</tr>
<tr>
<td>30-39</td>
<td>12</td>
<td>30.00</td>
<td>12</td>
<td>30.00</td>
<td>24</td>
<td>30.00</td>
</tr>
<tr>
<td>40-49</td>
<td>10</td>
<td>25.00</td>
<td>8</td>
<td>20.00</td>
<td>18</td>
<td>22.50</td>
</tr>
<tr>
<td>50-59</td>
<td>8</td>
<td>20.00</td>
<td>5</td>
<td>12.50</td>
<td>13</td>
<td>16.25</td>
</tr>
<tr>
<td>60 and above</td>
<td>4</td>
<td>10.00</td>
<td>0</td>
<td>0.00</td>
<td>4</td>
<td>5.00</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100</td>
<td>40</td>
<td>100</td>
<td>80</td>
<td>100</td>
</tr>
</tbody>
</table>
Table 4.3  Educational status of the respondents

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Vanilla as intercrop</th>
<th></th>
<th>Vanilla as pure crop</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Per cent</td>
<td>Frequency</td>
<td>Per cent</td>
<td>Frequency</td>
<td>Per cent</td>
</tr>
<tr>
<td>Illiterate</td>
<td>0</td>
<td>0.00</td>
<td>0</td>
<td>0.00</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>Primary + middle school</td>
<td>12</td>
<td>30.00</td>
<td>10</td>
<td>25.00</td>
<td>22</td>
<td>27.50</td>
</tr>
<tr>
<td>High school</td>
<td>15</td>
<td>37.50</td>
<td>12</td>
<td>30.00</td>
<td>27</td>
<td>33.75</td>
</tr>
<tr>
<td>Pre-university</td>
<td>5</td>
<td>12.50</td>
<td>14</td>
<td>35.00</td>
<td>19</td>
<td>23.75</td>
</tr>
<tr>
<td>Degree and above</td>
<td>8</td>
<td>20</td>
<td>4</td>
<td>10.00</td>
<td>12</td>
<td>15.00</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100</td>
<td>40</td>
<td>100</td>
<td>80</td>
<td>100</td>
</tr>
</tbody>
</table>
Table 4.4 Existing family system for irrigated and rainfed farmers in Uattara Kannada

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Kharif</th>
<th>Rabi</th>
<th>Summer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Paddy</td>
<td>Arecanut</td>
<td>Arecanut</td>
</tr>
<tr>
<td>2.</td>
<td>Arecanut + pepper</td>
<td>Coconut</td>
<td>Coconut</td>
</tr>
<tr>
<td>3.</td>
<td>Arecanut + Pepper + cardamom</td>
<td>Banana</td>
<td>Banana</td>
</tr>
<tr>
<td>4.</td>
<td>Arecanut + pepper + cardamom + banana</td>
<td>Cashew nut</td>
<td>Cashew nut</td>
</tr>
<tr>
<td>5.</td>
<td>Mulberry</td>
<td>Sugarcane</td>
<td>Mulberry</td>
</tr>
<tr>
<td>6.</td>
<td>Coconut</td>
<td>Mulberry</td>
<td>Arecanut + pepper</td>
</tr>
<tr>
<td>7.</td>
<td>Arecanut</td>
<td>Arecanut + pepper</td>
<td>Arecanut + pepper + cardamom</td>
</tr>
<tr>
<td>8.</td>
<td>Groundnut</td>
<td>Arecanut + pepper + cardamom</td>
<td>Arecanut + pepper + cardamom + banana</td>
</tr>
<tr>
<td>9.</td>
<td>Sugarcane</td>
<td>Arecanut + pepper + cardamom + banana</td>
<td>Fallow land</td>
</tr>
<tr>
<td>10.</td>
<td>Banana</td>
<td>Blackgram</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Cashewnut</td>
<td>Cowpea</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Fallow land</td>
<td>Fallow land</td>
<td></td>
</tr>
</tbody>
</table>
arecanut, coconut, banana, cashewnut, sugarcane, mulberry etc. Arecanut, coconut, banana, cashewnut, mulberry, arecanut + pepper etc. were taken under summer season.

The farmers growing vanilla as intercrop in the areca garden were further classified into two categories viz., small farmers (20) and large farmers (20). The average size of land holdings of the small and large farmers were 2.64 hectare and 9.16 hectare, respectively. The average size of vanilla plantation for small and large farmers was 0.90 hectare and 1.34 hectare, respectively. The range of bearing period was five years. The average number of vines per hectare in small and large farm was 1595 and 2340, respectively. The spacing followed in the vanilla plantation was 4.5' X 4.5' as a inter crop in areca garden. The average expected productive life of vanilla was 15 years. The table revealed that the average family size of farmers between four and five indicating potential family member for proper management of vanilla plantation.

The farmers growing vanilla as pure crop under artificial shade was grouped into small farmer (22) and large farmer (18). The average land holding of the small and large farmer was 2.66 hectare and 9.05 hectare, respectively. The average area under vanilla plantation for small and large farmer was 0.75 hectare and 1.78 hectare, respectively. The average number of vines per hectare in small and large farm was 4959 and 5304, respectively. The spacing followed in planting of vines was 6' × 3'. The family size of vanilla grower was around six and four in the case of small and large farmers, respectively indicating availability of family members for proper management of vanilla plantation.

4.2 ESTABLISHMENT COST OF VANILLA AS INTERCROP

The establishment cost is the cost incurred to sustain the plantation till bearing period of vanilla and is presented in Table 4.5. The establishment cost of vanilla in areca garden includes the initial year of investment and the maintenance cost incurred till the bearing period. The establishment cost includes labour cost and material cost. The material cost consists of cost on sprinkler, fencing, planting material, digging the pits for planting, purchase of manure, silt, mulching material and plant protection chemical. Among the labour cost, the cost is incurred on manuring, silt application, mulching, weeding, watch and ward, irrigation and other expenses. The other expenses include the cost incurred on training vines and the purchase of wooden poles for training on it. The results of establishment pattern on vanilla cultivation were analyzed for small and large farm are analyzed in the following.

4.2.1 Small farmer

The establishment cost of vanilla in areca garden made on small farm includes the cost incurred on the material and labour. Among the material cost, the cost incurred on planting material was Rs. 97,600 constituting the highest share of 39.20 per cent in the total establishment cost followed by sprinkler at Rs. 61,500 (24.2 per cent). The other material cost includes fencing (0.48 per cent), mulching (0.86 per cent) silt (2.34 per cent) and digging of pits for planting (0.39 per cent). The cost on plant protection chemical was of 0.23 per cent in the total material cost. Among the total labour cost, the cost incurred on watch & ward, weeding and mulching constitute about Rs. 11,200 (4.50 per cent), Rs. 10,240 (4.11 per cent) and Rs. 4,440 (1.78 per cent), respectively of the total labour cost.

4.2.2 Large farmer

The establishment made on large farm was similar to that of small farm. The establishment cost of vanilla in areca garden made on large farm include the cost incurred on the material cost and labour cost. Amongst the material cost, the cost incurred on planting material was Rs. 1,04,400 (42.2 per cent) constitute the highest share of 11.60 per cent in the total establishment cost followed by sprinkler at Rs. 56,000 (22.60 per cent), manure was Rs. 43,680 (17.60 per cent). The material cost include fencing (1.89 per cent), mulching (1.41 per cent), silt (0.95 per cent) and digging the pit for planting (0.31 per cent). The cost on plant protection chemical was least amount which constituted about Rs. 610 (0.25 per cent) of the total material cost. Among total labour cost, the cost incurred on watch & ward, weeding and mulching constitute about Rs. 10,200 (4.12 per cent), Rs. 9,160 (3.70 per cent) and Rs. 3,480 (1.41 per cent), respectively of the total labour cost.
Table 4.5. Establishment cost of vanilla as an intercrop (Rs. / hectare)

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Particulars</th>
<th>Initial year</th>
<th>First Year</th>
<th>Second Year</th>
<th>Total establishment cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Small</td>
<td>Large</td>
<td>Small</td>
<td>Large</td>
</tr>
<tr>
<td>A.</td>
<td>Labour cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Digging pits for planting</td>
<td>976</td>
<td>780</td>
<td>976</td>
<td>780</td>
</tr>
<tr>
<td>2.</td>
<td>Manure and Silt application</td>
<td>2880</td>
<td>2530.90</td>
<td>2,880</td>
<td>2,530.90</td>
</tr>
<tr>
<td>3.</td>
<td>Mulching</td>
<td>-</td>
<td>-</td>
<td>2,160</td>
<td>1,680</td>
</tr>
<tr>
<td>4.</td>
<td>PPC* application</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5.</td>
<td>Weeding</td>
<td>-</td>
<td>-</td>
<td>5,200</td>
<td>4,640</td>
</tr>
<tr>
<td>6.</td>
<td>Watch and ward</td>
<td>-</td>
<td>-</td>
<td>5,600</td>
<td>5,100</td>
</tr>
<tr>
<td>7.</td>
<td>Irrigation</td>
<td>-</td>
<td>-</td>
<td>1,525</td>
<td>1,525</td>
</tr>
<tr>
<td>8.</td>
<td>Fencing</td>
<td>1200</td>
<td>960</td>
<td>1200</td>
<td>960</td>
</tr>
<tr>
<td>9.</td>
<td>Other expenses</td>
<td>-</td>
<td>-</td>
<td>600</td>
<td>350</td>
</tr>
<tr>
<td></td>
<td>Total labour cost</td>
<td>5056</td>
<td>4270.90</td>
<td>20,141</td>
<td>17,565.9</td>
</tr>
<tr>
<td>B.</td>
<td>Material cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Manures</td>
<td>19520</td>
<td>21600</td>
<td>19,520</td>
<td>21,600</td>
</tr>
<tr>
<td>2.</td>
<td>Silt</td>
<td>1250</td>
<td>1100</td>
<td>1,250</td>
<td>1,100</td>
</tr>
<tr>
<td>3.</td>
<td>Mulching materials</td>
<td>-</td>
<td>-</td>
<td>1,020</td>
<td>756</td>
</tr>
<tr>
<td>4.</td>
<td>Plant Protection chemicals</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5.</td>
<td>Sprinkler</td>
<td>61500</td>
<td>56000</td>
<td>61,500</td>
<td>56,000</td>
</tr>
<tr>
<td>6.</td>
<td>Fencing</td>
<td>6200</td>
<td>4680</td>
<td>6,200</td>
<td>4,680</td>
</tr>
<tr>
<td>7.</td>
<td>Planting materials (cuttings)</td>
<td>97600</td>
<td>104400</td>
<td>97,600</td>
<td>1,04,400</td>
</tr>
<tr>
<td></td>
<td>Total material cost</td>
<td>186070</td>
<td>187780</td>
<td>1,87,090</td>
<td>1,88,536</td>
</tr>
<tr>
<td></td>
<td>Total establishment cost (A+B)</td>
<td>191126.00</td>
<td>192050.90</td>
<td>2,07,231</td>
<td>2,06,101.90</td>
</tr>
</tbody>
</table>

**Note:** Figures in parentheses indicates the percentage to the total cost

*Plant protection*
4.3 ANNUAL COST OF CULTIVATION FROM VANILLA AS AN INTERCROP

Annual cost of cultivation is the cost incurred annually for maintaining vanilla in areca garden and it was worked out for small and large farmers. Annual maintenance cost was classified into variable cost and fixed cost. The variable cost is further classified into material cost and labour cost. The labour cost is the cost incurred by employing the labour for performing various operations such as manuring and silt application, mulching, weeding, watch & ward and application of plant protection chemicals. The material costs include the cost incurred on the purchase of manure, silt, mulching materials and plant protection chemicals. The fixed cost includes rental value of land, depreciation on equipment, and apportioned establishment cost.

4.3.1 Small farmer

The annual cost of cultivation of vanilla during bearing period for small farmer is presented in the Table 4.6. The total cost per hectare during bearing period was Rs. 84,572.64, Rs. 93,642.41, Rs. 98,474.30 and Rs. 1,37,925.8 during 3rd, 4th, 5th year of bearing period, respectively and the total costs include total variable costs and total fixed costs.

Among total labour cost, the costs incurred on pollination and harvesting accounted the highest share. The cost incurred on pollination was Rs. 8,000 (9.46 Per cent), Rs. 12,000 (12.80 per cent), Rs. 10,000 (11.50 per cent) and Rs. 12,600 (12.80 per cent) during 3rd, 4th, 5th year of bearing period, respectively. The cost on pollination and harvesting were less during first season followed by increasing trend and the cost on the flowering and harvesting almost remain same from fifth year due to yield stabilization.

Among material cost, cost on purchase of manure accounted Rs. 20,000 (23.60 per cent) and a slight increase in cost on purchase of manure was observed over years. Cost on plant protection chemicals formed a least amount in total material cost, but increasing trend over years could be seen due to incidence of diseases. The labour cost on mulching, weeding and watch & ward contributed largest share to total labour cost. The cost on weeding was found high at initial years and almost remain same from fifth year onward. Interest on working capital was Rs. 6,210.10 (7.34 per cent) in the 3rd year and increasing trend over years can be observed but from fifth year onwards the interest on working capital almost remained same.

