# CERTIFICATE

This is to certify that the thesis entitled **"ECONOMIC ANALYSIS OF COMMERCIAL FLORICULTURAL NURSERY MANAGEMENT IN EAST GODAVARI DISRICT OF ANDHRA PRADESH"** submitted in partial fulfillment of the requirements for the degree of **MASTER OF SCIENCE IN AGRICULTURE** in the major field of **Agricultural Economics** of the Acharya N.G. Ranga Agricultural University, Hyderabad, is a record of the bonafide research work carried out by **Miss. K. MAYURI** under my guidance and supervision. The subject of the thesis has been approved by the Student's Advisory Committee.

No part of the thesis has been submitted by the student for any other degree or diploma. The published part has been fully acknowledged. All the assistance and help received during the course of investigations have been duly acknowledged by the author of the thesis.

**(S. HYMA JYOTHI)**
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# CERTIFICATE

**Miss. K. MAYURI** has satisfactorily prosecuted the course of research and that the thesis "**ECONOMIC ANALYSIS OF COMMERCIAL FLORICULTURAL NURSERY MANAGEMENT IN EAST GODAVARI DISRICT OF ANDHRA PRADESH"** submitted is the result of original research work and of sufficiently high standard to warrant its presentation to the examination. I also certify that the thesis or part thereof has not been previously submitted by her for a degree of any university.

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# Economic Analysis of Drip Irrigation in Oil palm Cultivation in East Godavari District of Andhra Pradesh


***BY***

**B.MRUDULA**

**B.Sc.(Ag.)**


**THESIS SUBMITTED TO THE**

**ACHARYA N.G.RANGA AGRICULTURAL UNIVERSITY**

**IN PARTIAL FULFILLMENT OF THE REQUIREMENTS**

**FOR THE AWARD OF THE DEGREE OF**

**MASTER OF SCIENCE IN AGRICULTURE**


**DEPARTMENT OF AGRICULTURAL ECONOMICS**
**AGRICULTURAL COLLEGE, BAPATLA**

**ACHARYA N.G. RANGA AGRICULTURAL UNIVERSITY**
**RAJENDRANAGAR, HYDERABAD – 500 030.**


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**RAJENDRANAGAR, HYDERABAD – 500 030.**

**2012**

# DECLARATION

**I, Miss. K.MAYURI,** hereby declare that the thesis entitled "**ECONOMIC ANALYSIS OF DRIP IRRIGATION IN OIL PALM CULTIVATION IN EAST GODAVARI DISTRICT OF ANDHRA PRADESH"** submitted to the Acharya N.G. Ranga Agricultural University for the degree of **MASTER OF SCIENCE IN AGRICULTURE** in the major field of ***Agricultural Economics*** is the result of the original research work done by me. It is further declared that the thesis or any part thereof has not been published earlier in any manner.

Place:

Date : **(B.MRUDULA)**

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***Date:*** ***(Mayuri…✍)***

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# LIST OF SYMBOLS AND ABBREVIATIONS

| | |
|---|---|
| % | : Per cent |
| ∑ | : Sum of |
| & | : And |
| < | : Less than |
| > | : More than |
| /acre | : Per acre |
| ac | : Acre |
| ºC | : Degrees Celsius |
| ‘000 hectares | : Thousand hectares |
| ‘000 tonnes | : Thousand tonnes |
| AP | : Andhra Pradesh |
| BCR | : Benefit-cost ratio |
| *et al.* | : and others |
| etc. | : et cetera (and the rest) |
| Fig | : Figure |
| Ha | : hectare |
| i.e., | : That is |
| IRR | : Internal Rate of Return |
| kg | : Kilogram |
| km | : Kilometre |
| MLR | : Multiple Linear Regression |
| m.m | : Millimetre |
| NGO | : Non Government Organization |
| NHB | : National Horticultural Board |
| NPW | : Net Present Worth |
| No. | : Number |
| NS | : Non Significant |
| p.a | : Per Annum |
| PBP | : Pay-back Period |
| $R^2$ | : Co-efficient of Multiple Determinations |
| Rs. | : Rupees |
| Rs/ha | : Rupees per hectare |

| | |
|---|---|
| sq. kms | : Square kilometres |
| sq. m | : Square metres |
| TC | : Total cost |
| TFC | : Total fixed cost |
| Tk. | : Taka |
| TR | : Total returns |
| Viz., | : namely |
| W | : Kendal's Coefficient of concordance |

# ABSTRACT


| | | |
|---|---|---|
| Name of the Author | : | **K. MAYURI** |
| Title of Thesis | : | "**ECONOMIC ANALYSIS OF COMMERCIAL FLORICULTURAL NURSERY MANAGEMENT IN EAST GODAVARI DISTRICT OF ANDHRA PRADESH**" |
| Degree | : | **MASTER OF SCIENCE IN AGRICULTURE** |
| Faculty | : | **AGRICULTURE** |
| Department | : | **AGRICULTURAL ECONOMICS** |
| Chair person | : | **Dr. S. HYMA JYOTHI** |
| University | : | **ACHARYA N. G. RANGA AGRICULTURAL UNIVERSITY** |
| Year of Submission | : | **2012** |


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The study was undertaken with objectives of 1) to estimate the cost and returns of commercial floricultural nursery, 2) to appraise the financial feasibility, 3) to study the factors affecting the gross returns of floricultural nursery, 4) to identify the constraints in floricultural nursery management.

East Godavari was purposively selected and Kadiyam mandal with highest area under floricultural nurseries was selected. The top four villages under floricultural nursery area were selected. The sample of 30 floricultural nursery enterprises were selected at random by following probability proportion to number of nurseries in each village giving equal weightage to both the categories (category I & II)considered. In this way, multi-stage purposive random sampling was adopted.

The total expenditure incurred by floricultural nursery entrepreneurs for establishing the per hectare floricultural nursery was Rs. 25,14,299.89 for category I and Rs. 25,88,383.90 for category II with an overall average establishment cost of Rs. 25,51,338.29.

