MANAGEMENT OF AGRIBUSINESS UNITS- A CASE OF GRAPE AND RAISIN PRODUCTION IN DRY AND HUMID REGION OF ATHANI TALUK, BELGAUM DISTRICT

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By

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CERTIFICATE

This is to certify that the thesis entitled **"MANAGEMENT OF AGRIBUSINESS UNITS- A CASE OF GRAPE AND RAISIN PRODUCTION IN DRY AND HUMID REGION OF ATHANI TALUK, BELGAUM DISTRICT"** *submitted by* **JAGDALE SANGRAM PRATAP** *for the degree of* **MASTER OF BUSINESS ADMINISTRATION (AGRI BUSINESS)** *to the University of Agricultural Sciences, Dharwad, is a record of research work done by him during the period of his study in this University, under my guidance and supervision and the thesis has not previously formed the basis for the award of any degree, diploma, associateship, fellowship or other similar titles.*

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DECEMBER, 2003

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Introduction

I. INTRODUCTION

The horticulture has gained importance in the recent years and has been sub-sector of agriculture having a very significant share in the economy of the country. The draft agriculture policy resolution of Government of India 1994 has amply emphasized the need for promotion of horticulture production, processing with special stress on export. Horticulture crop put together cover approximately of 137 million metric tones of fruits and vegetables production making an overall contribution of more than 18 percent of gross agricultural output of the country. These crops being highly remunerative and labour intensive, after greater potential for inclusion in the new farming systems.

Fruits and vegetables hold major portion in the total horticultural produce of India. India is the second largest producer of fruits after Brazil and poised to become the largest producer of fruits in the world in the coming years. India produces fruits like mango, banana, grape, pineapple, orange, sapota, guava, apple, pear, peach, plum etc. with a production of 46 million tones of fruits which accounts for 10 percent of the total world production.

Processing sector of India

Our country produces a very huge quantity of fruits. Despite such high level of fruits production 30 percent of the produce gets spoiled due to inadequate and/or improper post harvest technology, poor handling, lack of linkage between processors and marketers of fruits and vegetables which results in national loss of more than Rs. 6,000 crores per annum. Only 0.5 to 1.0 percent of total fruits and vegetables are processed in India as against 70 percent in Brazil, 65 percent in USA and 83 percent in Malaysia. The overall production of processed food products in India has been increasing since mid 1980's. The government is encouraging fruits and vegetables processing industry in the private sector but the capacity utilization is still poor. At the end of 1991 the total installed capacity for processing fruits and vegetables in country was 9.5 lakh tones per annum and it was increased to 21 Lakh tones by the end of year 1999-2000. The total number of licensed units under Fruits Product Order (FPO) at the year ending 2001 was 4000.

Grapes

Grape with scientific name *Vitis Vinifera* (L.) belongs to "Vitaces" family. Its cultivation is widely spread in the tropics and subtropics and even in temperate regions.

Evidences of grapes cultivation was found in Egypt during 4,000 to 3,000 BC and its origin to supposed to be in Egypt. Grape cultivation in India was found by some invaders from Afghanistan and Persia in 1300 A.D. Presently there exist more than thousand varieties of grapes in the world. Grape is also called as Oval Kishmish in Eastern Mediterranean regions and sultana in Australia and South Africa.

Nutritionally grape is one of the most delicious refreshing and nourishing fruit. Throughout the world it enjoys the status of 'table fruit'. Ripe grapes are easily digestible. They are rich in energy giving sugars and some useful minerals like phosphorous, iron and vitamins like vitamin B_1. vitamin B_2. Grapes are processed into products like raisins, wines, juice and jellies. Grape juice is a refreshing and medicinal drink, a stimulant to kidneys and a laxative, whereas raisins are eaten as raw and also used in food and bakery items.

Grape cultivation as a commercial proposition

The cultivation of grape compared to other perennial horticultural fruit crops is much more complicated and risky. The heavy initial investment on the supporting structure coupled with high annual maintenance cost make its cultivation the exclusive domain of affluent few. However its high economic value interms of quick and heavy returns attracts many enthusiastic growers towards this

enterprise. Given assured financial support together with good managerial capacity viticulture can be one of the most profitable and highly sought after enterprise.

The total area and production of grapes in India was 0.04 million hectare and 1.20 million tones. In India again Karnataka state rank second both in area and production next to Maharashtra. The total area and production of grapes in Karnataka are 6,051 ha. and 1,48,921 tonnes respectively. In Karnataka, Belgaum district is the third position in area and in fifth position in production of grapes. The total area and production of grapes in Belgaum is 1011 ha and 18,269 tonnes.

Most of the grape varieties grown in Karnataka are mainly used for table purpose except 'Bangalore Blue' which is being used for preparing wine, Thompson seedless a multipurpose variety is gaining popularity in Karnataka because of its high quality and its suitability for raisin making.

Among 7 grape growing taluks of Belgaum district, Athani taluk is leading in both area and production of grapes. The area and production of grapes in Athani taluk is 805 ha and 14,547 tonnes respectively which forms 80 percent of area and production of grapes in Belgaum district.

The grape vine usually propagated by hardwood cuttings and transplanted in October after rooting in nursery. It requires a deep, loamy soil with good structure and soil should be well drained and aerated PH of 6.0 is preferred and soil must be practically salt free. It is a heavy feeder and gives good response to manure and fertilizers and timely interculture operations. It is a highly labour intensive crop. However, irrigation is the main limiting factor for deciding the area under grape. The crop comes to harvest in 15 – 18 months after planting.

Processing of grapes

At international level grapes are mainly processed into wine, raisin, juice and jelly. Raisin is the second important product of grape after wine.

The word raisin comes from French word 'raisinsae' meaning dry grape. In India raisins are known as Kishmish and they are used in the preparation of sweets, puddings, bakery products, drakshasawas, etc. The varieties suited for raisin production are Thompson seedless, Sultania, Oval Kishmish, Black Corinth, Zante Current, Muscat of Alexandria, Sultana seedless, Redeorinth, Cape Current and Black Mannnuca.

Thompson seedless is multipurpose variety which is the best suited variety for raisin making. It contributes about 80 per cent of

raisin production in India. Raisins prepared by this variety has soft texture, seedlessness with sugar content, pleasing flavour and little tendency to become sticky in storage.

The grape variety for raisin production must have thin skin, thick pulp, brix value ranging between 20-24per cent and it should be preferably seedless, small sized and good attractive coloured.

Raisin production as a commercial proposition

Wherever grape cultivation exists in any part of the world, production of raisin should also be there, if the cultivation has to be economically viable. However, climate conditions do play an important role in dehydration process. About 80 per cent of grape produced in the globe is used in wine making, ten percent in raisin making and the remaining ten per cent is used for table purpose. In India 90 percent of grape production is used as table grapes and 7 per cent is used for raisin making and remaining 3 per cent for juice and wine making.

Though the grape cultivation in India is taken up on large scale during the last five to six decades, raisin production on large scale is of recent origin. Hitherto, the country had to depend for its raising requirements wholly on imports. India used to import raisins to the tune of 20,000 tones to 28,000 tonnes annually. The import of raisins

declined over the years and by the beginning of this century India will be self-sufficient in raisin production and consumption.

Raisin-making industry is highly labour intensive. It helps to generate large employment in grape growing areas in the country particularly for women during cleaning and grading of raisins.

Importance of the study

The Athani taluk of Belgaum district has an area of 805 hectares under grape cultivation and leading in raisin making in the district. The climate of the Athani taluk is divided into dry region and humid region. The Krishna river passes through humid region. The climate in humid region is not suitable for raisin making because raisin making requires dry climate. The farmers in humid region prefer to go to Sangola taluk of Solapur district of Maharashtra for raisin making which has dry climate. Whereas, the farmers in dry region prefer to raisin production locally.

The grape cultivation and raisin making forms an important economic activity of Athani taluk. Realising the role played by the grape cultivation, no studies have been made to analyse the overall economics, their costs, returns, profit margins, problems etc. Hence, this study attempts to make a detailed investigation and bring to limelight the prospect, potential and problems in grape and raisin production in Athani taluk. This may provide adequate information

for policy making in the wake of accelerating agricultural development in study area.

Objectives

The specific objectives of the study are;

(1) To study the cost and returns in grape production in two regions of Athani taluk.

(2) To compare the economics of raisin making in and outside the production area.

(3) To study the marketing management of table grapes and raisins.

(4) To identify the problems and suggest appropriate policy measures.

The study deals with the following chapters *viz.*, Review of literature, methodology used to analyse the data, results presentation, discussion, summary and policy implications and references.

Limitations of the study

Due to the limitations of time and resources of the researcher, the study was conducted in Athani taluk of Belgaum district, Karnataka state. The findings of the study are limited to the situation prevailing in that area and it could hardly be generalized to the entire state.

It was also difficult to demarcate sub parts of the Athani taluk as humid region and as dry region as it depends upon mansoon situation in the study area. Humid region generally falls under Krishna river basin.

Review of literature

II. REVIEW OF LITERATURE

The present chapter carries a brief review of some of the important economic studies of grape cultivation carried out in India and abroad. A few studies conducted on other crops, involving certain methodological aspects which are similar to the grapes, have also been included.

This chapter is presented under the following broad heads.

2.1 Cost of production

2.2 Processing

2.3 Marketing

2.4 Problems in production and marketing

2.1 Cost of production

Bose (1961) found the cost of establishing an acre of Anab-e-shahi on the mandhawa to be Rs. 17,973.00. He had divided cost components as preparation of land which accounted for Rs. 520-00 digging and filling of pits and cost of manures which accounted for Rs. 2,325.00. Plants and planting which accounted for Rs. 145.00. Cost of mandhawa accounted for Rs. 6,893.00 Cultivation expenses in the fist year was Rs. 3,220.00 and cultivation expenses in the second year accounted for Rs. 4,870.00.

Gopalkrishnan (1962) worked out the material and construction cost of trellising an ace of vineyard to overhead system. According to him, a total of Rs. 3,399.00 was required for trellising an ace of vineyard to overhead system using concrete tillars. The overhead system resulted in 20-30% more yield than their system.

Badenhop and Sharma (1964) classified the costs into two divisions. Those required to establish a vineyard and those required to maintain and operate a producing vineyard. They have considered all the costs incurred during the first two years of life of the vineyard i.e., upto the time it came into bearing, as establishing costs and found that 87 per cent of total costs incurred in establishing a vineyard was included during the first year. In their analysis, the costs required during the first year of the life of vineyard and pro-rated over the vineyards life. The costs are further analyzed on the basis of season which the crop was produced, size of the vineyard, number of vines per ace and age of vineyard.

Venkatram (1964) obtained information from 80 grape growers in Bangalore south taluk and found the gross income to be Rs. 2,450.40 per acre per annum. He also found that capital investments were high accounting for 50per cent of the total costs, others being labour 20 per cent, irrigation 185 per cent and plant protection 1.5 per cent. The study also indicated that an average of 202 mandays of labour was required per annum to maintain and operate a farm of 1.28 acres.

Joseph Raj (1966) revealed that the cost of production of one kilogram of grapes varied from 50 paise in Udumalpet taluk to Rs. 1.20 in Coimbatore taluk, with the overall district average of 68 paise.

Patil *et al.* (1969) used the cost A.B.C. and D concept in studying the cost of production of grapes in Maharashtra. In their study: Cost A included actual expenditure incurred in cash and kind plus apportioned nonrecurring expenditure. Cost B included Cost A plus rental value on owned land plus interest on fixed and working capital. Cost C included Cost B plus family labour charges. Cost D included Cost C plus managerial labour.

Poptean (1971) Analysed the cost of viticulture production in the co-operatives of the odobesti vineyards. The results showed the viticulture costs depend both on the volume of production and the expenses. The production expenses increased faster than output. In the cost structure the direct expenses represented 83.6 per cent of the total production cost, and 52.8 per cent of this was about labour cost because viticulture is heavily dependent on manual labour.

Menon (1979) worked out the economics of grape production in Bangalore North taluk by dividing total costs into two categories Viz., cost of establishment and costs required for established vineyard. The establishment cost mainly consisted of the labour costs on preparatory cultivation, planting, irrigation, plant protection, watch and ward, etc., and material costs such as fencing material, planting

material, FYM, fertilizers, PPC, electricity charges etc. The total per hectare establishment cost came to Rs. 30,941.38 in case of Banglareo blue and Rs. 36,471.38 incase of Anab-e-shahi. The total establishment cost was amortized over economic bearing life of the vineyard which was 25 years incase of Anab-e-shahi and 30 years in Bangalore blue.

Jung (1981) collected data on prime costs and returns of grape production in Czechoslovakia for 1972 to 1979 and analysed their structure and trends. The results included 33.6 per cent of direct costs were for labour, 66.3 per cent were material costs including overheads, depreciation and financial costs, and the rate of profit was 57.9 per cent.

Sindhu and Chitkara (1981) studied the yield and income in grapes as affected by adoption of package of practices in Hissar, Haryana state. The data on impact of adoption of package of practices on total expenditure, gross and net income was presented. It was found that in good adoption, expenditure was more than two and three times than in vine yards with medium and poor adoption of package of practices respectively. Mean gross income from the three categories of vineyards also varied appreciably. Gross income was Rs. 2825.50 in poor adoption group of vineyards, followed by Rs. 5200 in medium adoption group and highest income of Rs. 11010 per acre in good adoption group. Evaluation of data for net income showed that it was

highest i.e. Rs. 7248.50in good adoption, followed by Rs. 3452.00 in medium adoption and Rs. 1659.43 in poor adoption.

Gangawar and Godara (1982) classified the cost of grape overhead (in Haryana) into two parts namely, establishment cost and recurring and maintenance costs. The former consisted of all the expenditure on goods and services (excluding the value of land) required for the establishment of grape orchard. These included the preparation of land and layout, digging and filling of pits, cost of planting material, support structures, fencing and working capital (perishable dead stock). Recurring and maintenance expenses included upkeep of the establishment and working capital, manures, fertilizers, interculture, irrigation PPC, labour, interest on establishment cost and working capital and opportunity cost of land (rental value of land).

It was reported that the establishment costs were more than 70per cent of total costs while the maintenance and recurring costs amounted for 30 per cent. The total costs until the grape orchard started fruiting in the third year were Rs. 28,400 (including establishment cost, maintenance cost and recurring costs upto third year). Thus a huge amount had to be invested in grape orchard before it started fruiting. Income from grape orchard varied from Rs. 2,860 to 22,000 per hectare.

Mckibbon (1982) made a study on the cost of establishing a vineyard in Ontario using the "Concensus" method of developing the cost of planting and bringing a new vineyard into production. Physical and financial data associated with the various cultural operations performed were documented. A method of applying this establishment cost to an existing vineyard, so that the total annual costs of producing grapes could be determined was also shown

Sundareshan and Thanasekaran (1984) analyzed the costs and returns for cultivation of Muscat grapes in Madurai district, Tamil Nadu using 1981-82 data collected from 50 respondents. An average of Rs. 49,467 per hectare was required for establishing vines to bearing age. Operational and maintenance costs comprised Rs. 26,668 per hectare of this total, production costs for grapes were Rs. 1.58 per kg for the first four years. Rs. 1.80 per kg during the fifth to eight year and Rs. 2.29 per kg after the eight year.

Srinivasan (1987) studied the economics of grape cultivation in Dindigul taluk of Anna district in Tamil Nadu, based on data collected from a random sample of 42 growers relating to the year 1983-84. The average total establishment cost worked out to Rs. 16,460 per acre. The material cost on pandal errection and the labour costs on various operations were the major heads of expenditure under this item. The average operation and maintenance costs accounted for Rs. 8,208 per acre which included expenditure on labour, costs of fertilizers and

plant protection measures. The total cost of production was calculated at Rs. 12,693.

Sudha and Sharma (1987) evaluated the economic viability of Anab-e-shahi grape in Rangareddy district of Andhra Pradesh. The data for the agricultural year 1982 - 83, were collected from the selected 60 farmers. The results showed that 64 per cent to the total investment in the first year was accounted for fixed assets like construction of well, pandal, water lifting device, fencing etc. Manures and fertilizers, and irrigation accounted for a major share in the operating costs. About 14 per cent of the total cost of investment was accounted by land preparation and planting. The average cost of production per quintal worked out to be Rs. 1,900, Rs. 1,544, and Rs. 1,782 on small, medium and large farms respectively. The rate of return was the highest on medium farms (Rs. 1.80) followed by large farms (Rs. 1.62) and small farms (Rs. 1.60). The study also revealed an average return of Rs. 1.70 on every rupee invested in grape cultivation.

Kulkarni (1989) worked out costs and returns in grape cultivation in Bijapur district, Karnataka. He compared the per acre cost and return under spacing - I (1800 vines) and spacing II (1200 vines). The per acre cost of cultivation worked out to Rs. 43,415.69 and Rs. 38,918.59 in spacing - I and spacing - II vineyards respectively. The cost returns per acre over total costs were found to

be Rs. 41,862.22 in spacing –I and Rs.41,781.55 in spacing-II. Further the returns per rupee of investment were more in spacing-II (2.07) compared to (1.96) in spacing I. The major cost items were human labour, manures, fertilizers, PPC and interest on working capital.

Sharnesh (1994) studied the economics of production of processing of grapes in Bijapur district, Karnataka where the per hectare cost of establishment of grapes for the gestation period were worked out Rs. 1,79,475.14 in spacing - I (6' x 4'), Rs. 1,50,634.49 in spacing - II (6' x 6') under pandal system and Rs. 1,08,660 in spacing - I (9' x 5') and Rs. 1,02,112.52 in spacing - II (9' x 6'), under telephone trellis system. The total cost of production of grape were worked out highest spacing - I (Rs. 1,57519.80) followed by spacing - II (Rs. 1,35,508.07) in pandal system, for spacing I (Rs. 1,11,529.14) and for spacing - II (Rs. 99,591.85) in telephone trellis system. He also worked out per hectare cost of production of raisin, where for dipping oil method the cost of production of raisin was higher ((Rs. 42,102.37) followed by sulphur fumigation method (Rs. 39,594.19) and for hot dipping method (Rs. 24,616.06).He also worked out the net returns from raisin which was higher in dipping oil method (Rs. 3,33,336.26) followed by hot dipping method (Rs. 2,43.415.98) and sulphur fumigation method (Rs. 2,37,480.74).

Shah (2000) in his study on production and marketing pattern of grapes in Maharashtra worked out the gross cultivation cost was Rs. 40,361 for marginal category, Rs. 40,608 for small category Rs. 45,052 for medium category and Rs. 42,597 for large category with overall average of Rs. 42,795 for the average category of orchardists. He also worked out the net return over gross cultivation cost was Rs. 38.742 for marginal category, Rs. 52,148 for small category, Rs. 51389 for medium category and Rs. 53,371 for the large category with an overall average of Rs. 52,242 for the average category of orchardists. He noted that per kg of gross cultivation cost was the highest for marginal category (Rs. 5.58/kg) followed by medium (Rs. 5.12/kg), large (Rs. 4.83/kg) and small category (Rs. 4.78/kg). He also worked out the marketing cost per box was Rs. 12.05 for marginal category, Rs. 10.76 for small category Rs. 12.79 for medium category and Rs. 12.58 for the large category with an overall average of Rs. 12.35 for the average category of orchardists.

Singh *et al.* (2001) in their study on pattern of production and marketing of fruit crops in Punjab estimated the total annual cost of cultivation of grape, guava and peer was Rs. 26,547.09 per hectare, Rs. 22,381.22 per hectare and Rs. 24,176.47 per hectare ;respectively. They also studied the channels of marketing for grapes, guava and peer was Producer – Commission Agents – Retailer – Consumer Producer – Forwarding Agent – Secondary Wholesaler/Commission Agent – Retailer – Consumer.

Studies on other crops

Khan (1972) studied the production and marketing of coconuts in Tiptur taluk of Tumkur district, Karnataka. The study revealed that for establishing one acre of coconut upto bearing stage required on an average Rs.1,533.43 in small farms and Rs.1,491.54 in large farms. The average per acre total cost of production of coconut in the bearing stage was Rs.623.22 in small and Rs.656.50 in large farms.

Sharma and Pandey (1972) in their study in Uttar Pradesh tried to estimate the cost of establishing of guava upto the age of five years. They reported that cost of production would be Rs.3964.00 mainly spent on planting, manuring, irrigations and other interculture operations which accounted for Rs.589.49 per hectare per year. The study indicated that out of total cost, the expenditure on watch and ward accounted for 46.3 per cent followed by irrigation charges (17.08 per cent) fertilizers and manures (14.62 per cent) interculture operations (12.32 percent) and cost of fencing (9.68 per cent).

Vijayrajan *et al.*(1974) evaluated the cost of cultivation of arecanut in the Regional and Substations of Central Plantation Crops Research Institute (CPCRI) in Karnataka state. The results showed that the cost of cultivation was Rs.5,033 per hectare, while the yield of chali (Husked Kurnel) was 2,308.90 kg per hectare.

Patil (1975) worked out the economics of pomegranate cultivation in Ahmednagar district of Maharashtra. He classified the costs as establishment cost and maintenance cost. The per hectare total establishment cost that worked out up to the bearing age was Rs.11,373.75 incase of small farms, Rs.12,135.03 in medium and Rs.12,530.60 in large farms. The economic life span of pomegranate orchard was taken as 25 years and thus the total per hectare establishment cost per year came to Rs.145.38, Rs.324.60 and Rs.317.16 for the three size groups respectively. The overall per hectare establishment cost for all size groups of orchards for one year was Rs.258.50.

Sivanandan *et al.*(1980), in their study on economics of cashew plantations in Puddukkotai district of Tmil Nadu classified the costs into establishment cost (fixed cost) and maintenance cost. The costs incurred up to commercial bearing (4 years) was considered as establishment cost (fixed costs). The expenses incurred in annual maintenance after bearing were grouped under maintenance cost. Establishment costs per ha upto commercial bearing was found to be Rs. 774.26. The average annual maintenance cost including overhead cost per hectare worked out to be Rs.12.15. The unit cost of production per kilogram of cashew amounted to Rs.2.23, and finally the farmer had realized a net income of Rs.124.30 per hectare.

Gangawar (1982) estimated the cost of cultivation of ber (in Haryana) which composed of capital costs and recurring expenditure. The study revealed that the crop generated an average net income of Rs.1,515.22 per hectare per year in the fifth year and onwards. On an average 4614 Kg of berries per hectare (about 42 Kg/plant) were obtained which was quite low compared to the yields of improved varieties which vary from 73 to 112 Kg per plant. It indicated the potential to increase ber production which was actually being obtained by growers through proper manuring, irrigation and pruning of the orchards.

Das (1986) estimated the cost of production, net profit, and benefit cost ratio in plantation crops namely, cashew, coconut, pepper and cardomom. The study revealed that the cost of production per kilogram of cashew amounted to Rs.5.20, net returns per hectare worked out to be Rs. 7200. It was revealed that the production of cashew under good management was quite profitable.

Kalla *et al.*(1986) in their study on economic appraisal of ber cultivation in arid Rajastan found that the maximum cost flows were for maintenance and watch and ward (35.44 per cent) followed by harvesting. The distribution of costs indicated more costs towards labour employed (80.76 per cent) whereas, the planting material accounted for relatively small proportion (19.24 per cent) of the total expenditure over the planting horizon. Maximum (92.25 per cent)

returns were realized from ber fruits, fuel production accounted for only 7.05 per cent of total revenue flows.

Subramanyam (1986) studied the cost of cultivation of lime and sweet orange in Andhra Pradesh. He included the establishment cost (planting as well as maintenance cost upto bearing) and maintenance (after bearing). The total cost of establishment for lime and sweet orange was found to be Rs.4,664.08 and Rs.5,454.61 per hectare, respectively. The cost of maintenance upto bearing stage in sweet orange was Rs.260.00 per hectare compared to Rs.76.00 per hectare in the case of lime. Although these figures showed a low maintenance cost for both the crops, this was due to the non adoption of the recommended practices of important inputs like manures and fertilizers. The average net returns were found to be Rs.6,617.25 and Rs.5,102.32 per hectare in the case of lime and sweet orange respectively.

Jaiswal *et al.*(1987) studied the economics of production and marketing of guava in Allahabad district, Uttar Pradesh, on the basis of sample survey of 50 farmers for the agricultural year 1986-87. The study revealed that the expenditure incurred on guava orchard in the first year came to Rs.2,955 per hectare, since guava orchard bears fruit only from the fourth year, no income was earned during the first three years. In the second and third year, the total expenditure incurred on guava orchard come to Rs.3,243 per hectare. The average

cost per annum from the fourth to the tenth year worked out to Rs.2,500. The average net income per hectare per annum from the fourth to the tenth year worked out to Rs.6,080.

Nighot *et al.* (1987) studied the per hectare input use, costs and returns and profitability of sweet orange cultivation in Nagpur district of Maharashtra, based on the data of 40 orange orchards selected from five villages of the district. The total cost which consisted of establishment and annual maintenance cost of oranges accounted to Rs.11,660 per hectare. Human labour, manures, fertilizers and pesticides are the important items of expenditure in orange cultivation. The total cost per orange tree worked out to Rs.34. The yield of orange per hectare and per tree was observed to be 114.5 thousand fruits and 344 fruits respectively. While gross returns per hectare and per tree were Rs.28.599 and Rs.86 respectively. Based on the total returns and total costs, the output input ratio for orange production worked out to 2.56. Thus, under existing cost price situation, cultivation of oranges gives 15.6 per cent returns over variable costs. It could therefore be concluded that orange cultivation is a highly profitable proposition.

Koujalagi (1990) studied the pattern of investment in pomegranate orchards in Bijapur district, Karnataka. The establishment cost consisted of material cost in the initial year and maintenance cost upto bearing (three years). The material cost

included the value of land, plant material, cost on digging of pits and planting, well, pumpset, pumphouse, spray. The per hectare establishment cost was Rs. 2,42,229.53 and per orchard was Rs.4,54,299.96.

Raut, R.C. *et al.* (1995) in their study on economic feasibility of strawberry cultivation in Nasic district of Maharashtra observed that the per hectare total cost of strawberry was Rs. 4,26,868.72. Cost A shared 59.74 per cent of the total cost. Cost of runner (39.92 per cent) and rental value of owned land (36 per cent) were the important items of total cost. Per hectare gross income obtained from strawberry was to the tune of Rs. 10.22,790.24.