In fixed cost, amortized establishment cost accounted for largest share. The establishment cost was amortized for fifteen year, which is the productive period of vanilla. The cost on the depreciation and annual repairs amount the least in the total fixed cost.

4.3.2 Large farmer

The annual cost of cultivation of vanilla during bearing period of vanilla is presented in the Table 4.7. The total variable cost accounted for Rs. 59,390.50 (73.70 per cent), Rs. 68,509.20 (76.10 per cent), Rs. 73,177.80 (77.20 per cent) and total fixed costs accounted for Rs. 21,241.60 (33.61 per cent), Rs. 21,466.80 (23.90 per cent) and Rs. 21,613 (22.80 per cent), which together resulted in total cost of cultivation of vanilla during 3rd, 4th, 5th year of bearing period, respectively.

Similar results were observed in small farms in case of pollination and harvesting can be drawn to large farmers The cost incurred on pollination was Rs. 6,000 (7.44 per cent), Rs. 10,000 (11.70 per cent) and Rs. 12,000 (12.70 per cent) and harvesting was Rs. 5,400 (6.70 per cent), Rs. 9,000 (10.00 per cent), Rs. 10,800 (11.40 per cent) and Rs. 23,000 (15.42 per cent) during 3rd, 4th, 5th year of bearing period, respectively. The cost on pollination and harvesting was low during first year, resulting a increasing trend and cost on pollination and harvesting remained almost similar from fifth year onward due to yield stabilisation, which begins from fifth year onwards. Interest on working capital stabilizes from fifth year onward, as cost incurred on cultivation remain same as yield stabilizes.
Table 4.6. Annual cost of vanilla as an intercrop (Rs. / hectare)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particulars</th>
<th>Years</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>III</td>
<td>IV</td>
<td>V</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cost</td>
<td>Per cent</td>
<td>Cost</td>
<td>Per cent</td>
<td>Cost</td>
</tr>
<tr>
<td>A.</td>
<td>Variable costs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I.</td>
<td>Labour cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Manure and Silt application</td>
<td>3,000</td>
<td>3.55</td>
<td>3,060</td>
<td>3.27</td>
<td>3,120</td>
</tr>
<tr>
<td>2.</td>
<td>Mulching</td>
<td>2,340</td>
<td>2.77</td>
<td>2,400</td>
<td>2.56</td>
<td>2,460</td>
</tr>
<tr>
<td>3.</td>
<td>PPC* application</td>
<td>600</td>
<td>0.71</td>
<td>600</td>
<td>0.64</td>
<td>600</td>
</tr>
<tr>
<td>4.</td>
<td>Weeding</td>
<td>4,960</td>
<td>5.86</td>
<td>4,880</td>
<td>5.21</td>
<td>4,800</td>
</tr>
<tr>
<td>5.</td>
<td>Pollination</td>
<td>8,000</td>
<td>9.46</td>
<td>12,000</td>
<td>12.80</td>
<td>14,000</td>
</tr>
<tr>
<td>6.</td>
<td>Harvesting</td>
<td>7,200</td>
<td>8.51</td>
<td>10,800</td>
<td>11.50</td>
<td>12,600</td>
</tr>
<tr>
<td>7.</td>
<td>Watch and ward</td>
<td>5,600</td>
<td>6.62</td>
<td>5,600</td>
<td>5.98</td>
<td>5,600</td>
</tr>
<tr>
<td>8.</td>
<td>Irrigation</td>
<td>1,525</td>
<td>1.80</td>
<td>1,525</td>
<td>1.63</td>
<td>1,525</td>
</tr>
<tr>
<td>II</td>
<td>Material cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Manures</td>
<td>20,000</td>
<td>23.60</td>
<td>20,250</td>
<td>21.60</td>
<td>20,500</td>
</tr>
<tr>
<td>2.</td>
<td>Silt</td>
<td>1,437.50</td>
<td>1.70</td>
<td>1,500</td>
<td>1.60</td>
<td>1,562.50</td>
</tr>
<tr>
<td>3.</td>
<td>Plant protection chemicals</td>
<td>640</td>
<td>0.76</td>
<td>732</td>
<td>0.78</td>
<td>850</td>
</tr>
<tr>
<td>4.</td>
<td>Mulching</td>
<td>1,153</td>
<td>1.36</td>
<td>1,189</td>
<td>1.27</td>
<td>1,210</td>
</tr>
<tr>
<td>III</td>
<td>Interest rate on working capital @11%</td>
<td>6,210.10</td>
<td>7.34</td>
<td>7,098.96</td>
<td>7.56</td>
<td>7,571.03</td>
</tr>
<tr>
<td></td>
<td><strong>Total variable cost (I+II+III)</strong></td>
<td>62,665.61</td>
<td>74.10</td>
<td>71,634.96</td>
<td>76.50</td>
<td>76,398.50</td>
</tr>
<tr>
<td></td>
<td>Fixed costs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Rental value of land</td>
<td>4,650</td>
<td>23.60</td>
<td>4,850</td>
<td>4.97</td>
<td>4,650</td>
</tr>
<tr>
<td>2.</td>
<td>Land revenue</td>
<td>50</td>
<td>1.70</td>
<td>50</td>
<td>0.05</td>
<td>50</td>
</tr>
<tr>
<td>3.</td>
<td>Depreciation**</td>
<td>319.18</td>
<td>0.76</td>
<td>289.60</td>
<td>0.31</td>
<td>262.90</td>
</tr>
<tr>
<td>4.</td>
<td>Annual repairs</td>
<td>760</td>
<td>1.36</td>
<td>890</td>
<td>0.95</td>
<td>985</td>
</tr>
<tr>
<td></td>
<td><strong>Total fixed cost</strong></td>
<td>21,907.03</td>
<td>25.90</td>
<td>22,007.45</td>
<td>23.50</td>
<td>22,075.80</td>
</tr>
<tr>
<td></td>
<td><strong>Total cost (A+B)</strong></td>
<td>84,572.64</td>
<td>100.00</td>
<td>93,642.41</td>
<td>100.00</td>
<td>98,474.30</td>
</tr>
</tbody>
</table>

Note. 1) Figures in parentheses indicates the percentage to the total cost. *Plant protection chemical, **Depreciation on equipment, sprinkler and fencing
### Table 4.7. Annual cost of vanilla as an intercrop (large farmer)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particulars</th>
<th>III</th>
<th>IV</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cost</td>
<td>Perc</td>
<td>Cost</td>
<td>Perc</td>
</tr>
<tr>
<td>A.</td>
<td><strong>Labour cost</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Manure and Silt application</td>
<td>2,640</td>
<td>3.27</td>
<td>2,700</td>
</tr>
<tr>
<td>2.</td>
<td>Mulching</td>
<td>1,920</td>
<td>2.38</td>
<td>2,040</td>
</tr>
<tr>
<td>3.</td>
<td>PPC* application</td>
<td>540</td>
<td>0.67</td>
<td>540</td>
</tr>
<tr>
<td>4.</td>
<td>Weeding</td>
<td>4,440</td>
<td>5.51</td>
<td>4,360</td>
</tr>
<tr>
<td>5.</td>
<td>Pollination</td>
<td>6,000</td>
<td>7.44</td>
<td>10,000</td>
</tr>
<tr>
<td>6.</td>
<td>Harvesting</td>
<td>5,400</td>
<td>6.70</td>
<td>9,000</td>
</tr>
<tr>
<td>7.</td>
<td>Watch and ward</td>
<td>5,100</td>
<td>6.33</td>
<td>5,100</td>
</tr>
<tr>
<td>8.</td>
<td>Irrigation</td>
<td>1,525</td>
<td>1.89</td>
<td>1,525</td>
</tr>
<tr>
<td></td>
<td><strong>Material cost</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Manures</td>
<td>22,800</td>
<td>28.30</td>
<td>23,040</td>
</tr>
<tr>
<td>2.</td>
<td>Silt</td>
<td>1,380</td>
<td>1.71</td>
<td>1,440</td>
</tr>
<tr>
<td>3.</td>
<td>PPC* application</td>
<td>735</td>
<td>0.91</td>
<td>845</td>
</tr>
<tr>
<td>4.</td>
<td>Mulching materials</td>
<td>1,025</td>
<td>1.27</td>
<td>1,130</td>
</tr>
<tr>
<td>5.</td>
<td>Interest rate on working capital @11%</td>
<td>5,885.50</td>
<td>7.30</td>
<td>6,789.20</td>
</tr>
<tr>
<td></td>
<td><strong>Total variable cost</strong></td>
<td>59,390.50</td>
<td>73.70</td>
<td>68,509.20</td>
</tr>
<tr>
<td>B.</td>
<td><strong>Fixed cost</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Land rental value</td>
<td>4,650</td>
<td>5.77</td>
<td>4,650</td>
</tr>
<tr>
<td>2.</td>
<td>Land revenue</td>
<td>50</td>
<td>0.06</td>
<td>50</td>
</tr>
<tr>
<td>3.</td>
<td>Depreciation**</td>
<td>263</td>
<td>0.33</td>
<td>243.20</td>
</tr>
<tr>
<td>4.</td>
<td>Annual repairs</td>
<td>550</td>
<td>0.68</td>
<td>795</td>
</tr>
<tr>
<td>5.</td>
<td>Amortized establishment cost</td>
<td>15,728.60</td>
<td>19.50</td>
<td>15,728.60</td>
</tr>
<tr>
<td></td>
<td><strong>Total Fixed cost</strong></td>
<td>21,241.60</td>
<td>26.30</td>
<td>21,466.80</td>
</tr>
<tr>
<td></td>
<td><strong>Total cost (A+B)</strong></td>
<td>80,632.20</td>
<td>100</td>
<td>89,976</td>
</tr>
</tbody>
</table>

**Note.** 1) Figures in parentheses indicates the percentage to the total cost  
2) **Depreciation on equipment sprinkler and fencing.**  
3) *Plant protection chemical
Among total fixed costs, interest on fixed assets and amortized establishment cost constituted the highest share in the total fixed cost. The cost on the depreciation and annual repairs amounted to least in the total fixed cost.

4.3.3 Yield and returns from vanilla as an intercrop

Small farmer

The yield and returns of vanilla grown as intercrop in areca garden on small farm is presented in Table 4.8. The vine starts yielding from third year onwards and yield stabilizes from fifth year onwards. The gross returns earned by small farmers by selling green bean and cuttings were Rs. 16,7510, Rs. 4,10,880 and Rs. 6,39,760 during third, fourth and fifth year of bearing period. The net returns earned over total cost was Rs. 82,937, Rs. 3,17,237 and Rs. 5,41,286 during 3rd, 4th and 5th year of bearing period. Returns per rupee of total cost was Rs. 1.98 in 3rd year, Rs. 4.39 in 4th and Rs. 6.50 in 5th during bearing period of vanilla.

Large farmer

The yield and returns obtained from vanilla grown as intercrop in areca garden in large farm is presented in Table 4.9. The vine started yielding from third year onwards and yield stabilized from fifth year on wards. The gross returns include the returns from green bean and cuttings. The gross returns was Rs. 1,89,700, Rs. 4,90,580 and Rs. 7,65,350 during third, fourth and fifth year of bearing period. The net returns earned over total costs was Rs. 1,09,068, Rs. 4,01,604 and Rs. 6,72,560 during 3rd, 4th and 5th year of bearing period. Returns per rupee of total costs are Rs. 2.35 in third year, Rs. 5.51 in fourth year and Rs. 8.24 in fifth year during bearing period

4.4 ESTABLISHMENT COST OF VANILLA AS PURE CROP

The establishment cost of vanilla as pure crop under artificial shade is presented in the Table 4.10. The establishment cost of vanilla in areca garden includes the initial year of investment and the cost incurred till the bearing period.

The establishment cost of vanilla under artificial shade during the non-bearing period was analysed for small and large farmer. The establishment patterns include cost on sprinkler, fencing, stone pillars, shade nets, GI (Galvanized wire) and LDPE (Low Density Polypropyl Ethylene) pipes, planting materials, supporting trees. The other material cost include cost incurred on purchase of manure, silt, mulching material and plant protection chemical. The other labour cost incurred are manuring and silt application, mulching, weeding, watch and ward, irrigation, plant protection chemicals and the expenses incurred on tying vines and the cost on wooden logs for training vines.

4.4.1. Small farmer

The establishment cost of vanilla under artificial shade on small farm was worked out. The establishment made on small farm, the purchase of stone pillars, planting materials and shade nets amounted to Rs. 3,22,200 (27.2 per cent) Rs. 2,47,950 (21.0 per cent) and Rs. 2,00,000 (16.90 per cent), which contributed the largest share in the total establishment costs followed by purchase of GI (galvanized wire) and LDPE (Low Density poly Ethylene) pipes was Rs. 9,000 (0.95 per cent). The other material cost incurred during the establishment was manure (Rs. 99,590), sprinkler (Rs. 62,000), fencing (Rs. 8,900), mulching (Rs. 7,806 per cent) and silt application (Rs. 4,562). The plant protection chemical constituted the least amount of the total material cost.