The cost of cultivation of per hectare floricultural nurseries was Rs. 18,04,891.10 and Rs. 18,59,193.98 for category I and II nurseries respectively with an overall average cost of Rs. 18,32,100.75. The net returns per hectare were Rs. 4,62,363.43 for category I and Rs. 6,28,050.15 for category II nurseries with an overall average returns of Rs. 5,45,206.79. The cost of cultivation and net returns showed a direct relationship with the size of the floricultural nursery in the present study.

The results of investment appraisal techniques showed the pay-back period for floricultural nursery was found to be 2.92 and 2.52 years for category I and category II nurseries respectively and on an overall 2.72 years. The net present worth discounted at 12 per cent was found to be Rs. 27,03,004.31 per hectare for category I, Rs. 32,62,576.45 per hectare for category II and Rs. 29,82,790.38 overall the sample. The

benefit-cost ratio was found to be 1.59 for category I, 1.69 for category II nurseries and 1.64 overall the sample. The internal rate return that can be obtained by investment was found to be 113.09 per cent, 133.95 per cent for category I and II nurseries respectively and 123.52 percent overall the sample.

The results of break-even analysis revealed that break-even output in value per hectare of commercial floricultural nursery was Rs. 15,78,250.04 for category I, Rs. 15,73,923.41 for category II and Rs. 15,76,086.73 for overall sample.

The function analysis revealed that the expenditure on human labour, plant material along with polythene bags shown significant positive influence on the gross returns for overall sample.

The major constraint faced by the floricultural entrepreneurs was the unavailability of sufficient human labour for carrying nursery operations followed by unavailability of continuous supply of electricity, unavailability of suitable soil, insufficient supply of water for irrigation, mortality of plants and lack of adequate transportation facilities

## Chapter I

# INTRODUCTION

Flowers have their own importance since ancient times and are being used for decoration, worshiping as well as in satisfying the aesthetic feelings. In recent years the floriculture is emerging as a market demand driver activity throughout the world and considered as a potential money-spinner. The floricultural activities are being recognized as a lucrative profession with much higher margin of returns per unit area when compared to the field and other horticultural crops. Among horticultural crops, cut flowers and ornamentals perhaps do fetch higher value.

The words of John Keats, "A thing of beauty is a joy forever", connotes fresh flowers have been one of the best medium of expression of greetings, regards, respect, love and care in enhancing aesthetics of daily decor in human habitations. It is being rightly said "flowers speak a millions of unspoken words" They will fit all occasions, be it at birth, marriage or death ceremonies. Hence, floriculture is fast emerging activity as a major commercial venture in the world scene.

With changing life styles and increased urban affluence, floriculture has assumed a definite commercial status in recent times. Increased potential of commercial floriculture has resulted in the blossoming of this field into a viable agri-business option. Improved communication and transportation facilities have increased their availability in every part of the world. The commercial activity of production and marketing of floriculture products is also a source of gainful and quality employment to scores of people.

In India, the area under flowers has crossed one and half lakh hectares (National Board of Horticulture) concentrated mostly in states of Tamil Nadu which ranked first with an area of 29.10 thousand hectares (17.48 %) of the country's total area under flowers, followed by Karnataka 26.02 thousand hectares (15.63 %), West Bengal 21.07 thousand hectares (12.65 %) and Andhra Pradesh 19.45 thousand hectares (11.68 %) (Appendix-I). These states are considered as hot bed of traditional flowers and it clearly indicated that the cultivation of flowers is mostly concentrated

in southern states of India. According to a report of the NHB, the total area under flower crops in India during 2008-09 was estimated around 166.50 thousand hectares, which includes area under traditional flowers like jasmine, chrysanthemum, gomphrena, crossandra, tuberose, aster, marigold, lotus and Indian orchid and modern flowers including rose, carnation, gladiolus, liliums, anthurium, gerbera etc. Indian floriculture industry has been shifting from traditional flowers to cut flowers for export purpose. The liberalized economy has given an impetus to the Indian entrepreneurs for establishing export oriented floriculture units under controlled climatic conditions. The popularity of floriculture is catching up with progressive farmers in many states and the trend is more pronounced in the foothills of the Himalayas. Although India's share in the global market for flowers and flower products is minimal, the growth potential is large.

When it comes to production, India produces 987.4 thousand tonnes of loose flowers and 47,942 thousand tonnes of cut flowers annually. The state-wise production of loose and cut flowers is presented in Appendix-II. The table clearly indicated that Tamil Nadu ranks first in production of loose flowers followed by Karnataka and Andhra Pradesh while West Bengal ranks first in the production of cut flowers followed by Karnataka and Maharashtra.

**THE PROBLEM**

Floriculture is identified by NHB as promoting thrust area for investment and diversification of horticulture and agriculture activities. A very few studies have been done on the economic aspects of floricultural nursery management. There is every need to know the costs involved and returns obtained from floricultural nursery and the factors that are contributing for the viability of floricultural enterprise. Hence the economics of commercial floricultural nursery management has to be studied. The demand for the plants is not steady throughout the year and varies year to year. Factors such as the location of the nursery and desire of the consumers affect the demand and supply relationship in the nursery business. Thus, the entire production and marketing of floricultural plant is confronted with various types of problems which calls for an in-depth and systematic study on the economic aspects of production, investment, resource productivity of floricultural nurseries. The present study is an attempt in this direction, to know the present status and constraints involved in the floricultural nursery business.

## OBJECTIVES

The specific objectives of the present study are:

1. To study the costs and returns involved in maintenance of commercial floricultural nurseries.
2. To study the capital investment pattern of commercial floricultural nurseries.
3. To analyze the factors affecting the returns in floricultural nursery management.
4. To identify and analyze the constraints faced by the commercial floricultural entrepreneurs in maintaining the nurseries.