Prasher, R.S., *et al.* (1996) in their study on economics of apple cultivation; A case study of tribal self of North Western Himalyan region observed that the total cost of establishment of one hectare an apple orchard was Rs. 6,057. Of this orchardists have to incur about 31 per cent on layout, preparatory tillage and fencing, while cost incurred on digging of pits, purchase of seedlings and manures and fertilizers accounts for 14 per cent, 8 per cent, 19 per cent respectively. The maintenance cost varies between Rs. 6,157 to Rs. 16,878 per hectare, for various age-groups. On an average the net returns worked out was Rs. 2,034 to 39,755 per hectare for different age groups. The net returns were estimated to be high in the age

group of 17.22 years whereas were lowest for plants of 19-22 years of age.

Kakadia, B.H. *et al.* (1999) in their study on cost and returns of guava production in South Saurashtra zone of Gujarat observed that the on an average, the total establishment cost per hectare of guava was Rs. 22,862.98. The average materials cost contributed the maximum in total establishment cost of guava crop followed by rental value of land and labour cost. The average annual amortization cost was Rs. 3,938.42 per hectare in guava orchard, while the per hectare average maintenance cost was Rs. 15,265.83.

Mohapatra, S.C. (1999) in his study on production and marketing of onion in Bolangir district of Orissa observed that the average cost of cultivation of onion per hectare was Rs. 17,949.00 The cost of production of onion was worked out to Rs. 97 per quintal. Among various components of operational costs, human labour accounted for more than 33 per cent of the total cost followed by expenditure on manures and fertilizers (16.66%), seeds (11.10%), plant protection chemicals (9.69%) and bullock labour (6.94%). Total fixed cost constituted 17.16 per cent of the total cost of cultivation of onion crop.

2.2 Processing

Studies on raisins

Singh and Dhawan (1973) in their study on use of solar heat for raisin making found that the yield and quality of raisins related to the maturity of grape from which they are made. The grape with higher sugar content and more matured grapes with lower drying ratio produce better quality raisins.

Anonymous (1984) A simple and cheap method of making attractive golden coloured raisins has been standardized at I.I. H.R., Bangalore. The method consists of harvesting the fully ripened branches, exposing the branches for four hours to fumes of sulphur burnt at 10g/Kg drying under shade with adequate ventilation. Grape growers of Karnataka and Maharashtra have taken the advantage of this study.

Kulkarni (1984) stated that Thompson seedless grape contains maximum amount of pulp with minimum amount of rejects. The size of berries was optimum which contained total soluble solids of 20-30 per cent and good sugar acid balance. It is the most popular variety utilized world over for raisin making.

Karnic (1985) observed that lyetreated samples retained more sulphur dioxide than non lye treated samples. The concentration of

sulphur fumigation increased the retention of sulphur dioxide in raisins and also the keeping quality.

Krishnamurthy (1985) studied the preparation of Anab-e-shahi grapes for raisin making. But the main problem is the low sugar content of the berries have only 14-15° brix, such mature grapes when dried gave a poor quality raisins.

Ambadan *et al.*(1987) obtained golden yellow coloured raisins with superior texture in both Thompson seedless and Arkavati grapes, by treating bunches with sulphur fumigation followed by shade drying.

Thimma Reddy *et al.*(1988) in their study on effect of methods of drying on quality of raisins, found that two important factors affect the yield of raisins. Viz., total soluble solids content of fresh grapes and moisture content of dried grapes (raisins) with an average moisture level of 15 to 18 per cent. The yield of raisins obtained from sundrying was less compared to shade drying.

Thimma Reddy and Selvaraj (1988) concluded that the number of days required for drying were only 19 in case of grapes treated with a mixture of dipoil and K_2Co_3 solution. While 26 days in case of boiling NaOH or K_2Co_3, untreated grapes required 32 days to attain consistant weight.

Guddin (1998) in his study on management of agribusiness units: A case of grape production and raisin making in Bijapur

district, Karnataka. Analysed that the cost of establishment of raisin making unit in old model was Rs. 1,01,625 and the new model it was Rs. 4,03,425. But he was studied that establishment of new model raisin making unit was more economical.

He also studied the net returns per rupee of investment in sulphur fumigation method was 1.76 and 2.06 in dipping oil method. He also studied the net return per rupee of investment for grape growers going for raisin making was 0.28 and for non-grape growers going for raising making was 0.45. He also studied the marketing of raisins in Bijapur and Tasgaon market, from that he observed the total return per tonne of raisin in Tasgaon market was Rs. 776 and in Bijapur market was Rs. 389.

Anonymous (2000) In his study on value added business opportunities worked out then economics of processing of grapes and find out that cost of and return from raisin making for 70 tonnes of grapes the worked out the cost of erection of digging structure was Rs.8500, cost of inputs (chemicals, packing material, labour etc) is was 12,000 He found out the total return from 10 tonnes of raisin processing was Rs.1,86,500. He also found out the income from sale of 10 tonnes of fresh grapes which was Rs. 87,500 and worked out additional income due to processing was Rs.81250.

Processing studies on other crops

Raman Dev (1998) in this study on management appraisal of Cashew processing industries in Uttar Kannada found that the total capital investment directly varied with the size of the unit. Further he concluded that the total capital investment was Rs. 117.5 lakhs for large-scale units and Rs. 36.32 lakhs for small-scale units. Wherein the working capital accounted for about 75 per cent of the total capital investment with the majority of the fixed capital invested about 80 percent was in buildings and machinery.

Subrahmanyam and Sudha (1992) worked out the costs and returns associated with processing one tonne of finished product of tomato (Ketchup), it was observed that the benefit cost ratio was around 2.00 showing that processing was profitable. Raw material and packing were the two major items accounting for 67 per cent of the total variable cost of processing, which was Rs. 93.76 per tonne of raw material (fresh tomatoes) was needed for producing 32.42 tonnes of finished product was estimated at 130.00 tonnes of raw materials.

Ravishankar (1993) while studying the economics of production and processing of Dahavan in the Eastern dry zone of Karnataka observed that from among the various items included under variable costs, the cost of the raw material stood at Rs. 7.2 lakhs accounting for 92 per cent of total variable costs. The wages accounted for 4.60

per cent, fooled by the cost of fuel wood which accounted for 1.84 per cent.

Maurya *et al.* (1995) In their study an economics of production and processing of Aonla in district Varanasi, U.P. (A case study) worked out the total cost of input factors which was divided into two costs gestation period cost and fruiting period costs. Among gestation period cost the percentage cost was highest for 1st year 2.11 per cent, because it included cost of fencing, preparation of land planting charges etc., followed by 16.00 per cent, 14.21 per cent 8.25 per cent, 9.57 per cent and 9.86 per cent during II III, IV, V and VI year respectively. He worked out the total cost of production of anola, per hectare came to Rs. 21535.80. He also observed that the gestation period costs accounted for the highest expenditure being 3960 per cent to the total cost followed by labour 37.30 per cent, rental value of land 7.43 per cent, manure and fertilizers 7.05 per cent, over head charges 4.17per cent, plant protection 2.60 per cent and irrigation 1.85 per cent. He also worked out the total establishment cost of the processing unit of one quintal which was Rs. 8.00. It was highest for depreciation being Rs. 3.40 followed by interest on fixed capital Rs. 2.50, insurance Rs. 1.00. Maintenance cost Rs. 0.60 and electric and water charges Rs. 0.50. He also worked out the per quintal processing cost of aonla morabba, pickle and chutany came to Rs. 1298.80, Rs. 1750.40 and Rs. 3233.80 respectively.

Srinivas *et al.* (1996) in their study on the economics of processing of cashewnuts in Andhra Pradesh, indicated that the processors have to bear the processing cost of Rs. 124.22 per 80 kg of raw nuts, out of the total cost, Rs. 50.77 was raw material cost which formed 40.89 per cent and labour cost was Rs. 72.81 which accounted for Rs. 58.61 per cent of total processing cost.

Joshi *et al.* (1999) revealed in economics of processing of mango pulp in home, cottage, small, and large units in south region of Maharashtra state. Total cost processing for a single tin (850 grams) worked out to be in home, cottage, small and large scale units, were Rs. 47.73, Rs. 41.95, Rs. 42.58, and Rs. 33.70, with in the different categories the cost of processing was maximum in home scale and minimum in large scale. The net profit per tin reminded at Rs. 4.78 in home scale, Rs. 6.89 in cottage, Rs. 5.59 in small and Rs. 13.32 in lar4ge scale with overall net profit of Rs. 12.28 cost and return indicated that processing mango pulp in profitable as indicated by input ratio which is greater than unity.

Deshamukh *et al.* (2001) this study stated that the annual net returns of Mushrooms production were estimated by considering four crops/year. Thus, annual net returns obtained were Rs. 1314. 72, Rs. 4998.84 and Rs. 39014.50 respectively. The benefit cost ratio of Mushroom production for small, medium and large sized units was 1.35, 1.86 and 3.09 respectively showing all groups of farms were

economically viable enterprises. However in size of production unit the productivity of small, medium and large sized farms were 33.17 kg, 67.97 kg and 79.67 kg. per crop respectively. Thus, study suggests that, net returns and size of mushroom production farms had positive relationship i.e., as the form increased, profitability increased and vice versa.

Jayalakshmy and Abdul Salem (2002) conducted the study on cost of establishment and cost of production of cashew apple syrup in Kerala state. An on average 750 bottles of syrup can be obtained from one tonne of cashew apple. The extracted juice can be preserved for syrup production during the off season as well. The cost involved (the labour and inputs) for processing of one tonne of Cashew Apple is Rs. 1940. A minimum of 750 bottles of cashew apple syrup can be obtained from one tonne of cashew apple. This works out to a cost of Rs. 25.80 per bottle, of the total cost, 85 per cent forms the input cost (chemicals, bottles, sugar, *etc.*) and 15 per cent forms the labour cost. The price of apple and interest towards non-recurring cost was not included. At a scale price of Rs. 40 per bottle, the net profit per bottle was Rs. 14.20.

GENERAL APPRAISAL

Economic studies on grape carried out in India reviewed above, are very few and no study has been undertaken with respect to different cultivation methods, and different training systems followed.

Also there are no recent studies on economic aspects of raisin production, a important processed product of the grape in India.

From the review of the research studies attempted, it could be observed that, the studies conducted so for on raisin productions are only pertaining to technical aspects. Therefore, the economic research on grape in India especially on raisin making which is becoming popular now a days in grape growing areas needs to be directed to find out the cost economics, the level of resource use. Such studies, to a great extent, can help the gape growers in achieving higher productivity and avoiding distress sale of the produce.

In the present study, all the above mentioned important aspects have been covered to make it a comprehensive study.

2.3 Marketing

Venkataraman (1964) studied the marketing of grapes in Bangalore south taluk and found that the share of the producers in the consumers' rupee was only 54.53 per cent. The profit margin of the seller in Bangalore was 36.79 per cent. As per the study, the growers could get much higher prices by selling the produce directly in the local whole-sale markets than by selling the produce to crop contractors.

Kahlon and Singh (1968) studied the marketing of grapes in Punjab and found two main channels of marketing, viz., sale through

retailers in the local market and through commission agents in the terminal market and more than 80.00 per cent of the grapes were disposed of through these channels in almost equal proportion. The analysis of cost incurred in marketing of grapes revealed that in the total cost, the grading and packing operations alone accounted for 72.60 per cent in the primary market and 64.13 per cent in the terminal market. Another important cost was on transportation which accounted for 10.96 per cent and 34.24 per cent of the total marketing costs in these markets respectively.

Singh and Kahlon (1969) identified three important channels in marketing of grapes in Punjab. They were channel-I: Sale to the pre harvest contractor who in turn supplied the produce to retailers through commission agents in the primary market, channel-II: the producer supplying to the wholesaler through commission agent in the primary market and the former selling to the retailer in the same market and channel-III: the producer selling to the retailer through commission agent in the primary market. The net share of the producer in the consumers' rupee varied from 53.70 per cent in channel I to 71.48 per cent in channel III. The contractor's margin was as high as 20.76 per cent of the consumers' rupee and that of wholesaler's 14.29 per cent. Retailer's margin expressed as percentage of consumers' rupee was lowest (5.72%) in channel-II and was highest (15.91%) in channel-III.

Singh (1973) studied the marketing of grapes in Ludhinana. through co-operative marketing. The net returns could be increased by reduction in marketing costs and increase in gross returns by selling at the right place. Through co-operative marketing, costs decreased by 10.27 per cent and gross returns increased by 21.29 per cent.

Singh (1975) identified two marketing channels for grapes. Channel I: Producer → Pre-Harvest Contractor → Commission Agent → Retailer → Consumer. Channel II: Producer → Commission Agent → Retailer → Consumer. The price spread and marketing margins were estimated for 5 kg of grapes under both the channels. The marketing costs incurred by the producer and pre-harvest contractor were found to be at 8.25 per cent. The marketing cost incurred by the retailer was worked out to be 1.97 per cent in both the channels. The profit margins of pre-harvest contractor and the retailer were found to be 22.4 per cent and 20.18 per cent respectively. The producer's share in the consumers' rupee was 47.18 per cent and 69.93 per cent in channels I and II respectively.

Pawar and Patil (1976) reported that the packaging and transporting were the major items of marketing costs in all fruits in Bombay market. They estimated the marketing costs for Anab-e-Shahi grapes on account of packing at Rs.0.15, loading Rs.0.02, transporting Rs.0.20, entrance fee Rs.0.04, unloading Rs.0.02, Rs.0.02 Rs.0.20, Rs.0.04 and Rs. 0.02 per kg respectively. Producer's

share in the consumers' rupee ranged from 37 to 55 per cent in grape marketing. The profit margin of wholesaler was around 5 per cent of the consumers' price in case of all the fruits. The share of the marketing costs paid by the producer ranged between 5 and 19 per cent of the consumers' price in the case of different fruits, while the retailers' expenses ranged between 8 and 25 per cent and they could get 19.42 per cent of the consumers' price after meeting all the expenses.

Nagendran (1980) analysed the ,marketing systems of grapes in Bangalore for Anab-e-Shahi and Thompson Seedless cultivars. He identified two important channels for marketing the grapes.

Channel I: Producer → Pre-Harvest Contractor → Wholesaler/ Commission Agent → Retailer →Consumer

Channel II: Producer → Pre-Harvest Contractor → Wholesaler/ Commission Agent → Hawker → Consumer

The study showed that on each kg of Anab-e-Shahi handled, the commission agent incurred a marketing cost of little over one paisa and earned a net return of 28 paise; the corresponding figures for Thompson Seedless were a little over 3 paise and 50 paise. Retailers incurred a cost of 37 paise in marketing each kg of Anab-e-Shahi, where as it was 76 paise per kg in the case of Thompson seedless. Retailers earned a net return of 93 paise and Rs. 1.286 per kg from

the two varieties respectively. In the case of hawkers, it was found that the cost of marketing per kg of grape worked out to 34 paise for Anab-e-Shahi and 22 paise for Thompson Seedless varieties, as net return to management. The net return to management per kg of grape worked out at 99 paise and Rs. 1.94 from the two varieties, respectively.

Kulkarni (1989) studied the production and marketing of grape in Bijapur district, Karnataka and worked out the per kg cost of marketing of grapes in Bijapur and Hubli markets. In Bijapur market, the total marketing cost was Rs. 0.63 per kg. Packing charges accounted for the largest share of 61.91 per cent followed by the commission (15.87%) and transportation charges (9.52%) whereas in Hubli market the cost of marketing per kg of grape was found to be Rs. 1.08, transport, packing charges, losses during handling and commission charges accounted for 38.89, 36.11, 12.96 and 9.26 per cent, respectively.

Badge *et al.* (1996) in his study on dynamics of marketing of selected fruits in Nagpur to worked out the average annual arrivals in cost of apple, grape and mango was 34.23 hundred quintals, 23.27 hundred quintals and 502 quintals. He also worked out the average price for apple grapes and mango which was 763.33 per quintal, Rs. 824.64 per quintal and Rs. 448.33 per quintal respectively. He also worked out the market margins and price spread for apple, grape and

mango. He revealed that the producers share in consumer's rupee was 32.17 per cent in case of apple, 20.83 per cent in case of grape and 28.25 per cent in case of mango. He observed that commission agents net share in apple varies between 1.34 per cent and 3.78 per cent, for grapes commission agents share contributes 5.40 per cent and in case of mango it was 16.45 per cent.

Dangt *et al.* (1997) In his study on marketing and export of grapes from Maharashtra studied the various marketing channels for grape marketing was

Channel I : Producer – Retailer – Consumer

Channel II : Producer – Commission Agent cum-Wholesaler – Retailer – Consumer

Channel III : Producer – Co-operative Marketing Society Exporter – Retailer – Consumer

Channel IV : Producer – Co-operative Marketing Society Wholesaler – Retailer – Consumer

He also studied the quantity of grape sold through different marketing channels was Channel I 183 tonnes, 350 tonnes; 44 tonnes, 600tonnes through Channel I, Channel II channel III, channel IV respectively. He also worked out the quantity of grapes sold in different markets were in garden itself 183 tonnes, in Mumbai market 270 tonnes, in Delhi/Ludhinana market 680 tonnes, in London

market 11 tonnes, in Dubai market 33 tonnes. He also worked out the cost of marketing of grapes on per kg was lowest i.e. Rs. 0.11 only for sale of grapes in the garden itself. It was Rs. 6.08; Rs. 6.82, Rs. 19.33 and Rs. 24.45 for sale of grapes in Mumbai, Delhi, Dubai and England markets, respectively.

Shellikeri S.G. (1999) In his study on post harvest losses of price spread in marketing of perishables. A case study of grape in Bijapur district, Karnataka estimated the extent of loss of per harvest contractor level was 1,264.20 kg valued at 14778.50 whereas that at commission agent cum wholesaler was 3762.60 kg valued at Rs. 62534.40. The retailer lost 131.40 kg of grapes (worth of Rs. 1307.84) due to weight loss; loose berries and spoilage of berries in the process of handling. The producers share in consumer's rupee was found 58.13 per cent in channel I (Producer – pre-harvest contractor - Retailer – Consumer) and 74.79 per cent in channel II (Producer – Commission Agent – Cum Wholesaler – Retailer – Consumer).

Khunt, K.A. *et al.* (2001) In their study on marketing of kesar mango in Sankashtra region of Gujarat state worked out the marketing costs incurred by mango growers was Rs. 476.77 per quintal or 14.46 per cent of the consumer's price. Among the various costs incurred by the mango growers packing cost and commission charges accounts for the major share of 4.46 and 4.56 per cent respectively. The transportation charges incurred by the producer

amounted to Rs. 24.50 per quintal. The total costs incurred by wholesaler's was Rs. 77.50 per quintal and the net realization of wholesaler's was Rs. 357.53 per quintal. The expenses incurred by retailers was Rs. 55.70 per quintal and the net realization of retailers was Rs. 384.50 per quintal. They also studied the problems faced by mango growers in reference to its cultivation and marketing about 73 per cent growers experienced the dominant role of traders as a major problem in its marketing Non-availability of cold storage was also identified as a problem by 65.28 per cent mango growers. More than 50 per cent mango growers felt the transportation problem in terms of non-availability of transportation facility, lack of proper road and higher transportation cost.

2.4 Problems in production and marketing

Sundaresan and Thanasekaran (1984) studied the problems encountered in the production and marketing of grapes in Madurai district of Tamil Nadu. Unorganized market structure, high marketing costs, unnecessary deductions and lack of credit facilities were found to be the major problems encountered in the marketing of grapes. The study suggested to implement an integrated fruit and vegetable production, processing and marketing programmes in the area.

Subbanarasaiah and Mohan (1987) studied the marketing problems of lime and oranges in Cuddapah district of Andhra Pradesh. The problems of marketing included lack of proper cold storage

facilities due to which growers lost nearly 4 to 5 per cent of their produce, inadequate transport facilities to transport their produce to various distant markets and the high cost of transportation, absence of cooperative and regulated marketing system and high fluctuations in prices of the produce. The study suggested to have more and more fruit preservation of fruit growers' cooperative societies in the interest of the citrus growers.

Kulkarni (1989) studied the problems faced by the producers in production and marketing of grapes in Bijapur district of Karnataka. Limited availability of irrigation facilities, lack of adequate knowledge of pests and diseases, absence of adequate and efficient marketing system, non-availability of required finance were the main problems faced by the producers. The small share of the producer in the consumers' rupee was because of the presence of commission agents and pre-harvest contractors. The absence of alternative market out lets and high degree of risk due to highly perishable nature of the produce and the wide price fluctuations during the season were the main problems faced by them in marketing.

Hiremath (1993) conducted a survey regarding the problems confronting the producers about production and marketing of lime in Bijapur district, Karnataka. Scarcity of water, non-availability of labour during the peak season, lack of technical guidance, inadequate

availability of manure and lack of processing and cold storage facilities were the major problems.

* Saraswat (1996) studied the problems with regard to the production and marketing of the oranges in Himachal Pradesh. The problems of marketing included insufficient grading and packaging of fruits, shortage of packing material (baskets) during the peak season, lack of cold storage facilities in the area, lack of timely availability of vehicles for transport, higher transportation charges, lack of all-weather roads, lack of availability of market intelligence and the malpractices of middlemen.

* Singh (1996) studied the problems in marketing of citrus fruits in Rajouri district of Jammu and Kashmir. The absence of proper roads and non-availability of vehicles for transportation, high cost of transportation, absence of local market and lack of managerial personnel were the major problems in marketing.

* Mohamed Jaffer A. (2003) in his study on A sizeable portion of the agriculture of Tamil Nadu in general and of Theni district in particular observed that the problem faced by the farmers in production of banana, inadequate finance was a most serious problem with great mean score of 58.00 followed by damage by windwise 56.10, poor irrigation with 53.43, diseases with 41.90 and non availability of quality suckers with 40.57.

Methodology

III. METHODOLOGY

This chapter deals with the characteristics of the area selected for the study, the methods adopted in the selection of the samples, the nature and sources of data and various tools and techniques employed in analyzing the data and evaluating the results.

The methodology chapter is presented under the following heads.

3.1 Description of the study area

3.2 Sampling procedures

3.3 Nature and sources of data

3.4 Analysis of data

3.5 Methods of raisin making

3.1 Description of the study area

Belgaum district is located in the interior of the Deccan Peninsula and lies between North Latitude 15° 23' and 16° 58' and East Longitude 74° 05' and 75° 28', It is bounded on the North by Sangali district and in West Kolhapur and Ratnagiri districts of Maharashtra. On the East it is bounded by Bijapur, Bagalkot and Dharwad districts and on West by Uttar Kannada district.

The climate of the district divide into three zones *viz.* Hilly zone, North transition zone, North dry zone. The average annual rainfall distribution is 808 mm. The temperature ranges from 19.5 ^{o}C to 35.7^{o}C.

There are three main types of soils namely black, red sandy and sandy loam. The soils are slightly acidic and are good in organic matter. The main food crops are jowar, paddy, bajara, maize, wheat and other cereals. Among the commercial crops tobacco, cotton, sugarcane are more popular. Major fruit crops grown in this area are grape, mango, sapota, guava, pomegranate, papaya etc.

3.2 Sampling procedures

3.2.1 Selection of the study area

The medium rainfall, dry and healthy weather are considered to be the favourable conditions for grape cultivation. Belgaum district in Karnataka has all these ideal conditions for successful grape cultivation. It ranks third in the area under grape cultivation and fifth in production of grapes (Table 3.1). The area under grape cultivation is 1011 hectares in this district with 18269 tonnes of grape production in the year 2000-2001. With respect to raisin production, it also stands third in the state and almost all the produce in this study area is converted into raisin and the raisin prepared in the area

Table 3.1 Districtwise area and production under grape in Karnataka in 2000-01.

District	Area (hectare)	Production (tones)
Bagalkot	552	13610
Bangalore Urban	1381	38447
Bangalore Rural	813	29844
Belgaum	1011	18269
Bellary	20	492
Bidar	29	714
Bijapur	1053	22511
Chikkmangalore	14	133
Gadag	16	394
Gulbarga	101	2486
Kolar	939	19467
Koppal	102	2510
Tumkur	11	271
Total	6051	148921

Source: Directorate of Economics and Statistics, Bangalore

is known for its quality. Hence Belgaum was specifically selected for the study.

3.2.2 Selection of sample taluk

Grape cultivation is practiced throughout the district. However, the large scale cultivation of grape vine and raisin preparation is concentrated in Athani taluk only. Which accounts for nearly 80 per cent of the area of the grapes production in the district. Ranking next other taluks like Chikodi, Raibag and Gokak covering 7.55 per cent, 6.66 per cent and 3.77 per cent of total area under grapes in the district respectively. These four taluks together account for 98 per cent of the total area under grape.

Raisin making was first introduced in Athani taluk and later became popular in other taluks of the district. Nearly 85 per cent of the total grape produced goes for raisin production in Athani taluk, where only about 11.5 per cent of grape is sold as fresh/raw grape.

The talukawise area under grape during 2000-01 is given in Table 3.2. Observing the concentration of grape growing area, grape production and raisins production levels, Athani taluk is selected for the study.

Athani taluk is divided into two regions according to information given by Horticulture Department Government of Karnataka viz. dry

Table 3.2 Talukawise area and production under grape in Belgaum district in 2000-01

Taluk	Area (hectare)	Production (tonnes)
Athani	805	14547
Chikodi	75	1355
Raibag	67	1210
Gokak	38	687
Saundatti	13.5	243
Ramdurg	8	145
Hukkeri	4.5	82
Total	1011	18269

Source: Deputy Director of Horticulture Office, Belgaum.

region and humid region. Moisture content in the atmosphere is more in humid region than dry region. Raisin production requires dry climate. Hence farmers in humid region undertake raisin production in dry climate situation.

3.2.3 Selection of sample villages

A list of villages cultivating grape was prepared in consultation with Athani Taluk Grape Growers Association. The villages were selected mainly on the basis of relative importance of raisin making vis-à-vis area under grape cultivation. On the basis of this consideration in all twelve sample villages were selected from the study area presented in Table 3.3 i.e. six from dry region and six from humid region. The villages so selected are Badachi, Kohalli, Aigali, Adhalli, Yeledagi, Anathapur from dry region and Kagawad, Shirguppi, Mangsuli, Ugar K.H., Ugar B.K., Shedbal from humid region.

3.2.4 Selection of sample grape cultivators and raisin makers

The list of grape growers and raisin makers were obtained from the Athani Taluk Grape Growers Association. Then the farmers were post classified on the basis of training system followed for grape cultivation and the method of raisin production. Thus there were 4 classifications namely

1. Sulphur fumigation method with spacing –I (8' X 6')

Table 3. 3 Village wise selection of sample grape growers and raisin producers.