Among labour cost incurred during the establishment of vanilla in areca garden, the labour cost on stone pillar installation and land preparation for planting vanilla were Rs. 57,800 (4.49 per cent) and 42,000 (3.55 per cent), respectively and accounted for the largest share in the total labour cost. The other labour cost incurred were weeding (9.01 per cent), watch and ward (1.10 per cent) and mulching (0.34 per cent) constitute the next prominent cost in the total labour cost.
Table 4.8. Yield and returns from vanilla as an intercrop (small farmer)

(Rs. / hectare)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>particulars</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td></td>
<td>III</td>
</tr>
<tr>
<td>1.</td>
<td>No. of vines</td>
<td>1,952</td>
</tr>
<tr>
<td>2.</td>
<td>No of yielding vines</td>
<td>1,658</td>
</tr>
<tr>
<td>3.</td>
<td>Yield of vanilla bean per vine (Kg)</td>
<td>0.38</td>
</tr>
<tr>
<td>4.</td>
<td>Total yield of vanilla bean (Kg)</td>
<td>630.04</td>
</tr>
<tr>
<td>5.</td>
<td>Sale price per kg (Rs.)</td>
<td>250</td>
</tr>
<tr>
<td>6.</td>
<td>Returns by sale of bean (Rs.)</td>
<td>1,57,510</td>
</tr>
<tr>
<td>7.</td>
<td>Returns by sale of cuttings (Rs.)</td>
<td>10,000</td>
</tr>
<tr>
<td>8.</td>
<td>Gross returns by sale of bean and cuttings (Rs.)</td>
<td>1,67,510</td>
</tr>
<tr>
<td>9.</td>
<td>Total variable cost of cultivation (Rs.)</td>
<td>62,665.61</td>
</tr>
<tr>
<td>10.</td>
<td>Total cost of cultivation (Rs.)</td>
<td>84,572.64</td>
</tr>
<tr>
<td>11.</td>
<td>Net returns over variable cost (Rs.)</td>
<td>1,04,844.4</td>
</tr>
<tr>
<td>12.</td>
<td>Net returns over total cost (Rs.)</td>
<td>82,937.36</td>
</tr>
</tbody>
</table>
Table 4.9. Yield and returns from vanilla as an intercrop (large farmer)

(Rs. / hectare)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particulars</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>III</td>
</tr>
<tr>
<td>1.</td>
<td>No. of vines</td>
<td>2,340</td>
</tr>
<tr>
<td>2.</td>
<td>No of yielding vines</td>
<td>1,860</td>
</tr>
<tr>
<td>3.</td>
<td>Yield of vanilla bean per vine (Kg)</td>
<td>0.38</td>
</tr>
<tr>
<td>4.</td>
<td>Total yield of vanilla bean (Kg)</td>
<td>706.8</td>
</tr>
<tr>
<td>5.</td>
<td>Sale price per kg (Rs.)</td>
<td>250</td>
</tr>
<tr>
<td>6.</td>
<td>Returns by sale of bean (Rs.)</td>
<td>1,76,700</td>
</tr>
<tr>
<td>7.</td>
<td>Returns by sale of cuttings (Rs.)</td>
<td>13,000</td>
</tr>
<tr>
<td>8.</td>
<td>Gross returns by sale of bean and cuttings (Rs.)</td>
<td>1,89,700</td>
</tr>
<tr>
<td>9.</td>
<td>Total variable cost of cultivation (Rs.)</td>
<td>59,390.5</td>
</tr>
<tr>
<td>10.</td>
<td>Total cost of cultivation (Rs.)</td>
<td>80,632.2</td>
</tr>
<tr>
<td>11.</td>
<td>Net returns over variable cost (Rs.)</td>
<td>1,30,309.5</td>
</tr>
<tr>
<td>12.</td>
<td>Net returns over total cost (Rs.)</td>
<td>1,09,067.8</td>
</tr>
</tbody>
</table>
Table 4.10. Establishment cost of vanilla as pure crop (Rs. / hectare)

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Particulars</th>
<th>Initial year</th>
<th>First Year</th>
<th>Second Year</th>
<th>Total establishment cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Small farmer</td>
<td>Large farmer</td>
<td>Small farmer</td>
<td>Large farmer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>42000</td>
<td>36500</td>
<td>42000</td>
<td>36500</td>
</tr>
<tr>
<td>1.</td>
<td>Land preparation</td>
<td>57800</td>
<td>51020</td>
<td>57800</td>
<td>51020</td>
</tr>
<tr>
<td>2.</td>
<td>Stitching of shade nets</td>
<td>1920</td>
<td>1680</td>
<td>1920</td>
<td>1680</td>
</tr>
<tr>
<td>3.</td>
<td>Installing GI wire and LPDE pipes</td>
<td>2640</td>
<td>2100</td>
<td>2640</td>
<td>2100</td>
</tr>
<tr>
<td>4.</td>
<td>Planting supporting trees</td>
<td>2479.50</td>
<td>2273.10</td>
<td>2479.50</td>
<td>2273.10</td>
</tr>
<tr>
<td>6.</td>
<td>Manure and Silt application</td>
<td>5950.80</td>
<td>5304</td>
<td>5950.80</td>
<td>5304</td>
</tr>
<tr>
<td>7.</td>
<td>Mulching</td>
<td>-</td>
<td>-</td>
<td>3967.20</td>
<td>3744</td>
</tr>
<tr>
<td>8.</td>
<td>Weeding</td>
<td>-</td>
<td>-</td>
<td>5600</td>
<td>5200</td>
</tr>
<tr>
<td>9.</td>
<td>Watch and ward</td>
<td>-</td>
<td>-</td>
<td>6500</td>
<td>5900</td>
</tr>
<tr>
<td>10.</td>
<td>Irrigation</td>
<td>-</td>
<td>-</td>
<td>1525</td>
<td>1525</td>
</tr>
<tr>
<td>11.</td>
<td>Fencing</td>
<td>1800</td>
<td>1500</td>
<td>1800</td>
<td>1500</td>
</tr>
<tr>
<td></td>
<td>Total Labour cost</td>
<td>1165739.00</td>
<td>102366.10</td>
<td>1165739.00</td>
<td>102366.10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Material cost</th>
<th>Initial year</th>
<th>First Year</th>
<th>Second Year</th>
<th>Total establishment cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Small farmer</td>
<td>Large farmer</td>
<td>Small farmer</td>
<td>Large farmer</td>
</tr>
<tr>
<td>1.</td>
<td>Manures</td>
<td>49590</td>
<td>50918.40</td>
<td>49590</td>
<td>50918.40</td>
</tr>
<tr>
<td>2.</td>
<td>Silt</td>
<td>2250</td>
<td>2400</td>
<td>2250</td>
<td>2400</td>
</tr>
<tr>
<td>3.</td>
<td>Mulching materials</td>
<td>62000</td>
<td>58200</td>
<td>62000</td>
<td>58200</td>
</tr>
<tr>
<td>4.</td>
<td>Plant Protection chemicals</td>
<td>8900</td>
<td>7020</td>
<td>8900</td>
<td>7020</td>
</tr>
<tr>
<td>5.</td>
<td>Sprinkler</td>
<td>322200</td>
<td>318060</td>
<td>322200</td>
<td>318060</td>
</tr>
<tr>
<td>6.</td>
<td>Fencing</td>
<td>200000</td>
<td>195000</td>
<td>200000</td>
<td>195000</td>
</tr>
<tr>
<td>7.</td>
<td>Stone pillar</td>
<td>9000</td>
<td>8546</td>
<td>9000</td>
<td>8546</td>
</tr>
<tr>
<td>8.</td>
<td>Shade nets</td>
<td>48844</td>
<td>4480</td>
<td>48844</td>
<td>4480</td>
</tr>
<tr>
<td>9.</td>
<td>GI wire and LPDE pipes</td>
<td>247950</td>
<td>254593</td>
<td>247950</td>
<td>254593</td>
</tr>
<tr>
<td>10.</td>
<td>Supporting trees</td>
<td>-</td>
<td>-</td>
<td>4844</td>
<td>4480</td>
</tr>
<tr>
<td>11.</td>
<td>Planting materials</td>
<td>-</td>
<td>-</td>
<td>247950</td>
<td>254593</td>
</tr>
<tr>
<td></td>
<td>Total material cost</td>
<td>726734</td>
<td>899217.40</td>
<td>726734</td>
<td>899217.40</td>
</tr>
<tr>
<td></td>
<td>Total establishment cost (A+B)</td>
<td>1023307.90</td>
<td>1001583.50</td>
<td>1023307.90</td>
<td>1001583.50</td>
</tr>
</tbody>
</table>

Note. GI = Galvanised Iron wire  LDPE= Low density Polypropylene pipe  * Plant protection chemical  2) Depreciation on equipment sprinkler and fencing
4.4.2 Large farmer

The establishment cost of vanilla under artificial shade on large farm was worked out. The establishment made on large farm, the purchase of stone pillars, planting materials and shade nets amounted to Rs. 3,22,200 (27.2 per cent) Rs. 2,54,593 (21.80 per cent) and Rs. 19,500 (16.70 per cent), which contributed largest share in the total establishment costs followed by purchase of GI (galvanized wire) and LDPE (Low Density poly Ethylene) pipes was Rs. 8,546 (0.72 per cent). The other material cost incurred during the establishment cost was manure (Rs. 1,02,284), sprinkler (Rs. 58,200), fencing (Rs. 8,900), mulching (Rs. 2,747), and silt application (Rs. 4,860). The plant protection chemical constitute the least amount of the total material cost.

Among labour cost incurred during the establishment of vanilla in areca garden, the labour cost on stone pillar installation and land preparation for planting vanilla was Rs. 51,020 (4.38 per cent) and 36,500 (3.13 per cent), respectively and accounts in the largest share in the total labour cost. The other labour cost incurred were weeding (0.86 per cent), watch & ward (0.01 per cent) and mulching (0.63 per cent) constitute the next prominent cost in the total labour cost.

4.5 ANNUAL COST OF VANILLA AS PURE CROP

The annual cost incurred in cultivation and returns obtained from vanilla under artificial shade during bearing period were worked out for small and large farmer.

4.5.1 Small farmer

The annual cost incurred on cultivation of vanilla under artificial shade on small farm is presented in the Table 4.11. The total cost per hectare during bearing period was Rs. 2,09,874, Rs. 2,18,014 and Rs. 2,23,259 during 3rd, 4th and 5th year of bearing period, respectively and the total cost included total variable cost and total fixed cost.

Among total labour cost, the costs incurred on pollination and harvesting accounted the highest share in total variable cost. The cost incurred on pollination was Rs. 12,000 (5.72 per cent), Rs. 16,000 (6.61 per cent) and Rs. 18,000 (8.06 per cent) and harvesting was Rs. 10,800 (5.15 per cent), Rs. 14,400 (2.75 per cent) and Rs. 16,200 (7.26 per cent) during 3rd, 4th and 5th year of bearing period, respectively. It was observed from the Table 4.8, that the cost on pollination and harvesting was low and increasing trend was seen in fourth and fifth years. But, yield stabilisation began from fifth year onwards.

Among material cost, cost on manure was Rs. 2,375 (1.13 per cent) and a slight increase in cost on manure over the years was observed followed by silt and mulching material. Interest on working capital was Rs. 11,128 (5.30 per cent) and a increasing trend was observed due to increase in labour cost and material cost over the year. The interest on working capital remained almost same from fifth year onwards. The labour cost on mulching, weeding as well as watch and ward contributed largest share to total labour cost. Whereas cost on mulching and weeding were high in initial years and stabilized from fifth year onwards. Cost on plant protection chemicals formed least amount in total variable cost.

In fixed cost, amortized establishment cost was Rs. 92,091 (43.90 per cent) accounted for the largest share to the total fixed cost, which remain same throughout the productive period of fifteen year Rs. Depreciation on equipments and annual repairs accounted the least share to the total fixed costs.