## SCOPE OF THE STUDY

The study was taken to focus the problems of the floricultural nursery entrepreneurs. The study also throws light on the costs and returns of the nursery business. The findings obtained from the study may be useful to design appropriate policy measures for the planners, administrators and extension workers.

## LIMITATIONS OF THE STUDY

The study has its own inherent limitations. The necessary data and information were collected through survey method by conducting personal interview with the sample commercial floricultural entrepreneurs. Therefore, the data collected and inferences drawn thereon are subject to recall bias since the floricultural entrepreneurs did not maintain proper records on costs and returns of the nursery. However, care was taken to minimize the recall bias through cross checks during the personal interview.

The other major limitation was the sample size which was limited to 30 as it was difficult to get the required information from the nursery owners due to the pressure and fear of taxation in the recent period.

The generalization made from this study is applicable to those areas with similar situation. These aspects have to be borne in mind while interpreting the results of the study.

## HYPOTHESES

The following hypotheses were postulated for testing:

1. Commercial floricultural nursery business is labour intensive.

2. Commercial floricultural nursery business is profitable.

## ORGANIZATION OF THE THESIS

| | | |
|---|---|---|
| Chapter I | - | The problem setting, the objectives, scope, limitations and hypotheses of the study are presented. |
| Chapter II | - | Concepts used in the present study and review of the past studies on the subject are discussed. |
| Chapter III | - | The methodology and techniques of analysis used in the study are presented. |
| Chapter IV | - | Agro-economic profile of the study area is given. |
| Chapter V | - | Results of the study are presented and discussed. |
| Chapter VI | - | Summary and conclusions are presented. |

## Chapter II

# REVIEW OF LITERATURE

Clear cut knowledge of the various concepts is very important for any research work. The concepts identify the objectives and phenomenon to bring clarity in making inferences and permit comparison with other studies dealing with similar concepts. The review of concepts used in earlier studies help to adopt, modify and improve the conceptual frame work and provide link with past studies. In this chapter an attempt is made to review the various concepts used in the earlier studies and to specify the concepts used and adopted in the study.

For better exposition, the review of literature has been organized under the following headings.

i. Studies on costs and returns in floriculture.
ii. Studies of investment and functional analysis in floriculture.
iii. Studies on constraint analysis in floriculture.

### 2.1 STUDIES ON COSTS AND RETURNS

Patil and Hiremath (1985) studied the production and marketing of chrysanthemum flowers in Dharwad district, Karnataka. They reported that the per hectare cost of production was Rs. 19,350 and sales through commission agent was the main channel of marketing.

Subrahmanyam (1986) estimated the economics of production and marketing of chrysanthemum flowers in Karnataka. He observed that the average total cost of cultivation was around Rs. 21,537.59 per hectare showing the high capital intensive nature of crop. Among the different items of cost, input cost has accounted for nearly 46 per cent of the average total cost of cultivation followed by marketing cost at 44 per cent showing the heavy expenditure incurred for marketing the crop. Among the different items of costs, human labour consisting of mostly hired labour had accounted for nearly 50 per cent of the total input cost showing the labour intensive nature of the crop.

Rameshkumar (1989) studied the economics of production and investment in jasmine flowers in Madurai district of Tamil Nadu. He reported that the total expenditure incurred by jasmine growers for establishing the jasmine garden in the first year was Rs. 13,700 per hectare. Among the different items of establishment, planting and plant material has accounted for the major portion i.e., about 31 per cent of establishment cost. The maintenance cost for carrying out various operations was Rs. 32,184 per hectare.

Subrahmanyam (1989) studied the economics of investment in jasmine in Kolar district in Karnataka. Jasmine was a perennial crop and its economic life varies from 15 to 20 years. In the first year the total cost of cultivation was around Rs. 18,400 per hectare. Out of which around Rs. 10,900 was incurred towards cost of inputs. From second year onwards the total cost of cultivation varied from Rs. 42,000 to Rs. 52,570 per hectare. Out of which, nearly 35 per cent was towards marketing cost, 55 per cent towards cost of inputs and the rest towards fixed costs. Out of the total input cost large amount was accounted by harvesting cost. This was because of the fact that Kakada variety plants bear flowers throughout the year.

Neerajadevi (1990) studied the economics of production and marketing of Kakada flowers in Bangalore district, Karnataka. The results revealed that the average per acre establishment cost incurred by the Kakada growers was Rs. 3,978.16 of which, the labour and material costs accounted for 50.75 and 49.25 per cent respectively. The average labour used per acre for establishment was 71.09, 65.88 and 8.89 men, women and bullock pairs, respectively. The annual maintenance cost for carrying out various operations was Rs. 6,849.75 per acre.

Nagarajan (1992) conducted study on cost of cultivation of Soundarya Kanakambaram at Olakkur village in Tindivanam taluk (Madras). The results revealed that, it provides a net income of Rs. 1,59,485 per acre with a gross output value of Rs. 2,40,000 on total input cost of Rs. 80,515.

Rao *et al.* (1992) examined the costs and returns of jasmine cultivation in Guntur district of Andhra Pradesh. They categorized the sample into three main age groups of plants based on area under this crop. The per hectare maintenance cost of jasmine were Rs. 43,009.88, Rs. 52,597.90 and Rs.46,842.01 for the age groups of plants in one to three years, four to eight years and nine and above nine year age groups respectively. The gross returns per hectare were Rs. 52,171.70, Rs. 67,411.50 and Rs. 57,954.10, in the above age group of plants respectively.

Shedage and Borude (1992) studied the economic analysis of flower production in Thane district, Maharashtra. The study revealed that the flower production needs very intensive cultivation and large initial investment. Once the production starts, there was continuous income to the farmers. The generation of employment opportunities was also very high. Study also indicated the excessive use of inputs resulted into low profit margins.