Sl.No.	Villages	No. of sample grape and raisin producers
	Dry region	
1.	Badachi	10
2.	Kohalli	10
3.	Igalli	10
4.	Adhalli	10
5.	Yelledagi	10
6.	Anathpur	10
	Humid region	
7.	Kagawad	10
8.	Shiraguppi	10
9.	Mangsuli	10
10.	Ugar K.H.	10
11.	Ugar B.K.	10
12.	Shedbal	10
	Total	120

2. Sulphur fumigation method with spacing – II (6' x 6')

3. Dipping oil method with spacing-I (8' x 6')

4. Dipping oil method with spacing –II (6' x 6')

3.3 Nature and sources of data

The necessary primary data for evaluating specific objective of the study was collected from sample grape growers and raisin producers through personal interview with the help of pre-tested schedule (Appendix – I). The data were collected pertaining to the year 2002-03.

Similarly pretested schedule was prepared for interviewing market intermediaries and information was collected by personal interview method. The survey method was adopted for the data collection. In both cases questions were asked in local languages to obtain as accurate information as possible. Each grape grower cum raisin producer was questioned systematically with reference to the successive steps required to establish vineyard, and of the cultural operations necessary to maintain producing vineyard. The data included some general information about area under grape and age of the vineyard. Details of the various inputs like organic manures, fertilizers, plant protection chemicals (ppc) micro nutrients etc. and cultivation practices which were taken regularly such as weeding,

spraying, irrigation, pruning girdling, gibberlic acid treatment etc. and labour requirements were collected. Total yield and prices of grapes were also collected. In case of raisin with reference to processing of raisin making units, sale of raisins and grapes were also collected.

The market intermediaries were asked about total quantity of produce handled, quantity of grape and raisin handled, total annual turnover, prices paid by them, prices received by them, percentage of commission, markets of areas of sale and purchase, problems faced by them about infrastructure facilities.

All the respondents were convinced about the purpose and the importance of the study in order to establish a good rapport and to get the reliable information.

Secondary data collected for the study included the district wise area and production of grapes in Karnataka, taluka wise area and production of grapes in Belgaum district. These data were collected from the offices of

1. Directorate of Horticulture, Bangalore
2. Deputy Director of Horticulture, Belgaum
3. District Statistical Office, Belgaum
4. Assistant Director of Horticulture, Athani

5. Athani Taluk Grape Growers Association, Athani.

3.4 Analysis of data

To study the specific objectives of the study, the data collected were subjected to statistical analysis. For this purpose the following statistical techniques were adopted.

1. Tabular analysis

2. Benefit Cost ratio

3.4.1 Tabular Analysis

Tabular analysis was adopted for analyzing the general economic characteristics of the sample farms, per hectare labour utilization; costs, returns and profits on per hectare basis; The data were compared and contrasted with the aid of averages, percentages, etc, to obtain meaningful results.

3.4.2 Benefit Cost ratio (B:C ratio)

The benefit cost ratio was worked out by the present value of benefits divided by present value of costs.

For any project the B: C ratio must be more than one which indicates the project is viable.

$$\text{B:C ratio} = \frac{\text{Present value of benefits}}{\text{Present value of costs}}$$

Cost Procedures:

Grape:

Costs were classified into two main divisions: (Badenhop and Sharma, 1964)

(i) Those required to establish vineyard, and (ii) Those required to maintain and operate a producing vineyard.

(i) The costs required to establish vineyard included all costs incurred during the initial two years of life of the vineyard, that is, upto the approximate time the vine starts to set fruits.

(ii) The maintenance and operating costs included all the costs incurred annually in the actual operation of the yielding vineyard. The operating costs were further divided into variable costs: cost of manures, fertilizers, plant protection chemicals, micro-nutrients and growth regulators, cost of cultivation, repairs, hiring charges and interest on working capital and fixed costs, imputed rental value of land, land revenue, depreciation charges, apportioned establishment cost and interest on apportioned establishment cost.

In the study cost concepts for grape cultivation such as cost A_1, B and C were calculated as under.

Cost A_1 included value of farm yard manure, wages of human labour, cost of bullock labour, value of plant protection chemicals, depreciation charges and apportioned establishment costs.

All women labour days were converted into man labour days on the criteria that one women day equals to 0.70 mandays in dry region and 0.75 in humid region on the basis of wage rate equivalence and the wages of hired labour were calculated at the prevailing market rate of Rs. 50 for men labour in dry region and Rs. 60 for men labour in humid region.

Bullock labour both hired and owned was calculated in pair days of 8 hours. The hired charges were calculated at the rate of Rs. 250.00 per pair as paid in the both area. One pair means eight hours of work by a pair of bullock

Interest on total variable cost was calculated at the rate of 12.5 per cent per annum on the cost of manures, fertilizers, plant protection chemicals, micro nutrients, growth regulators, labour costs, repairs and hiring charges.

Depreciation on agricultural implements and machinery was calculated by straight line method. Similar methodology was adopted by Tandon and Dondyal (1965).

Apportioned establishment cost included the material and labour cost for establishment of vineyard. Costs of manure, fertilizer, plant protection chemicals (ppc), micronutrients and labour costs for maintenance of vineyard upto bearing period, establishment cost of irrigation structure and repairs on its establishment cost.

Cost B is the Cost A_1, plus land revenue plus imputed interest on apportioned establishment cost which was calculated at the rate of 10 per cent per annum.

Cost C is the Cost B plus imputed value of family labour.

Raisins:

Cost items in raisins preparation included variable costs and fixed costs. Under variable costs, the cost of chemicals, labour costs and interest on working capital were included and under fixed costs, the apportioned establishment cost of processing shed, fumigation chamber, crates, tanks, land revenue and interest on fixed cost were included.

The cost concepts for raisin such as Cost A_1, Cost B, Cost C and Cost D were calculated as under.

Cost A_1 included land revenue, cost of production of grapes, cost of chemicals, labour costs, apportioned establishment cost and interest on working capital.

The cost of chemicals were calculated at the rate of actual price paid by farmers including transportation charges and incidental charges if any.

All women labour days were converted into men labour days and wages for hired human labour were calculated at the prevailing market rates of Rs.50 in both regions.

Apportioned establishment cost included cost of construction of processing shed, fumigation chamber, checking tanks racks and crates.

In the study area sheds were of iron made sheds. The weighted average is calculated to work out at the cost of processing shed.

Interest on working capital was calculated at the rate of 12.5 per cent on costs of chemicals and labour costs.

Cost B is the Cost A_1, plus land revenue plus imputed interest on apportioned establishment cost at the rate of 10 per cent.

Cost C is the cost B plus imputed value of family labour.

Labour.

Cost D is the cost of C plus costs of marketing. Marketing cost included cost of labour plus cost of packing material plus storage cost and transportation cost.

3.5 Methods of raisin making:

There are two methods of raisin making followed in study area namely.

(i) Sulphur fumigation method

(ii) Dipping oil method

(i) Sulphur fumigation method

This method is extensively followed in study area. Various steps involved in preparation of raisins under this method are as follows.

(a) Selection and preparation of grape bunches

Small sized berries with 20-40 brix are harvested and selected for processing. The yield, quality and drying ratio depend on the maturity of grape. Grapes with higher sugar content will therefore yield better quality raisins and higher yields with lower drying ratio (Sing and Dhawan, 1973). Damaged, diseased and immature berries from bunches are removed, because damaged and diseased berries are sticky, accumulate sand and dust. Immature berries will yield raisins

of poor quality (Krishnamurthy, 1985). Then the bunches are washed in washing powder to remove the dust particles then once again they are washed in clean water to remove washing chemical contents.

(b) Chemical treatment

Bunches after cleaning in water are brought in plastic crates of 10 kg capacity and dipped in tank containing solution of 100 liter water and 2.0 - 2.5 kg potassium carbonate. In this solution one tonne grapes can be dipped. Each crate is dipped for 2 minutes. However, the quantity of potassium carbonate used depends on thickness of the skin of grape. This treatment is done to get the cracks on the surface of grapes.

The crates are dipped in tank containing solution of 10 litre water and 1.0 - 1.5 litre ethyl-oleate-lye solution for 2-3 minutes. One tonne grapes can be dipped in this solution. This treatment is done to get softness and shining on the raisins.

(c) Sulphur fumigation

After the above chemical treatments, the creates are kept in fumigation chamber of size 4' x 8' with one tonne grape capacity, and fumigated with sulphur (about 2-3 kg sulphur is used for 1 tonne of grape). This treatment is given for about four hours.

Advantages of sulphur fumigation:

(i) Reduces the fungal disease.

(ii) Outer layer becomes leathery and damage will be less

(iii) Golden yellow colour can be obtained

(iv) Keeping quality will be enhanced

(d) Drying in shed:

The sulphur treated bunches are brought to the shed and spread on perforated plastic mesh stretched throughout the tiers of each rack created in the shed. The bunches are placed at the rate of 1 kg per square feet for early drying. Drying period varies from 22 to30 days depending upon temperature

The raisins should be taken out from the shed after its drying to 15-18 per cent moisture to get better quality.

Drying ratio

It is the ratio of grapes to raisin i.e., how much quantity of grape is required to prepare 1 kg of raisin. Drying ratio depends upon sugar percentage in grapes and method adopted for processing of grapes.

The raisins prepared from sulphur fumigation method are classified into four grades.

Grade I : Golden yellow coloured raisins.

Grade II: Brown coloured raisins.

Grade III: Black coloured raisins.

Grade IV: Pulpless

(ii) Dipping oil method

The raisins prepared out of this method are green coloured. The steps involved in preparation of green raisin is as follows.

(a) Selection and preparation of bunches:

The procedure is similar as in case of sulphur fumigation method.

(b) Chemical treatment:

Bunches after cleaning in water are brought in crates of 10 kg capacity and dipped in a tank containing solution of 10 litre water and 2.0-2.5 kg potassium carbonate.

The creates are dipped in another tank containing solution of 100 litre water and 1.0-1.5 litre dipping oil for about 3-4 minutes. The dipping oil imparts green colour to raisins and reduces drying period.

(c) Drying in shed:

The chemically treated bunches are brought to shed and spread on perforated plastic mesh at the rate of 1 kg per square foot. On racks 50 per cent of original dipping oil solution used for dipping is sprayed on second or third day and 25 per cent of the above solution (50 per cent spray) is sprayed one times on fourth and 8th day for early drying.

The drying period varied from 10-12 days, and the raisins prepared are sweet and fetch more prices in market compared to raisins prepared from other methods.

The raisins are classified into 4 grades.

Grade I : Green coloured raisins

Grade II: Slight green to chocolate coloured raisins

Grade III: Slight green to dark brown coloured raisins

Grade IV: Pulpless raisins with black colour

Price of raisins:

The price difference exists even within individual grades of raisins prepared by raw grapes and raisins prepared by different methods of processing.

Grading of raisins:

Raisins are graded into different grades based on (i) shape, (ii) size, (iii) colour, (iv) pulpness (v) sweetness and (vi) dryness. Usually they are graded into four categories.

Grade I: Oval shaped, small sized, bright green or golden yellow coloured raisins with high pulp content with dryness. Dryness is tested by pressing raisins. Grade I quality raisins will not form a ball shape indicating total nonstickyness.

Grade II: Oval to round shaped, bright to slight dark green or slight reddish yellow coloured, high pulp content with total dryness.

Grade III: Round to ablong shaped, dull green to brown or dull/darkish red yellow to brown coloured, comparatively less pulp content, which may form ball shape on pressing.

Grade IV: No particular shape, ablong, shriveled dull brown to black coloured, less pulp content with high water percentage, turn to perfect ball shape on pressing.

Results

IV. RESULTS

In this study chapter, the results obtained with respect to various objectives set for the study are being presented in the following heads

4.1 General characteristics of the sample grape vineyards.

4.2 Cost of establishment of grape vineyards.

4.3 Cost and returns in grape production.

4.4 Processing of grapes.

4.5 Marketing of grapes and raisins.

4.6 Problem faced in production and marketing of grapes and raisins.

4.1 General characteristics of the sample grape vineyards.

The general characteristics of sample farms are presented in Table 4.1. The present study covered 120 grape vineyards. Consisting of 30 in spacing-I and 30 in spacing-II in dry region, 30 in spacing-I and 30 in spacing -II in humid region. The present study also covered 120 raisin making units consisting of 60 in dry region and 60 in humid region. Average size of grape vineyard ranged from 2.00 to 4.50 acres. Average age of the vineyard ranged from 7 to 9 years in humid region and 3 to 4 years in dry region. Average number of plants per

Table 4.1 General characteristics of the sample grape vineyards under spacing –I and II in dry and humid regions

(per hectare)

Particulars	Dry region		Humid region	
	Spacing -I	Spacing-II	Spacing -I	Spacing-II
Number of vines	2250	3000	2250	3000
Average age of the vineyards (years)	3-4	3-4	7-9	7-9
Range of bearing of vineyards (years)	3-20	3-20	3-20	3-20
Life span of vineyards (Years)	15	15	15	15

hectare is 2250 in spacing-I and 3000 in spacing-II in both the regions. The range of bearing of vineyards was 3 to 20 years. Average expected life span of vineyard is 15 years and variety grown in the study area was Thompson seedless by telephone trellis system.

4.2 Cost of establishment of grape vineyard

Establishment costs are those costs which are incurred during the first year on the establishment of a vineyard and the subsequent cost incurred on the maintainance upto the bearing period. These costs included that of preparatory cultivation, planting material, material used for errection of training system, manures and fertilizers, plant protection chemicals and the labour costs incurred for undertaking various operations.

The average material inputs required to establish a hectare of vineyard under spacing -I and spacing-II in two regions is given in Table 4.2.

4.2.1 Material inputs required to establish vineyard

Table 4.2 shows that, spacing-I adopted vineyards in dry region and humid region which accommodate 2250 cutting vines per hectare, used 2250 bamboo sticks, 625 stone pillars, 3750 kg of different gauze trellis wire, 62.5 kg of tar for varnishing the cotton portion of bamboo sticks 625 clamps and 5000 kg of angles to fix 3 parallel wires over

Table 4.2 Material inputs required to establish vineyard under spacing-I and II in dry and humid regions

(per hectare)

Items	Number	
	Spacing I	Spacing II
Cuttings	2250	3000
Bamboo sticks	2250	3000
Stone pillars	625	655
Trellis wires (Kg)	3750	5000
Tar (Kg)	62.50	66.50
Clamps	625	657
Angles (Kg)	5000	5500
Nut bolts	1250	1314

the stones. 1250 nut bolts to fix the angles and clamps to the stone pillars.

Spacing -II adopted vineyards in dry and humid region which accommodate 3000 cutting vines per hectare, used 3000 bamboo sticks, 655 stone pillars, 5000 kg of different gauge trellis wire, 66.5 kg of tar for varnishing the bottom portion of bamboo sticks, 657 clamps, and 5500 kg angles to fix 3 parallel wires over the stone 1314 nut bolts to fix the angles and clamps to the stone pillars.

4.2.2 Labour requirements for the establishment of vineyards.

The operation wise labour requirements to establish one hectare of vineyard under spacing I and II in two regions are presented in Table 4.3

On spacing -I adopted vineyards in dry region, the total labour required was 926.95 man days and 5 bullock days. Out of which 731.97 (78.97 per cent) mandays and 5 (100 per cent) bullock days were used for preparatory tillage and plantings, while the remaining human labour of 194.98 (21.03 percent) was used for the errection of trellis system. The digging of pits operation consumed largest share of (67.43 per cent) of total labour required for the establishment. The next important operation was training system establishment (8.02 per cent). The other operations like errection of stone pillars accounted

Table 4. 3 Labour requirements for the establishment of vineyard under spacing –I and spacing II in dry and humid regions

(Man days per hectare)

Sl. No.	Operations	Dry region				Humid region			
		Spacing I		Spacing II		Spacing I		Spacing II	
		Human labour	Bullock labour	Human labour	Bullock labour	Human labour	Bullock labour	Human labour	Bullock labour
A	Preparatory tillage and plantings								
1.	Preparatory tillage	5.00 (0.54)	5.00 (100.00)	7.84 (0.71)	7.84 (100.00)	5.16 (0.56)	5.16 (100.00)	6.84 (0.64)	6.84 (100.00)
2.	Digging of pits	625 (67.43)		752.64 (68.28)		611.85 (67.41)		735.80 (68.90)	
3.	Filling pits with FYM and others	64.62 (6.97)		77.84 (7.06)		58.55 (6.45)		72.83 (6.82)	
4.	Planting of cuttings	37.35 (4.03)		41.98 (3.81)		45.08 (4.97)		48.68 (4.56)	
	Sub total	731.97 (78.97)	5.00 (100.00)	880.30 (79.86)	7.84 (100.00)	720.64 (79.39)	5.16 (100.00)	864.15 (80.92)	6.84 (100.00)

Table : 4.3 Conted...

B	Errection of trellis system							
1.	Errection of bamboo sticks	31.58 (3.40)		41.42 (3.76)		31.01 (3.42)		35.88 (3.36)
2.	Errection of stone pillars	73.74 (7.96)		78.75 (7.14)		68.99 (7.60)		75.60 (7.08)
3.	Training system establishment	74.32 (8.02)		85.58 (7.76)		72.49 (7.98)		77.90 (7.30)
	Miscellaneous	15.34 (1.65)		16.20 (1.47)		14.58 (1.61)		14.35 (1.34)
	Subtotal	194.98 (21.03)		221.95 (20.14)		187.07 (20.61)		203.73 (19.08)
	Total	926.95 (100.00)	5.00 (100.00)	1102.25 (100.00)	7.84 (100.00)	907.71 (100.00)	5.16 (100.00)	1067.88 (100.00)	6.84 (100.00)

Figures in parentheses indicate percentages to the total

for 7.96 per cent, filling pits with FYM and others accounted for 6,97 per cent. The errection of bamboo sticks shared 3.40 per cent and miscellaneous operations like application of tar to bamboo sticks etc. required 1.65 per cent and for preparatory tillage the man required to operate bullock required 0.54 per cent of the total labour used. Bullock labour which was exclusively used for land operation like ploughing and harrowing accounted for 5.00 bullock days (100 per cent).

On spacing -II adopted vineyards in dry region, the total labour required was 1102.25 mandays and 7.84 bullock days. Out of which 880.30 (79.86 per cent) human labour and 7.84 (100 per cent) bullock labour days were used for preparatory tillage and planting, while the remaining human labour of 221.95 (20.14 per cent) was used for the errection of trellis system. Digging of pits operation consumed largest share of 752.64 (68.28 per cent) of total labour required for the establishment. The next important operation was training system establishment used 85.58 (7.76 per cent) labour. The other operations like errection of stone pillars accounted for 7.14 per cent, filling its with FYM and others accounted for 7.06 per cent, planting of cuttings accounted for 3.81 per cent. The errection of bamboo sticks shared 3.76 per cent and miscellaneous operations like application of tar to bamboo sticks etc required 1.47 per cent and for preparatory tillage the man required to operate bullock required 0.71 per cent of the total

human labour used. Bullock labour which was exclusively used for land operation like ploughing and harrowing accounted for 7.84 bullock days (100 per cent).

On spacing -I adopted vineyards in humid region, the total labour required was 907.71 man days and 5.16 bullock days of which 720.64 (79.39 per cent) man days and 5.16 (100 per cent) bullock days were used for preparatory tillage and planting, while the remaining human labour of 187.07 (20.61 per cent) was used for the errection of trellis system. Here also digging of pits accounted largest share of 67.41 per cent, the next important operation was training system establishment (7.98 per cent) of the total labour required for establishment and other operations consumed less than training system establishment of the total labour required as in the case of spacing -I in dry region.

On spacing -II adopted vineyards in humid region, the total labour required was 1067.88 man days and 6.84 bullock days. Out of which 864.15 (80.92 per cent) mandays and 6.84 bullock days were used for preparatory tillage and plantings, while the remaining human labour of 203.73 (19.08 per cent) was used for the errection of trellis system. Here also digging of pits accounted largest share of 735.80 (68.90 per cent). The next important operation was training system establishment required 77.90 (7.30 per cent) labour of the total labour

required for establishment, and other operations consumed less than training system establishment of the total labour required as in the case of spacing -II dry region.

From the table 4.3 of labour requirements for the establishment of one hectare vineyard, under spacing -I and spacing -II in dry and humid regions, it was found that bullock labour used was more or less the same under spacing -I in both regions and spacing -II in both regions. The more variation observed was only in the operation for digging of pits in both regions under spacing -I and spacing -II. Whatever the variation observed was attributed to the number of times a particular operation was carried out in other than digging pits operations. But significantly more human labour was used in dry region than humid region under both spacing adopted vineyards.

4.2.3 Cost of establishment of vineyard under spacing I and spacing II in dry and humid regions.

On spacing -I adopted vineyards in dry region, the total cost of establishment showed in table 4.4 was Rs. 3,57,389.45 of which material costs shared the maximum of Rs. 2,61,500.46 (73.17 per cent)and the remaining amount of Rs. 48,291.13 (13.51 per cent) and Rs.47,597.86 (13.32 per cent) by irrigation system establishment and labour cost respectively. Under material costs trellis wire accounted Rs.1,00,854.43 (28.22 per cent) followed by angles with 25.86 per cent

Table 4.4 Establishment cost of vineyard under spacing –I and II in dry and humid regions

(Rupees per hectare)

Sl. No.	Items	Dry region		Humid region	
		Spacing I	Spacing II	Spacing I	Spacing II
A	**Material inputs**				
1	Cuttings	7,366.35 (2.06)	9,375.00 (2.48)	6,627.00 (1.97)	8,336.06 (2.26)
2	Bamboo sticks	8,487.34 (2.37)	10,586.54 (2.80)	7,646.00 (2.27)	10,081.97 (2.74)
3	Stone pillars	48,069.62 (13.45)	50,228.37 (13.29)	44,922.00 (13.36)	48,382.17 (13.15)
4	Trellis wires	1,00,854 .43 (28.22)	1,01,673.10 (26.90)	95,636.00 (28.44)	97,725.40 (26.55)
5	Tar	902.54 (0.25)	985.00 (0.26)	834.00 (0.25)	954.15 (0.26)
6	Clamps	945.50 (0.26)	998.17 (0.26)	875.20 (0.26)	995.90 (0.27)
7	Angles	9,2405.06 (25.86)	95,433.00 (25.24)	77,969.00 (23.19)	87,065.57 (23.66)
8	Nut bolts	2,469.62 (0.69)	2,683.70 (0.71)	2,211.00 (0.66)	2,573.77 (0.70)
	Sub total	2,61,500.46 (73.17)	2,71,962.71 (71.94)	2,36,720.20 (70.40)	2,56,114.99 (69.59)

Table:4.4Contd...

B		**Labour cost**				
1		Land preparation				
	i.	Human labour	34,731.36 (9.72)	41,916.00 (11.09)	40,533.60 (12.05)	48,928.00 (13.29)
	ii.	Bullock labour	1,250.00 (0.35)	1,960.00 (0.52)	1,290.00 (0.38)	1,710.00 (0.47)
2		Planting of cuttings	1,867.50 (0.52)	2,099.00 (0.56)	2,704.80 (0.80)	2,920.80 (0.79)
3		Errection of training system	8,982.00 (2.51)	10,287.50 (2.72)	10,289.40 (3.06)	11,362.80 (3.09)
4		Miscellaneous	767.00 (0.22)	810.00 (0.21)	1,054.80 (0.31)	1,054.80 (0.29)
		Sub total	47,597.86 (13.32)	57,072.50 (15.10)	55,872.60 (16.61)	65,976.40 (17.93)
C		Irrigation system	48,291.13 (13.51)	48,990.38 (12.96)	43,676.00 (12.99)	45,955.88 (12.48)
		Total	3,57,389.45 (100.00)	3,78,025.59 (100.00)	3,36,268.80 (100.00)	3,68,047.27 (100.00)

Figures in parentheses indicate percentages to the total

and stone pillars with 13.45 per cent. The bamboo sticks, rooted cuttings, Nut bolts, clamps and tar consumed 2.37 per cent, 2.06 pr cent, 0.69 per cent, 0.26 per cent and 0.25 per cent of total material costs respectively.

Land preparation consumed 10.07 per cent of the total labour used costs incurred in establishment. It included 9.72 per cent spent on human labour used for digging of pits, filling pits with FYM and others and 0.35 per cent of the total costs incurred on bullock labour. The next in order is errection of training system which accounted 2.51 per cent of the total labour costs. Planting of cuttings and miscellaneous charges were less, 0.52 per cent and 0.22 per cent of the total labour costs.

On spacing -II adopted vineyards in dry region, the total establishment cost worked out to Rs.3,78,025.59 out of which Rs.2,71,962.71 (71.94 per cent) was incurred on material inputs, Rs.57,072.5 (15.10 per cent) was incurred on labour and Rs.48,990.38 (12.96 per cent) on establishment of irrigation system. Among the material costs trellis wire accounted Rs.1,01,673.10 (26.90 per cent) followed by angles with 25.24 per cent and stone pillars 13.29 per cent. The bamboo sticks, rotted cuttings, nutbolts, clamps and tar consumed 2.80 per cent, 2.48 per cent, 0.71 per cent, 0.26 per cent and 0.26 per cent respectively.

Land preparation consumed 11.61 per cent of the total labour costs incurred on establishment of vineyard. It included 11.09 per cent spent on human labour used for digging pits, filling pits with FYM and others and man required to operate bullocks and 0.52 per cent of the total labour cost incurred on bullock labour. The next in order to errection of training system which accounted 2.72 per cent of the total labour costs. Planting of cuttings and miscellaneous charges were less, 0.56 per cent and 0.21 per cent of the total labour costs.

On spacing -I adopted vineyards in humid region the total establishment cost amounted to Rs.3,36,268.80 of which Rs.2,36,720.20 (70.40 per cent) was incurred on material inputs and Rs.55,872.60 (16.61 per cent)and Rs.43,676.00 (12.99 per cent) was incurred on labour and establishment of irrigation system respectively. Among the material costs, trellis wire consumed largest share of 28.44 per cent followed by angles with 23.19 per cent, stone pillars 13.36 per cent bamboo sticks with 2.27 per cent, rooted cuttings with 1.97 per cent. The nutbolts, clamps and tar accounted for 0.66 per cent, 0.26 per cent, and 0.25 per cent of total material costs respectively.