4.5.2 Large farmer

The annual cost incurred on cultivation of vanilla under artificial shade on large farm is presented in the Table 4.12. The total variable cost accounted Rs. 1,05,904 (53.00 per cent), Rs. 1,12,310 (54.00 per cent), Rs. 1,16,795 (55.00 per cent) and total fixed costs accounted to Rs. 95,822 (47.00 per cent), Rs. 95,645 (46.00 per cent) and Rs. 95,822 (45.00 per cent), which together resulted in total cost of cultivation of vanilla during 3rd, 4th and 5th year of bearing period, respectively.
Table 4.11. Annual cost of vanilla as pure (small farmers)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particulars</th>
<th>Years</th>
<th>III</th>
<th></th>
<th>IV</th>
<th></th>
<th>V</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A. Variable costs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cost</td>
<td></td>
<td>Per cent</td>
<td>Cost</td>
<td></td>
<td>Per cent</td>
</tr>
<tr>
<td></td>
<td>I. Labour cost</td>
<td></td>
<td>1. Manure and Silt application</td>
<td>6,120</td>
<td>2.92</td>
<td>6,180</td>
<td>1.73</td>
<td>6,240</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Mulching</td>
<td>3,719.20</td>
<td>1.77</td>
<td>3,766</td>
<td>2.02</td>
<td>3,814.60</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>3. Weeding</td>
<td>4,800</td>
<td>2.29</td>
<td>4,400</td>
<td>0.17</td>
<td>4,000</td>
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<tr>
<td></td>
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<td></td>
<td>4. PPC* application</td>
<td>360</td>
<td>0.17</td>
<td>360</td>
<td>7.34</td>
<td>360</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5. Pollination</td>
<td>12,000</td>
<td>5.72</td>
<td>16,000</td>
<td>6.61</td>
<td>18,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6. Harvesting</td>
<td>10,800</td>
<td>5.15</td>
<td>14,400</td>
<td>2.75</td>
<td>16,200</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>7. Watch and ward</td>
<td>6,500</td>
<td>3.10</td>
<td>6,000</td>
<td>0.70</td>
<td>6,500</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>8. Irrigation</td>
<td>1,525</td>
<td>0.73</td>
<td>1,525</td>
<td>0.68</td>
<td>1,525</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>II. Material cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>9. Silt</td>
<td>50,250</td>
<td>23.90</td>
<td>50,500</td>
<td>23.20</td>
<td>50,750</td>
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<td></td>
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<td></td>
<td>10. Manure</td>
<td>2,375</td>
<td>1.13</td>
<td>2,437.50</td>
<td>1.12</td>
<td>2,562.50</td>
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<td>11. PPC* application</td>
<td>998</td>
<td>0.48</td>
<td>1,025</td>
<td>0.47</td>
<td>1,185</td>
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<td>12. Mulching materials</td>
<td>1,685</td>
<td>0.80</td>
<td>1,702</td>
<td>0.78</td>
<td>1,754</td>
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<td></td>
<td>III. Interest rate on working capital</td>
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<td>11,124.50</td>
<td>5.30</td>
<td></td>
<td>11,912.50</td>
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<td>Total variable cost (I+II+III)</td>
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<td>53.50</td>
<td></td>
<td>1,20,208</td>
<td>55.10</td>
<td></td>
<td>1,25,309.10</td>
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<tr>
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<td>B. Fixed cost</td>
<td></td>
<td>1. Land rental value</td>
<td>4,650</td>
<td>2.22</td>
<td>4,650</td>
<td>2.13</td>
<td>4,650</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>2. Land revenue</td>
<td>50</td>
<td>0.02</td>
<td>50</td>
<td>0.02</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3. Depreciation**</td>
<td>284</td>
<td>0.14</td>
<td>260</td>
<td>0.12</td>
<td>238.70</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4. Annual repairs</td>
<td>542</td>
<td>0.26</td>
<td>754.50</td>
<td>0.35</td>
<td>920.50</td>
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<tr>
<td></td>
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<td></td>
<td>5. Amortized establishment cost</td>
<td>92,090.90</td>
<td>43.90</td>
<td>92,090.90</td>
<td>42.20</td>
<td>92,090.90</td>
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<tr>
<td></td>
<td>Total fixed cost</td>
<td></td>
<td>97,616.90</td>
<td>46.50</td>
<td></td>
<td>97,805.50</td>
<td>44.90</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total cost (A+B)</td>
<td></td>
<td>2,09,873.80</td>
<td>100</td>
<td></td>
<td>2,18,013.50</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Note. 1) Figures in parentheses indicates the percentage to the total cost  
2) Depreciation on equipment sprinkler and fencing
Fig. 2: Cost of vanilla as an intercrop (yearwise of small farmers)
Plate 4: Pure Crop

Plate 5: Pure crop of vanilla

Plate 6: Vanilla as a intercrop
### Table 4.12: Annual cost of vanilla as pure crop (large farmers)

(Rs. / hectare)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particulars</th>
<th>III</th>
<th>IV</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Cost</td>
<td>Per cent</td>
<td>Cost</td>
</tr>
<tr>
<td>A.</td>
<td>Variable costs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Labour cost</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Manure and Silt application</td>
<td>5,520</td>
<td>2.74</td>
<td>5,640</td>
</tr>
<tr>
<td></td>
<td>2. Mulching</td>
<td>3,575.70</td>
<td>1.78</td>
<td>3,536</td>
</tr>
<tr>
<td></td>
<td>3. Weeding</td>
<td>420</td>
<td>0.21</td>
<td>420</td>
</tr>
<tr>
<td></td>
<td>4. PPC* application</td>
<td>4,400</td>
<td>2.19</td>
<td>4,000</td>
</tr>
<tr>
<td></td>
<td>5. Pollination</td>
<td>10,000</td>
<td>4.97</td>
<td>12,000</td>
</tr>
<tr>
<td></td>
<td>6. Harvesting</td>
<td>8,200</td>
<td>3.58</td>
<td>10,800</td>
</tr>
<tr>
<td></td>
<td>7. Watch and ward</td>
<td>5,900</td>
<td>2.93</td>
<td>5,900</td>
</tr>
<tr>
<td></td>
<td>8. Irigation</td>
<td>1,525</td>
<td>0.76</td>
<td>1,525</td>
</tr>
<tr>
<td></td>
<td>Material cost</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>9. Manure</td>
<td>51,600</td>
<td>25.6</td>
<td>51,840</td>
</tr>
<tr>
<td></td>
<td>10. Silt</td>
<td>2,520</td>
<td>1.25</td>
<td>2,580</td>
</tr>
<tr>
<td></td>
<td>11. PPC* application</td>
<td>1,023</td>
<td>0.51</td>
<td>1,135</td>
</tr>
<tr>
<td></td>
<td>12. Mulching materials</td>
<td>1,725.40</td>
<td>0.86</td>
<td>1,804.20</td>
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<tr>
<td></td>
<td>III. Interest rate on working capital</td>
<td>10,495</td>
<td>5.21</td>
<td>11,129.80</td>
</tr>
<tr>
<td></td>
<td>Total variable cost (I+II+III)</td>
<td>1,06,904.20</td>
<td>52.6</td>
<td>1,12,310</td>
</tr>
<tr>
<td></td>
<td>Fixed cost</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Land rental value</td>
<td>4,650</td>
<td>2.31</td>
<td>4,650</td>
</tr>
<tr>
<td></td>
<td>2. Land revenue</td>
<td>50</td>
<td>0.02</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>3. Depreciation**</td>
<td>284</td>
<td>0.14</td>
<td>260.30</td>
</tr>
<tr>
<td></td>
<td>4. Annual repairs</td>
<td>352</td>
<td>0.17</td>
<td>685</td>
</tr>
<tr>
<td></td>
<td>5. Amortized establishment cost</td>
<td>90,008.20</td>
<td>44.70</td>
<td>90,008.20</td>
</tr>
<tr>
<td></td>
<td>Total fixed cost</td>
<td>95,344.30</td>
<td>47.40</td>
<td>95,653.60</td>
</tr>
<tr>
<td></td>
<td>Total cost (A+B)</td>
<td>2,02,248.50</td>
<td>100</td>
<td>2,07,963.70</td>
</tr>
</tbody>
</table>

**Note.** * Plant protection chemical  
** Depreciation on equipment sprinkler and fencing
Fig. 3 : Cost of vanilla as an intercrop in arecanut plantation (yearwise of large farmers)
The cost incurred on pollination was Rs. 10,000 (4.97 per cent), Rs. 12,000 (5.77 per cent), Rs. 14,000 (6.58 per cent) and harvesting was Rs. 8,200 (3.58 per cent), Rs. 10,800 (5.19 per cent) and Rs. 12,600 (5.93 per cent) during 3rd, 4th and 5th year of bearing period, respectively accounted the highest share to the total variable cost next to manure cost. The cost on pollination and harvesting have increasing trend from third year onwards and cost remained almost same from fifth year. Interest on working capital in initial years was found increasing trend and interest stabilized from fifth year onward as cost incurred on labour cost and material cost remained almost same from fifth year onwards due to stabilization.

As for on fixed cost, is concerned similar pattern was under large farmer it was observed in small farmer.

### 4.5.3 Yield and returns from vanilla

**Small farmers**

The yield and returns from vanilla on small farm is presented in the Table 4.13. The vine started yielding from third year onwards and yield stabilized from fifth year onwards. The gross returns by sale were Rs. 4,48,085, Rs. 10,90,620 and Rs. 17,71,650 during third, fourth and fifth year of bearing period. The net returns earned over total costs was Rs. 2,38,212, Rs. 8,72,607 and Rs. 1,54,839 and during third, fourth, fifth and sixth year of bearing period, respectively. Returns per rupee of total costs were Rs. 2.14, Rs. 5.00 and Rs. 7.93 in third, fourth and fifth year during bearing period of vanilla.

**Large farmer**

The yield and returns from vanilla on large farm is presented in the Table 4.14. The vine started yielding from third year onward and yield stabilized from fifth year onwards. The gross returns earned by large farmer through the sale of green bean and cuttings. The gross returns were Rs. 4,93,010, Rs. 11,5,0440 and Rs. 18,87,600 during third, fourth and fifth year of bearing period. The net returns earned over total cost were Rs. 2,91,762, Rs. 9,42,476 and Rs. 16,74,983 during year third, fourth and fifth year of bearing period. Returns per rupee of total costs was Rs. 2.45 in third year, Rs. 5.50 in fourth year and Rs. 8.87 in fifth year during year of bearing period.

### 4.5.4 Costs and returns in processing of vanilla bean

The cost and returns incurred in processing vanilla beans were analysed and presented in Table 4.15. The total cost incurred in processing of vanilla bean was Rs. 6775.94 per quintal. The total cost comprises of variable cost and fixed cost. The variable cost includes the cost incurred in employing labour to perform the different processing operations, the cost on packing material and fuel. The total labour cost was Rs. 4680 (69.07 per cent), packing material was Rs. 50 (0.73 per cent) and fuel were Rs. 60 (0.88 per cent).

The fixed cost on processing of vanilla includes apportioned establishment cost and apportioned interest on fixed capital. The apportioned establishment cost and apportioned interest on fixed capital was Rs. 1829.10 (26.99 per cent) and Rs. 156.84 (2.31 per cent), respectively.

The processed bean obtained from one quintal of green bean was 20 kg. The average price realized per kg of processed bean was Rs. 1500.00. Hence, the gross returns obtained from 20 kg processed bean was Rs. 30,000 and net returns obtained from processed bean was Rs. 23224.06.

### 4.6 FINANCIAL FEASIBILITY OF VANILLA AS AN INTERCROP

To evaluate the feasibility of investment in vanilla as intercrop in areca garden, the criteria of net present value, benefit cost ratio, internal rate of returns were used. Analysis was carried out for the two size groups and the results are presented in the Table 4.16.
Table 4.13. Yield and Returns from vanilla as pure crop (small farmers)

(Rs. / hectare)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particulars</th>
<th>III</th>
<th>IV</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>No. of vines</td>
<td>4,959</td>
<td>4,959</td>
<td>4,959</td>
</tr>
<tr>
<td>2.</td>
<td>No of yielding vines</td>
<td>4,523</td>
<td>4,821</td>
<td>4,959</td>
</tr>
<tr>
<td>3.</td>
<td>Yield of vanilla bean per vine (Kg)</td>
<td>0.38</td>
<td>0.88</td>
<td>1.40</td>
</tr>
<tr>
<td>4.</td>
<td>Total yield of vanilla bean (Kg)</td>
<td>1,718.74</td>
<td>4,242.48</td>
<td>6942.6</td>
</tr>
<tr>
<td>5.</td>
<td>Sale price per kg (Rs.)</td>
<td>250</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>6.</td>
<td>Returns by sale of bean (Rs.)</td>
<td>4,29,685</td>
<td>10,60,620</td>
<td>1735650</td>
</tr>
<tr>
<td>7.</td>
<td>Returns by sale of cutting (Rs.)</td>
<td>18,400</td>
<td>30,000</td>
<td>36,000</td>
</tr>
<tr>
<td>8.</td>
<td>Gross returns by sale of beans and cuttings</td>
<td>4,48,085</td>
<td>10,90,620</td>
<td>1771650</td>
</tr>
<tr>
<td>9.</td>
<td>Total variable cost of cultivation (Rs.)</td>
<td>1,12,256.8</td>
<td>1,20,208</td>
<td>1,25,309.1</td>
</tr>
<tr>
<td>10.</td>
<td>Total cost of cultivation (Rs.)</td>
<td>2,09,873</td>
<td>2,18,013</td>
<td>2,23,259</td>
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<tr>
<td>11.</td>
<td>Net returns over variable cost (Rs.)</td>
<td>3,35,828.2</td>
<td>9,70,412</td>
<td>1646340.9</td>
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<tr>
<td>12.</td>
<td>Net returns over total cost (Rs.)</td>
<td>2,38,212</td>
<td>8,72,607</td>
<td>1548391</td>
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</tbody>
</table>
Table 4.14. Yield and Return from vanilla as pure crop (large farmers)  