Ravindrakumar (1996) studied the cost of production of gladiolus in Karnataka. He estimated the total cost of cultivation of gladiolus per hectare to be Rs. 2,84,356.78. The net returns realized per hectare of gladiolus was Rs. 1,40,544.70.

Bhattacharya (1997) made a detailed study on floriculture industry in India and found that the profit margin varied between 25 to 30 per cent on the cost of production. Roses were sold in the local markets at Rs. 70-100 per kg. He opined that floriculture industry is both labour and capital intensive with an investment of Rs. 2.50 crores per hectare. The investment on plant materials alone accounted about 25 per cent of the total establishment cost and low cost greenhouse would cost Rs. 70,000. Labour cost and depreciation were found to be major components accounting 24.5 per cent and 22.7 per cent respectively of total cost of production.

Chengappa *et al.* (1998) compared the net returns across flowers such as rose, chrysanthemum, aster, gladiolus and tuberose in and around Bangalore. The study indicated that the net returns were maximum in rose (Rs. 79,671.56) followed by tuberose(Rs. 57,666.25) and gladiolus (Rs. 61,097.09). In terms of returns per rupee of investment it was observed that tuberose yielded the maximum input-output ratio at 1:3.28 followed by gladiolus (1:2.98), chrysanthemum (1:2.92) and aster (1:2.04).

Pavan and Goyal (1998) studied the cost of establishing the rose gardens in Sonepet district of Haryana state. The total cost of establishing the garden worked out to be Rs. 27,356 per hectare. The breakup of the total establishment cost revealed that among the various components of establishment cost, the cost of seedlings of rose formed the single largest cost item accounting for 63.97 per cent of the total establishment cost i.e., Rs. 17,500 per hectare. Manures and fertilizers, transplanting and preparatory tillage were the other major components of establishment cost accounting for 10 per cent, 43 per cent, 5.63 per cent and 4.26 per cent of the total establishment cost respectively. The average annual net returns were Rs. 44,457 per hectare.

Gajanana and Subramanyam (1999) found out the cost of establishment of 1000 anthuriums consisting of shade house, pots, seedlings, material and labour inputs to be Rs. 1.27 lakhs in Karnataka and Rs. 1.39 lakhs in Kerala. The cost of seedlings was the major component of establishment cost in both the states. Cost of cultivation including the amortised establishment cost accounted to be Rs. 49,000 in Karnataka and Rs. 55,000 in Kerala. The cost of producing one anthurium stem would be Rs. 8 to Rs. 10 in Karnataka and Rs. 9 to Rs. 12 in Kerala. The average price received by the producer ranged from Rs. 7.5 to Rs. 11 per stem in Karnataka and Rs. 8 to Rs. 13 per stem in Kerala depending upon whether the flower was sold in the local or distant market. Though the cost of cultivation was less in Karnataka, the net returns were also lower at 1.36 per stem in Karnataka as against Rs. 1.46 per stem in Kerala, which was attributed mainly to higher price realized by Kerala farmers who sold their flowers in distant markets like Mumbai and Kolkata.

Banerjee and Ali (2000) studied economics of annual chrysanthemum var. cherrygold (*Chrysanthemum carinatum*) flower in West Bengal. The study analysed some economic aspects in cultivation of annual chrysanthemum. Amongst the operations, intercultural operation was noted to be the most labour intensive operation. The cost of cultivation per bigha (0.133 hectare) of this flower was calculated to be Rs. 3,116 at cost 'A' and Rs. 4,406 at cost 'B'. Its cultivation was highly remunerative as output-input ratio was more than 3 indicating the feasibility of the cultivation of cherrygold flower.

Sharma (2001) conducted a study in Ludhiana, Punjab, India, to estimate the economics of flower seed production. Results showed that 84.63% of the total area under flower crops in selected farms was under seed production of flowering annuals. The total cost of cultivation was Rs. 55,276.21 per hectare, 73.44% of which was the operational cost and 26.56% the fixed cost. Among various cost components, human labour accounted for the major portion of the total cost (59.04%). Return to cost '$A_1$' was Rs. 78,905.70 per hectare and return to cost '$C_2$', i.e. net return from this crop, was Rs. 64,266.09 per hectare. Seed production of flowering annuals was mostly adopted by the flower growers of this area was due to favourable marketing arrangement for these crop.

Hymajyothi and Raju (2002) conducted a study to estimate the costs and returns in cultivation in rose, jasmine and crossandra crops in Kadiyam mandal of East Godavari district of Andhra Pradesh. For collecting the information regarding costs and returns per hectare, a sample of 30 farmers each were selected for jasmine, rose and crossandra. Total cost per hectare was highest in case of rose i.e., Rs. 1,15.675.08 followed by jasmine with Rs. 1,05,816.49 and crossandra Rs. 72,834.14. Net returns realised per hectare was highest in case of jasmine Rs. 42,683.51 followed by Rs. 40,984.92 in rose and Rs. 31,357.51 in crossandra. The annuity value of establishment cost per hectare for jasmine and rose were Rs. 7,512.70 and Rs. 22,911.01 respectively.

Shivprasad (2002) conducted an experiment on anthurium cultivation in Madikeri taluk of Coorg district. He analysed a total recurring expenses of Rs. 3,88,060. The total planting area was 5,148 sq.m. The flowers produced per plant was eight, in all flowers produced was Rs. 2,59,200 number. Ninety per cent of the total flowers produced were sold at a sale price of Rs. 10 per flower. The total income realized per year was Rs. 23,32,800.

Tale and Kalamkar (2003) examined the per hectare level of inputs used, the costs, and returns for zandu, budded rose, gaillardia, chrysanthemum and mogra flower crops based on survey data collected from 40 flower growers in the vicinity of Nagpur district, Maharashtra. It is observed that flowers are labour-intensive crops. Per hectare labour requirement was lowest in zandu (35.85 days) while highest in budded rose (535.93 days). Per hectare gross return was lowest in gaillardia (Rs 39,000) followed by annual chrysanthemum (Rs. 43,500) and highest in budded rose (Rs. 1,96,800.6). Input-output ratio was highest in zandu (2.01) followed by in mogra (1.19) and gaillardia (1.17).