Under labour costs, land preparation involved highest share of 12.43 per cent of the total establishment costs. This included 0.38 per cent of bullock labour and 12.05 per cent of human labour costs.

It was followed by errection of training system which accounted 3.06 per cent, planting of cuttings 0.80 per cent and miscellaneous operations 0.31 per cent.

On spacing -II adopted vineyards in humid region the total establishment cost accounted to Rs.3,68,047.27 of which Rs.2,56,114.99 (69.59 per cent)was incurred on material inputs, Rs.65,976.4 (17.93 per cent) and Rs.45,955.88 (12.48 per cent) was incurred on labour and irrigation system establishment respectively. Among the material costs, trellis wire consumed largest share of 26.55 per cent followed by angles with 23.66 per cent, stone pillars with 13.15 per cent, bamboo sticks with 2.74 per cent, rooted cuttings with 2.26 per cent. The nutbolts, clamps and tar accounted for 0.70 per cent, 0.27 per cent, 0.26 per cent of total material costs respectively.

Land preparation consumed 13.76 per cent of the total costs incurred in establishment. It included 0.47 per cent of the total labour costs incurred on bullock labour and 13.29 per cent spent on human labour used for digging of pits, filling pits with FYM and others and the labour required for operating bullock. The next in order was errection of training system which accounted 3.09 per cent of the total labour costs. Planting of cuttings and miscellaneous charges were less, 0.79 per cent and 0.29 per cent of the total labour costs.

From the table 4.4 cost of establishment of one hectare, under spacing –I and spacing-II in both regions was found that more or less same. The labour cost in dry region was less than the humid region in both spacing.

4.2.4 Labour requirements to maintain vineyard upto the bearing period

The labour requirements according to the operations to be done for maintenance of vineyard upto the bearing period is analyzed and presented under spacing –I and spacing II adopted vineyards in tables 4.5 and 4.6 in dry and humid regions.

On spacing -I adopted vineyards in dry region, the total labour required to maintain an hectare of vineyard was 812.17 man days and 14.5 bullock days of which 522.79 mandays (64.37 per cent)and 9.75 bullock days (67.24 per cent) were used during the year of planting and 289.38 mandays (35.63 per cent) and 4.75 bullock days (32.76 per cent) were used during the second year.

During the year of planting, the weeding, fertilizer application, manuring and ppc application accounted a major share of 67.54 per cent. Pruning consumed 6.99 per cent, recutting accounted 6.91 per cent. The subcaning, irrigation, shoot thinning, and intercultivation accounted for 6.56 per cent, 5.67 per cent, 4.47 per cent, 1.86 per

Table 4. 5 Labour requirements to maintain the vineyard up to bearing under spacing –I in dry and humid regions. (Man days per hectare)

Sl.No.	Operations	Dry region				Humid region			
		1st Year		2nd Year		1st Year		2nd Year	
		Human labour	Bullock labour	Human labour	Bullock labour	Human labour	Bullock labour	Human labour	Bullock labour
1	Intercultivation	9.75 (1.86)	9.75 (100.00)	4.75 (1.64)	4.75 (100.00)	9.22 (1.81)	9.22 (100.00)	5.53 (1.91)	5.53 (100.00)
2	Weeding	62.87 (12.02)		33.85 (11.70)		66.82 (13.15)		41.78 (14.44)	
3	Fertilizer application	75.95 (14.53)		51.27 (17.72)		68.20 (13.42)		47.52 (16.42)	
4	Pruning	36.52 (6.99)		61.33 (21.19)		40.66 (8.00)		57.92 (20.01)	
5	Irrigation	29.62 (5.67)		15.38 (5.31)		20.69 (4.07)		8.32 (2.88)	
6	Recutting	36.14 (6.91)				32.45 (6.38)			
7	Shoot thinning	23.35 (4.47)				20.16 (3.97)			
8	Subcaning	34.28 (6.56)				29.17 (5.74)			
9	Manuring	59.25 (11.33)		32.60 (11.27)		55.28 (10.88)		34.16 (11.81)	
10	ppc	155.06 (29.66)		69.94 (24.17)		165.60 (32.58)		78.03 (26.97)	
11	Topping or pinching			20.26 (7.00)				16.09 (5.56)	
	Total	522.79 (100.00)	9.75 (100.00)	289.38 (100.00)	4.75 (100.00)	508.25 (100.00)	9.22 (100.00)	289.35 (100.00)	5.53 (100.00)

Figures in parentheses indicate percentages to the total

Table 4.6 Labour requirements to maintain the vineyard up to bearing under spacing–II in dry land humid regions

(Mandays per hectare)

Sl.No.	Operations	Dry region				Humid region			
		1st Year		2nd Year		1st Year		2nd Year	
		Human labour	Bullock labour	Human labour	Bullock labour	Human labour	Bullock labour	Human labour	Bullock labour
1	Intercultivation	10.24 (1.80)	10.24 (100.00)	5.82 (1.72)	5.82 (100.00)	6.85 (1.24)	6.85 (100.00)	4.92 (1.54)	4.92 (100.00)
2	Weeding	67.18 (11.77)		39.76 (11.78)		75.20 (13.62)		45.28 (14.16)	
3	Fertilizer application	87.26 (15.29)		55.43 (16.42)		81.33 (14.73)		47.52 (14.86)	
4	Pruning	50.87 (8.92)		61.68 (18.27)		42.36 (7.67)		52.88 (16.53)	
5	Irrigation	37.89 (6.63)		19.85 (5.88)		23.27 (4.22)		14.26 (4.46)	
6	Recutting	38.99 (6.82)				37.13 (6.73)			
7	Shoot thinning	25.00 (4.38)				19.02 (3.45)			
8	Subcaning	25.53 (4.47)				27.70 (5.02)			
9	Manuring	63.99 (11.21)		38.43 (11.39)		57.35 (10.39)		34.85 (10.89)	
10	ppc	163.81 (28.70)		87.45 (25.91)		181.80 (32.93)		97.82 (30.58)	
11	Topping or pinching			29.14 (8.63)				22.33 (6.98)	
	Total	570.76 (100.00)	10.24 (100.00)	337.56 (100.00)	5.82 (100.00)	552.01 (100.00)	6.85 (100.00)	319.86 (100.00)	4.92 (100.00)

Figures in parentheses indicate percentages to the total

cent respectively. Bullock labour was exclusively used for intercultivation operations.

During the second year 24.17 per cent of the total mandays of labour required per hectare was spent on crop protection. Followed by pruning with 21.19 per cent, fertilizer application with 17.72 per cent, weeding with 11.70 per cent, manure application with 11.27 per cent. The topping or pinching, irrigation and intercultivation accounted 7.00 per cent, 5.3 per cent 1.64 per cent respectively. The bullock labour was exclusively used for intercultivation operations.

On spacing -II adopted vineyards in dry region, the total labour required to maintain one hectare of vineyard was 908.32 man days and 16.06 bullock days, of which 570.76 man days (62.83 per cent) and 10.24bullock days (63.76 per cent) were used during the year of planting and 337.56 man days (37.17 per cent) and 5.82 (36.24 per cent) were used during the second year.

During the year of planting, the weeding, fertilizer application, manuring and ppc application accounted major share of 66.37 per cent. Pruning consumed 8.92 per cent recutting 6.82 per cent. The subcaning, irrigation, shoot thinning and intercultivation accounted for 4.47 per cent, 6.63 per cent, 4.38 per cent and 1.80 per cent respectively. Bullock labour was exclusively used for intercultivation operations.

During the second year 25.91 per cent of the total man days of labour required per hectare was spent on crop protection. Followed by pruning with 18.27 per cent fertilizer application with 16.42 per cent, weeding with 11.78 per cent, manure application with 11.39 per cent. The topping or pinching, irrigation and intercultivation accounted 8.63 per cent, 5.88 per cent and 1.72 per cent respectively. Bullock labour was exclusively used for intercultivation operation.

On spacing -I adopted vineyards in humid region, the total labour required to maintain an hectare of vineyard was 797.60 mandays and 14.75 bullock days of which 508.25 mandays (63.72 per cent) and 9.22 bullock days (62.51 per cent) were used during the year of planting and 289.35 mandays (36.28 per cent) and 5.53 bullock days (37.49 per cent) were used during the second year.

During the year of planting, the weeding, fertilizer application, manuring and ppc application accounted a major share of 70.03 per cent. Pruning consumed 8.00 per cent, recutting accounted 6.38 per cent. The subcaning, irrigation, shoot thinning, and intercultivation accounted for 5.74 per cent, 4.07 per cent, 3.97 per cent, 1.81 per cent respectively. Bullock labour was exclusively used for intercultivation operations.

During the second year 26.97 per cent of the total mandays of labour required per hectare was spent on crop protection, followed by

pruning with 20.01 per cent, fertilizer application with 16.42 per cent, weeding with 14.44 per cent, manure application with 11.81 per cent. The topping or pinching, irrigation and intercultivation accounted 5.56 per cent, 2.88 per cent, 1.91 per cent respectively. The bullock labour which was exclusively used for intercultivation operation amounted to 5.53 bullock days.

On spacing -II adopted vineyards in humid region, the total labour required to maintain an hectare of vineyard was 871.87 man days and 11.77 bullock days, of which 552.01 man days (63.31 per cent) and 6.85 bullock days (58.20 per cent) were used during the year of planting and 319.86 man days (36.87 per cent) and 4.92 bullock days (41.80 per cent) were used during the second year.

During the year of planting, the weeding fertilizer application, manuring and ppc application accounted major share of 71.69 per cent. Pruning consumed 7.67 per cent, recutting 6.73 per cent. The subcaning, irrigation, shoot thinning and intercultivation accounted for 5.02 per cent, 4.22 per cent, 3.45 per cent and 1.24 per cent respectively. The bullock labour was exclusively used for intercultivation.

During the second year 30.58 per cent of the total labour required to maintain one hectare vineyard was spent on crop protection. Followed by pruning with 16.53 per cent, fertilizer

application with 14.86 per cent, weeding with 14.16 per cent and manuring with 10.89 per cent. The topping or pinching, irrigation and inter cultivation accounted 6.98 per cent, 4.46 per cent, 1.54 per cent. The bullock labour was exclusively used for intercultivation.

The proportion of labour used for different operations during first year and second year remain more or less same.

The per hectare labour utilization for the maintainance of a vineyard under two spacing was found to be more in spacing -II compared to spacing -I. It was considerably more during the first year compared to second year. The labour utilization for the maintainance of a vineyard under two spacing was more in dry region compared to humid region especially the labour required for irrigation.

The bullock labour used was more less same in both regions.

4.2.5 Cost of maintainance of vineyard upto bearing period.

The per hectare cost of maintainance of vineyard during the year of planting and during the second year for the spacing I and II was worked out and is presented in Table 4.7

On spacing -I adopted vineyards in dry region, the total maintainance costs for the two years amounted to Rs.1,82,447.32 of which Rs.1,18,996.23 (65.22 per cent) was incurred during the year of planting and Rs.63,451.09 (34.78 per cent) during second year.

Table 4.7 Cost of maintenance of vineyard up to bearing period under spacing-I and spacing-II in dry and humid regions.

(Rupees per hectare)

Sl. No.	Cost items	Dry region				Humid region			
		I[st] year		II[nd] year		I[st] year		II[nd] year	
		Spacing I	Spacing II	Spacing I	Spacing II	Spacing I	Spacing II	Spacing I	Spacing II
	A. Material inputs								
1	Manures	28,192.35 (23.69)	27,120.20 (22.52)	13,106.40 (20.66)	12,055.02 (21.53)	23,625.27 (20.09)	20,140.50 (18.18)	9,195.14 (15.72)	9,087.14 (16.80)
2	Fertilizers	29,640.50 (24.91)	35,456.14 (29.44)	15,322.07 (24.15)	15,240.60 (27.22)	25,157.32 (21.39)	23,190.20 (20.93)	10,243.27 (17.52)	10,078.25 (18.64)
3	PPC	28,237.48 (23.73)	27,550.27 (22.87)	13,878.40 (21.87)	12,323.15 (22.01)	32,216.18 (27.40)	31,165.25 (28.12)	17,128.08 (29.29)	14,069.13 (26.02)
4	Micro-nutrients	1,832.90 (1.54)	1,724.45 (1.43)	811.22 (1.28)	712.35 (1.27)	1,758.45 (1.50)	3,515.22 (3.17)	1,489.09 (2.55)	2,090.25 (3.87)
	Sub total	87903.23 (73.87)	91851.06 (76.25)	43,118.09 (67.96)	40,331.12 (72.03)	82,757.22 (70.38)	78,011.17 (70.40)	38,055.58 (65.08)	35,324.77 (65.33)
	B Labour cost								
1	Human labour	28,533.00 (23.98)	26,169.50 (21.73)	18,878.00 (29.75)	14,469.00 (25.85)	33,120.60 (28.17)	30,495.00 (27.52)	19,191.60 (32.82)	17,361.00 (32.11)
2	Bullock labour	2,560.00 (2.15)	2,437.50 (2.20)	1,455.00 (2.29)	1,187.50 (2.12)	1,712.50 (1.45)	2,305.00 (2.08)	1,230.00 (2.10)	1,382.50 (2.56)
	Sub total	31093.00 (26.13)	28,607.00 (23.75)	20,333.00 (32.04)	15,656.50 (27.97)	34,833.10 (29.62)	32,800.00 (29.60)	20,421.60 (34.92)	18,743.50 (34.67)
	Total	1,18,996.23 (100.00)	1,20,428.06 (100.00)	63,451.09 (100.00)	55,987.62 (100.00)	1,17,590.32 (100.00)	1,10,811.17 (100.00)	58,477.18 (100.00)	54,068.27 (100.00)

Figures in parentheses indicate percentages to the total

During year of planting, material costs accounted for largest share of 73.87 per cent and labour costs about 26.13 per cent of the total costs incurred during first year. Among the material inputs fertilizers accounted largest share of 24.91 per cent, followed by plant protection chemicals accounted 23.73 per cent, manure with 23.69 per cent and micronutrients with 1.54 per cent. Among the labour costs human labour accounted 23.98 per cent and bullock labour used exclusively for intercultivation accounted 2.15 per cent.

During second year also, material costs accounted for largest share of 67.96 per cent and labour costs accounted for 32.04 per cent. Among material costs, fertilizers accounted largest share of 24.15 per cent, followed by manures with 20.66 per cent and plant protection chemicals with 21.87 per cent and micronutrients with 1.28 per cent. Among labour costs human labour accounted for 29.75 per cent and bullock labour accounted for 2.29 per cent.

On spacing -II adopted vineyards in dry region, the total maintainance cost for the two years amounted to Rs.1,76,415.68 of which Rs.1,20,428.06 (68.26 per cent) was incurred during the year of planting and Rs.55,987.62 (31.74 per cent) was incurred during the second year.

During the year of planting, material costs accounted for largest share of 76.25 per cent while the labour cost accounted for 23.75 per

cent. Among material costs fertilizer cost accounted largest share of 29.44 per cent followed by plant protection with 22.87 per cent, manures 22.52 per cent and micronutrients with 1.43 per cent of the total cost incurred during year of planting. Among labour cost, human labour accounted for largest share of 21.73 per cent and bullock labour which was exclusively used for intercultivation accounted 2.20 per cent of the total costs incurred during the year of planting.

During second year also, the material costs accounted for largest share of 72.03 per cent and labour cost accounted for 27.97 per cent. Among material costs, plant protection chemicals (ppc) accounted the largest share of 27.22 per cent followed by fertilizers 22.01 per cent, manures 21.53 per cent and micronutrient 1.27 per cent of the total cost incurred during second year. Among labour costs human labour accounted largest share of 25.85 per cent and bullock labour accounted for 2.12 per cent of the total cost incurred during second year.

On spacing -I adopted vineyards in humid region, the total maintenance costs up to bearing for two years amounted to Rs.1,76,067.50, of which Rs.1,17,590.32 (66.79 per cent) was incurred during the year of planting and Rs.58,477.18 (33.21 per cent) during the second year.

During the year of planting, the material costs accounted for largest share of 70.38 per cent and labour costs about 29.62 per cent of the total costs incurred during first year. Among the material inputs cost, plant protection chemicals accounted largest share of 27.40 per cent, followed by fertilizers 21.39 per cent, manures 20.09 per cent and micronutrients, 1.50 per cent. Among labour costs, human labour accounted for largest share of 28.17 per cent and bullock labour, which was exclusively used for intercultivation accounted 1.45 per cent.

During the second year also, the material costs accounted for largest share of 65.08 per cent and labour costs accounted for 34.92 per cent of the total costs incurred during second year. Among material costs plant protection chemicals accounted largest share of 29.29 per cent followed by fertilizers 17.52 per cent, manuring 15.72 per cent and micronutrient 2.55 per cent of the total costs incurred during second year.

Among labour costs, the human labour accounted the largest share of 32.82 per cent and bullock labour accounted 2.10 per cent of the total costs incurred during the second year.

On spacing -II adopted vineyards in humid region, the total maintainance cost for the two years amounted to the Rs. 1,64,879.44 of which Rs.1,10,811.17 (67.21 per cent) was incurred during the year

of planting and Rs.54,068.27 (32.79 per cent) was incurred during the second year.

During the year of planting, material costs accounted for largest share of 70.40 per cent and labour costs accounted for 29.60 per cent. Among material costs, plant protection chemicals accounted for largest share of 28.12 per cent followed by fertilizers 20.93 per cent, manures 18.18 per cent and micronutrients 3.17 per cent of the total costs incurred during the year of planting. Among labour costs, the human labour accounted for largest share of 27.52 per cent and bullock labour accounted for 2.08 per cent of the total cost incurred during year of planting.

During second year also, the material cost accounted for largest share of 65.33 per cent and labour cost accounted for 34.67 per cent. Among the material costs, the plant protection chemicals accounted for largest share of 26.02 per cent followed by fertilizers 18.64 per cent, manures 16.80 per cent and micronutrients 3.87 per cent of the total cost incurred during second year. Among labour costs the human labour accounted largest share of 32.11 per cent and bullock labour accounted for 2.56 per cent of the total cost incurred during second year.

Table 4.7 clearly revealed that the costs incurred on most of the items were more in the first year of planting when compared to second year.

Maintenance costs, both during the first year of planting, and the second year of planting were comparatively more in dry region than humid region except plant protection chemicals cost which is more in humid region as compared to dry region.

4.3 Costs and returns in grape production

The production costs include all the costs incurred annually in the actual production of grapes.

4.3.1 Labour requirements in grape production during bearing period in dry and humid regions.

The per hectare labour utilization according to operations in grape production during April-September period and October-March period was analyzed and presented under spacing-I and spacing II in dry and humid regions in Table 4.8.

In dry region the total labour required in case of spacing -I was 908.58 man days and 7.94 bullock days, of which the total labour required during April-September period was 303.85 man days (33.44 per cent) and 5.34 bullock days (67.25 per cent) and total labour

Table 4.8 Labour requirements in grape cultivation during bearing period under spacing- I and spacing II in dry and humid regions

(Days per hectare)

Sl. No.	Operation	Dry region				Humid region			
		Spacing I		Spacing II		Spacing I		Spacing II	
		Human labour	Bullock labour	Human labour	Bullock labour	Human labour	Bullock labour	Human labour	Bullock labour
	A. April – September period								
1	Pruning	40.00		45.28		38.86		45.57	
		(4.40)		(4.48)		(4.42)		(4.74)	
2	Inter cultivation	5.34	5.34	5.09	5.09	4.69	4.69	4.67	4.67
		(0.59)	(67.25)	(0.51)	(50.25)	(0.53)	(66.62)	(0.49)	(48.29)
3	Weeding	35.68		42.35		37.58		42.67	
		(3.93)		(4.19)		(4.27)		(4.43)	
4	Fertilizer application	42.79		50.52		40.67		48.99	
		(4.71)		(5.01)		(4.62)		(5.09)	
5	PPC application	60.00		67.78		70.69		65.37	
		(6.60)		(6.71)		(8.03)		(6.79)	
6	Irrigation	16.46		23.36		12.07		20.82	
		(1.81)		(2.31)		(1.37)		(2.16)	
7	Manuring	46.52		58.49		45.48		50.29	
		(5.12)		(5.79)		(5.17)		(5.23)	
8	Shoot thinning	20.50		25.14		18.23		25.74	
		(2.26)		(2.49)		(2.07)		(2.67)	
9	Subcaning	36.56		40.00		24.69		39.09	
		(4.02)		(3.96)		(2.81)		(4.06)	
	Sub total	303.85	5.34	358.01	5.09	292.96	4.69	343.22	4.67
		(33.44)	(67.25)	(35.45)	(50.25)	(33.29)	(66.62)	(35.66)	(48.29)
	B. October March period								
1	Pruning	57.34		61.40		46.29		56.00	
		(6.31)		(6.08)		(5.26)		(5.82)	
2	Intercultivation	2.60	2.60	5.04	5.04	2.35	2.35	5.00	5.00
		(0.29)	(32.75)	(0.50)	(49.75)	(0.27)	(33.38)	(0.52)	(51.71)
3	Weeding	38.64		41.41		35.86		40.00	
		(4.25)		(4.10)		(4.08)		(4.16)	
4	Fertilizer application	58.81		63.81		59.18		62.34	
		(6.47)		(6.32)		(6.73)		(6.48)	
5	PPC application	72.37		85.80		84.06		92.13	
		(7.97)		(8.50)		(9.55)		(9.57)	
6	Irrigation	13.37		12.88		7.03		8.15	
		(1.47)		(1.28)		(0.80)		(0.85)	
7	Manuring	67.82		72.00		60.75		64.12	
		(7.46)		(7.13)		(6.90)		(6.66)	
8	Girdling	42.13		49.34		43.24		50.27	
		(4.64)		(4.89)		(4.91)		(5.22)	
9	GA treatment	67.85		74.95		72.54		65.58	
		(7.47)		(7.42)		(8.24)		(6.81)	
10	Harvesting	108.96		112.45		112.01		111.19	
		(11.99)		(11.13)		(12.73)		(11.55)	
11	Thinning	49.24		51.96		45.16		47.12	
		(5.42)		(5.15)		(5.13)		(4.90)	
12	Topping or pinching	25.60		20.76		18.60		17.30	
		(2.82)		(2.05)		(2.11)		(1.80)	
	Sub total	604.73	2.60	651.80	5.04	587.07	2.35	619.2	5.00
		(66.56)	(32.75)	(64.55)	(49.75)	(66.71)	(33.38)	(64.34)	(51.71)
	Total	908.58	7.94	1009.81	10.13	880.03	7.04	962.42	9.67
		(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)

Figures in parentheses indicate percentages to the total

required during October-March period was 604.73 man days (66.56 per cent) and 2.60 bullock days (32.75 per cent).

Among April-September period, a maximum of 6.60 per cent required for plant protection chemicals application, followed by manures application with 5.12 per cent, fertilizer application with 4.71 per cent, pruning with 4.40 per cent of the total labour required for the grape production. The subcaning, weeding, shoot thinning, irrigation and intercultivation accounted for 4.02 per cent, 3.93 per cent, 2.26 per cent, 1.81 per cent and 0.59 per cent respectively of the total labour required for the grape production. The bullock labour required which was exclusively used for intercultivation.

Among October-March period, a maximum of 11.99 per cent labour required for harvesting followed by plant protection application with 7.97 per cent, Gibberlic Acid treatment with 7.47 per cent, manuring with 7.46 per cent, fertilizer application with 6.47 per cent, pruning with 6.31 per cent and thinning with 5.42 per cent of the total labour required for the grape production. The girdling, weeding, topping or pinching, irrigation and intercultivation accounted for 4.64 per cent, 4.25 per cent, 2.82 per cent, 1.47 per cent and 0.29 per cent of the total labour required for the grape production respectively. The bullock labour required which was exclusively used for intercultivation.

In dry region spacing -II adopted vineyards, the total labour required was 1009.81 man days and 10.13 bullock labour days, of which the total labour required during April-September period was 358.01 man days (35.45 per cent) and 5.09 bullock days (50.25 per cent) and the total labour required during October-March period was 651.80 man days (64.55 per cent) and 5.04 bullock labour days (49.75 per cent).

During April-September period, a maximum of 6.71 per cent required for plant protection chemicals application, followed by manure application with 5.79 per cent, fertilizer application with 5.01 per cent, pruning with 4.48 per cent, of the total labour required for the production of grapes. The weeding, subcaning, shoot thinning, irrigation and intercultivation accounted for 4.19 per cent, 3.96 per cent, 2.49 per cent, 2.31 per cent and 0.51 per cent of the total labour required for production of grapes respectively. The bullock labour was exclusively used for intercultivation.

During October-March period, a maximum of 11.13 per cent labour required for harvesting, followed by plant protection chemicals application with 8.50 pr cent, Gibberlic Acid treatment with 7.42 per cent, manure application with 7.13 per cent, fertilizer application with 6.32 per cent, pruning with 6.08 per cent and thinning with 5.15 per cent of the total labour required for the production of grapes. The

girdling, weeding, topping or pinching, irrigation and intercultivation accounted for 4.89 per cent, 4.10 per cent, 2.05 per cent, 1.28 per cent, 0.50 per cent of the total labour required for the production of grapes respectively. The bullock labour required which was exclusively used for intercultivation.

In humid region the total labour required for spacing –I adopted vineyards was 880.03 man days and 7.04 bullock labour days, of which the total labour required during April-September period was 292.96 man days (33.29 per cent) and 4.69 bullock labour days (66.62 per cent) and total labour required during October-March period was 587.07 man days (66.71 per cent) and 2.35 bullock labour days (33.38 per cent).

Among April-September period, a maximum of 8.03 per cent required for plant protection chemicals application, followed by manures application with 5.17 per cent, fertilizer application with 4.62 per cent, pruning with 4.42 per cent of the total labour required for the grape production. The weeding, sub caning, shoot thinning, irrigation and intercultivation accounted for 4.27 per cent, 2.81 per cent, 2..07 per cent, 1.37 per cent and 0.53 per cent respectively of the total labour required for the grape production. The bullock labour required which was exclusively used for intercultivation.

Among October-March period, a maximum of 12.73 per cent labour required for harvesting followed by plant protection application with 9.55 per cent, Gibberlic Acid treatment with 8.24 per cent, manuring with 6.90 per cent, fertilizer application with 6.73 per cent, pruning with 5.26 per cent and thinning with 5.13 per cent of the total labour required for the grape production. The girdling, weeding, topping or pinching, irrigation and intercultivation accounted for 4.91 per cent, 4.08 per cent, 2.11 per cent, 0.80 per cent and 0.27 per cent of the total labour required for the grape production respectively. The bullock labour required which was exclusively used for intercultivation.