(Rs. / hectare)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particulars</th>
<th>III</th>
<th>IV</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>No. of vines</td>
<td>5,304</td>
<td>5,304</td>
<td>5,304</td>
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<tr>
<td>2.</td>
<td>No of yielding vines</td>
<td>4,958</td>
<td>5,102</td>
<td>5,304</td>
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<tr>
<td>3.</td>
<td>Yield of vanilla bean per vine (Kg)</td>
<td>0.38</td>
<td>0.88</td>
<td>1.4</td>
</tr>
<tr>
<td>4.</td>
<td>Total yield of vanilla bean (Kg)</td>
<td>1,884.04</td>
<td>4,489.76</td>
<td>7,425.60</td>
</tr>
<tr>
<td>5.</td>
<td>Sale price per kg (Rs.)</td>
<td>250</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>6.</td>
<td>Returns by sale of bean (Rs.)</td>
<td>4,71,010</td>
<td>11,22,440</td>
<td>18,56,400</td>
</tr>
<tr>
<td>7.</td>
<td>Returns by sale of cutting (Rs.)</td>
<td>22,000</td>
<td>28,000</td>
<td>31,200</td>
</tr>
<tr>
<td>8.</td>
<td>Gross returns by sale bean and cuttings</td>
<td>4,93,010</td>
<td>11,50,440</td>
<td>18,87,600</td>
</tr>
<tr>
<td>9.</td>
<td>Total variable cost of cultivation (Rs.)</td>
<td>1,05,904.2</td>
<td>1,12,310</td>
<td>1,16,794.5</td>
</tr>
<tr>
<td>10.</td>
<td>Total cost of cultivation (Rs.)</td>
<td>2,01,248.5</td>
<td>2,07,963.7</td>
<td>2,12,617</td>
</tr>
<tr>
<td>11.</td>
<td>Net returns over variable cost (Rs.)</td>
<td>3,87,105.8</td>
<td>10,38,130</td>
<td>17,70,805.5</td>
</tr>
<tr>
<td>12.</td>
<td>Net returns over total cost (Rs.)</td>
<td>2,91,761.5</td>
<td>9,42,476.3</td>
<td>16,74,983</td>
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</table>
Table 4.15. Processing cost of green bean of vanilla

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Particulars</th>
<th>Cost (Rs.)</th>
<th>Percentage to the total</th>
</tr>
</thead>
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<td><strong>Variable cost</strong></td>
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<td></td>
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<tr>
<td>1.</td>
<td>Labour cost</td>
<td>4.68</td>
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<tr>
<td>2.</td>
<td>Packing materials</td>
<td>0.05</td>
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<td>3.</td>
<td>Fuel charges</td>
<td>0.06</td>
<td>0.90</td>
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<tr>
<td></td>
<td><strong>Fixed cost</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Apportioned establishment cost</td>
<td>1.82</td>
<td>27.53</td>
</tr>
<tr>
<td></td>
<td><strong>Total Cost (A+B)</strong></td>
<td>6.61</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td><strong>Value addition to green bean</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Manufacture of processed bean from one kg of green bean (kg)</td>
<td>0.20</td>
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</tr>
<tr>
<td>2.</td>
<td>Average price realized (Rs./kg)</td>
<td>1500</td>
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</tr>
<tr>
<td>3.</td>
<td>Gross returns (Rs.)</td>
<td>300</td>
<td></td>
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<td>4.</td>
<td>Net returns for processed bean (Rs./kg)</td>
<td>293.39</td>
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<td>5.</td>
<td>Net returns realized by sale of one kg of vanilla green bean</td>
<td>250</td>
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<td>6.</td>
<td>Return obtained by the value addition to green bean</td>
<td>43.39</td>
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</table>
Table 4.16. Economic feasibility of growing vanilla as an intercrop

<table>
<thead>
<tr>
<th>Types of farmer</th>
<th>Financial viability measures</th>
<th>Small farmer</th>
<th>Large farmer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Net present worth</td>
<td>1856659.4</td>
<td>2448524.8</td>
</tr>
<tr>
<td></td>
<td>Benefit-cost ratio</td>
<td>10.71</td>
<td>13.74</td>
</tr>
<tr>
<td></td>
<td>Internal rate of return</td>
<td>58 (%)</td>
<td>65 (%)</td>
</tr>
</tbody>
</table>

Note. The discount rate was taken at 12%

4.6.1 Net present value (NPV)

The net present value worked out for the small and large farm groups. The net present value is the present value of the net returns of the project discounted at opportunity cost of capital (12 %). The annual net cash inflows were discounted at the discount rate of 12 Per cent. The net present value of the cash inflows per hectare was Rs. 185659.40 on small farm and Rs. 2448524.8 on large farm. Thus the net present value per hectare was found to be high on large plantation than in small plantation. However, the results showed that investment in vanilla plantation was financially feasible proposal both for small and large farm.

4.6.2 Benefit Cost Ratio (BCR)

The benefit cost ratio worked out for the small and large farm groups. The criterion indicated the returns per rupee invested in vanilla plantation. It was 10.714 on small farm and 13.749 large farm, respectively. The results showed that investment in large farm were more profitable than those on small farm. However, both the size groups had benefit cost ratio more than unity. It could be concluded that investment in plantation was financially sound and economically viable.

4.6.3 Internal rate of returns (IRR)

The internal rate of return was worked out for the small and large farm groups. This criterion measures the rate of returns that can be earned by investing in vanilla plantation. It also considers the re-investment opportunities, which are absent in other techniques. The internal rate of return was 58 per cent on small and 65 per cent on large plantations. Thus, the large farm had higher earning capacity than small farm. However, in both size groups, investment found feasible since internal rate of returns was higher than opportunity cost of capital of 12 per cent.

4.6.4 Cost and returns from vanilla as an intercrop

Small farmers

The cash outflow, the cash inflow and net return is presented in Table 4.17. The net return for initial investment is Rs. –191126, for the first year it is Rs. -16105 and for the 15th year is Rs. 227305.5. It was calculated from the first year to fifteenth year.
In this case also cash outflow, cash inflow and net returns is presented in Table 4.18. The net returns was calculated for the initial investment is Rs. –192050.9, for the first year it is Rs. –14051 and for the fifteenth year it is Rs. 329843.7.

4.7 BREAK-EVEN POINT ANALYSIS OF VANILLA AS AN INTERCROP

The technique of break-even analysis was employed in order to determine the minimum level of vanilla production required to cover the total fixed cost incurred in the vanilla cultivation as intercrop in areca garden. It also helps to plan the production to the changing situation of price fluctuation of vanilla. The break-even point indicates the minimum quantity of vanilla to be produced, so as to continue vanilla production process without sustaining losses.

The break-even analysis was carried out for each group of farmers and presented in the Table 4.19. The small farmer should produce the minimum quantity of 145.52 kg in 3rd year, and decreases over the years. The large farmer should produce minimum quantity of 127.98 kg in 3rd year and decreases over the years of vanilla bean to continue the production without incurring losses. It is evident from the table that, the break-even point for small farmer is comparatively higher than large farmer.

4.8 FINANCIAL FEASIBILITY OF VANILLA AS PURE CROP

To evaluate the feasibility of investment in vanilla as intercrop in areca garden, the criteria of net present value, benefit-cost ratio, internal rate of returns were used. Analysis was carried out for the two size groups are presented in the Table 4.20.

4.8.1 Net present value (NPV)

The net present value worked out for the small and large farm groups. The net present value is the present value of the net returns of the project discounted at opportunity cost of capital (12 %). The annual net cash inflows were discounted at the discount rate of 12 per cent. The net present value of the cash inflows per hectare was Rs. 4942593.61 on small farm and Rs. 5373993.33 on large farm. Thus the net present value per hectare was found to be more on large plantation than on small plantation. However, the results showed that investment in vanilla plantation was financially sound and economically viable both in small and large farmers.

4.8.2 Benefit Cost Ratio (BCR)

The benefit cost ratio worked out for the small and large farm groups. The benefit cost ratio were 5.83 and 6.37 for small and large farmer, respectively. The results showed that investment in large farm were more profitable than those in small farm. However, for both the size groups had benefit cost ratio were more than unity. It can be concluded that investment in plantation was financially sound and economically feasible.

4.8.3 Internal rate of returns (IRR)

The internal rate of return was worked out for the small and large farm groups. This criterion measures the rate of returns that could be earned by investing in vanilla plantation. It also considers the re-investment opportunities, which are absent in other techniques. The internal rate of return were 43 per cent in small and 46 per cent in large plantations. Thus, the large orchards had higher earning capacity than small plantation. However, in both size groups, investment were found feasible since Internal Rate of Returns were higher than opportunity cost of capital.
Table 4.17. Cost and returns from vanilla as an intercrop (small farmers)

<table>
<thead>
<tr>
<th>Year</th>
<th>Cash outflow (Rs./ha)</th>
<th>Cash inflow (Rs./ha)</th>
<th>Net returns (Rs./ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>191126</td>
<td>0</td>
<td>-191126</td>
</tr>
<tr>
<td>1</td>
<td>16105</td>
<td>0</td>
<td>-16105</td>
</tr>
<tr>
<td>2</td>
<td>41760.5</td>
<td>0</td>
<td>-41760.5</td>
</tr>
<tr>
<td>3</td>
<td>84572.64</td>
<td>167510</td>
<td>82937.36</td>
</tr>
<tr>
<td>4</td>
<td>93642.4</td>
<td>639760</td>
<td>317237.6</td>
</tr>
<tr>
<td>5</td>
<td>98474.3</td>
<td>639760</td>
<td>541285.7</td>
</tr>
<tr>
<td>6</td>
<td>98474.3</td>
<td>639760</td>
<td>541285.7</td>
</tr>
<tr>
<td>7</td>
<td>98474.3</td>
<td>639760</td>
<td>541285.7</td>
</tr>
<tr>
<td>8</td>
<td>98474.3</td>
<td>639760</td>
<td>541285.7</td>
</tr>
<tr>
<td>9</td>
<td>98474.3</td>
<td>639760</td>
<td>541285.7</td>
</tr>
<tr>
<td>10</td>
<td>98474.3</td>
<td>612354</td>
<td>496668.9</td>
</tr>
<tr>
<td>11</td>
<td>89562.1</td>
<td>586231</td>
<td>376581.8</td>
</tr>
<tr>
<td>12</td>
<td>88631.2</td>
<td>465213</td>
<td>356942.7</td>
</tr>
<tr>
<td>13</td>
<td>75621.3</td>
<td>432564</td>
<td>356942.7</td>
</tr>
<tr>
<td>14</td>
<td>71266.3</td>
<td>396623</td>
<td>325266.7</td>
</tr>
<tr>
<td>15</td>
<td>69235.5</td>
<td>2968541</td>
<td>227305.5</td>
</tr>
</tbody>
</table>

Note. The discount rate was taken at 12 %
Table 4.18. Cost and returns from vanilla as an intercrop (large farmers)

<table>
<thead>
<tr>
<th>Year</th>
<th>Cash outflow (Rs./ha)</th>
<th>Cash inflow (Rs./ha)</th>
<th>Net returns (Rs./ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial Investment</td>
<td>192050.9</td>
<td>0</td>
<td>-192050.9</td>
</tr>
<tr>
<td>1</td>
<td>14051</td>
<td>0</td>
<td>-14051</td>
</tr>
<tr>
<td>2</td>
<td>41541</td>
<td>0</td>
<td>-41541</td>
</tr>
<tr>
<td>3</td>
<td>80632.2</td>
<td>189700</td>
<td>109067.6</td>
</tr>
<tr>
<td>4</td>
<td>89976</td>
<td>490580</td>
<td>400604</td>
</tr>
<tr>
<td>5</td>
<td>92790.9</td>
<td>765350</td>
<td>672559.1</td>
</tr>
<tr>
<td>6</td>
<td>92790.9</td>
<td>765350</td>
<td>572559.1</td>
</tr>
<tr>
<td>7</td>
<td>92790.9</td>
<td>765350</td>
<td>672559.1</td>
</tr>
<tr>
<td>8</td>
<td>92790.9</td>
<td>765350</td>
<td>672559.1</td>
</tr>
<tr>
<td>9</td>
<td>92790.9</td>
<td>765350</td>
<td>672559.1</td>
</tr>
<tr>
<td>10</td>
<td>92790.9</td>
<td>765350</td>
<td>672559.1</td>
</tr>
<tr>
<td>11</td>
<td>82365.3</td>
<td>698535</td>
<td>646169.7</td>
</tr>
<tr>
<td>12</td>
<td>79256.4</td>
<td>675642</td>
<td>596385.6</td>
</tr>
<tr>
<td>13</td>
<td>78965.4</td>
<td>598642</td>
<td>519676.6</td>
</tr>
<tr>
<td>14</td>
<td>69853.3</td>
<td>495682</td>
<td>425828.7</td>
</tr>
<tr>
<td>15</td>
<td>66698.3</td>
<td>396542</td>
<td>329843.7</td>
</tr>
</tbody>
</table>

Note. The discount rate was taken at 12%
Table 4.19. Break-even output in vanilla production as an intercrop

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particulars</th>
<th>Small farmer</th>
<th>Large farmer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>III Year</td>
<td>IV Year</td>
</tr>
<tr>
<td>1.</td>
<td>Fixed cost (Rs.)</td>
<td>21,907</td>
<td>22,007.40</td>
</tr>
<tr>
<td>2.</td>
<td>Average variable cost per Kg of bean (Rs.)</td>
<td>99.46</td>
<td>45.12</td>
</tr>
<tr>
<td>3.</td>
<td>Average price of vanilla bean (Rs/Kg)</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>4.</td>
<td>Break-even output of vanilla bean (kg)</td>
<td>145.52</td>
<td>110.42</td>
</tr>
</tbody>
</table>
Table 4.20. Economic feasibility of growing vanilla as pure crop

<table>
<thead>
<tr>
<th>Types of farmer</th>
<th>Small farmer</th>
<th>Large farmer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial ratio</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net present worth</td>
<td>4942593.61</td>
<td>5373993.33</td>
</tr>
<tr>
<td>Benefit-cost ratio</td>
<td>5.83</td>
<td>6.37</td>
</tr>
<tr>
<td>Internal rate return</td>
<td>43 (%)</td>
<td>46 (%)</td>
</tr>
</tbody>
</table>

4.8.4 Cost and returns of vanilla grown as pure crop

4.8.5 Small farmers

The cash outflow and inflow and net cash flow is presented in Table 4.21. The net cash flow for the initial investment was Rs. –1023307.9, for the first year was Rs. –20894.2 and for the 15th year was Rs. 853967. It was calculated from first year to fifteenth year.