Haque *et al*. (2007) conducted a study in Jessore and Gazipur districts to assess the socio-economic status of plant nursery business in Bangladesh. A total of forty private nurseries, four government nurseries and six NGO nurseries were selected for the study. The yearly net returns per hectare for private, government, and NGO nursery were Tk. 2,15,766, Tk. 1,20,149 and Tk. 5,35,961, respectively. The rates of returns over total costs were found to be 1.43 for private, 1.37 for government, and 1.50 for NGO nurseries.

Hind Agri-Horticultural Society (2007) studied the economic feasibility of cultivating marigold, gladiolus, chrysanthemum, rose and tuberose, a study was conducted in four purposively selected villages in Sonepat and Panipat district of Haryana state, India. Results revealed that the total mandays required were 141.83/acre for rose, 89.37/acre for gladiolus, 86.41/acre for tuberose, 64.08/acre for chrysanthemum, and 61.33/acre for marigold. The maximum mandays required for hoeing/weeding operation were 40 for rose, and 30 for marigold, gladiolus, and chrysanthemum. In the case of tuberose, 22.50 maximum mandays were required for transportation, 20 for sowing, and 15 each for hoeing/weeding and harvesting/picking. Operational cost per acre was 24.99, 22.30, 20.72, 8.30 and 7.28 per cent of total costs for rose, chrysanthemum, marigold, tuberose and gladiolus, respectively. The percentage shares of per acre material cost and working cost were found highest in gladiolus (81.28 and 88.88, respectively), followed by tuberose (61.65 and 69.72, respectively), and minimum in chrysanthemum (24.28 and 46.58, respectively). The percentage share of fixed cost was found to be highest in chrysanthemum (53.41) and marigold (53.13) followed by rose (47.13) and lowest in gladiolus (11.12).

Bagade *et al.* (2008) studied the input utilization, costs, returns and profitability of cut flower production and identified the production constraints in Ratnagiri district, Maharashtra. The cost of planting materials for gerbera under co-operative and private units accounted for 40.67 per cent and 41.71 per cent of total production costs, respectively. The total labour used in co-operative and private units was 469 and 464 mandays, respectively. The cost of cultivation in the co-operative and private units was Rs.2,68,171 and Rs.2,67,563 per hectare, respectively. The costs for the rental value of land and planting materials occupied the lion's share of total costs in co-operative and private units. The total cost of production per hectare was Rs.3,52,813 and Rs.3,45,092, with a gross return of Rs.3,88,993 and Rs.3,66,936 and input-output ratio of 1:1.10 and 1:1.06 for co-operative and private units, respectively.

Ingle *et al.* (2009) conducted a study to evaluate the production cost of Jasmine flowers in Nanded district of Maharashtra. Results revealed that overall production cost worked out to be Rs.1,83,021.94. Component wise, rental value of land accounted for the highest share (30.55%) in total cost followed by hired human labour (25.14 %), amortised cost (13.13 %), family human labour (11.32 %), irrigation (6.35 %) manures (4.24 %), fertilizers (2.20 %), bullock labours (1.61 %) and plant protection (0.73 %). Net profit was Rs.1,52,791.39 per hectare.

Perke *et al.* (2009) studied economic analysis of mogra flower production in Nanded district of Maharashtra. The results revealed that use of hired human labour and family labour was 627.63 mandays and 160.32 mandays per hectare, respectively. Cost 'A' was Rs.49,617.39 per hectare and cost 'C' was Rs.87,248.78. The output-input ratio at cost-C was 1.41.

Patil *et al.* (2010) worked out the cost, return and profitability of mogra, spider lily, kagda flowers in Thane district of Maharashtra. Total cost of cultivation for the maintenance of a kagda garden (cost 'C') was determined to be Rs. 2,83,348.15, whereas cost 'A' and cost 'B' were Rs. 1,40,368.19 (49.54 %) and Rs. 2,26,058.54 (79.78%), respectively. Among various cost items for mogra, the maximum cost was incurred on rental value of land (27.65%), followed by human labour (27.19%), marketing (24.25%), amortization value (6.13%), plant protection (6.00%), supervision (4.58%) and fertilizers (2.62%). The per hectare total cost of maintenance of a spider lily garden (cost 'C') was worked out to be Rs. 1,39,723.11, whereas cost 'A' and cost 'B' were Rs. 85 447.44 (61.15%) and Rs. 1,31,178.37 (93.88%), respectively. The per hectare total cost of production in the case of kagda was more than that for mogra and spider lily. The profit at cost 'A', cost 'B' and cost 'C' was maximum in the case of mogra, with a benefit-cost ratio of 1.65. Hence, mogra production is more profitable than kagda and spider lily.

## 2.2 STUDIES OF INVESTMENT AND FUNCTIONAL ANALYSIS

Rameshkumar (1989) evaluated the investment in jasmine gardens in Madurai district using discounted cash flow measures. The economic life of the jasmine was assumed to be 12 years. The net present worth was found to be Rs. 13,195 per hectare at a discount rate of 15 per cent. The benefit-cost ratio was 1.6 and the internal rate of return was found to be more than 50 per cent.

Subrahmanyam (1989) evaluated the investment in jasmine cultivation in Kolar district, Karnataka. He assumed the economic life span of jasmine as 15 years and applied commonly used discounted methods like benefit-cost ratio, net present value, payback period and internal rate of return. The benefit-cost ratio was 3.33 (12%) and 3.27 (15%), net present value per hectare was Rs. 3,41,300 (12%) and Rs. 2,82,664 (15%), internal rate of return was 50 per cent and pay-back period was 2 years.