In humid region spacing -II adopted vineyards, the total labour required was 962.42 man days and 9.67 bullock labour days, of which the total labour required during April-September period was 343.22 man days (35.66 per cent) and 4.67 bullock labour days (48.29 per cent) and the total labour required during October-March period was 619.20 man days (64.34 per cent) and 5.00 bullock labour days (51.71 per cent).

During April-September period, a maximum of 6.79 per cent required for plant protection chemicals application followed by manure application with 5.23 per cent, fertilizer application with 5.09 per cent, pruning with 4.74 per cent, of the total labour required for the

production of grapes. The weeding, subcaning, shoot thinning, irrigation and intercultivation accounted for 4.43 pr cent, 4.06 per cent, 2.67 per cent, 2.16 per cent, 0.49 per cent of the total labour required for the production of grapes respectively. The bullock labour was exclusively used for intercultivation.

During October-March period, a maximum of 11.55 per cent labour required for harvesting, followed by plant protection chemicals application with 9.57 per cent, Gibberlic Acid treatment with 6.81 per cent, manure application with 6.66 per cent, fertilizer application with 6.48 per cent, pruning with 5.82 per cent of the total labour required during production of grapes. The girdling, weeding, topping or pinching, irrigation and intercultivation accounted for 5.22 per cent, 4.16 per cent, 1.80 per cent, 0.85 per cent 0 and 0.52 per cent of the total labour required for production of the grapes respectively. The bullock labour required which was exclusively used for the intercultivation.

In general, the per hectare labour utilization pattern was significantly more during October-March period than during April-September period under spacing -I and spacing -II in dry and humid regions. From the tables, it was observed that the use of human labour was high in the dry region compared to humid region. The bullock labour was used more or less the same in both the regions.

4.3.2 Cost of production of grapes under spacing I and spacing II in dry and humid regions.

The item-wise per hectare cost of production of grapes under spacing –I and spacing –II in dry and humid regions were worked out and compared, and same were presented in Table 4.9

In spacing -I adopted vineyards in dry region the total cost of production of grapes was Rs.2,27,366.02 of which variable costs were Rs.1,84,521.40 (81.16 per cent) and fixed costs were Rs.42,844.62 (18.84 per cent).

Under variable costs, human labour shared maximum of 19.98 per cent, followed by plant protection chemicals with 18.78 per cent, fertilizers with 11.77 per cent, manures with 11.25 per cent and interest on working capital with 9.02 per cent of the total costs required for the production of grapes. The tractor hiring charges, growth regulators, repairs, bullock labour and micronutrients was accounted for 4.61 per cent, 3.12 per cent, 0.98 per cent, 0.87 per cent, 0.78 per cent of the total costs required for the production of grapes respectively.

Under fixed costs, apportioned establishment costs accounted maximum share of 15.38 per cent. The interest on establishment costs, depreciation on implements and machinery and land revenue

Table 4.9 Cost of production of grapes under spacing –I and spacing II in dry and humid regions.

(Rupees per hectare)

Sl. No.	Items	Dry region		Humid region	
		Spacing I	Spacing II	Spacing I	Spacing II
A	**Variable costs**				
1.	**Material inputs**				
i.	Manures	25,569.60 (11.25)	23,667.30 (10.11)	23,531.43 (9.98)	22,500.00 (9.24)
ii.	Fertilizers	26,772.15 (11.77)	27,612.12 (11.80)	24,389.92 (10.34)	24,618.38 (10.11)
iii.	Plant protection chemicals (ppc)	42,696.20 (18.78)	41,125.00 (17.57)	47,273.44 (20.06)	47,162.30 (17.76)
iv.	Micronutrients	1,772.15 (0.78)	1,610.60 (0.69)	1,878.90 (0.80)	1,925.63 (0.79)
v.	Growth regulators	7,094.94 (3.12)	8,378.25 (3.58)	8,923.11 (3.79)	9,849.59 (4.05)
2	**Labour inputs**				
i.	Human labour	45,429.00 (19.98)	50,490.50 (21.57)	52,801.20 (22.40)	57,745.20 (23.72)
ii.	Bullock labour	1,985.00 (0.87)	2,532.50 (1.08)	1,760.00 (0.75)	2,417.50 (0.99)
3	Repairs	2,225.30 (0.98)	2,378.23 (1.02)	1,910.15 (0.81)	2,620.18 (1.08)
4	Tractor hiring charges	10,474.68 (4.61)	11,178.00 (4.78)	10,976.56 (4.26)	10,040.98 (4.12)
	Subtotal	1,64,019.02	1,68,972.50	1,73,445.30	1,78,879.76
5	Interest on working capital (On total 1 to 4 @ 12.5%)	20,502.38 (9.02)	21,121.56 (9.02)	21,680.66 (9.20)	22,359.97 (9.19)
	Sub total	1,84,521.40 (81.16)	1,90,094.06 (81.22)	1,95,125.97 (82.79)	2,01,239.73 (82.66)

Table 4. 9 Conted...

B	**Fixed costs**				
1	Land revenue	5.00	5.00	5.00	5.00
		(0.002)	(0.002)	(0.002)	(0.002)
2	Depreciation on implements	2,955.53	2,992.82	2,709.39	2,830.98
	and machinery	(1.30)	(1.28)	(1.15)	(1.16)
3	Apportioned establishment	35,989.19	36,964.55	34,155.73	35,528.45
	costs	(15.38)	(15.79)	(14.49)	(14.59)
	Sub total	38,949.65	39,962.57	36,870.14	38,364.43
4	Interest on establishment	3,894.97	3,996.26	3,687.01	3,836.44
	cost (On total 1 to 4 @ 10%)	(1.71)	(1.71)	(1.56)	(1.58)
	Sub total	42,844.62	43,958.83	40,557.15	42,200.87
		(18.84)	(18.78)	(17.21)	(17.34)
	Total	2,27,366.02	2,34,052.89	2,35,683.12	2,43,440.60
		(100.00)	(100.00)	(100.00)	(100.00)

Figures in parentheses indicate percentages to the total

accounted for 1.71 per cent, 1.30 per cent, and 0.002 percent of the total costs required for the production of grapes respectively.

In spacing -II adopted vineyards in dry region per hectare cost of production of grapes was Rs.2,34,052.89, of which variable costs was Rs.1,90,094.06 (81.22 per cent) and fixed cost was Rs.43,958.83 (18.78 per cent).

Under variable costs, human labour shared maximum of 21.57 per cent, followed by plant protection chemicals with 17.57 per cent, fertilizers with 11.80 per cent, manures with 10.11 per cent and interest on working capital with 9.02 per cent of the total cost required for the production of grapes. The tractor hiring charges, growth regulators, bullock labour, repairs and micronutrients accounted for 4.78 per cent, 3.58 per cent, 1.08 per cent, 1.02 per cent and 0.69 per cent of the total labour required for production of grapes respectively.

Under fixed costs, apportioned establishment costs accounted maximum share of 15.79 per cent. The interest on establishment costs, depreciation on implements and machinery and land revenue accounted for 1.71 per cent, 1.28 per cent, and 0.002 percent of the total costs required for the production of grapes respectively.

In spacing -I adopted vineyard in humid region, the total cost of production of grapes was Rs.2,35,683.12 of which variable costs were

Rs.1,95,125.97 (82.79 per cent) and fixed costs were Rs.40,557.15 (17.21 per cent).

Under variable costs, human labour shared maximum of 22.40 per cent, followed by plant protection chemicals with 20.06 per cent, fertilizers with 10.34 per cent, manures with 9.98 per cent and interest on working capital with 9.20 per cent of the total cots required for the production of grapes. The tractor hiring charges, growth regulators, repairs, micronutrients and bullock labour was accounted for 4.26 per cent, 3.79 per cent, 0.81 per cent, 0.80 per cent and 0.75 per cent of the total costs required for the production of grapes respectively.

Under fixed costs, apportioned establishment costs accounted maximum share of 14.49 per cent. The interest on establishment costs, depreciation on implements and machinery and land revenue accounted for 1.56 per cent, 1.15 per cent, and 0.002 percent of the total costs required for the production of grapes respectively.

In spacing -II adopted vineyards in humid region, the per hectare cost of production of grapes was Rs.2,43,440.60, of which variable costs was Rs.2,01,239.73 (82.66 per cent) and fixed costs was Rs.42,200.87(17.34 per cent).

Under variable costs, human labour shared maximum of 23.72 per cent, followed by plant protection chemicals with 17.76 per cent,

fertilizers with 10.11 per cent, manures with 9.24 per cent and interest on working capital with 9.19 per cent of the total cost required for the production of grapes. The tractor hiring charges, growth regulators, repairs, bullock labour and micronutrients accounted for 4.12 per cent, 4.05 per cent, 1.08 per cent, 0.99 per cent and 0.79 per cent of the total costs required for the production of grapes respectively.

Under fixed costs, apportioned establishment costs accounted maximum share of 14.59 per cent. The interest on establishment costs, depreciation on implements and machinery and land revenue accounted for 1.58 per cent, 1.16 per cent, and 0.002 percent of the total costs required for the production of grapes respectively.

It was observed that the total cost of production of grapes per hectare was relatively more in humid region compared to dry region.

4.3.3 Returns from grape cultivation under spacing I and spacing II in dry and humid regions.

The per hectare cost, returns and net profit at different levels of cost were computed and the same is presented in Table 4.10 for spacing -I and spacing -II in both regions.

In dry region, the per hectare cost of cultivation worked out to Rs.2,27,366.02 in spacing-I and Rs.2,34,052.89 in spacing -II. The

Table 4.10 Cost, returns structure in grape production in dry and humid regions

(Rupees per hectare)

Sl. No.	Particulars	Dry region		Humid region	
		Spacing –I	Spacing -II	Spacing -I	Spacing -II
1	Yield (kg)	54,000	59,000	59,000	64,000
2	Returns	7,02,000.00	7,67,000.0	7,67,000.00	8,32,000.00
3	Costs				
	Variable cost	1,84,521.40	1,90,094.06	1,95,132.05	2,01,239.73
	Fixed cost	42,844.62	42,958.83	40,577.15	42,200.87
	Total cost	2,27,366.02	2,34,052.89	2,35,683.12	2,43,440.60
4	Net income				
	Over variable cost	5,17,478.60	5,76,905.94	5,71,867.95	6,30,760.27
	Over fixed cost	6,59,155.38	7,23,041.17	7,26,422.85	7,89,799.13
	Over total cost	4,74,633.98	5,32,947.11	5,31,316.88	5,88,559.40
5	Cost per kg				
	Variable costs	3.42	3.22	3.36	3.14
	Over fixed cost	0.79	0.75	0.69	0.66
	Total costs	4.21	3.97	4.00	3.80
6	Net returns per kg				
	Over variable costs	9.58	9.78	9.69	9.86
	Over fixed cost	12.21	12.25	12.31	12.34
	Over total cost	8.79	9.03	9.01	9.20
7	Returns per rupee of investment	3.09	3.28	3.25	3.42

net returns per hectare over total costs found to Rs.4,74,633.98 in spacing -I and Rs.5,32,947.11 in spacing -II. The net returns per kg of grapes worked out to Rs.8.79 and Rs.9.03 in spacing -I and spacing -II respectively. The cost per kg of grapes worked out to Rs.4.21 and 3.97 in spacing -I and spacing -II respectively. The returns per rupee of investments was more in spacing -II Rs.3.28 compared to spacing -I Rs.3.09.

In humid region, the per hectare cost of cultivation worked out to Rs.2,35,683.12 in spacing -I and Rs.2,43,440.60 in spacing-II. The net returns per hectare over total costs found to Rs5,31,316.88 in spacing -I and Rs.5,88,559.40 in spacing -II. The net returns per kg of grapes worked out to Rs.9.01 in spacing -I and Rs.9.20 in spacing -II. The cost per kg of grapes worked out to Rs.4.00 and Rs.3.80 in spacing -I and spacing -II respectively. The returns per rupee of investments was more in spacing -II (Rs.3.42) compared to spacing -I (Rs.3.25).

4.4 Processing of grapes

The processing of grapes was divided in two stages as follows (i) Cost involved in establishment of raisin making unit in dry and humid regions (ii) Operational and working cost involved in raisin making unit under two different raisin making method in dry and humid regions.

4.4.1 Cost of establishment of raisin making unit in dry and humid regions.

Cost of establishing a raisin making unit was workout and presented in Table 4.11.

The total cost of establishment of raisin making unit in dry and humid regions was worked out to Rs.5,31,560.83. The steel racks shared a maximum of Rs.2,27,000 of the total cost. The cost involved in construction of processing shed, grading machine, rental value of land, fumigation chamber, checking tanks, and crates were Rs.1,78,616.00, Rs. 73,068.97, Rs. 5000.00, Rs.15,000.00, Rs.15,500.00 and Rs.14,125 respectively. Other assets and requirements occupy 0.60 per of the total cost of establishment and actual cost worked out was Rs.3250.86.

4.4.2 Operational and working costs involved in raisin making.

The total cost incurred was different in the said two different raisin making methods in two regions. This was because of the differences in chemicals used, quantity of chemicals used and the differences in raw material cost, cost of labour and transportation cost.

Table 4.11 Cost of establishment of raisin making unit in dry and humid regions

(Capacity 50 tonnes)

Sl.No.	Capital investment	Number	Value(Rs.)
1	Value of land	1 ha.	5,000 (0.94)
2	Building processing shed	4500ft	1,78,616 (33.60)
3	Checking tanks	1No.	15,500 (02.92)
4	Fumigation chamber (12'x4'x6')	3No.	15,000 (02.83)
5	Steel racks	5-6 No.	2,27,000 (42.70)
6	Crates	125No.	14,125 (02.66)
7	Grading machine	1No.	73,068.97 (13.75)
8	Other assets and requirements		3,250.86 (0.60)
	Total		5,31,560.83 (100.00)

Figures in parentheses indicate percentages to the total

4.4.2.1 Cost and returns structure in raisin production by sulphur fumigation method in dry and humid regions.

The costs required for raisin production by 5 tonnes of raw grapes were calculated and same was presented in Table 4.12 for sulphur fumigation method.

The total cost required for raisin production from 50 tonnes of grapes by sulphur fumigation method in dry region was Rs.3,57,205.81, of which variable costs accounted to Rs.2,76,796.69 and fixed costs accounted to Rs.80,409.12.

Among variable costs, the raw material cost was worked out to maximum of Rs.2,04,000.00 followed by interest on working capital Rs.30,755.19, packing material cost for packing 699 boxes of capacity 15 kg raising per box was Rs.13,976.24.

The total chemicals costs was worked out to Rs.11,760, of which Ethyl-oleate-lye solution of 45 liters used shared the maximum of Rs.7,200, followed by for 69 kg potassium carbonate used Rs.2,760 and for 80 kg sulphur used Rs.1,800. The total labour cost worked out was Rs.10,190.00 of which men labour 121.8 man days used and shared a maximum of Rs.6,090.00, followed by women labour for 50 man days used was Rs.2,500.00 and labour required for cleaning, and packing 32 mandays was Rs.1,600.00. The cold storage rent was accounted for 10,482.18 kg of raisins was 3,668.76. The

Table 4.12 Cost and return structure in raisin production by sulphur fumigation method in dry and humid regions

(Rupees per 50 tonnes)

Sl. No.	Particulars	Dry region				Humid region			
		Unit	Quantity	Price (Rs)	Value (Rs)	Quantity	Price (Rs)	Value (Rs)	
1 Variable costs									
A	Chemicals								
i	Ethyl-oleate-lye solution	Liter	45	160.00	7,200	46.70	160.00	7,472	
ii	Potassium carbonate	Kg	69	40.00	2,760	65	40.00	2,600	
iii	Sulphur	Kg	80	22.50	1,800	78	20.00	1,560	
B	Raw material	Kg	50,000	4.08	2,04,000	50,000	3.90	1,95,000	
C	Labour								
i	Men labour	Days	121.80	50.00	6,090	125	50.00	6250	
ii	Women labour	Days	50	50.00	2,500	52	50.00	2600	
iii	Cleaning and packaging women labour	Days	32	50.00	1,600	37	50.00	1850	
D	Transportation charges								
i	Grapes	Kg	-			50,000	227.8/ 1000 kg	11,390	
ii	Raisins	Box	699	3.50	2,446.5	699	3.00	2,097	
E	Cold storage rent	Kg	10,482.18	350.00/ 1000 kg	3,668.76	10842.18	350.00/ 1000kg	3,668.76	
F	Packaging material (Card board + polythene bag)	Box	699	20.00	13,976.24	699	20.00	13,976.2	
G	Interest on working capital @ 12.5%				30,755.19			31,058.00	
	Sub total				2,76,796.69			2,79,521.96	

Table : 4.12 Conted...

	2 Fixed costs							
A	Depreciation on building, racks and other over head expenses		@ 5 per cent of interest		27,253.04	@ 5 per cent of interest		27,253.04
B	Interest on long term loan @ 10 per cent per annum				53,156.08			53,156.08
	Sub total				80,409.12			80,409.12
3	Total cost of production				3,57,205.81			3,59,931.08
4	Sales revenue	Kg	10482.18	75	7,86,163.50	10482.18	75	7,86,163.50
5	Profit (4 - 3)				4,28,957.69			4,26,232.42
6	Net return per Kg of raisins				40.92			40.66
7	Net return on investment				2.20			2.18

transportation cost for 699 boxes of capacity 15 kg raisins was Rs.2,446.50.

Among fixed costs, the depreciation of five per cent on buildings, racks and other overhead expenses and interest on long term loans were worked out to Rs.27,253.04 and Rs.53,156.08 respectively.

The revenue earned by selling 10,482.18 kgs of raisins for Rs.75 per kg was worked out to Rs.7,86,163.50. The total profit was calculated to Rs.4,28,957.69. The net returns per kg of raisin was calculated to Rs.40.92 and the net return on investment was Rs.2.20.

The total cost required for raisin production from 50 tonnes of grapes in humid region was Rs.3,59,931.08, of which variable costs accounted to Rs. 2,79,521.96 and fixed costs accounted to Rs.80409.12,

Among variable costs, the raw material cost was worked out to maximum of Rs,1,95,000.00 followed by interest on working capital Rs.31,058.00, packing material cost for packing 699 boxes of capacity 15 kg raisins per box was Rs.13,976.24.

The total chemicals costs was worked out to Rs.11,632.00, of which Ethyl-oleate-lye solution of 46.70 liters used for production of raisins shared a maximum of Rs.7,472.00 followed by 65 kg potassium carbonate used for production of raisins accounted to Rs.2,600.00 and

78 kg sulphur used for production of raisins accounted to Rs.1,560.00. The total labour cost worked out was Rs.10,700.00 of which men labour 125 man days used for production of raisins shared a maximum of Rs.6,250.00, followed by women labour 52 man days used for production of raisins accounted to Rs.2,600.00 and women labour used for cleaning and packing 37 man days accounted to R.1,850.00. The cold storage rent was same for the humid region as in dry region. The total transportation cost was accounted to Rs.13,487.00 of which the transportation cost incurred on transportation of 50,000 kg grapes was accounted to Rs.11,390.00 and for transportation 699 boxes of capacity of 15 kg of raisins was Rs.2,097.00.

The fixed cost was worked out same for dry and humid regions.

The revenue earned by selling 10,482.18 kgs of raisins for Rs.75 per kg was worked out to Rs.7,86,163.50. The total profit was calculated to Rs.4,26,232.42. The net returns per kg of raisins was calculated to Rs.40.66 and net return on investment was calculated to Rs.2.18.

4.4.2.2 Cost and returns structure in raisin production by dipping oil method in dry and humid regions.

The costs required for raisin production by 50 tonnes of raw grapes were calculated and same was presented in Table 4.13 for dipping oil method.

Table 4.13 Cost and return structure in raisin production by dipping oil method in dry and humid region

(Rupees per 50 tonnes)

Sl. No.	Particulars	Dry region				Humid region			
		Unit	Quantity	Price (Rs)	Value (Rs)	Quantity	Price (Rs)	Value (Rs)	
1 Variable costs									
A	Chemicals								
i	Potassium carbonate	Kg	68	40	2,720	65	40	2600	
ii	Dipping oil								
1	Soaking	Liter	58.8	147	8,634.60	60	148.5	8,910.00	
2	50 % of spray	Liter	27	147.	3,969.00	25.5	148.5	3,786.75	
3	25 % of spray	Liter	13.5	147	1,984.50	15.7	148.5	2,331.45	
4	25 % of spray	Liter	13.5	147	1,984.50	15.7	148.5	2,331.45	
B	Raw material	Kg	50,000	4.08	2,04,000	50,000	3.90	1,95,000	
C	Labour								
i	Men labour	Days	138	50	6,900.00	140	50	7,000.00	
ii	Women labour	Days	56.48	50	2,824.00	58	50	2,900.00	
iii	Cleaning and packaging women labour	Days	40	50	2,000.00	42	50	2,100.00	
D	Transportation charges								
i	Grapes	Kg	-	-	-	50000	227.8/ 1000 kg	11,390.00	
ii	Raisins	Box	840	3.5	2,940.00	840	3.0	2,520.00	
E	Cold storage rent	Kg	12594.46	350/ 1000kg	4,408.60	12594.46	350/ 1000kg	4,408.60	
F	Packaging material (Card board + polythene bag)	Box	840	20	16,800.00	840	20	16,800.00	
G	Interest on working capital@12.5				32,395.25			32,759.78	
	Sub total				2,91,560.85			2,94,838.03	

Table 4.13 Conted...

2	**Fixed costs**							
A	Depreciation on building, racks and other over head expenses		@ 5 % of interest		27,253.04	@ 5 % of interest		27253.04
B	Interest on long term loan @ 10 per cent per annum				53,156.08			53,156.08
	Sub total				80,409.12			80,409.12
3	Total cost of production				3,71,696.97			3,75,247.15
4	Sales revenue	Kg	12,594.46	78	9,82,367.88	12594.46	78	9,82,367.88
5	Profit (4 - 3)				6,10,670.91			6,07,120.73
6	Net return per Kg of raisins				48.49			48.21
7	Net return on investment				2.64			2.62

The total cost required for raisin production from 50 tonnes of grapes in dry region was Rs.3,71,696.97, of which variable costs accounted to Rs.2,91,560.85 and fixed costs accounted to Rs.80,409.12

Among variable costs, the raw material cost was worked out maximum of Rs.2,04,000.00, followed by interest on working capital to with Rs.32,395.25, packing material cost for packing 840 boxes of capacity 15 kg of raisins accounted to Rs.16,800.00.

The total chemical cost was worked out to Rs.19,292.60 of which oil used for dipping shared a maximum of Rs.16,570.6 and potassium carbonate 68 kg used for production of raisins was Rs.2,720.00. Among the dipping oil 58.8 liter oil used for soaking shared a maximum of Rs.8,634.60 followed by 27 liter oil used for 50 per cent spray accounted to Rs.3,969 followed by 25 per cent spray two times to Rs.1,984.5 and Rs.1,984.50 The total labour costs worked out was Rs.11,724.00, of which men labour 138 man days used for production of raisins shared a maximum of Rs.6,900.00 followed by women labour 56.48 man days used for production of raisins was Rs.2,824.00 and women labour 40 man days used for cleaning and packing was Rs.2,000.00.

The cold storage rent worked out for 12,594.46 kg of raisins was Rs.4,408.60. The transportation charges worked out for transportation of 840 boxes of capacity of 15 kg raisins was Rs.2,940.00. .

Among fixed costs, the depreciation of five per cent on buildings, racks and other overhead expenses and interest on long term loans were worked out to Rs.27,253.04 and Rs.53,156.08 respectively.

The revenue earned by selling 12,594.46 kgs of raisins for Rs.78 per kg was worked out to Rs.9,82,367.88. The total profit was calculated to Rs.6,10,670.91. The net returns per kg of raisins was calculated to Rs.48.49 and net return on investment was calculated to Rs.2.64.

The total cost required for raisin production from 50 tonnes of grapes in humid region was Rs.3,75,247.15, of which variable costs accounted to Rs.2,94,838.03 and fixed cost accounted to Rs.80,409.12.

Among variable costs, the raw material cost was worked out to maximum of Rs.1,95,000.00, followed by interest on working capital with Rs.32,759.78, packing material cost for packing 840 boxes of capacity 15 kg of raisins accounted to Rs.16,800.00.

The total chemical cost worked out was Rs.19,083.50, of which oil used for dipping grapes shared a maximum of Rs.16,483.5 and potassium carbonate 65 kg used for production of raisins was Rs.2,600.00. Among the dipping oil, 60 liters oil used for soaking shared a maximum of Rs.8,910.00, followed by 50 per cent of spray with Rs.3,786.75, and two 25 per cent spray Rs.2,331.45 and

Rs.2,331.45 respectively. The total labour costs worked out was Rs.12,000.00, of which men labour 140 mandays used for production of raisins shared a maximum of Rs.7,000.00 followed by women labour 58 mandays used for production of raisins with Rs.2,900.00 and the women labour 42 man days used for cleaning and packing of raisins with Rs.2,100.00.

The total transportation cost worked out to Rs.13,910.00, of which the transportation cost required to transport the 50 tonnes of grapes shared a maximum of Rs.11,390.00 and for transportation of raisin it was Rs.2,520.00. The cold storage rent and fixed costs was same for humid region as in dry region.

The revenue earned by selling 12,594.46 kgs of raisins for Rs.78 per kg was worked out to Rs.9,82,367.88. The total profit was calculated to Rs.6,07,120.73. The net returns per kg of raisins was calculated to Rs.48.21 and net return on investment was calculated to Rs.2.62.

From the tables 4.12 and 4.13 it was observed that the raisin production was economical in the dry region than the humid region in both the raisin making methods. In case of raisin production methods it observed that the raisin production was more economical in dipping oil method than sulphur fumigation method.

4.4.2.3 Output and value of production of raisins produced by sulphur fumigation method in dry and humid regions.

The output value of one tonne of raisins produced by sulphur fumigation method in dry and humid regions is presented in Table 4.14

The drying ratio was same for both the regions 4.77: 1.00 (by processing 4.77 kg of grapes 1 kg raisins obtained) Thus the total raisins produced in dry and humid regions was 209.64 kg. The grade I raisins produced in dry region produce was more 182.64 kg (87 per cent) compared to humid region produce 176.10 kg (84 per cent). The revenue earned by selling grade I raisin was also more in dry region produce Rs. 13,679.25 compared to humid region produce Rs. 13,207.50.