Large farmer

The cash outflow and inflow and net cash flow is presented in Table 4.22. The net cash flow for the initial investment was Rs. –1001583.5, for the first year was Rs. –19184 and for the 15th year was Rs. 859127. It was calculated from first year to fifteenth year.

4.8.5 Comparison of economic feasibility of vanilla grown as intercrop and pure crop

The economic feasibility of vanilla grown as intercrop and pure crop is presented in Table 4.23. The net present value of vanilla grown as intercrop was more in large farmers it is Rs. 2448524.8 and small farmer is Rs. 1856659.4. In case of pure crop, the net present value is more in case of large farmer. It is Rs. 5373993.33 and for small farmer is 4942593.61. The B:C ratio of intercrop in case of large farmer is 13.74 and for small farmer is 10.7 and in pure crop it is 6.37 for large farmer and 5.83 for small farmers. The internal rate of return for the vanilla grown as intercrop for the large farm was 65 per cent and for the small farms it was 58 per cent. In the case of pure crop, it was 46 per cent for the larger and 43 per cent for the small farm.

4.9 BREAK-EVEN POINT ANALYSIS OF VANILLA AS PURE CROP

The break-even analysis was carried out for small and large group farmers and presented in the Table 4.24. The break even output for small farms was 528.55 kg in 3rd year, whereas it decreased to 425.68 kg in the fifth year. Similarly, it could be observed that large farmer should produce minimum quantity of 492.00 kg of vanilla bean to continue in the production without incurring losses during third year. It was evident from the table that, the break-even point for small farmer was comparatively higher than that of large farmer.
Table 4.21. Cost and returns from vanilla grown as pure crop (small farmers)

<table>
<thead>
<tr>
<th>Year</th>
<th>Cash outflow (Rs./ha)</th>
<th>Cash inflow (Rs./ha)</th>
<th>Net cash flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Investment</td>
<td>1023308</td>
<td>0</td>
<td>-1023307.9</td>
</tr>
<tr>
<td>1</td>
<td>20894.2</td>
<td>0</td>
<td>-20894.2</td>
</tr>
<tr>
<td>2</td>
<td>76196.7</td>
<td>0</td>
<td>-78196.7</td>
</tr>
<tr>
<td>3</td>
<td>209874</td>
<td>448085</td>
<td>238211</td>
</tr>
<tr>
<td>4</td>
<td>218014</td>
<td>1090620</td>
<td>572606</td>
</tr>
<tr>
<td>5</td>
<td>223259</td>
<td>1771650</td>
<td>1548391</td>
</tr>
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<td>6</td>
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<td>1771650</td>
<td>1548391</td>
</tr>
<tr>
<td>7</td>
<td>223259</td>
<td>1771650</td>
<td>1548391</td>
</tr>
<tr>
<td>8</td>
<td>223259</td>
<td>1771650</td>
<td>1548391</td>
</tr>
<tr>
<td>9</td>
<td>223259</td>
<td>1771650</td>
<td>1548391</td>
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<tr>
<td>10</td>
<td>223259</td>
<td>1771650</td>
<td>1548391</td>
</tr>
<tr>
<td>11</td>
<td>192654</td>
<td>1526523</td>
<td>1333869</td>
</tr>
<tr>
<td>12</td>
<td>162547</td>
<td>1326541</td>
<td>1163994</td>
</tr>
<tr>
<td>13</td>
<td>132654</td>
<td>1235642</td>
<td>1102988</td>
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<td>14</td>
<td>123564</td>
<td>1032652</td>
<td>909088</td>
</tr>
<tr>
<td>15</td>
<td>102356</td>
<td>956323</td>
<td>853967</td>
</tr>
</tbody>
</table>

Note. The discount rate was taken at 12 %
Table 4.22. Cost and returns from vanilla grown as pure crop (large farmers)

<table>
<thead>
<tr>
<th>Year</th>
<th>Cash outflow (Rs./ha)</th>
<th>Cash inflow (Rs./ha)</th>
<th>Net cash flow</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Initial Investment</td>
<td>1001583.5</td>
<td>-1001583.5</td>
</tr>
<tr>
<td>1</td>
<td>19184</td>
<td>0</td>
<td>-19184</td>
</tr>
<tr>
<td>2</td>
<td>77672</td>
<td>0</td>
<td>-77672</td>
</tr>
<tr>
<td>3</td>
<td>202248.5</td>
<td>493010</td>
<td>290761.5</td>
</tr>
<tr>
<td>4</td>
<td>207964</td>
<td>1150440</td>
<td>942476</td>
</tr>
<tr>
<td>5</td>
<td>212617</td>
<td>1887600</td>
<td>1674988</td>
</tr>
<tr>
<td>6</td>
<td>212617</td>
<td>1887600</td>
<td>1674988</td>
</tr>
<tr>
<td>7</td>
<td>212617</td>
<td>1887600</td>
<td>1674988</td>
</tr>
<tr>
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<td>212617</td>
<td>1887600</td>
<td>1674988</td>
</tr>
<tr>
<td>9</td>
<td>212617</td>
<td>1887600</td>
<td>1674988</td>
</tr>
<tr>
<td>10</td>
<td>212617</td>
<td>1795680</td>
<td>1583063</td>
</tr>
<tr>
<td>11</td>
<td>195682</td>
<td>1652310</td>
<td>1456628</td>
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<td>163525</td>
<td>1426351</td>
<td>1262826</td>
</tr>
<tr>
<td>13</td>
<td>156321</td>
<td>1123651</td>
<td>967330</td>
</tr>
<tr>
<td>14</td>
<td>142635</td>
<td>1023561</td>
<td>880926</td>
</tr>
<tr>
<td>15</td>
<td>123626</td>
<td>982653</td>
<td>859127</td>
</tr>
</tbody>
</table>

Note. The discount rate was taken at 12 %
Table 4.23. Comparison farmers growing vanilla as an intercrop and pure crop

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particulars</th>
<th>Intercrop</th>
<th>Pure crop</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Small farmer</td>
<td>Large farmer</td>
</tr>
<tr>
<td>1.</td>
<td>Net present value</td>
<td>1856659.4</td>
<td>2448524.8</td>
</tr>
<tr>
<td>3.</td>
<td>Internal rate of interest</td>
<td>58 (%)</td>
<td>65 (%)</td>
</tr>
</tbody>
</table>

Table 4.24. Break-even analysis in vanilla production as pure crop

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particulars</th>
<th>Small farmer</th>
<th>Large farmer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>III Year</td>
<td>IV Year</td>
</tr>
<tr>
<td>1.</td>
<td>Fixed cost (Rs.)</td>
<td>97,616.90</td>
<td>97,805.50</td>
</tr>
<tr>
<td>2.</td>
<td>Average variable cost per Kg of bean (Rs.)</td>
<td>65.31</td>
<td>28.33</td>
</tr>
<tr>
<td>3.</td>
<td>Average price of vanilla bean (Rs/Kg)</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>4.</td>
<td>Break-even output of vanilla bean (kg)</td>
<td>528.55</td>
<td>441.23</td>
</tr>
</tbody>
</table>
4.10 MARKETING OF VANILLA

During investigation in the study area, it was observed that most of the farmer sold their produce to the local agents, who are the representative of the company. Some farmers who are the members of vanilla Development trust (VDT) sold their produce at VDT. Vanilla Development trust is the co-operative society which procured the bean only from its member. The procured vanilla by the company and Vanilla Development Trust exported to international market.

4.10.1 Marketing channels

The study revealed two marketing channels they are

Channel I : Producer → Local agents (Company) → Export
Channel II : Producer → Vanilla Development Trust → Export

In channel I, the producers themselves brought the produce to the local agents or sometimes local agents themselves would purchase the produce at farm level. In channel II, the farmers who are the members of Vanilla Development Trust (VDT), sold their produce at VDT. Vanilla Development Trust procured the bean only from its member.

4.10.2 Marketing cost incurred by farmer during sale of produce

The marketing costs incurred per quintal of green bean by farmer while marketing the produce is presented in Table 4.25.

In channel I the transportation cost was 36.80 per cent, which constituted the largest share in total marketing cost, followed by packing material and cost of packing was about 35 per cent and 28 per cent, respectively.

In channel II, transportation accounted the major share in total marketing costs about 45.40 per cent, followed by packing material (30.30 per cent) and cost of packing (24.20 per cent).

4.10.3 Price spread in marketing of vanilla bean

The price spread in the study area cannot be traced, as the price received by the producer for the sale of their produce was available. But, the details on price received by the company and vanilla development trust by the export of produce was not possible. Hence the objective of price spread in the study area was not fulfilled.

4.11 PROBLEMS FACED BY VANILLA GROWERS IN PRODUCTION, PROCESSING AND MARKETING

The problems faced by vanilla growers in production, processing and marketing were listed for both small and large farmer and which are presented in Table 4.26.

4.11.1 Production

The main problem faced by the small and large farmer during production of vanilla are, occurrence of pest and disease, non-availability of skilled labour for pollination and high initial cost in pure crop plantation. The occurrence of pest and disease was high about 95.00 per cent on the large farm than on the small farm (87.50%). The non-availability of skilled labour for pollination was low on small farm (71.40 per cent) than on the large farm (87.50%). The high initial cost in pure crop plantation was observed high on small farm (61.90 per cent) than on large farm (50.00 per cent).

The other problems faced by small and large farmers were non-availability of planting materials and non-availability of organic manure. The farmers expressed they need credit facility. The number of farmers expressing this need were 28 (70.00%) and 15 (37.50%) small and large farmers, respectively. They indicated unavailability of standardized package of practice for this crop. The number of farmers were 18 (45.00%) and 24 (60.00%) small and
### Table 4.25. Marketing cost of green vanilla bean (Rs. / kg)

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Particular</th>
<th>Channel I</th>
<th>Percentage</th>
<th>Channel II</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Packing</td>
<td>0.08</td>
<td>27.50</td>
<td>0.08</td>
<td>24.20</td>
</tr>
<tr>
<td>2.</td>
<td>Packing material</td>
<td>0.10</td>
<td>35.00</td>
<td>0.10</td>
<td>30.30</td>
</tr>
<tr>
<td>3.</td>
<td>Transportation</td>
<td>0.11</td>
<td>36.80</td>
<td>0.15</td>
<td>45.40</td>
</tr>
<tr>
<td></td>
<td><strong>Marketing cost</strong></td>
<td>0.29</td>
<td>100.00</td>
<td>0.33</td>
<td>100.00</td>
</tr>
</tbody>
</table>

**Note.**
1) Channel I: Producer → local agents (Company) → Export
2) Channel II: Producer → Vanilla Development Trust → Export
Fig. 4: Marketing cost of fresh unprocessed vanilla beans

Fig. 4: Marketing cost of fresh unprocessed vanilla beans
Table 4.26. Problems faced by vanilla farmers on different aspects of production processing and marketing

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Problems faced</th>
<th>Small farmer (n=40)</th>
<th>Large farmer (n=40)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Production</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Non-availability of planting materials</td>
<td>12 (30)</td>
<td>15 (37.50)</td>
</tr>
<tr>
<td>2.</td>
<td>Non-availability of organic manure</td>
<td>4 (10)</td>
<td>7 (17.50)</td>
</tr>
<tr>
<td>3.</td>
<td>Incidence of pest and diseases</td>
<td>31 (80)</td>
<td>36 (90)</td>
</tr>
<tr>
<td>4.</td>
<td>Non-availability of credit facility</td>
<td>28 (70.0)</td>
<td>15 (37.5)</td>
</tr>
<tr>
<td>5.</td>
<td>No standardized package of practices</td>
<td>18 (45.0)</td>
<td>24 (60.0)</td>
</tr>
<tr>
<td>II</td>
<td>Processing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Lack of knowledge to process the bean</td>
<td>8 (20)</td>
<td>0</td>
</tr>
<tr>
<td>7.</td>
<td>Non-availability of skilled labour for processing</td>
<td>32 (76.1)</td>
<td>38 (95)</td>
</tr>
<tr>
<td>8.</td>
<td>Occurrence of pest and diseases after processing</td>
<td>35 (87.50)</td>
<td>38 (95)</td>
</tr>
<tr>
<td>9.</td>
<td>Low price to poor processed bean</td>
<td>12 (30)</td>
<td>20 (50)</td>
</tr>
<tr>
<td>III</td>
<td>Marketing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Price fluctuation</td>
<td>40 (100)</td>
<td>40 (100)</td>
</tr>
<tr>
<td>11.</td>
<td>No proper scale of finance for commercial bank to sanction loan</td>
<td>35 (87.50)</td>
<td>36 (90)</td>
</tr>
<tr>
<td>12.</td>
<td>Lack of marketing facility</td>
<td>40 (100)</td>
<td>40 (100)</td>
</tr>
</tbody>
</table>

Note: Figures in parentheses indicates the percentage of the total.
large farmers, respectively and also no proper scale of finance for commercial banks. The number of farmers expressing this on a problem among small and large farmers were 30 (75.00%) and 25 (62.00%), respectively

4.11.2 Processing

The main problem faced by small and large farmers during processing of vanilla was low price due to poor quality processed bean, occurrence of diseases after processing and non-availability of skilled labour for processing. Low price to poorly processed bean was a major reason as expressed by both large farmer (50.00 per cent) and the small farmer (30.00 per cent). Non-availability of skilled labour for processing was another major problem for both the group followed by the incidence of pest and diseases. Lack of knowledge for processing of the bean was a problem as expressed by only small farmers (20.00 per cent).