Neerajadevi (1990) evaluated the investment pattern in jasmine gardens in Bangalore district using discounted cash flow measures. The average expected productive economic life of the jasmine orchard was assumed to be 15 years. The net present worth was found to be Rs. 1,05,198 per acre at a discount rate of 15 per cent. The benefit-cost ratio was 2.3 and the internal rate of return was found to be more than 50 per cent.

Rao (1990) employed production function analysis in his study on jasmine in Guntur district of Andhra Pradesh. The results revealed that in case of pooled situation the area in hectares and human labour showed positive significant influence where as cost on seed material showed negative significant influence on gross returns.

Singh and Vasisht (1994) while studying resource allocation efficiency on various sizes of farms in Salem district Tamil Nadu observed that values of coefficient of multiple determination ($R^2$) were quite high in all small, medium and large farms. They concluded that the expenditure on fertilizers, irrigation and bullock labour significantly increased the farm returns. Human labour which was available in abundance on the small farms was used excessively and inefficiently whereas on the large farms the man power increased the farm returns considerably.

Hemakumari (1995) studied resource productivity in chrysanthemum in East Godavari district of Andhra Pradesh using functional analysis and found that in case of pooled farm situation seed, manures and fertilizers, machines labour and human labour were found to influence gross returns significantly.

Hymajyothi (1996) employed functional analysis to study the factors affecting the gross returns in floriculture in East Godavari district. The results showed that human labour and machine labour were found to be significantly affecting the gross returns at one and five level respectively. The manures and fertilizers were negatively non-significant and plant protection chemicals were positively non-significant on gross returns. The $R^2$ was 0.96.

Biju (1999) studied the resource productivity in orchids and anthurium using functional analysis in Southern districts of Kerala and Tamil Nadu. The results revealed that area under orchids in cents, the number of mandays of labour and the media and material cost were found to be exerting significant influence on returns. Similarly the area under anturium, irrigation, plant protection costs, number of mandays of labour and the media and material cost were found to have significant influence on returns.

Hind Agri-Horticultural Society (2007) studied the economic feasibility of cultivating marigold, gladiolus, chrysanthemum, rose and tuberose. This study was conducted in four purposively selected villages in Sonepat and Panipat districts of Haryana state. The return per rupee of investment was found highest in chrysanthemum (95.15%) followed by rose (87.75%), gladiolus (80.67%), marigold (60.96%) and lowest in tuberose (58.49%).

Vanishree (2007) studied the investment appraisal analysis in jasmine in Chitradurga district, Karnataka. The results revealed that net present value of investment was Rs. 5,36,212.40 per acre at 12 per cent discount rate, pay-back period was found to be three years (3.09), discounted benefit cost ratio was 2.28 and the internal rate of return was found to be 250 per cent for jasmine enterprise.

Singh (2011) studied economics of damask rose plantation in Punjab. Cost of cultivation per acre was worked out to be Rs. 36,647. Damask rose oil production is a remunerative venture with Rs. 59,842 as net present value (NPV), 12.70% as internal rate of return (IRR) and benefit-cost ratio (BCR) as 1.54.

## 2.4 STUDIES ON CONSTRAINT ANALYSIS

Gajanana and Subrahmanyam (1999) studied the constraints in production of anthurium in Karnataka. The major constraints as expressed by the respondents were non availability of required quantity and quality of planting material followed by high cost of seedlings and incidence of pests and diseases.

Patil (2001) conducted a study on commercial flowers like kagda, mogra and spider lilly. The constraints faced by the growers were pests and diseases followed by costly insecticides.

Tale and Kalamkar (2003) reported problems in cultivation of flower crops like zandu, budded rose, gaillardia, chrysanthemum and mogra. The data collected from 40 flower growers in the vicinity of Nagpur district, Maharashtra. The major problems were non-availability of required quantity and quality of planting material followed by high cost of seedling and incidence of pests and disease.

Parab (2004) studied cut flower (gerberas, carnations and orchids) production in South Konkan region, Maharashtra. The major constraints faced by growers in cultivation of cut flowers include lengthy loan procedure, high pest and disease incidence, high cultivation cost, high commission charges, high transportation costs and lack of organized market in the area.

Rakeshkumar *et al*. (2004) conducted a study on the marketing of marigold, rose and jasmine in U.P. A variety of problems were identified by them with the marketing of flowers in the study area. They were, price fluctuation (78.50%), lack of institutional credit facilities (60%), inadequate transport facility (49%), delayed payment for the produce (34%), illegal deduction from the receipts of the farmers (25.50%) and improper weighment of produce in the market (17.50%).

Gowda *et al.* (2006) conducted a study to know constraints in cultivation and marketing of cut flowers in Belgaum District, Karnataka. Data were gathered from 40 gerbera and 40 carnation growers in the district. The major problems in production and marketing of cut flowers were pests and disease attack, high investment cost, exploitation by the middlemen, fluctuation in prices and low price of the flowers.

Ravinder and Joshi (2006) studied problems and prospects in contract farming of floriculture in Punjab. Five companies engaged in the business of flower seed production through contract farming and 72 farmers having contractual arrangements with these contracting agencies were selected as the respondents. Contract farmers faced problems like labour scarcity, verbal contract while the contracting agencies faced problems like difficulty to motivate farmers to grow flowers and lack of technical know-how about flower cultivation with the farmers.

Haque *et al*. (2007) conducted a study in Jessore and Gazipur districts to assess the socio-economic status of plant nursery business in Bangladesh. Non-availability of improved seeds/seedlings was the main constraint for private and NGO nurseries, whereas, lack of adequate fund was the crucial problem for government nurseries

Bagade *et al.* (2008) studied cut flower (gerbera, anthurium, orchids, and rose) production in Ratnagiri district, Maharashtra. The major production constraints observed were non availability of credit, labour, suitable planting material and manures and fertilizers.