The grade II raisins produced was more in humid region produce 25.16 kg (12 per cent) compared to dry region produce 20.94 kg (10 per cent). The revenue earned by selling grade II was more in humid region Rs. 1484.44 compared to dry region Rs. 1236.64 as the grade II raisins sold at Rs. 59 per kg in both regions. The grade III raisins produced was more in humid region produce 6.29 kg (3 per cent) compared to dry region produce 4.19 kg (2 per cent). The revenue earned by selling grade III was more in humid region Rs. 270.47 compared to dry region 180.17 as the grade III raisins were

Table 4.14 Output and value of raisins produced by sulphur fumigation method in dry and humid regions.

(Per tonne)

Sl.No.	Items	Dry region			Humid region		
		Quantity Kg	Price Rs./Kg	Returns Rs.	Quantity Kg	Price Rs./Kg	Returns Rs.
1	Total grapes processed	1000			1000		
2	Drying ratio	4.77:1.00			4.77:1.00		
3	Total raisins produced	209.64			209.64		
4	Grade –I	182.64 (87.00)	75	13,679.25	176.10 (84.00)	75	13,207.50
5	Grade –II	20.96 (10.00)	59	1,236.64	25.16 (12.00)	59	1,484.44
6	Grade –III	4.19 (2.00)	43	180.17	6.29 (3.00)	43	270.47
7	Grade –IV	2.10 (1.00)	22	46.20	2.10 (1.00)	22	46.20

Figures in parentheses indicate percentages to the total

sold at Rs. 43 per kg in both the regions. The grade IV raisins produced (1 per cent) was same for both regions.

4.4.2.4 Output and value of production of raisins produced by dipping oil method in dry and humid region produce.

The output value of one tonne of raisins produced by dipping oil method in dry and humid regions is presented in Table 4.15.

The drying ratio was same for both the regions 3.97: 1.00 (by processing 3.97 kg of grapes 1 kg raisins obtained) Thus the total raisins produced in dry and humid regions produce was 251.89 kg. The grade I raisins produced in dry region produce was more 224.18 kg (89 per cent) compared to humid region produce 201.51 kg (86 per cent). The revenue earned by selling grade I raisin was also more in dry region produce Rs. 17,934.40 compared to humid region produce Rs. 16,120.80.

The grade II raisins produced was more in humid region produce 30.23 kg (12 per cent) compared to dry region produce 12.93 kg (10 per cent). The revenue earned by selling grade II was more in humid region Rs. 1,889.38 compared to dry region Rs. 1574.38 as the grade II raisins sold at Rs. 62.50 per kg in both regions. The grade III raisins produced was more in humid region produce 5.04 kg (2 per cent) compared to dry region produce 2.52 kg (1 per cent). The

Table 4.15 Output and value of raisin produced by dipping oil method in dry and humid regions.

(Per tonne)

Sl.No.	Items	Dry region			Humid region		
		Quantity Kg	Price Rs./Kg	Returns Rs.	Quantity Kg	Price Rs./Kg	Returns Rs.
1	Total grapes processed	1,000			1,000		
2	Drying ratio	3.97:1.00			3.97:1.00		
3	Total raisins produced	251.89			251.89		
4	Grade –I	224.18 (89.00)	80	17,934.40	201.51 (86.00)	80	16,120.80
5	Grade –II	25.19 (10.00)	62.50	1,574.38	30.23 (12.00)	62.50	1,889.38
6	Grade –III	2.52 (1.00)	47	118.44	5.04 (2.00)	47	236.88

Figures in parentheses indicate percentages to the total

revenue earned by selling grade III was more in humid region Rs. 236.88 compared to dry region 118.44 as the grade III raisins were sold at Rs. 47 per kg in both the regions. The grade IV raisins produced in negligible quantity in dry and humid regions so it was not taken into consideration.

4.5 Marketing of grapes and raisins.

The marketing of grapes studied for the two different markets viz. local and distant market while marketing of raisins studied in distant market because the farmers in study area were selling their raisin in distant market which was same for both regions.

This chapter includes the i. Economics of marketing raisins produced by two different methods ii. cost of marketing of grapes and raisins in dry and humid region and in dry and humid regions.

4.5.1 Cost of marketing of grapes for farmers in two different markets in dry and humid regions.

The cost of marketing of grapes in two different markets viz. local and distant (Sangali) for one tonne worked out and same presented in Table 4.16.

Marketing costs were worked out separately for two different markets, considering labour cost, packing material cost and transportation cost including handling charges.

Table 4.16 Cost of marketing of grapes for farmers in two different markets in dry and humid regions.

(Rupees per tonne)

Sl. No.	Particulars	Dry region			Humid region		
		Local market	Distant market (Sangali)	Difference	Local market	Distant market (Sangali)	Difference
1	Cleaning and grading	500	500		600	600	
2	Labour charges for weighing and packaging	500	500		600	600	
3	Packing material@ 8Rs./Kg	4000	4000		4000	4000	
4	Transportation cost	125	1000	875	125	500	375
	Total	5125	6000	875	5325	5700	375

The total marketing cost of grapes for dry and humid regions for one tonne was worked out to Rs.5,125.00 for local market and Rs.6,000.00 for distant market and Rs.5,325.00 for local market and Rs.5,700.00 for distant market respectively. The difference in marketing cost of grapes was Rs.875.00 in distant market compared to local market in dry region, while in humid region the marketing cost of grapes was more in distant market than local market by Rs.375.00.

Out of the total cost, packing material shared a maximum of Rs.4,000.0 in dry region for both markets. The cleaning and grading shared Rs.500.00 in dry region for both markets. The labour required for weighing and packing accounted to Rs.500.00 in dry region for both markets. The transportation cost accounted in dry region to Rs.125.00 for local market and Rs.1,000.00 for distant market. The difference in transportation cost was calculated more in distant market compared to local market by Rs.875.00.

Out of the total cost in humid region, packing material shared a maximum of Rs.4000.00 in dry region for both markets. The cleaning and grading shared Rs.600.00 for both markets. The labour required for weighing and packing accounted to Rs.600.00 for both markets. The transportation cost accounted to Rs.125.00 for local market and Rs.500.00 for distant market. The difference in transportation cost

was calculated more in distant market compared to local market by Rs.375.00.

It was observed that the cost incurred on cleaning and grading, labour required for weighing and packing was more in humid region compared to dry region, while packing material cost was same for both markets in dry and humid regions. The difference was observed in transportation cost in local and distant market in both regions, which is more in dry region compared to humid region because of the difference in distance in two regions.

4.5.2 Cost of marketing of raisins for the farmers in dry and humid regions

The cost of marketing of raisins in dry and humid regions worked out for one tonne and presented in Table 4.17.

Marketing costs were worked out considering labour cost, packing material cost and transportation cost including handling charges and cold storage rent.

The total marketing cost of raisin in dry region was worked out to Rs.3,366.40 of which packing material shared a maximum of Rs.1,333.33 followed by labour required for cl3eaning and grading with Rs.1,000.00, labour required for weighing and packing with

Table 4.17 Cost of marketing of raisins for farmers in dry and humid regions.

(Rupees per tonne)

Sl. No.	Particulars	Dry region	Humid region
1	Cleaning and grading	1000.00	1000.00
2	Labour charges for weighing and packaging	450.00	450.00
3	Packing material	1333.33	1333.32
4	Cold storage rent	350.00	350.00
5	Transportation cost	233.31	199.98
	Total	3366.64	3333.30

Rs.450.00 and cold storage rent with Rs.350.00. The transportation cost was worked out to Rs.233.31.

The total cost of marketing of raisin in humid region was worked out to Rs.3,333.30 of which cleaning and grading, labour required for weighing and packing, packing material cost and cold storage rent were same as in dry region. The transportation cost in humid region was accounted to Rs.199.80 which is less in humid region compared to dry region byRs.33.33.

It was observed that the all the costs incurred in marketing of raisins was same in both the regions except the transportation cost. This difference occurred due to the distance up to market which is more in case of dry region compared to humid region..

4.5.3 Economics of marketing of raisins produced by two different methods in dry and humid regions.

The economics of marketing of raisins produced by two different methods viz. sulphur fumigation and dipping oil method was worked out in dry and humid regions for one tonne separately.

4.5.3.1 Economics of marketing of raisins produced by sulphur fumigation method in dry and humid regions.

The economics of marketing of raisins produced by sulphur fumigation was worked out for the same market intermediaries for

Table 4. 18 Economics of marketing of raisins made by sulphur fumigation method for market intermediaries in two different markets.

(Rupees per tonne)

Sl No.	Grad	Mumbai market					Hyderabad market				
		Purchase price	Marketing cost	Total cost	Sale price	Net returns	Purchase price	Marketing cost	Total cost	Sale price	Net returns
1	I	75000	333.33	75333.33	78000	2666.67	75000	433.33	75433.33	79200	3766.67
2	II	59000	333.33	59333.33	61500	2166.67	59000	433.33	59433.33	61600	2166.67
3	III	43000	333.33	43333.33	45000	1666.67	43000	433.33	43433.33	45500	2066.67
4	IV	22000	333.33	22333.33	23000	666.67	22000	433.33	22433.33	23000	566.67

both regions (as the farmers in both the regions sold their raisins in the same market) in Table 4.18 for both regions. In Mumbai market grade I raisins shared a maximum total costs of Rs.75,333.33 followed by grade II with Rs.59,333.33, grade III with Rs.43,333.33 and grade IV with Rs.22,333.33 of among total cots the purchase price shared a maximum cost followed by marketing cost which accounted for grade I raisins was Rs.75,000.00 and Rs.333.33, for grade II Rs.59,000.00 and Rs. 333.33, for grade III Rs.43,000 and Rs. 333.33, and for grade IV Rs. 22,000.00 and Rs. 333.33 respectively. The sale price for different grades were Rs. 78,000.00, Rs. 61,500.00, Rs. 45,000.00 and Rs. 23,000.00 for grade I, grade II, grade III and grade IV respectively. The net returns calculated for grade I, grade II, grade III and grade IV raisins were Rs. 2,666.67, Rs. 2,166.67, Rs. 1,666.67 and Rs. 666.67 respectively.

The economics of marketing of raisins produced by sulphur fumigation was worked for Hyderabad market, of which grade I raisins shared a maximum total costs of Rs.75,433.33 followed by grade II with Rs. 59,433.33, grade III with Rs.43,433.33 and grade IV with 22,433.33. Among total costs the purchase price shared a maximum cost followed by marketing cost, which was accounted for grade I Rs.75,000.00 and Rs. 433.33, for grade II Rs.59,000.00 and Rs. 433.33, for grade III Rs.43,000.00 and Rs. 433.33, for grade IV Rs.22,000.00 and Rs. 433.33 respectively. The sale price for different

grades were accounted to Rs.79,200.00, Rs.61,600.00, Rs.45,500.00 and Rs.23,000.00 for grade I, grade II, grade III and grade IV respectively. The net returns calculated for grade I, grade II, grade III, and grade IV raisins were Rs.3,766.67, Rs.2,166.67, Rs.2,066.67 and Rs.566.67 respectively.

It was observed that the marketing cost was more for Hyderabad market compared to Mumbai market but the marketing of raisin was more economical in Hyderabad market compared to Mumbai market as the net returns from Hyderabad market was more compared to Mumbai market.

4.5.3.2 Economics of marketing of raisins produced by dipping oil method for market intermediaries in two different markets.

The economics of marketing of raisins produced by dipping oil method was worked out in Table 4.19 for both the markets (Mumbai market and Hyderabad market) . In case of total cost of marketing in Mumbai market, grade I shared maximum total costs of Rs.80,333.33 followed by grade II with Rs.62,833.33 and grade III with Rs.47,333.33 Among total costs the purchase price shared a maximum followed by marketing cost which accounted for grade I raisins was Rs.80,000.00 and Rs. 333.33, grade II Rs.62,500.00 and Rs. 333.33 and for grade III Rs.47,000.00 and Rs. 333.33 respectively. The sale price for different

Table 4.19 Economics of marketing of raisins made by dipping oil method for market intermediaries in two different markets.

(Rupees per tonne)

Sl. No.	Grade	Mumbai market					Hyderabad market				
		Purchase Price	Marketing cost	Total cost	Sale price	Net returns	Purchase price	Marketing cost	Total cost	Sale price	Net returns
1	I	80000	333.33	80333.33	83800	3466.67	80000	433.33	80433.33	84000	3566.67
2	II	62500	333.33	62833.33	66100	3266.67	62500	433.33	62933.33	66400	3466.67
3	III	47000	333.33	47333.33	49600	2266.67	47000	433.33	47433.33	49900	2466.67

grades were accounted to Rs.83,800.00, Rs.66,100.00 and Rs.49,600.00 for grade I, grade II and grade III respectively. The net returns calculated for grade I, grade II and grade III raisins were Rs.3,466.67, Rs.3,266.67 and Rs.2,266.67 respectively.

In case of total cost of marketing in Hyderabad market, of which grade I raisins shared a maximum total costs of Rs.80,433.33followed by grade II with Rs.62,933.33 and grade III with Rs.47,433.33. Among total costs the purchase price shared a maximum cost followed by marketing cost which was accounted for grade I, grade II and grade III to Rs.80,000.00 and Rs. 433.33, Rs.62,500.00 and Rs. 433.33, Rs.47,000.00 and Rs. 433.33 respectively. The sale price for different grades were accounted to Rs.84,000.00 Rs.66,400.00 and Rs.49,900.00 for grade I, grade II and grade III raisins respectively. The net returns calculated for grade I, grade II and grade III raisins were Rs.3,566.67 Rs.3,466.67 and Rs.2,466.67 respectively.

It was observed that the marketing cost was more for Hyderabad market compared to Mumbai market but the marketing of raisins was more economical in Hyderabad market compared to Mumbai market as the net returns from Hyderabad market was more compared to Mumbai market.

4.5.4 Price spread among different market intermediaries in grapes and raisins marketing.

The price spread under different market intermediaries viz. producers, commission agents cum wholesalers, wholesalers and retailers were worked out for marketing of grapes and raisins separately in dry and humid regions. It was observed that the grapes were sold in the local and distant markets while the raisins were sold in the distant market in the study area in both regions.

4.5.4.1 Price spread among different market intermediaries in grapes marketing.

The price spread among different market intermediaries were worked out for marketing of one kg grapes and presented in Table 4.20.

In dry region, the consumer price or retailers price of grapes worked out in local market was Rs.19, while it was 25 Rs. in distant market. The producers, commission agents and wholesalers price worked out for local market was Rs.13, Rs.14.50, and Rs.16, while for distant market Rs.13, Rs.16.50 and Rs.21 respectively. The marketing cost incurred for marketing of grapes a maximum for producers and it was accounted to Rs.5.13 for local market and Rs.6.00 for distant market, followed by commission agents cum wholesaler with Rs.1.00 for local market and Rs. 3.00 for distant market, wholesalers with

Table 4.20 Price spread among different market intermediaries in grapes marketing in dry and humid regions.

Producer/Intermediaries	Dry region		Humid region	
	Local market	Distance market	Local market	Distance market
A. Producer				
Cost of production	4.08	4.08	3.90	3.90
Marketing cost	5.13	6.00	5.13	5.00
Profit margin	3.79	2.92	3.97	4.10
Sale price	13.00	13.00	13.00	13.00
B. Commission agents				
Purchase price	13.00	13.00	13.00	13.00
Marketing cost	1.00	3.00	1.00	3.00
Profit margin	0.50	0.50	0.50	0.50
Sale price	14.50	16.50	14.50	16.50
C. Wholesalers				
Purchase price	14.50	16.50	14.50	16.50
Marketing cost	1.00	3.00	1.00	3.00
Profit margin	0.50	1.50	0.50	1.50
Sale price	16.00	21.00	16.00	21.00
D. Retailers				
Purchase price	16.00	21.00	16.00	21.00
Marketing cost	0.50	1.00	0.50	1.00
Profit margin	2.50	3.00	2.50	3.00
Sale price or consumer price	19.00	25.00	19.00	25.00
Producers share in consumer rupee (%)	68.42	52.00	68.42	52.00

Rs.1.00 and Rs. 3.00 and retailers with Rs.0.50 and Rs. 1.00. The profit remained with farmer was worked to Rs. 3.79 for local market and Rs. 2.92 for distant market. The profit margins shared by different market intermediaries for Rs. 0.34 for local market and Rs.0.50, for distant market, Rs. 0.34 for local market and Rs. 0.63 for distant market, Rs. 2.00 for local market and Rs.3.00 for distant market respectively for commission agents, wholesalers and retailers.

In humid region the consumers price or retailers price of grapes worked out in local market was Rs.19. While it was Rs.25 in distant market. The producers, commission agents, wholesalers and retailers price worked out in humid region was same as in dry region. The marketing cost incurred for marketing of grapes was maximum for producers and it was accounted to Rs.5.13 for local market and Rs.5.00 for distant market. The commission agents, wholesalers and retailers cost of marketing for marketing of grapes for local and distant market was observed same in humid region as in dry region. The profit margin for the farmers in humid region was worked out to Rs. 3.97 for local market and Rs. 4.10 for distant market. The profit margin for different market intermediaries stated was also observed same in humid region as in dry region.

The only difference was observed in the cost of production of grapes and marketing costs incurred by the farmers in the respective

regions in marketing of grapes. The marketing costs, profit margin and the sale price of marketing intermediaries was same in dry and humid regions because the farmers sold their produce in the same local and distant markets.

The producers share in consumers rupee was more for local market 68.42 per cent compared to distant market 52 per cent

4.5.4.2 Price spread among different market intermediaries in raisins marketing.

The price spread among different market intermediaries were worked out for marketing of one kg raisins and presented in Table 4.21.

In humid region the cost of production of 1 kg raisins made by the sulphur fumigation method was Rs.34.08 and raisins made by dipping oil method was Rs.29.51.

In dry and humid regions consumer price or retailers price for raisins worked out in local market was Rs.90.50 for raisins made by sulphur fumigation method and Rs.93.50 for raisins made by dipping oil method. The producers, commission agents and wholesalers price worked out for raisins made by sulphur fumigation method was Rs.75.00, Rs.80.00 and Rs.85.00 while it for raisins made by dipping oil method was Rs.78.00, Rs.83.00 and Rs.88.00 respectively. The

Table 4.21 Price spread among different market intermediaries in raisins marketing in dry and humid regions.

(Rs. per kg)

Producer/Intermediaries	Dry region		Humid region	
	SF	DO	SF	DO
A. Producer				
Cost of production	34.08	29.51	34.30	29.79
Marketing cost	3.67	3.67	3.33	3.33
Profit margin	37.25	46.46	37.33	44.88
Sale price	75.00	78.00	75.00	78.00
B. Commission agent				
Purchase price	75.00	78.00	75.00	78.00
Marketing cost	3.00	3.00	3.00	3.00
Profit margin	2.00	2.00	2.00	2.00
Sale price	80.00	83.00	80.00	83.00
C. Wholesalers				
Purchase price	80.00	83.00	80.00	83.00
Marketing cost	3.00	3.00	3.00	3.00
Profit margin	2.00	2.00	2.00	2.00
Sale price	85.00	88.00	85.00	88.00
D. Retailers				
Purchase price	85.00	88.00	85.00	88.00
Marketing cost	1.50	1.50	1.50	1.50
Profit margin	4.00	4.00	4.00	4.00
Sale price or consumer price	90.50	93.50	90.50	93.50
Producers share in consumer rupee (%)	82.87	83.42	82.87	83.42

SF- Raisin made by sulphur fumigation method
DO- Raisins made by dipping oil method

marketing costs incurred for marketing of raisins made by both the methods accounted a maximum for producers was Rs.3.67for dry region and Rs.3.33 for humid region. The profit margin for the farmers in dry and humid region was calculated to Rs. 37.25 and Rs.37.33 for raisins produced by sulphur fumigation method and Rs.46.46 and Rs. 44.88 for raisins produced by dipping oil method respectively. The profit margins shared by different market intermediaries for raisins made by sulphur fumigation method and dipping oil method were Rs.1.60 and Rs.1.66, Rs.1.70 and Rs.1.76 Rs.4 and Rs.4 respectively.

In humid region, the cost of production of 1 kg raisins made by the sulphur fumigation method was Rs.34.30 and raisins made by dipping oil method was Rs.29.79. The marketing cost incurred in marketing of raisins made by sulphur fumigation method and dipping oil method was Rs.3.33.The commission agents, wholesalers and retailers incurred cost of marketing the raisins made by the both methods was same for humid region as in dry region. The profit margin for different market intermediaries stated was observed same for raisins made by both regions in humid region as in dry regions.

The only difference observed in the cost of production and marketing costs incurred in marketing of raisins made by both raisin making methods in dry and humid regions. The marketing costs,

profit margins and the sale-price of different marketing intermediaries for marking of raisins made by both raisin making methods was same in dry and humid region because the farmers in both regions sold their produce in the same distant market.

The producers share in consumers rupee was more for Hyderabad market 83.42 per cent compared to Mumbai market 82.87 per cent

4.6 problems faced by the farmers in production and marketing of grapes and raisins.

The problems faced by the farmers in the production of grapes in both the regions was given in the Table 4.22 . The most problems faced by the farmers in production of grapes was non availability of labour which responded by the 105 farmers(87.50 per cent), followed by lack of technical assistant responded by 93 farmers (77.50 per cent), non availability of water responded by 73 farmers (60.83 per cent)and lack of proper supply of electricity responded by 67 farmers (55.83 per cent). The non availability of chemicals was not a serious problem as only 12 farmers responded for it.

The problems faced by the farmers in production of raisins in dry and humid region is presented in Table 4.23. From the table it was observed that the labour problem was serious in both regions as it was responded by the 98 farmers (81.67 per cent), followed by problem of

Table 4.22 Problems faced in production of grapes.

Problem	Frequency	Percentage
Non availability of labours	105	87.50
Lack of Technical assistance	93	77.50
Non availability of water	73	60.83
Non availability of electricity	67	55.83
Non availability of pesticides	12	10

N= 120 for each problem

Table 4.23 Problems faced in production of raisins.

Problem	Frequency	Percentage
Non availability of labours	98	81.67
Lack of technical assistance	75	62.50
Non availability of fuel	40	37.50
Non availability of transportation*	18	30.00
Non availability of chemicals	13	10.83

N =120 for each problem

* N = 60 (Transportation of grapes from humid region to raisin making unit)

the technical assistance by the government was responded by the 75 (62.50 per cent) farmers, the problem about the transportation for transportation of grapes from farm to the raisin making unit was responded by the 18 farmers in (30.00 per cent) in the humid region only. The problems like non availability of chemicals and non availability of fuel was not the serious problems in the study area as it was responded by 10.83 per cent and 9.17 per cent farmers.

The problems regarding the marketing of grapes in dry and humid region is presented in the Table 4.24. It was observed that the low price was most serious problem faced by the farmers as it was responded by the 112 farmers (93.33 per cent), followed by lack of road network, lack of buyers or merchants with 90 per cent, and 30.83 per cent respectively. The non availability of packaging material and high spoilage during transportation was not much serious problems as it responded by 6.67 per cent and 7.5 per cent of the farmers respectively.

The problems regarding the marketing of raisins in dry and humid region is presented in the Table 4.25. It was observed that the low price was most serious problem faced by the farmers as it was responded by the 115 farmers (95.83 per cent), followed by lack of road network, lack of cold storage facility for storage of raisins and lack of buyers or merchants which was responded by 85.83 per cent,

Table 4.24 Problems faced by the farmers in marketing of grapes

Problem	Frequency	Percentage
Low price	112	93.33
Lack of road network	108	90
Lack of buyer/merchants	37	30.83
Non availability of packaging material	08	6.67
High spoilage	09	7.5

N=120 for each problem

Table 4.25 Problems faced by the farmers in marketing of raisins.

Problem	Frequency	Percentage
Low price	115	95.83
Lack of road network	103	85.83
Lack of cold storage	85	70.83
Lack of buyer/merchants	57	47.5
Non availability of transportation	18	15.00
Non availability of packaging material	15	12.5
High spoilage	03	2.5

N=120 for each problem

70.83 per cent and 47.50 per cent of farmers in both the regions respectively. The non availability of transportation, non availability of packaging material and high spoilage was not much serious problems as it was responded by 15.00 per cent, 12.50per cent and 2.5 per cent farmers in both regions.

Discussion

V. DISCUSSION

The results presented in the previous chapter are discussed in this chapter. The discussions are presented under the following broad heads.

5.1 General characteristics of the sample grape vineyards.

5.2 Cost of establishment of grape vineyards.

5.3 Cost and returns in grape production.

5.4 Processing of grapes.

5.5 Marketing of grapes and raisins.

5.6 Problem faced in production and marketing of grapes and raisins.

5.1 General characteristics of the sample grape vineyard under spacing I and spacing II in dry and humid regions .

The data required for the purpose of the study were collected from the 120 grape growers. The farmers were post classified into two categories in both dry and humid regions based on 2 spacings. The average number of vines per hectare was 2,250 in spacing I and 3,000 in spacing II. The range of bearing of vineyard was 3 to 20 years. The average expected life span of grape vineyard was 15 years. Thompson seedless variety was grown in the study area by majority of grape

growers. This variety was preferred because it is a multipurpose variety suitable for table purpose as well as raisin making. The age of bearing vineyards was three to twenty two years.

Space was recommended in all the vineyards but the number of vines within the row were more than the recommended. Most of the grape growers secured their planting material from the already established vineyards the performance of which were well known to them.

5.2 Cost of establishment of grape vineyard.

5.2.1 Material inputs required to establish vineyard under spacing I and spacing II in dry and humid regions .

An examination of Table 4.2 revealed that the material inputs required had a marginal difference between two spacings. This was because the number of plants in two spacings were different. The levels of material inputs used in vineyard had direct relationship with the number of vines accommodated per unit area of the material inputs were common between both the spacings.

There was not much difference in the material input used in dry and humid regions between two spacings.