Marketing

The major problems faced while marketing by small and large farmers during were lack of assured market facility and price fluctuations.
V. DISCUSSION

The results presented in the previous chapter are discussed in this chapter with reasons and explanation wherever possible to interpret the observed phenomena, under the same headings as presented in results chapter.

5.1 General information of sample farmers

5.2 Establishment cost of vanilla as an intercrop

5.3 Cost and returns of vanilla as an intercrop

5.4 Establishment cost of vanilla as pure crop

5.5 Cost and returns from vanilla as pure crop

5.6 Cost and returns of processing of vanilla beans

5.7 Economic feasibility of vanilla as an intercrop

5.8 Break-even analysis for vanilla production as an intercrop

5.9 Economic feasibility of vanilla as pure crop

5.10 Break-even analysis for vanilla production as pure crop

5.11 Comparison of economic feasibility of vanilla grown as an intercrop and as pure crop

5.12 Marketing of vanilla

5.13 Problems faced by vanilla farmers in production, processing and marketing

5.1 GENERAL INFORMATION OF SAMPLE FARMERS

General characteristics of sample farmers implied the information about farmers growing vanilla as intercrop in arecanut plantation and also as pure crop under artificial shade. Further, categorization in each group was done to compare the cost and returns. The average number of vine per hectare was found high on large farm than on small farm indicating the economies of size. The range of bearing period of vine is between third to fifth year. Though vine starts bearing from third year onwards yield stabilized from fifth year onwards. The productive life of the vine was fifteen years. The classification based on number of vines indicated that, the number of vines were more on the large farm than on the small farm in vanilla as intercrop in arecanut plantation and as pure crop under artificial shade.

5.2 ESTABLISHMENT COST OF VANILLA AS AN INTERCROP

The establishment cost pattern of vanilla follows the similar pattern as found in any other plantations. The establishment of vanilla requires heavy capital investment during first year. From second year onwards only maintenance cost, is required. The establishment cost include the capital invested on sprinkler, fencing, planting materials, digging the pits for planting cuttings purchase of manure, silt, mulching materials and plant protection chemicals.

The level of establishment cost on vanilla in arecanut plantation varies with the small and large size farmer. The total establishment cost on large farm was Rs. 2,47,642.9 per hectare, which was comparatively less than small farm (Rs. 2,48,991.5), indicating the economies of scale in large farmers.

The cost incurred on planting materials constituted the highest share in total investment on small and large farm. The cost incurred on planting materials on the large farm was higher than that of the small farm. This was attributed due to the fact that, the number of vines planted on the large farm was higher than the vines planted on the small farm. Hence, the requirement of manure on large farm was high.

The cost on sprinkler on both the size groups remained almost same. The cost on manure was high on the large farm than on the small farm, due to intensive care taken by the
large farmers and number of vines were also more with large farms. The material cost such as fencing, mulching silt constituted the less on both the farms. The cost on fencing material per hectare was high on the small farm than on the large farm as large farmers purchased the hence materials on whole scale basis which reduced the cost.

The plant protection chemical applied was high on large farm, than on small farm. This might be due to planting of large number of vines on the large farm in comparison to small farm and also the plant protection chemicals were sprayed twice in a year on large farm.

The labour cost incurred for performing operations such as watch and ward, weeding and manure and silt application constituted the highest cost on the small farm than on the large farm, as the small farmers engaged themselves in intensive cultivation. Watch and ward was also important to prevent the theft of vanilla cuttings and beans during maturation. The cost spent on the watch and ward is less on large farm due to the fact that large farmers hired labour on permanent basis.

Mulching and weeding operations are other important cultures, which laid a major share in the total labour cost in both size group. This might be due to the fact that mulching help to protect the soil from water evaporation, water infiltration and soil erosion. Manure and silt application constituted the third highest share in the total labour cost. The reason is that they applied manure and silt in split doses twice in a year that needed more labourers. The cost incurred on the small farm was higher than on the large farm due to more number of vines on the large farms. However the cost per vine worked out to be less in comparison with small farmer.

5.3 ANNUAL COST AND RETURNS OF VANILLA AS AN INTERCROP

During the bearing period, the costs incurred on pollination and harvesting accounted the highest share in the total variable cost as the pollination in vanilla was done by hand and hence labour was intensively used. The vine starts flowering by the end of December and continues till April. So the pollination was to be carried out daily and continuously till the flowering season ended. The pollination was high on the small than on the large farm, because of the presence of large number of permanent labourers to carry out the operations.

The harvesting of bean started from October and ended in December. Hence, the bean is harvested daily and continuously till the end of the season. It is evident from the Tables 4.4 & 4.5 that the cost on the pollination and harvesting was low during the initial bearing period and the cost from fifth year almost remained same due to yield stabilization began from fifth year onwards.

The cost incurred on purchase of manure has increased over the years, but the cost remained almost same from fifth year onwards. Because, the increased nutrient requirement of vines during bearing period and the cost almost remained same from fifth year onwards. The manure requirement on large farm is higher than on small farm due to the higher number of vines on large farm than on the small farm.

Watch and ward is also important to prevent the theft of vanilla cuttings and beans during maturity. The amount spent on the watch and ward is less on large than on small farm large farmers have permanent labour who are paid less than the daily labourers. The labour cost on weeding is higher on small farm than large farm as the small farms engaged more hired casual labour. The interest on working capital is high during the initial periods and it stabilized from fifth year onwards.

In fixed cost, the amortized establishment cost is found high, which indicated high initial investment as intercrop in areca garden. The fixed cost per hectare on large farm is comparatively less than on small farm exhibiting economies of scale on large farm.

Yield and returns from vanilla as an intercrop

A comparative study between the small and large farmer revealed that, the yield observed was high on the large plantation (6,942.6) than in small plantation (7,425.60) due to
more number of vines on the large farm. Gross returns obtained from vine was also high on large farm (18,87,600) than on small farm (17,71,650). The large farm had higher number of vines and relatively better yields were obtained on the large farm than on small farm. Small farmers are conservative they did not take risk whereas large farmers took more care in production and therefore additional risk which resulted in higher returns. Hence, the net returns obtained over total cost is high on large farm than on small farm and also return per rupee of investment is high on large farm (8.87) compared to small farm (7.93) in fifth year.

5.4 ESTABLISHMENT COST OF VANILLA AS PURE CROP

The establishment pattern of vanilla follows the same course as found in any other plantation. The establishment of vanilla required heavy capital investment under artificial shade during the first year.

The investment cost included the cost incurred on employing labour to perform different operations and material costs. The labour cost included the cost incurred on employing labours for land preparation, stone pillar installation, stitching of shade nets, installation of GI wire and LDPE pipes, planting of plant materials, application of manure and silt, watch & ward and irrigation. The material cost included the cost of stone pillar, shade net, GI (Galvanize Iron) wires and LDPE (Low Density Poly Ethylene) pipes, manure, silt, plant materials and mulching material.

The material cost on stone pillars, planting materials and shade net is high on small farm than on large farm as the purchase of materials in large farm are on wholesale basis. Similar results were obtained by the study calculated by Sudha and Sharma (1987).

The cost incurred on stone pillar installation, land preparation and stitching of shade nets is higher on small farm than on the larger farm. Here also, reasons quoted above holds true.

Watch and ward, manure and silt application and weeding operation are important, which have major share in the total labour cost in both size group. Watch and ward is important in both size groups to prevent the theft of vanilla vines and beans. The amount spent on the watch and ward is less on large farm than on the small farm as there are permanent labour on large farms who are residing in the field itself.

5.5 ANNUAL COST AND RETURNS OF VANILLA AS PURE CROP

As regard to the variable cost, similar pattern is observed in this type also and the reasons quoted in the previous paragraphs also hold true here. However, the pattern of fixed cost is different which is discussed here.

In fixed cost, the amortized establishment cost is found high, which indicate high initial investment under artificial shade. The fixed cost per hectare on large farm is comparatively less than on small farm exhibiting economies of size on large orchard.

Yield and returns from vanilla as pure crop

The vines started yielding from third year onwards and yield stabilized from fifth year. A comparative study between the small and large size farmer revealed that the yield observed is higher on the large farm than on small farm. Gross return obtained from vine is also high on large farm than small farm. This might be due to the fact that the large farm has higher number of vines hence obtained higher yield on large farm than on small farm. Hence, the net returns obtained over total cost is high on large farm than on small farm and also return per rupee of cost is high on large farm than the small farm.

5.6 COST AND RETURNS OF PROCESSING OF VANILLA BEANS

The cost incurred on processing of vanilla per kilogram is Rs. 6.67. The processed bean obtained from every kg of vanilla green bean is 200 g. It is evident from the Table 4.14,
the value addition due to processing of vanilla green bean per kg is Rs. 43.39. The processed vanilla bean fetch higher price than the green bean sold in the market. The investment on the processing structure is very meager. But, the cost of raw material itself is very high indicating better returns by integration of production and processing aspects.

5.7 INVESTMENT EVALUATION OF VANILLA AS AN INTERCROP

To determine the viability of vanilla in arecanut plantation, various measures of investment viz., net present worth, benefit cost ratio and internal rate of return are used.

The net present worth shows the present value of all the future flow of profit from the vanilla plantation. The net present worth (NPW) is found higher on large farmers than on small farms at 12% discount rate. This is due to low costs incurred by the large farmers. Hence, NPW is found higher and positive on the large farm than on the small farm. However, the results showed that investment in vanilla plantation is financially feasible proposal both in small and large farms. Therefore, it is profitable to invest on vanilla in the arecanut plantation.

The benefit-cost ratio at 12 per cent discount rate is found higher (2.32) on large farm than small farm (1.88) indicating that for every one rupee investment made by the large farmer on vanilla in arecanut plantation earned higher return than the small farmer over the productive life of the plantation. As the values in both size groups are more than one which indicate the economic feasibility of the investments in both size groups of farms.

The internal rate of return (IRR) worked out for large farmer is higher (63%) compared to small farm (51%) indicating a higher earning power on large farm. However, the results showed that investments in vanilla plantations are higher than the opportunity cost of capital in both the size groups revealing a higher average earnings in these projects.

The analytical technique revealed that NPV is positive, BCR is greater than one and IRR is sufficiently higher than prevailing interest rate of banks. Thus, the results of the study justify the farmers investment in vanilla plantation is economically viable. All these measures clearly indicate investment in vanilla plantation is a profitable proposition. Similar conclusion was made in the study conducted by Singh et al. (1987).

5.8 BREAK-EVEN ANALYSIS FOR VANILLA PRODUCTION AS AN INTERCROP

It is evident from break-even analysis that the break-even output is higher on the small farm than on the large farm. The variation in the break-even output is mainly due to variation in the fixed costs, variable cost incurred per vine is more in case of small farm than the large farm. The results of the analysis clearly indicated that the production of vanilla in both the groups are higher than the break even point of production of vanilla. Hence, the investment on vanilla in arecanut plantation is found economically viable.

5.9 INVESTMENT EVALUATION OF VANILLA AS PURE CROP

With regard to this, the techniques used for the crop are same as those used in the intercrop. Hence, the details provided with respect to these techniques hold same here also.

The analysis revealed that NPV is positive, BCR is greater than one and IRR is sufficiently higher than prevailing interest rate of banks. Thus, the results of the study justified that investment in vanilla plantation is economically feasible. All these measures clearly revealed that investment in vanilla is a profitable venture and similar conclusion was made by Singh et al. (1987).
5.10 BREAK-EVEN ANALYSIS FOR GROWING VANILLA AS PURE CROP

With regard to this aspect, the techniques used for the crop here are same as those used in the intercrop. Hence, the details provided with respect to techniques in the previous paragraph holds true here.

Break-even point of production was at higher level in small farm than on large farm. However in both the size groups the break-even analysis revealed the efficacy in the production of vanilla.

5.11 COMPARISON OF ECONOMIC FEASIBILITY OF VANILLA GROWN AS INTERCROP AND PURE CROP

Economic feasibility measures carried out for vanilla grown as intercrop and as pure crop revealed feasibility with respect to all the techniques used.