Jagadishkumar and Prakashkumar (2008) conducted farm-level study in Tumkur district of Karnataka and reported the constraints identified in contract farming. Delayed payment for crop produce, lack of credit for crop production, scarcity of water for irrigation, erratic power supply and difficulty in meeting quality requirements were found to be the major constraints faced by contract farmers. The major constraints expressed by the contract agencies in expanding contract farming include violation of terms and conditions by farmers, lack of proper management by the company, frequent price fluctuations in the international market and scarcity of transport vehicles during peak periods.

# Chapter III

# MATERIAL AND METHODS

Perfect understanding of the design of the study is very important for any scientific enquiry. Hence, a brief description of the methodology followed in the sampling, data collection and analysis of the data is presented in this chapter. Different concepts and methods followed in the course of study are also outlined.

## 3.1 SAMPLING DESIGN

In this study, a multistage purposive random sampling technique was employed to select the sample commercial floricultural nurseries.

### 3.1.1 Selection of Districts

East Godavari district is one the major district which ranks first in coastal Andhra Pradesh and ranks fifth in Andhra Pradesh in the sphere of floriculture in area as well as production (Appendix-III). Therefore East Godavari district is purposively selected for the survey.

### 3.1.2 Selection of Mandal

The selection of the study area was mainly based on the dominance of the floricultural nurseries in the district. The mandals of the district were arranged in descending order based on area under floriculture. Kadiyam mandal topped the list and hence selected for the study (Table 3.1.).

**Table 3.1. Mandal-wise area of flowers in East Godavari district of Andhra Pradesh during 2008-09.**

| Mandal | Area (ha) | Per cent in total |
|---|---|---|
| Tuni | 34 | 1.62 |
| Kadiyam | 1,555 | 74.31 |
| Alamuru | 305 | 14.57 |
| Atreyapuram | 182 | 8.70 |
| TOTAL | 2,093 | 100.00 |

Source: Agriculture Census, Chief Planning Office, Kakinada.

### 3.1.3 Selection of Villages

The village-wise information relating to area under floriculture nurseries was obtained from the Mandal Revenue Office, Kadiyam. The top four villages having the highest area under floriculture nurseries were selected from Kadiyam mandal for the purpose of the study (Table 3.2.) and selected villages are:

(a) Kadiyapulanka (b) Vemagiri (c) K.Savaram (d) Muramanda

**Table 3.2. Village-wise area of commercial floricultural nurseries in Kadiyam mandal during 2008-09.**

| S. No. | Village | Area in hectares |
|---|---|---|
| 1 | Kadiyapulanka | 498 |
| 2 | Vemagiri | 216 |
| 3 | K.Savaram | 202 |
| 4 | Muramanda | 156 |
| 5 | Burrilanka | 75 |
| 6 | Kadiyam | 36 |
| 7 | Others | 17 |
| | Total | 1200 |

Source: Mandal Revenue Office, Kadiyam, East Godavari district.

### 3.1.4 Selection of Sample Floricultural Nursery Enterprises

The list of floricultural nursery enterprises was obtained from the Mandal Revenue Office, Kadiyam. The floricultural nursery enterprises were selected randomly from each village based on probability proportional to number of floricultural nurseries. The total nursery area under floricultural nurseries was averaged and mean area of nursery was arrived at one hectare (2.5 acres). Two different size categories were made in the sample respondents based on the mean nursery area i.e., category I having less than one hectare nursery area and category II having nursery area more than one hectare. Form each category 15 nursery enterprises were selected randomly, making total sample size of 30 floricultural nursery enterprises for the present study.

### 3.1.5 Size-Wise Distribution of the Floricultural Nurseries in the Selected Villages

It was noticed from the table 3.3. that the size-wise distribution of floricultural nurseries in the four selected villages were, 20 from Kadiyapulanka, 4 from Vemagiri, 3 each from K. Savaram and Muramanda, making a total of 30.

**Table 3.3. Size-wise distribution of floricultural nurseries in the selected villages.**

| S. No. | Village | Category I | Category II | Total |
|---|---|---|---|---|
| 1 | Kadiyapulanka | 10 | 10 | 20 |
| 2 | Vemagiri | 2 | 2 | 4 |
| 3 | K. Savaram | 1 | 2 | 3 |
| 4 | Muramanda | 2 | 1 | 3 |
| | Total | 15 | 15 | 30 |

## 3.2 DATA COLLECTION

The reference period for the data collection was 2010-11 agricultural year.

The data required for the present study was collected by personally interviewing the sample floricultural nursery entrepreneurs through a pre-tested well structured schedule prepared for the purpose.

### 3.2.1 Primary Data

The primary data on the following aspects were collected from the sample floricultural nursery entrepreneurs.

General particulars such as,

- Name of the floricultural nursery and respondent, extent of acreage and year of establishment.
- Establishment cost of commercial floricultural nursery which include total labour cost and total material cost at the time of establishment.
- Maintenance cost and returns from the established floricultural nursery.

- Details about the fixed expenses such as rental value of land, depreciation of farm assets and interest on fixed capital etc.
- Details regarding the inventory of assets.
- Details regarding the constraints faced by the entrepreneurs in maintaining the floricultural nurseries.

### 3.2.2 Secondary Data

The data regarding the agro-economic aspects of the study area was collected from the Chief Planning Office, Kakinada and the list of floricultural nurseries was collected from Mandal Revenue Office, Kadiyam.

During the survey, it was observed that majority of the respondents were not maintaining proper records about the expenditure and income from the nursery. However, all the efforts were made to convince the farmer about the purpose of the study to elicit the accurate information.

## 3.3 TOOLS OF ANALYSIS

The methods of analysis followed are presented under the following sub-heads.

(1) Computation of costs and returns.
(2) Analysis of investment pattern.
(3) Functional analysis.
(4) Problems in nursery business.