5.2.2 Labour requirements for the establishment of vineyard under spacing I and spacing II in dry and humid regions.

Table 4.3 revealed that the preparatory tillage and planting required largest proportion of human labour used for establishment of vineyard in (78.97 per cent) dry region, while (79.39 per cent) in humid region in spacing I and (79.86 per cent) in dry region, (80.92 per cent) in humid region in spacing II . This was because preparatory tillage and planting were fundamental operations for establishment of a vineyard. This involved ploughing and leveling of land, marking of plot to open pits. The dug out pits were filled with manures and fertilizers etc and then the cuttings were planted. All these operations required more than (78 per cent) of the total labour required for the establishment of vineyard. The erecting of training system required the remaining labour for the establishment of vineyard.

The difference observed between two spacings in the use of labour for different operations was due to the difference in the quantities of materials inputs used which inturn was influenced by the density of vines.

It was observed that the labour required for the establishment of vineyard was more in dry region because the labour required for digging of pits was much more in dry region compared to humid region

while labour required for other operations was more or less same. The labour required for digging of pits was more in dry region compared to humid region because of the hardness of the land which reduces the efficiency of the labour compared to humid region.

5.2..3 Cost of establishment of vineyard under spacing I and spacing II in dry and humid regions.

From the Table 4.4 it was observed that the material inputs consumed more than (70 per cent) of the total cost required for establishment of vineyard. Whereas, labour costs accounted to 13 to 17 per cent of the total costs incurred. This was due to the material items used such as trellis wire, stone pillars, angles, bamboo sticks and cuttings were costlier.

The total cost incurred in establishment of vineyard was more in dry region compared to humid region. The material cost was more in dry region compared to humid region. This was because the average age of vineyard in dry region was 3 to 4 years while it was 7 to 9 years in humid region so the material inputs were costlier in dry region compared to humid region.

The total cost of labour was more in case of humid region (Rs.55,872.60 and Rs. 65,976.40) compared to dry region (Rs.47,597.86 and Rs. 57,072.50) in spacing I and spacing II. This

was because the labour wage rate was more in humid region (Rs.60 per man day) compared to dry region (Rs. 50 per man day).

The cost of establishment of irrigation system was more in dry region compared to humid region because the average age of vineyard in dry region was 3 to 4 years and humid region was 7 to 9 years so that it was costlier in dry region.

5.2.4 Labour requirements to maintain vineyard upto bearing period under spacing I and spacing II in dry and humid regions.

5.2.4.1 During the year of planting.

The results from the Table 4.5 and Table 4.6 revealed that the total labour required to maintain vineyard up to bearing period was more in dry region (522.79 mandays) compared to humid region (508.25 mandays). This was due to the labour requirement for the operations like pruning, irrigation, fertilizer application, manuring, shoot thinning, subcaning was more in dry region compared to humid region which was influenced by the labour efficiency and the number of times particular operation carried out.

The labour requirement for weeding and plant protection chemicals was more in humid region (66.82, 165.60 man days respectively in spacing I and 75.20, 181.80 mandays respectively in

spacing II) compared to dry region (62.87, 155.06 mandays respectively in spacing I and 67.18, 163.81 mandays respectively in spacing II). This was because the weeding operation was carried out in humid region was more due to high humidity compared to dry region and the plant protection chemicals application was also more in humid region due to humid conditions the pest attack was more in humid region as compared to dry region.

Relatively more labour was used in spacing II compared to spacing I because the number of vines per hectare was more in spacing II compared to spacing I and the operations like pruning, recutting, shoot thinning, manuring and plant protection chemicals application required more labour.

5.2.4.2During the second year

During second year the total labour requirements was more or less same in dry region (289.38 mandays and 377.56 mandays in spacing I and II respectively) compared to humid region (289.35 mandays and 319.86 mandays in spacing I and II respectively). This was due to the labour requirement for the operations like manuring, fertilizer application, pruning, topping or pinching, was more in dry region compared to humid region, which was influenced by labour efficiency and number of times particular application carried out. The labour required for weeding and plant protection chemicals

application was more in humid region (41.78, 78.03 mandays in spacing I and 45.28, 97.82 mandays in spacing II) compared to dry region (33.85, 69.94 mandays in spacing I and 39.76, 87.45 mandays in spacing II). This was because of the weeding operation carried out in the humid region was more due to high humidity compared to dry region, and the plant protection chemicals application was also more in humid region due to humid condition the pest attack was more in humid region compared to dry region.

Some operations like pruning, shoot thing, subcaning and topping etc. are skilled operations. Pruning was the most skillful job followed by other operations. However no specialized labourers were engaged for these operations since, most of the local labourers were familiar with these operations in humid region compared to dry region and therefore the labour efficiency was more in humid region compared to dry region for these operation, which resulted in to less labour utilization for these operations in humid region compared to dry region.

5.2.5 Cost of maintainance of vineyard up to bearing period under spacing I and spacing II in dry and humid regions.

The Table 4.7 revealed that the material inputs cost was high in dry region (73.87, 67.96 per cent and 76.25, 72.03 per cent) compared

to humid region (70.38, 65.08 per cent and 70.40, 65.33 per cent) in spacing I and spacing II for first and second year respectively and the labour cost was high in the humid region compared to dry region. This was because of the labour wage rate in the humid region was high compared to dry region. The material inputs required such as manures and fertilizer were less quantities in humid region compared to dry region because these inputs are generally used for more vigorous growth of the plant. Due to good water condition in the humid region these material inputs were required in less quantity and whatever the manures and fertilizers applied to the plants, were quickly solubelized in the water due to good water availability and moisture retention capacity of the fertile soil in humid region compared to dry region.

The plant protection chemicals and micronutrients required was more in humid region compared to dry region because in humid region due to humid climatic conditions the pest attack was more so the number of spraying operations were more compared to dry region.

Among labour costs, human labour accounted for major share (23.98 per cent in first year and 29.75 per cent in second year) as grape cultivation involved more application of fertilizers and plant protection chemicals. However in absolute terms they were more in first year and less in second and subsequent years.

Spacing II adopted vineyard under both the regions both during the year of planting and the second year required more maintenance cost due to the fact the it involved considerably more number of vines which required more manures, fertilizers, plant protection chemicals micronutrients and labours etc.

Relatively more cost was incurred for maintainance during the year of planting in both the spacings in both the regions, because the vines were put up vegetative growth there by requiring more of nutrients for growth and more of crop protection measures. In the second year the fruit bearing begins, so the material cost as well as labour costs consumed were less. Labour expenses were also more in the year of planting because of more number of operations.

The vines required heavy nourishment during its initial period. Once the fertility is developed it requires lesser plant nutrients from second year and onwards. Conspicuously the vineyards received large quantities of micronutrients unlike in other crops. The farmers are quite aware of this phenomenon and were able to appreciate the role of micronutrients on the quantity and quality of grapes.

5.3 Costs and returns in grape production

5.3.1 Labour requirements in grape production under spacing I and spacing II in dry and humid regions.

An examination of Table 4.8 indicated that a major proportion of human labour was utilized during April-September and October-

March period for plant protection, manuring, fertilizer application, pruning and sub canning. Plant protection required relatively more labour (78.06 man days in humid region and 71.49 man days in dry regions, the average of spacing I and spacing II and April – September and October – March period) as the grape is susceptible to pests and diseases which required regular control measures. The labour requirement for plant protection chemicals application was more in humid region compared to dry region because due to humid condition pests attack was more in humid region. Manuring required more labour (61.21 human days in dry region and 55.13 man days in humid region average of two spacings) since split application was practiced. Farm yard manure was applied in two doses, one after April pruning and another after October pruning. The labour required for manuring was more in dry region compared to humid region because fertility in dry region was low so the application of this was more. The labour required for fertilizer application was (44.83 man days in humid region and 46.66 man days in dry region average of spacing I and spacing II) more since fertilizers were also applied in split doses of 2-4 times in April-September period as well as October-March period.

Pruning an equally important operation, was a seasonal operation that strives to regulate the vegetative growth necessary to induce the production of fruiting branches. Summer pruning done during April was intended to promote vegetative growth. Winter

pruning under taken during October intended to induce the production of buds on the spurs. The operation needed considerable attention since time of pruning determines the successive bearing time of the vines and it also required more labour of (42.22 in humid region and 42.64 in dry region average of spacing I and II). The labour required for pruning was more or less same in both regions.

Irrigation required nearly (1.30 per cent in humid region and 1.69 per cent in dry region) of the labour required since the drip irrigation system was followed for irrigating the crop, the labour required only to start the drip system. The labour required for irrigation was more in dry region compared to humid region because the irrigation required in dry region was more compared to humid region.

During October-March period, which is fruit setting and developing period, chemical sprays were more depending upon the climatic conditions. Harvesting, GA treatment, thinning required more number of labour days. The labour required for harvesting was (111.60 man days in humid region and 110.70 man days in dry region average of spacing I and II) dependent upon the quantity of grape harvested on a particular plot. Since the yield of grapes in humid region was more compared to dry region the labour required for harvesting was more in humid region. The GA treatment which need

to be done at three stages required more (69.06 in humid region and 71.40 in dry region average of spacing I and II) man days. Because the labour required for treatment was dependent on the skill of labourers, as the labourers in humid regions were very skilled it required less labour compared to dry region. Thinning required labour (46.14 in humid region and 50.60 in dry region man days average of spacing I and II) for removal of undesirable series such as bird picked berries, short berries, over ripened and green coloured berries.

The labour required for weeding was dependent upon the number of times operation performed. The labour required for weeding was more during April-September period as compared to October-march period as April-September period was rainy season. The labour required for weeding in dry and humid region was (39.03in humid region and 39.52 in dry region average of spacing I and II) more or less same.

The labour required for production of grapes was more in spacing- II compared to spacing-I in both regions (962.42 man days in humid region and 1009.81 man days in dry region for spacing II and 880.12 man days in humid region and 908.58 man days in dry region for spacing I). Because the labour required for various operations depend upon the number of vines per hectare, which was more in spacing II.

The results indicated that the grape is a highly labour intensive crop and required human labour on a large scale. The vineyards were a good source of employment which existed almost throughout the year as one or the other operation was involved regularly.

It is possible to stagger the period of pruning. This enables to extend or prepone the pruning period to about 2 to 3 months, though generally October is the month preferred for winter pruning was preponed up to 15th August. Since the fruits will be ready for harvest 135 days after winter pruning the harvesting season can also be altered. Farmers having large vineyards prefer to prune parts of their vineyards at different intervals. They were able to adjust the period of harvest for 2 to 3 months, this facilitated them to process and prepare raisins over a long period. This has reduced fixed cost of processing units.

5.3.2 Cost of production of grapes.

Table 4.9 revealed that variable costs accounted for 81.19 per cent and 82.16 per cent average of spacing I and spacing II in dry and humid region respectively of the total cost of production incurred per hectare. The fixed costs constituted the remaining share of 18.81 percent in dry region and 17.8 per cent in humid region.

Human labour shared the maximum (20.00 per cent) among the total cost items as grape being a labour intensive crop and its

cultivation and production involved many improved cultural operations which were essential to maintain vineyard and improve grape quality, each required more of human labour. Among two regions the dry region shared (20.76 per cent) and humid region shared (23.12 per cent average of spacing I and II) human labour cost of the total cost. The human labour costs were more in humid region because of labour wage rate was more in humid region compared to dry region.

The proportion of expenditure made on manures and fertilizers was 10.68 per cent and 9.61 per cent of the total cost in dry region and 11.79 per cent and 10.23 per cent (average of spacing I and II) in humid region. The high cost was because grape is a heavy feeder and required more of nutrients sustained growth and subsequent high yields which can be supplied through fertilizers.

The manures and fertilizers required in dry region was more compared to humid region because the soil in humid region was more fertile and the wastage of fertilizers was not occurred due to moisture retain capacity of the soil in humid region, so full use of fertilizers was occurred compared to dry region.

Grape is very much susceptible for several pests and diseases like downy mildew, powdery, mildew, anthracnose, beetles, mealy bugs, stem borer etc. Regular control measure needed to keep the

vineyard away from pests and diseases which affect the growth and yield of grape to a considerable extent. This involved more costs which accounted to 18.18 per cent in dry region and 18.91 per cent (average of spacing I and II) in humid region of the total cost of production. The costs of plant protection chemicals was more in humid region because of humid climate the pests and disease attack was more in this region compared to dry region.

Manures, fertilizers, human labour and plant protection chemicals involved heavy expenses in the production of grape. Thus, interest on this working capital, was also one of the major item under variable costs which accounted for 9.02 per cent of the total cost of cultivation for dry region and 9.20 per cent for humid region. Other cost items under variable costs were growth regulators, micronutrients, bullock labour, repairs and tractor wiring charges etc.

Grape cultivation involved heavy initial establishment cost and also high maintenance expenses up to the bearing period. It starts bearing in the second year. Thus, apportioned establishment cost was the major item of expenditure under fixed costs, which accounted for 15.59 per cent of the total cost of production annually for dry region and 14.54 per cent for humid region. The apportioned establishment cost in dry region was more because the average age of the vineyard in dry region was 4 years while it was 7 years in humid region because of

which the cost incurred on establishment and maintenance of vineyard was more in dry region due to increase in the prices of item involved compared to humid region. The interest on establishment cost was more or less same in both the regions. The imputed rental value of owned land was more in humid region compared to dry region because the fertility and the water availability in humid region was good compared to dry region.

Land revenue was identical since it was charged on per hectare basis irrespective of crops grown and it had no relationship with the method of cultivation and region.

It was clear from the Table that costs incurred on most of the items were relatively high in spacing II adopted vineyards compared to spacing I as former accommodated more number of vines per hectare than the latter.

The dry region required less costs of production compared to humid region as the cost involved in plant protection chemicals, growth regulators, human labour was much more in humid region compared to dry region.

5.3.3 Returns from grape cultivation

The per hectare returns and profits presented in the Table 4.10 revealed that per hectare yield of grapes was more in humid region

compared to dry region because of good water condition in humid region compared to dry region as the water is the deciding factor in grape production. It also revealed that the yield was more in spacing II compared to spacing I, since it had more number of producing vines. The yields obtained were (54,000 kg and 59000 kg in spacing I and spacing II adopted vineyards respectively in the case of dry region and 59000 kg and 64000 kg in spacing I and spacing II adopted vineyards respectively in humid region).

The relative returns were Rs.7,02,000 and Rs,7,67,000 from spacing I and spacing II adopted vineyards respectively in dry region and Rs.7,67,000 and Rs.8,32,000 from spacing I and spacing II adopted vineyards respectively in humid region. The returns obtained was high in the humid region because the productivity in humid region was more compared to dry region as the yield in humid region was more. The net income per hectare were Rs.4,74,633.98 and Rs.5,32,947.11 from spacing I and spacing II adopted vineyards respectively in dry region and Rs.5,31,316.88 and 5,88,559.40 from spacing I and spacing II adopted vineyards respectively in humid region. The relatively high income from humid region due to higher yield compared to dry region as the price (Rs.13per kg) obtained and market (Sangali and Athani) in which the produce sold were same for both the regions.

The cost per kg of grape was more for dry region (Rs.4.21 and Rs.3.97 for spacing I and II) compared to humid region (Rs. 4.00 and Rs. 3.80 for spacing I and II) as the total cost of production was more for humid region compared to dry region but the yield was also more in the humid region compared to dry region. The net profit per kg and returns per rupee of investment for one hectare was more in humid region (Rs. 9.01 and Rs. 9.20 from spacing I and II respectively) compared to dry region (Rs. 8.79 and Rs. 9.03 from spacing I and II respectively) due to higher yield in humid region compared to dry region. But it was not much different in humid and dry region.

5.4 Processing of grapes

5.4.1Costs of establishment of raisin making unit in dry and humid regions.

The costs of establishing raisin making unit was same for dry and humid regions, since the grape production was popular in humid region from years but the raisin making was as recent in humid region as in dry region so there was not much difference in the cost involved in raisin making unit in both the regions.

The Table 4.11 revealed that total cost of establishment of raisin making unit was accounted to Rs. 5,31,560.83. The cost incurred on steel racks was the major component Rs. 2,27,000 of the total cost of establishment of raisin making unit as it was made by steel angles

fitted rectangular frame and steel mesh (iron mesh). The next important item of cost was construction of processing shed, the cost incurred on it was Rs. 1,78,616.00 since it was prepared by brick wall, cement roof, cemented building and steel rods. The cost incurred on grading machine was Rs. 73,068.97. This is essential item in raisin production as the prices of raisin was given on different grades. The life of grading machine was 20-25 years as it was made up by steel rods.

The fumigation chamber was used only for the sulphur fumigation method of raisin making as the checking tanks were used for dipping the grapes in the solution for raisin making by dipping oil method. As the fumigation chamber was made by wooden frame and tins it was much less costlier compared to the cemented chember. The checking tanks were made up with the bricks and cement.

5.4.2 Operational and working costs involved in raisin making.

5.4.2.1 Cost and return structure in raisin production by sulphur fumigation in dry and humid regions.

Table 4.12 revealed that the variable cost in production of raisin accounted to Rs. 2,79,521.96 in humid region and Rs. 2,76,796.69 in dry region. The variable cost was high in humid region because of the

transportation cost of the grapes from humid region to the raisin production unit was involved.

As the cost involved in establishment on raisin making unit was same for both regions the fixed cost (Rs.80,409.12), which involved depreciation on the buildings, racks and other overhead expenses (27,253.04) and interest on long term loan (53,156.08)was same for both regions.

The costs such as cold storage rent and costs incurred on packing material Rs. 3,668.76 and Rs. 13,976.24 respectively was same for both regions as the cost was accounted for the raisin produced by processing 50 tonnes of grapes which was same in both region (10,482.18 kg).

The costs incurred on the chemicals was more in dry region compared to humid region because the chemicals used in dry region was more. The labour cost was more in humid region as compared to dry region because of the labour used in the humid region was more as the labour required for cleaning and packing was more in humid region.

The transportation cost in raisin transportation was more in dry region because of the distance from the market was more compared to humid region.

The raw material cost was more for dry region compared to humid region as the cost of production of one kg grape in dry region was Rs. 4.08 and for humid region it was Rs. 3.90.

The total cost of production of raisin was more in humid region (Rs. 3,59,931.08) as compared to dry region (3,57,205.81) because variable cost was more in humid region as fixed cost was same for both regions.

The sales revenue was same for both regions Rs. 7,86,163.50 as the total raisin produced by processing of 50 tonnes of raisins and sold (at Rs. 75 per kg) was same in both regions.

The profit obtained was more in dry region Rs. 4,28,957.69 as compared to humid region Rs. 4,26,232.42 because of the total cost of production of raisins was more in humid region.

The net returns per kg of raisins and net returns on investment was more (Rs. 40.92 and Rs. 2.20 respectively)in dry region compared to (Rs. 40.66 and Rs. 2.18 respectively) in humid region because of the profit in dry region was more compared to humid region.

The Table clearly indicated that the raisin production by sulphur fumigation method was economical in dry region compared to humid region.

5.4.2.2 Costs and returns in raisin production by Dipping oil method in dry and humid regions.

Table 4.13 revealed that the variable cost in production of raisin accounted to Rs. 2,91,560.85 in dry region and Rs. 2,94,838.03 in humid region. The variable cost was high in humid region because of the transportation cost of grapes from humid region to raisin production unit involved in humid region as the raisin production by the farmer in humid region was carried out in Sangola taluk of Solapur district of Maharashtra which have a dry climate and better infrastructure facilities for raisin production. Whereas the farmer in dry region was making raisin in their own farm so did not involve any grape transportation cost in dry region.

As the cost involved in establishment on raisin making unit was same for both regions the fixed costs, which involved depreciation on buildings, racks and other overhead expenses and interest on long term loan was same for both regions.

The costs such as cold storage rent and cost incurred on packing material was Rs. 4,408.60 and Rs. 16,800.00 respectively was same for both the regions as raisin produced in both the regions by processing 50 tonnes of grapes was same (12,594.46 kg) and packaging material used and cold storages used for storage was same in both regions.

The costs incurred on chemicals was more Rs. 19,959.65 in humid region compared to dry region Rs. 19,292.60 because of quantity of chemicals used in both regions was more or less different in both regions.

The labour cost in humid region was more (Rs. 12,000) compared to dry region (Rs. 11724.00) as labour used in humid region was more than dry region.

The transportation cost of raisin was more in dry region (Rs. 2,940) compared to humid region was (Rs. 2520). This was because of the transportation cost for the box of capacity 15 kg raisin in dry region was Rs. 3.50 per box and in humid region Rs. 3.0 per box As the distance of market from dry region was more compared to humid region as it was found that the raisin sold by the farmers in these regions were in same market (Sangali).

The raw material cost was more for dry region compared to humid region because of production cost of one kg of grapes in dry region was Rs. 4.08 which was more compared to humid region Rs. 3.97.

As the variable cost in humid region was more compared to dry region the total cost of production of raisins was also more in humid region compared to dry region as the fixed costs was same in both regions.

The sales revenue was same for both regions (Rs. 9,82,367.88) as the total raisins produced by processing 50 tonnes of grapes and sold (at Rs. 78 per kg) was same in both regions.

The profit obtained was more in dry regions (Rs. 6,10,670.91) compared to the humid region (Rs. 6,07,120.73) because of the total production cost was more for humid region compared to dry region.

The net returns per kg of raisins and net returns on investment was more (Rs. 48.49 and Rs. 2.64 respectively) in dry region compared to (Rs. 48.21 and Rs. 2.62 in respectively) in humid regions as the profit obtained in dry region was more compared to humid region.

The Table 4.13 clearly indicated that the raisin production by dipping oil method was economical in dry region compared to humid region.

From Table 4.12 and Table 4.13 it was revealed that the raisin production was economical by producing raisins by dipping oil method compared to sulphur fumigation method as ratio per kg raisin produced by processing grapes was more by dipping oil method (1.00:3.97) as compared to sulphur fumigation method (1.00:4.77). The raisins produced by dipping oil method fetched more price per kg (Rs. 78) as compared to raisins produced by sulphur fumigation method (Rs. 75) per kg because of the quality of raisins produced by

dipping oil method was good as compared to raisins produced by sulphur fumigation method.

The farmers in humid region preferred to go to Sangola for raisin making because it is nearer to them and they have sufficient land at Sangola at cheaper rate instead of going in dry region where the land rates are more. The farmers in humid region are also getting the facilities like good transportation, good roads, better electricity and skilled labourers which is used for cleaning and packaging of the raisins.

5.4.3 Output and value of production of raisins by sulphur fumigation method in dry and humid regions.

Table 4.14 revealed that the grade I raisins produced was more in dry region (87 per cent) compared to humid region (84 per cent) because due to dry weather throughout the raisin making period in dry region which is useful for the production of better quality raisins and the farmers in humid region, were also making their raisins (Sangola taluk Maharashtra state) due to humid condition in that region were not getting the as dry climate as the farmers in dry region. The grade II and grade III raisins produced was more in humid region (12 per cent and 3 per cent respectively) compared to dry region (10 per cent and 2 percent respectively) because low recovery in the grade I raisins so whatever the remaining production obtained was in the

form of these two grades in humid region. The grade VI raisins produced was same (1 per cent) for both the regions

The revenue obtained by selling grade I raisins (at Rs. 75) was more in dry region compared to humid region as the grade I raisins produced was more in dry region compared to humid region. The revenue earned by selling grade II and grade III raisins (at Rs. 59 and Rs. 43 respectively) was more in humid region compared to dry region as the grade II and grade III raisins produced was more in humid region compared to dry region.

5.4.4 Output and value of raisins production by dipping oil method in dry and humid regions.

Table 4.15 revealed that the grade I raisins produced was more in dry region (89 per cent) compared to humid region (86 per cent) because due dry weather throughout the raisin making period in dry region which is useful for the better quality raisins and the farmers in humid region, where making their raisins (Sangola taluk Maharashtra state) due to irrigation farming in that region were not getting the as dry climate as the farmers in dry region. The grade II and grade III raisins produced was more in humid region (12 per cent and 2 per cent respectively) compared to dry region (10 per cent and 1per cent respectively) because low recovery in the grade I raisins so

whatever the remaining production obtained was in the form of these two grades in humid region.

The revenue obtained by selling grade I raisins (at Rs. 80) was more in dry region compared to humid region as the grade I raisins produced was more in dry region compared to humid region. The revenue earned by selling grade II and grade III raisins (at Rs. 62.50 and Rs. 47s respectively) was more in humid region compared to dry region as the grade II and grade III raisins produced was more in humid region compared to dry region.

5.5 Marketing of grapes and raisins.

5.5.1 Cost of marketing of grapes for farmers in two different markets in dry and humid regions.

Table 4.16 revealed that the cleaning and grading and labour required for weighting and packing cost was high in humid region for local and distant market (Rs. 600 and Rs. 600 respectively) as compared to dry region (Rs. 500 and Rs. 500) because the labour required for cleaning and grading for one tonne of grapes was (10 man labours) and the wage rate in humid ;region was high (Rs. 60 per labour per day) compared to dry region (Rs. 50 per labour per day).

The packing material cost was same in both the regions for both the markets. The packing materials used at the rate (Rs. 8 per box of 2 kg of grapes) was same for both regions for both markets.

The transportation cost was same (Rs. 125) for both regions for local market because the distance for both regions from the local market was almost same. The transportation cost for distant market was more for dry region (Rs. 1,000) as compared to humid region (Rs. 500) because of the distance from the distant market was more for dry region compared to humid region.

5.5.2 Cost of marketing of raisins for farmers in dry and humid regions

Table 4.17 revealed that the cost incurred on cleaning and grading of one tonne raisins and labour required for weighing and packing was same in both regions because the grading machine rent (Rs. 1 per kg of raisin) were also same in both regions and the labour charges (Rs. 50 per labour per day) were also same for both regions as the labour wage rate for grapes producing area for humid region was Rs. 60 per labour per day but the labour wage rate for the farmers producing raisins (in Sangola taluk) was same as dry region (Rs. 50 per labour per day).

The packing material cost and cold storage rent was same in both regions (Rs. 1,333.33 and Rs. 350 per tonne of raisins per month respectively) as the packing materials used and the cold storages used (in Sangali) were same in both regions.

The transportation cost was more in dry ;region (Rs. 233.31) compared to humid region (Rs. 199.98) because of the transportation cost required for transporting a box of capacity of 15 kg raisins was more in dry region (Rs. 3.5) compared to humid region (Rs. 3.0) as the distance from market was more for dry region compared to humid ;region as the raisins produced in both regions were marketed in same market (Sangali).