Further, the benefit-cost ratio and internal rate of return of vanilla grown as intercrop in arecanut plantation on large farm was higher than the vanilla grown as pure crop under artificial shade. Hence, vanilla grown as intercrop in arecanut plantation was found economically feasible than the vanilla grown as pure crop under artificial shade.

5.12 MARKETING OF VANILLA

It was observed from the study that labours employed for packing, transportation and packing materials constituted the main functions in the process of marketing of vanilla. The other items such as loading and unloading and commission charges were not incurred in the marketing of vanilla, as in the study area, the producers sold their produce to the local agent, who was the representatives of the company and Vanilla development Trust (VDT).

5.12.1 Marketing channels

In channel I, the producer sold his produce directly to the local agents who were representatives of company. In some cases, the local agents themselves purchased the produce in the market at the prevailing price level, the local agents purchased the produce at farm level also. However, the price difference is negligible and is almost equal to the extent of transportation cost, hence some farmers felt easy to sell their produce at the farm level.

In channel II, Vanilla Development Trust procures the bean only from their members. Hence, the producers incurred the marketing cost as the produce is taken to the vanilla development trust. The procured vanilla by VDT is exported to other countries.

Selling through channel-II is the best one, whereas in channel-I the farmer received less price through local agents, but there is no exploitation of the farmers in the channel-II as it is the trust of the vanilla growers.

5.12.2 Marketing cost of vanilla

Of the total marketing cost the transportation cost accounted to 36.80 % in channel I and 45.40 per cent of the total marketing cost in channel II. The mode of transportation is through public transport and through their own vehicle. The transportation facility is poor as the houses are located in the interior places often separated by distance.

The next item is packing materials and it accounted for 35 per cent and 30.30 per cent in the channel I and channel II, respectively. The material used for packing of vanilla bean is polypropylene bags. The cost incurred on packing materials formed the second important cost next to transportation cost.

The labour cost on packaging of vanilla bean formed the third important item in the total marketing cost, which is in the form of wages for packages. The women labourers are used for packaging purpose. The packaging accounted for 28.00 and 24.20 per cent of total marketing cost in both channel I and channel II, respectively.
Grading of bean is done to grade the bean according to specified standards but no cost on grading is incurred in both channel I and channel II. Hence, there is no share of grading in marketing cost.

5.12.3 Price spread in marketing of vanilla bean

The price spread in the study area cannot be traced as the details of export of vanilla by the company and vanilla development trust are not available. Hence, the price spread in the study area is not calculated.

5.13 PROBLEMS FACED BY VANILLA FARMERS IN PRODUCTION, PROCESSING AND MARKETING

The problems faced by vanilla farmers in production and marketing are worked out for both small and large farms and are discussed under the following sub-heads.

5.13.1 Production

The major problem faced by the farmers in the production of vanilla in incidence of pests and diseases. The main diseases which infected the vines are fungal and viral diseases. The diseases are most prevalent when there are adverse climatic conditions. The beetle pest damaged the leaves and flowers.

Non-availability of skilled labours for pollination is another important problem faced by farmers. Vanilla being a self-pollinated crop has to be pollinated manually. The credit facility is not available for this crop and also no standardized package of practice, no proper scale of finance for commercial bank.

Some of the farmers expressed that the investment is very high when it is taken as a pure crop. As investments includes cost on land preparation, stone pillar installation, stitching of shade nets, installing GI wire and LDPE pipes and purchase of planting material. Non-availability of organic manure is a major problem found by both the categories of farmers. Almost all farmers prepare the organic manure and it is purchased only during shortage of organic manure.

5.13.2 Processing

The processing of vanilla bean is not standardized at the farmer’s level. Low price to poorly processed bean and non-availability of skilled labourers for processing are the major problems faced during the processing. The poorly processed beans are of low grade and fetched low price. This is the major problem expressed by vanilla growers.

Since, the small farms are managed and maintained by farmers themselves the hired labour requirement is less for the small farmer for processing than the large farmers.

Attack of fungus to processed bean is one of the major problems. This is mainly attributed to the presence of higher moisture content in the processed bean which developed fungus. The fungus attacked beans are more on the large farm due to large quantity of bean processed during certain atmospheric condition and the quality maintenance is difficult for the large farmers.

A few farmers did not take up processing of bean due to the lack of knowledge about processing of bean. This problem is expressed by small farmer only.

5.13.3 Marketing

It observed in the study area that the marketing structure for vanilla is poorly developed for lack of assured marketing facility and price fluctuation is a major marketing problem faced by the farmers. The supply of good quality of vanilla bean from other countries led to the low price for the Indian vanilla bean at international trade due to poor processing knowledge of the Indian farmers. A good package for processing of vanilla beans needs the attention of the policy makers.
VI. SUMMARY AND POLICY IMPLICATIONS

Vanilla is an important commercial crop growing in India and is most expensive spice after saffron. The global production of vanilla beans was estimated at 5,598 tonnes from an area of 41,025 hectares in 2001. India ranks sixth in production with 60 tonnes (2001). In India, vanilla is cultivated in Karnataka, Kerala, Tamil Nadu, Lakshadweep and Andaman & Nicobar Islands. Karnataka occupies the largest area under vanilla cultivation in India with 1465 hectares, followed by Kerala (812 ha) and Tamil Nadu (268 ha) in 2003. In Karnataka State, Vanilla is cultivated in the districts of Chikmagalur, Udupi, Shimoga, Hassan, Kodagu, Dakshina Kannada and Uttara Kannada. In Northern Karnataka, Uttara Kannada ranks first in terms of area and production. It is grown as pure crop under artificial shade and as an intercrop.

Vanilla plantation involves large investment and it is essential to evaluate the investment in vanilla with respect to economic viability, as there are not many economic studies taken up on this crop. The research study on the economic analysis of production, marketing and processing of vanilla was proposed. The specific objectives of the study were:

1. To examine the costs and returns of production of vanilla as well as processing of vanilla in the study area
2. To assess the financial feasibility of vanilla plantations
3. To identify the marketing channels, marketing costs and price spread and
4. To document the constraints in production processing and marketing of vanilla and to suggest measures to improve

METHODOLOGY

Sampling procedure

Uttara Kannada district was selected for the study based on the highest area under vanilla cultivation in Northern Karnataka. The two taluks namely Sirsi and Yellapur were selected based on highest area under vanilla cultivation. From each taluk, top five villages having highest area under vanilla cultivation were selected. Eight farmers cultivating vanilla from each village were selected randomly. A total sample of 80 farmers growing vanilla as intercrop in areca plantation and as pure crop under artificial shade were selected. The farmers were further post classified as small farmer and large farmer based on the number of vines.

The data for the study included both the primary data and secondary sources. The primary data for the study was collected fo the year 2005 and obtained from the sample farmers through personal interview method with the help of pre-tested questionnaire. The primary data collected from the farmer respondents related to details of total capital requirement for the establishment of vanilla in arecanut plantation and vanilla under artificial shade, details on maintenance cost of the plantation during non-bearing and bearing stage, yield levels and returns etc. were also collected. The secondary data on the area and production were collected from Department of Horticulture.

Analytical technique

Analytical techniques used were namely the discounted cash flow measures used which include 1) net present worth/value 2) benefit:cost ratio (B:C ratio) 3) internal rate of return (IRR). Breakeven point analysis besides using tabular analysis, percentages and ratios.
MAJOR FINDINGS OF THE STUDY

6.1. The cost of vanilla as an intercrop

The establishment cost per hectare of vanilla grown as intercrop in arecanut plantation was Rs. 2,47,642.90 on large farm and Rs. 2,48,991.50 on small farm. This study reveals that the cost of establishment was comparatively low on large farm than on small farm. This was due to lower cost per vine on large farm.

During establishment of vanilla in arecanut plantation, the cost incurred on the planting materials was higher (Rs. 1,04,400) on the large plantation than on the small plantation (Rs. 97,600). This was attributed to the fact that, the number of vines planted on the large farm was higher than the vines planted on the small farm.

The cost incurred on manure was Rs. 19,750 on large farm compared to small farm (Rs. 19,520) on per hectare vanilla cultivation as intercrop in arecanut as well as a pure crop. However, the cost on manure was little more on large farm than on small farm due to the fact that number of vines were more which require a heavy application of manure, and also the application of manure increased during bearing period to meet nutrient requirement of vine. Hence, the cost on manure requirement was more on large farm.

During bearing stage of vanilla, the cost incurred on pollination and harvesting was high in intercrop and pure crop also. This was attributed to the pollination and harvesting operations which were done manually. Moreover the pollination operation was done regularly and continuously till the end of the season and also the harvesting of bean starts from October upto December. This was the reason that the cost incurred on the pollination and harvesting were high in both size groups.

The yield was observed higher on the large plantation than on small plantation. Because large farm had higher number of vines and also the cost incurred by the large farm was comparatively lower than the small farm, which resulted in higher gross returns. Net return and return per rupee over total cost were also higher on large farm.

6.2 The cost of vanilla as pure crop

The establishment cost per hectare of vanilla under artificial shade was Rs. 11,83,301.10 and Rs. 11,56,540 on small and large farmers, respectively. The cost on both small farm and large farms were high indicating a heavy initial investment under artificial shade. The cost on the small farm was comparatively higher than the large farms. This was attributed to higher that labour and material cost on small farm than on large farm.

The return from vanilla plantation as pure crop under artificial shade were higher on large farms than on small farms, because large farms had more vines compared to small farms. Net returns and returns per rupee of total cost were also high on large farm indicating economies of scale.

Vanilla was highly profitable venture for the producer in the study area in which vanilla is grown as intercrop in arecanut plantation and as pure crop under artificial shade. Hence, the investment was economically feasible in both farm size.

6.3 The processing of vanilla

The processing of vanilla was practiced by most of the farmers in the study area. The cost of processing of vanilla per kilogram of green bean was Rs. 6.77. The processed bean fetched more price. But the processing method could not meet the quality standards.

6.4 Marketing of vanilla

In the study area, two marketing channels were found, they were.

Channel I : Producer → local agent (company) → export
Channel II: Producer → vanilla development trust → export

The total marketing cost per kg was Rs. 0.29 in channel I and Rs. 0.33 in channel II. The main items of marketing cost were transportation, packing material and packages in both the channels. The transportation cost in Channel I was lower than that of Channel II. This was due to, the products in Channel I sold their produce to near-by local agents. The price spread in the study area could not be computed as product was sold to local agent/vanilla development trust who did not reveal the expert price they received.

6.5 Problems faced by vanilla growers

The main problems in production of vanilla were incidence of pest and diseases as well as non-availability of skilled labour. Problems in processing were low price to poorly processed bean and non-availability of skilled labour for processing. Lack of assured market facility and drastic price fluctuations are the major constraints observed. The credit facility was not available for this crop and also no standardized package of practice and did not follow proper scale of finance for vanilla cultivation.

POLICY IMPLICATIONS

1. Cultivation of vanilla as intercrop in arecanut plantation was found financially viable. Hence, appropriate combination of vanilla and perennial crop has to be encouraged which would reduce the establishment cost and provide sufficient additional income.

2. The study also indicated that vanilla could be grown as intercrop and as pure crop profitably. Hence, there is a scope for extending necessary credit facilities for the cultivation of the crop.

3. Since quality is the major deciding factor in international market, Government has to encourage for establishment of post harvest processing centres to maintain quality of processed vanilla to meet specific international standards.

4. As there is no standardized package of practices prevailing for cultivation of vanilla, either the University or the State Department of Horticulture has to develop the package of practices.

5. As there is no proper scale of finance for the vanilla crop by commercial banks. Prevailing cost may be considered as the scale of finance for sanctioning loans.


Vanilla is an important orchid commercial spice crop. It is commercially cultivated as an intercrop under arecanut garden and also as pure crop under artificial shade. The study was undertaken in Uttara Kannada district because it is having highest area under vanilla cultivation in Northern Karnataka. In Uttara Kannada, Sirsi and Yallapur taluks were selected, respectively primary data was collected from the farmers growing vanilla. The secondary data was collected from spice board and other agencies. The present study covered 80 farmers who were grouped into farmers growing vanilla as a intercrop, pure crop. In vanilla grown as intercrop, the net present value of the cash inflow per ha was Rs. 1856659.40 on small farm and Rs. 2448524.8 on large farm. B:C ratio was 10.71 on small farm and 13.71 on large farm. The internal rate of return was 58 per cent on small and 65 per cent on large farm. The break even point for small farm was 145.52 and 127.98 kg for the large farm. In vanilla grown as pure crop, the net present value per ha was Rs. 4942593.61 on small farm and Rs. 5373993.35 on large farm. The major problem faced by the farmers in the production of vanilla was incidence of pest and diseases. The main diseases which infected the vines are fungal and viral diseases and the beetle pest damaged the leaves and flowers. Non - availability of skilled labours for pollination is another important problems faced by farmers. Some of the farmers expressed that the investment is very high when it is taken as a pure crop. The processing of vanilla bean is not standardized at the farmer level low price to poor processed bean. The marketing structure for vanilla is poorly developed. Finally vanilla cultivation is profitable.