5.5.3 Economics of marketing of raisins made by both methods of raisin making in dry and humid regions.

Table 4.18 revealed that the purchase price for the traders in Mumbai market for grade I, grade II, grade III and grade IV raisins produced by sulphur fumigation method (Rs. 75,000, Rs. 59,000, Rs. 43,000 and Rs. 22,000 respectively) was same for both markets as the study was done for the intermediaries of one market, because the farmers in dry and humid region sold raisins in same market (Sangali).

The marketing cost for grade I, grade II, grade III and grade IV raisins was Rs. 333.33 for each grade in Mumbai market and Rs.433.33 in Hyderabad market. The marketing cost for one tonne of raisins was high for Hyderabad market compared to Mumbai market because of the cost of transportation of a box of 15 kg of raisins to Hyderabad market was more (Rs. 6.5 per box) compared to Mumbai

market (Rs. 5.0 per box) as the distance from market was more in case of Hyderabad market compared to Mumbai market.

The total cost was high for the marketing of raisins in Hyderabad market compared to Mumbai market as the marketing cost was more in Hyderabad market compared to Mumbai market.

The sale price was slightly more in Hyderabad market for different grades compared to Mumbai market as the raisins from this market was distributed later in the Tamil Nadu , Andhra Pradesh, while the produce in the Mumbai market was only sold at the Mumbai.

The Table clearly indicated that the raisin marketing was more economical in Hyderabad market compared to Mumbai market as the net returns from Hyderabad market was more compared to Mumbai market because, however the marketing cost for Hyderabad market was more but the sale price of raisin was also more compared to Mumbai market.

Table 4.19 revealed that the purchase price for grade I, grade II and grade III raisins produced by dipping oil method (Rs. 80,000 Rs. 62,5000 and Rs. 47,000) was same for raisins of both markets as the study was done for the intermediaries of one market (Sangali), because the raisins sold by the farmers in dry and humid regions was in same market (Sangali).

The grade IV raisins made by dipping oil method was not taken in to consideration as it was produced in very negligible quantity and used for fodder purpose.

The marketing cost was same for the raisins produced by dipping oil method as well as for the raisins produced by sulphur fumigation method. This was because the marketing cost depended on the quantity of the raisins and not on the quality and method by which the raisins produced. The sale price was more for grade I grade II and grade III raisins in Hyderabad market compared to Mumbai market as the raisins from this market was distributed later in the Tamil Nadu , Andhra Pradesh, while the produce in the Mumbai market was only sold at the Mumbai.

The Table clearly indicated that the raisin marketing was more economical in Hyderabad market compared to Mumbai market as the net returns from Hyderabad market was more compared to Mumbai market because, however the marketing cost for Hyderabad market was more but the sale price of raisin was also more compared to Mumbai market

5.5.4 Price spread among different market intermediaries in grape marketing in dry and humid regions.

The Table 4.20 showed that the price spread for different market intermediaries for the local and distant market in grape marketing in dry and humid regions.

The cost of production of grapes for producers was (Rs. 4.08 per kg) for dry region and (Rs. 3.97 per kg) for humid region because the productivity per hectare in humid region was more compared to dry region due to which the cost per kg in humid region was less compared to dry region.

The marketing cost per kg in dry region and humid region was same (Rs.5.13 per kg) because the distance from the local market was same for both regions. The marketing cost for distant market was more for dry region (Rs. 6.00 per kg) compared to humid region (Rs. 5.00 per kg) as the distance from the market for dry region was more compared to humid region. The profit of the farmers in the humid region was more (Rs.3.97 for local market and Rs.4.10 for distant market) compared to dry region (Rs.3.79 for local market and Rs. 2.92 for distant market) as the production and marketing cost for dry region was more compared to humid region.

The net price observed was same in both markets for both the regions.

The purchase price for commission agents cum wholesalers was the same as the net price obtained by farmers. The cost incurred by commission agents cum wholesalers was (Rs. 1 per kg) in local market and Rs. 3 per kg in distant market for both regions because the commission agents cum wholesalers sold grapes to the other

wholesalers and retailers which were in the different taluks. The profit margins for commission agents was same for distant market (Rs. 0.50 per kg) and (Rs. 0.50 per kg) for local market as the cost incurred by commission agents was same in both the markets.

The purchase price of wholesalers was same as the sale price of commission agents. The cost incurred by wholesalers was same as that of commission agents as the wholesalers in distant market also sold the grapes in different taluks which were far distance from Sangali as the wholesalers in local market were sold their grapes in local market. The profit margins per kg was more in distant market (Rs. 1.50) compared to local market (Rs. 0.50) because as the cost incurred by the wholesalers in distant market was more compared to local market and the loading and unloading charges were also high in distant market compared to local markets.

The sale price of wholesalers or purchase price of retailers was more (Rs. 21) for distant market compared to (Rs. 16) local market as the cost incurred by the wholesalers in distant market was more compared to local market.

The cost incurred by retailers was more in distant market (Rs. 1.00) compared to local market (Rs. 0.50). The profit margin per kg for retailers was more in distant market (Rs. 3) compared to local market (Rs. 2.50) as the market cost incurred by retailers in distant

market was more compared to local market. The sale price or consumer price per kg for retailers was more in distant market (Rs. 25) compared to local market (Rs. 19) as the cost incurred was more in distant market compared to local market.

5.5.5 The price spread among different market intermediaries in raisins marketing in dry and humid regions.

The price spread among different market intermediaries for raisins produced by sulphur fumigation method and dipping oil method is presented in Table 4.21. The Table revealed that the cost of production per kg of raisins for producers for raisins produced by sulphur fumigation method and raisins produced by dipping oil method was more in humid region (Rs. 34.30 and Rs. 29.79 respectively) as compared to dry region (Rs. 34.08 and Rs. 29.51 respectively). Because the cost of production of raisins was high for humid region compared to dry region. The marketing cost which included transportation cost, loading and unloading charges and packing material costs was more in dry regions (Rs. 3.67 per kg) of raisins compared to humid regions (Rs. 3.33 per kg) of raisins for raisins made by both methods as the distance from market was more for dry region compared to humid region. The profit margin for the raisins produced by sulphur fumigation method and raisin produced by dipping oil method was more for the farmers in the dry region (Rs.

37.25 and Rs. 46.46) compared to the humid region (Rs.37.33 and Rs. 44.88). The net price obtained by producers was high for raisins produced by dipping oil method (Rs. 78 per kg) as compared to raisins produced by sulphur fumigation method (Rs. 75 per kg) as the quality of raisins produced by dipping oil method was good compared to raisins produced by sulphur fumigation method. The price obtained by farmers in both regions was same for raisins produced by both methods because the farmers in these two regions was sold their produce in same market (Sangli).

The purchase price, marketing cost, profit margin, sale price for commission agents were same for both regions as the farmers in both regions sold their produce in same market. The commission charged by commission agents was 2 per cent on the sale price. As the sale price of raisins made by dipping oil method due to it's good quality was high (Rs. 83) compared to raisins made fumigation method (Rs. 80), the profit margin for commission agents was same in case of raisins produced by the dipping oil method (Rs. 2.00 per kg) of raisins and also raisins produced by sulphur fumigation method.

The purchase price was same as the sale price of commission agents for wholesalers for the raisins produced by both methods. The cost incurred by the wholesalers was same for the raisins produced by the both methods (Rs. 3.00 per kg of raisins). The sale price of the

raisins produced by dipping oil method (Rs. 88 per kg) was high compared to raisins produced by the sulphur fumigation method (Rs. 85 per kg) for the wholesalers. The profit margin for wholesalers was same for the raisins produced by dipping oil method (Rs. 2.00 per kg) and also raisins produced by sulphur fumigation method as the profit margin charged wholesalers was 2 per cent on sale price of raisins produced by both methods.

The purchase price for retailers was same as the sale price of the wholesalers which was high for dipping oil method (Rs. 88 per kg) compared to raisins produced by sulphur fumigation method (Rs. 85 per kg).

The cost incurred by retailers was (Rs. 1.5) on the raisins produced by both methods as the cost incurred was on the per kg of raisins irrespective of quality. The sale price or consumer price was high for raisins produced by dipping oil method (Rs. 93.50 per kg) compared to raisin produced by sulphur fumigation method (Rs. 90.50 per kg) as the quality of raisins produced by dipping oil method was good compared to raisins produced by sulphur fumigation method. The profit margin for retailers was same for the raisins produced by the both methods as the retailers charged their profit on the quantity (per kg) irrespective of quality of raisins.

5.6 Problems faced by the farmers

Table 4.22, Table 4.23, Table 4.24 and Table 4.25 revealed that the non availability of the labour was the serious problem for both the regions because grape and raisin production required more and skilled labour for the operations like pruning, shoot thinning , subcaning, harvesting, dipping the grape bunches into the oil and for sulphur fumigation etc. The farmers faced the problem of lack of technical assistance, regarding the production of grapes and raisins either by government or any private institution.

Non availability of water in dry region was responded as a serious problem by all the farmers but only 15 farmers in the humid region responded it as a problem. Non availability of chemicals was a problem for (10.83 per cent) farmers as they want some specific chemicals for the production of raisins. Non availability of pesticides was a problem for (10 per cent) farmers as they want some specific pesticides for the production of grapes.

The low price was observed to be serious problem for marketing of grapes and raisins as it was expressed by 112 and 115 farmers in the dry and humid regions, followed by the road network as for the farmers in the humid region required to transport their grapes from the production area to the raisin making unit and for the farmers in the dry region transportation of raisin from raisin making unit to

market. The farmers also faced the problem of lack of buyers or merchants as the farmers in both regions sold their grapes and raisins in the same market. Packaging material and high spoilage were not serious problems. These farmers want specific type of the packaging material.

Summary and Policy Implication

VI. SUMMARY AND POLICY IMPLICATIONS

The nutritive value of fruits in human diet is universally recognized. Fruits are chief sources of vitamins and certain minerals, which are necessary to maintain proper health and acquire resistance to diseases. Fruit growing serves as the mother of many industries and it reduces the seasonal unemployment.

India is the second largest producer of fruits after Brazil. India produces 46 million tonnes of fruits which accounts for 10 per cent of world production of fruits. Grape is rich in energy giving sugars and some useful minerals like phosphorus, iron and vitamins like vitamin B_1 and vitamin B_2.

Raisin is the second important product of grape. Raisins are used in preparation of sweets, puddings, bakery products, drakshas was etc. Thomson seedless is the multipurpose variety suitable for raisin making.

In Karnataka, grape occupies an area of 6,051 hectare with the production of 1,48,921 tonnes. It is cultivated in almost all the districts, the leading districts are Bangalore rural, Bijapur, Belgaum and Kolar. Grape cultivation is becoming popular in Belgaum district. Though few studies were made on economics of grape cultivation, no studies were conducted on economics of raisin making in two different

regions. The information on the economics of grape cultivation and raisin making help for making decisions related to grape enterprise. The present study was taken up in Athani taluk of Belgaum district of Karnataka with the following specific objectives.

Objectives

The specific objectives of the study are;

(1) To study the cost and returns in grape production in two regions of Athani taluk.

(2) To compare the economics of raisin making in and outside the production area.

(3) To study the marketing management of table grapes and raisins.

(4) To identify the problems and suggest appropriate policy measures.

Sampling

Grape is cultivated in almost all the districts of Karnataka. The leading districts are Bangalore, Bijapur and Belgaum. Belgaum district ranks third in area and fifth in production.

Grape cultivation is practiced throughout the district with area of 1011 hectares. However, the large scale cultivation of grape and raisin making is concentrated in Athani taluk of Belgaum District.

Hence this taluk was specifically selected. The villages where the raisin making is extensively practiced were selected from each region. The number of farmers selected were 60 in dry region and 60 in humid region. Thus the total size for the sample selected for the study was 120. The sample grape cultivators, were then post classified into four categories based in their spacings adopted and method of raisin making viz., sulphur fumigation method with spacing-I (8' x6'), sulphur fumigation method with spacing-II (6' x6'), dipping oil method with spacing –I (8' x 6'), dipping oil method with spacing –II (6' x 6').

Analytical Techniques

The analytical tools were used in the analysis was simple tabular analysis and benefit cost ratio.

The technique of tabular analysis was employed to estimate the cost of establishment, cost of maintenance, cost of production, pattern of labour use, cost of marketing, etc.

The benefit cost ratio was worked out by the present value of benefits divided by present value of cost.

Findings

The cost of establishment of vineyard per hectare was higher in dry region for spacing-I Rs. 3,57,389.45 followed by spacing –II Rs. 3,78,025.59 compared to humid region, spacing –I Rs. 3,36,268.80

and spacing –II Rs. 3,68,047.27. Material costs accounted 73.17 per cent, 71.94 per cent in dry region and 70.40 per cent, 69.59 per cent in humid region for spacing –II and I respectively. While the labour costs accounted for 13.32 per cent, 15.10 per cent in dry region and 16.61 per cent and 17.93 per cent in humid region for spacing I and spacing II respectively. The irrigation system establishment cost accounted for spacing II and I was 13.51 per cent, 12.96 per cent in dry region and 12.99 per cent, 12.48 per cent in humid region respectively.

The cost of maintenance of vineyard upto bearing period was highest in dry region with Rs. 1,82,447.32 and Rs. 1,76,415.68 compared to humid region 1,76,067.5 and Rs. 1,64,879.44 in spacing I and spacing II respectively.

The total cost of establishment of vineyard which includes the establishment cost and maintenance cost upto bearing period was more in dry region Rs. 5,39.837.27 in spacing –I and Rs. 5,54,471.27 in spacing II followed by humid region Rs. 5,12,336.3 in spacing –I and Rs. 5,32,926.71 in spacing –II . The highest cost incurred in spacing –II was due to more number of vines accommodated which required more quantity of material and labour inputs.

The per hectare total variable cost was Rs. 1,84,521.40 in spacing-I and Rs. 1,90,094.06 in spacing –II for dry region and Rs.

1,95,125.97 spacing –I and Rs. 2,01,239.73 in spacing –II for humid region. In all the spacings labour cost constituted the major portion (labour 22.00 per cent). Since, the important operations like manuring, fertilizer application, ppc application, GA treatment, harvesting and thinning required relatively more labour.

The total cost of production during bearing period was less in dry region for spacing II Rs. 2,34,052.89 followed by spacing –I Rs. 2,27,366.02 and in humid region spacing –II Rs. 2,43,440.60 and spacing I Rs. 2,35,683.12. The net returns were Rs. 4,74,633.98, Rs. 5,32,947.11 in dry region, Rs. 5,31,316.88 and Rs. 5,88,559.40 in humid region for spacing II and I respectively. The higher costs and net returns in humid region were due to more quantity of variable inputs used and higher yields obtained.

The returns per rupee of investment was Rs. 3.09, Rs. 3.28 in dry region and Rs. 3.25, Rs. 3.42 in humid region for spacing II and I respectively.

The cost of production of raisin was higher in dipping oil method Rs. 3,75,247.15 in humid region Rs. 3,71,696.97 in dry region, followed by sulphur fumigation method Rs. 3,59,931.08 in humid region and Rs. 3,57,205.81 in dry region. Variable cost accounted maximum share in raisin production by both methods (78 per cent).

Among the fixed costs, steel racks shared maximum cost 42.70 per cent while, the cost of chemicals accounted for maximum share among variable costs 40.00 per cent in the total cost of production. The heavy cost on processing shed Rs. 1,78,616.00 was due to the basic materials like iron angles, tins whose price per unit is more.

The Drying ratio was more in dipping oil method 3.97: 1.00 and less in sulphur fumigation method 4.77: 1.00.

The net returns from raisins was higher in dipping method Rs. 6,10,670.91 in dry region and Rs. 6,07,120.73 in humid region followed; by sulphur fumigation method Rs. 4,28,957.69 in dry region and Rs. 4,26,232.42 in humid region. The higher net returns received in dipping oil method was due to higher price per kg of produce on account of better quality (mainly green colour).

The marketing cost incurred was more for marketing intermediaries for Hyderabad market Rs. 433.33 compared to Mumbai market Rs. 333.33. The net return in Hyderabad market was more for different grades compared to Mumbai market.

In the marketing cost of 1 tonne grapes for farmers, the labour cost required for cleaning and packing and for weighing and grading was more in humid region Rs. 600 compared to dry region Rs. 500. The total cost of marketing of one tonne of grapes was more for humid region Rs. 5,325 for local market compared to dry region Rs. 5,125 as

for the distance market, it was higher for the dry region Rs. 6,000 compared to humid region Rs. 5,700.

The marketing cost of one tonne raisin was high in dry region Rs. 3,366.64 compared to humid region Rs. 3,333.30.

The majority of farmers expressed non-availability of labours, lack of technical assistance as major problem in production of grapes and raisins. Almost all the farmers in dry region expressed non-availability of water as a major problem. In case of marketing of grapes and raisins low price, lack of road network, lack of buyers and lack of cold storage was expressed as major problems by the farmers in both regions.

POLICY IMPLICATIONS

1. Grape cultivation generates ample and regular employment opportunities throughout the year, as it requires human labour on a large scale throughout its production period. Hence, the cultivation of this crop on a large scale would go a long way in over coming the problem of seasonal unemployment for the landless agricultural labourers and thus contributes to the level of incomes of landless labourers.

2. It is necessary to establish grape growers co-operative marketing and processing society in the study for production, processing and marketing of grapes/raisins.

3. Grapes and raisins are highly perishable. Hence, scientific cold storage facilities and insulated refrigeration vehicles may be arranged by govt. on a commercial basis to help the farmers, processors and marketers to store and transport the produce to a distant market safeguarding its acceptability.

4. It is necessary to create infrastructure facilities like good road network better electricity supply etc. in dry region by state government to avoid farmers of humid region going to neighbouring state for raisin making.

5. It is necessary to create technical training facility for production of grapes for the farmers in dry region to improve their skill and to increase their labour efficiency so that the cost of production will come down.

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Appendices

APPENDIX- I

SCHEDULE –I

(Grape growers and raisin manufactures)

1. Name: -

2. Village: -

3. Total Area: - (Owned land)

Total Area (hectares)	Irrigated	Non-irrigated

4. Land revenue: -

5. Loan taken: -

6. Planting system: -

7. Year of establishment of vineyard:-

8. Establishment of vineyard (days per acre)

Particulars	Labour requirements					
	Human labour				Bullock labour	
	Number	Days	Number	Days	Number	Days
A) Preparatory tillage and planting (i) Preparatory tillage (ii) Digging of pits (iii) Filling pits with FYM and others (iv) Planting of cuttings						
B) Errection of training system (i) Errection of bamboo sticks (ii) Errection of stone pillars (iii) Training system establish-ment						
C) Miscellaneous						

9. Establishment cost of vineyard

Particulars	Quantity	Value
(A) Material inputs		
(i) Cuttings		
(ii) Bamboo sticks		
(iii) Stone pillars		
(iv) Trellis wires		
(v) Tar		
(vi) Clamps		
(vii) Angels		
(viii) Nut bolts		
(B) Labour requirements		
(i) Land preparation		
(a) Human		
(b) Bullock		
(ii) Planting of cuttings		
(iii) Errection of training system		
(iv) Miscellaneous expenditure		

10. Cost of maintenance of vineyard up to bearing

Particulars	I year		II year	
	Quantity	Value	Quantity	Value
A) Material inputs				
(i) Manures				
(ii) Fertilizers				
(iii) Plant protection chemicals (PPC)				
(iv) Micronutrients				
B) Labour requirements				
(i) Human labour (Man days)				
(ii) Bullock labour (Pair days)				

11. Labour requirements to maintain vineyard upto bearing (days per acre)

Particulars	Labour requirements											
	Ist year						IInd Year					
	Human labour				Bullock labour		Human labour				Bullock labour	
	Men		Women				Men		Women			
	Number	Days	Number	Days	Number	Days	Number	Days	Number	Days	Number	Days
Intercultivation												
Weeding												
Fertilizer application												
Pruning												
Irrigation												
Recutting												
Shoot thinning												
Subcaning												
Manuring												
PPC												
Topping or pinching												

12. Labour requirements in grape cultivation during bearing period (days per acre)

Particulars	Labour requirements					
	Human labour				Bullock labour	
	Men		Women			
	Number	Days	Number	Days	Number	Days
April-September Period						
1. Pruning						
2. Intercultivation						
3. Weeding						
4. Manuring						
5. Fertilizer application						
6. PPC application						
7. Irrigation						
8. Shoot thinning						
9. Subcaning						
October-March Period						
1. Pruning						
2. Intercultivation						
3. Weeding						
4. Manuring						
5. Fertilizer application						
6. PPC application						
7. Irrigation						
8. Girdling						
9. GA treatment						
10. Harvesting						
11. Thinning						
12. Topping or Pinching						

13. Cost of production of grapes

Particulars	Quantity	Value
A) Material Inputs (i) Manures (ii) Fertilizers (iii) Plant Protection Chemicals (PPC) (iv) Micronutrients (v) Growth Regulators		
B) Labour Requirements (i) Human labour (ii) Bullock labour		
C) Repairs		
D) Any others		

14. Type of raisin making unit:-

1. Sulphur fumigation method
2. Dipping oil method

15. Cost of establishment of raisin making Unit

Particulars	Number	Value
A) Value of land		
B) Buildings (i) Processing shed (ii) Checking tanks (iii) Fumigation chamber (iv) Steel/Bamboo racks/ crates		
C) Other assets and requirements		

16 Labour requirements in production of raisins

Particulars	Labour requirements			
	Men		Women	
	Number	Days	Number	Days
A) Cleaning dipping and sulphuring				
B) Cleaning and dipping				
C) Watch and ward (up to drying)				
D) Any others				

17. Cost of chemicals in production of raisin

Chemicals	Quantity (liter)	Value (Rs.)
1. Ethyl oleate lye		
2. Potassium carbonate (K_2CO_3)		
3. Sulphur		
4. Dipping oil (i) 50% spray (ii) 25% spray (iii) 25% spray		
5. Fuel		
6. Any others		

18 Cost of production of raisins

Particulars	Number	Value
A) Chemicals		
B) Raw materials		
C) Labour (i) Men (ii) Women		
D) Transportation		

19. Processing of grapes

Particulars	Quantity (Qty)
Own farm in dry region	
Farmers from humid region	

20. Sale of grapes:

Particulars	Quantity (Qty)	Price (Rs.)
Local market		
Distant market		

21. Sale of raisins:

Particulars	Quantity (Qty)	Price (Rs.)
Local market		
Distant market		

22. Cost incurred in marketing of table grapes

Particulars	Local market	Distant market
A) Production cost		
B) Packing and grading cost		
C) Labour charges (loading and unloading)		
D) Transportation cost (i) Distance (ii) Cost		
E) Government duties		
F) Spoilage of product		
G) Other costs		

23. Cost incurred in marketing of raisins

Particulars	Local market	Distant market
(A) Production cost		
(B) Packing and grading cost		
(C) Labour charges (loading and unloading)		
(D) Transportation (i) Distance (ii) Cost		
(E) Government duties		
(F) Spoilage of product		
(G) Bank loan		
(H) Storage cost		
(I) Other costs		

24. Problems faced in production and marketing of grapes and raisins

Particulars	Good	Bad	Poor	Very poor
(i) Lack of road network				
(ii) Lack of banking facility				
(iii) Lack of government assistance				
(iv) Non availability of packing material				
(v) Lack of cold storage facility				
(vi) Lack of technical assistance				
(vii) Non availability of chemicals				
(viii) Non availability of labour				
(ix) Non availability of electricity				
(x) Non availability of water				
(xi) Lack of marketing facility				

25. Problems faced during marketing

Particulars	Grapes	Raisins
(i) Low price		
(ii) Lack of buyers/merchants		
(iii) High spoilage		
(iv) Any other		

SCHEDULE –II

(Market intermediaries)

1. Name: -

2. Place of operation: -

3. Annual turnover

Particulars	Quantity handled (Qty)	Rupees worth (Rs.)
(a) Grapes		
(b) Raisins		

4. Price

Particulars	Table/raw grapes	Raisins			
		Grade I	Grade II	Grade III	Grade IV
Quantity					
Price					

5. Sale of produce:

Particulars	Grapes	Raisins			
		Grade I	Grade II	Grade III	Grade IV
A) Market in which sold (i) Local (ii) Distant					
B) Quantity sold in market (i) Local (ii) Distant					
C) Cost of grading					
D) Cost of packing					
E) Cost of labour					
F) Cost of transportation in markets (i) Local (ii) Distant					
G) Cost of storage (i) Local (ii) Distant					
H) Commission					
I) Government duties					
J) Price obtained in markets (i) Local (ii) Distant					

6. Off take of product by the buyer

Particulars	
A) Easily taken	
B) Should put in effort to sell	
C) Sell at lower prices	

7. Prospect of increasing turnover in local market and distant market

8. Problems faced in marketing

I) Table grapes

II) Raisins

MANAGEMENT OF AGRIBUSINESS UNITS – A CASE OF GRAPE AND RAISIN PRODUCTION IN DRY AND HUMID REGIONS OF ATHANI TALUK, BELGAUM DISTRICT

JAGDALE S. P. **2003** **Mr. J. S. SONNAD**

ABSTRACT

Study on the management of agribusiness units – a case of grape and raisin production in dry and humid regions of Athani taluk, Belgaum district was carried out in Karnataka state during 2002-03 by following proporationate random sampling with 120 farmers were selected and data was collected by personal interview.

The important findings of the study were – the cost of production of grapes were high in humid region (spacing-I Rs. 235684 and spacing-II Rs. 243440) compared to dry region (spacing-I Rs. 227366 and spacing-II Rs. 231053).

The net returns from grape production were high in humid region (spacing-I Rs. 531317 and spacing-II Rs. 588560) compared to dry region (spacing-I Rs. 474634 and spacing-II Rs. 532984) which could be attributed to good irrigation management in humid region.

The total cost of production of raisins in humid region was Rs.359931 (sulphur fumigation method) and Rs.375247 (dipping oil method) while in dry region it was Rs.357206 (sulphur fumigation method) and Rs.371697 (dipping oil method).

The net returns in raisin making by sulphur fumigation method in dry region and humid region was Rs.428958 and Rs. 426333 respectively while by dipping oil method it was Rs. 610671 and Rs. 607121 for dry and humid region respectively.

The cost of marketing of grapes in local and distant market was Rs. 5125 and Rs. 6000 respectively for dry region while it was Rs. 5325 and Rs. 5700 respectively for humid region.

The producer share in consumer rupee (%) in grape marketing was 68.42 and 52.00 for local and distant market in both regions while in case of raisins it was 82.87 and 83.42 for raisins made by sulphur fumigation method and dipping oil method in both regions.