### 3.3.1 Computation of Costs and Returns

Floricultural nursery is a perennial business with an approximate economic life span of 5 years. The cost incurred can be classified into two categories viz., (1) establishment cost and (2) maintenance cost. It is to be done by working out the simple averages of various costs and returns involved in maintenance of nurseries. As floricultural nurseries are perennial in nature establishment cost was estimated and annuity value of establishment cost was worked out.

$$\text{Annuity value} = \frac{[C\ (1+r)^{N}]\ [1-(1+r)]}{1 - (1+r)^{N}}$$

Where, C- capital

r- rate of interest

N- number of years of economic life

### 3.3.1.1 Establishment cost

The establishment costs include all the expenditure incurred during the initial year for the establishment of floricultural nursery. Items like cost of ploughing, levelling and digging of pits, plant material, manures and fertilizers, plant protection chemicals, cost of irrigation, after cultivation practices, earthing up, making of field channels etc. were included.

### 3.3.1.2 Maintenance Cost

All recurring costs required for maintaining the plants and their health during economic life span of floricultural nursery such as expenditure on cultural practices, manures and fertilizers, plant protection chemicals, irrigation, pruning, weeding etc., were considered as maintenance costs. Besides, interest on fixed and working capital, annual depreciation on equipments, land rent and annuity value of establishment were also included for working out the cost of cultivation.

### 3.3.1.3 Cost of cultivation according to cost concepts

**3.3.1.3.1 Cost $A_1$ :** Value of the hired labour + attached labour + value of owned and hired bullock labour + charges on owned and hired machinery + value of seed material + value of manures + value of fertilisers + value of plant protection chemicals + irrigation charges + depreciation, repairs and maintenance of farm machinery, farm implements and farm buildings + land revenue + cess + interest on working capital.

**3.3.1.3.2 Cost $A_2$:** Cost $A_1$ + rent paid on leased in land.

**3.3.1.3.3 Cost B:** Cost $A_1$ or Cost $A_2$ + imputed rental value on owned land + imputed interest paid on owned fixed capital assets excluding land.

**3.3.1.3.4 Cost C:** Cost B + imputed value of family labour. This gives the commercial cost of production. For all the practical purposes cost ‘C’ is the relevant cost and the prices received should cover the cost of production based on cost ‘C’.

### 3.3.1.4 Returns

In the present study the concepts of gross income and net income were used. The gross income from floricultural nursery was computed by summing all the income from flower and ornamental plants obtained by multiplying the physical quantity and the weighted average price of each flower plant. The different varieties of plants sold by the commercial floricultural nursery were ornamentals (shrubs, crotons, palms, creepers, xerophytes, tujas etc.) and flowering plants (rose, jasmines, chrysanthemum, crossandra, lilies, chinese rose, flower creepers, marigold, carnation etc). Net returns were worked out by deducting cost 'C' from gross income.

### 3.3.1.5 Farm Efficiency Measures

Farm business income, family labour income, farm investment income were calculated.

**3.3.1.5.1 Farm Business Income :** This is the return to the nursery owner for himself and his family labour and investment on owned land and owned fixed capital. It is worked out by deducting the cost 'A' from gross income.

Farm business income = Gross income – Cost '$A_1$'/ Cost '$A_2$'

**3.3.1.5.2 Family Labour Income:** It is the measure of returns from nursery to family labour. This was obtained by deducting cost 'B' from gross income.

Family labour income = Gross income – Cost 'B'

**3.3.1.5.3 Farm Investment Income:** It is a measure of return from nursery to the fixed capital investment of the nursery. This was calculated by adding imputed rental value of owned land and interest on fixed capital to net income.

Farm investment income = Farm business income – Imputed value of family labour

### 3.3.2 Analysis of Investment Pattern

Undiscounted and discounted cash flow techniques were used to analyse the investment and find out the technical feasibility and economic viability of investment in floricultural nurseries.

The discounted cash flow technique of evaluating long term projects is based on the fact that a rupee invested today is worth more than a rupee in future years. It is a process of finding the present worth of an amount received or paid in the future. This has an advantage that future cash flows are reduced to a single sum at one specific point of time and this facilitates comparison between alternative investment choices, if any.

The discounted flow measures used in the analysis were, net present worth, benefit-cost ratio and internal rate of returns. Besides these the undiscounted measure, pay-back period was also calculated.

### 3.3.2.1 Pay-back Period

The Pay-back Period (PBP) is the duration of time in years taken to liquidate the investment. The payback period was estimated by summing up all the undiscounted net benefits over the years to make up the initial investment incurred for establishment.

Pay-Back Period = I/E

Where, I= investment of the project

E=annual net cash inflows.

### 3.3.2.2 Net Present Worth (NPW)

The net present worth represents the discounted value of the future net cash inflows to floricultural enterprise. In the present study, a discount factor of 12 per cent was used to discount the net cash inflows representing the opportunity cost of capital. It can be represented by

$$\text{Net present worth} = \sum_{t=1}^{n} \frac{B_t - C_t}{(1+i)^t}$$

where, n = number of years

i = discount rate

$B_t$ = benefit in rupees for $t^{th}$ year

$C_t$ = cost in rupees for $t^{th}$ year

The net present worth has to be positive to indicate that the project investment is economically feasible and financially sound.

### 3.3.2.3 Benefit-cost ratio (BC ratio)

It is the ratio between the discounted cash inflows and discounted cash outflows and the ratio must be unity or more for an investment to be considered worthwhile. The benefit cost ratio (BCR) was worked out by using the following formula.

$$\text{Benefit cost ratio} = \frac{\sum_{t=1}^{n} B_t / (1+i)^t}{\sum_{t=1}^{n} C_t / (1+i)^t}$$

where, n = number of years

i = discount rate i.e., at 12%

$B_t$ = benefit in rupees for $t^{th}$ year

$C_t$ = cost in rupees for $t^{th}$ year

### 3.3.2.4 Internal Rate of Returns (IRR)

It is the rate of returns which equates the discounted benefits with discounted costs. In other words, it is the discounted rate which equates the present worth of benefits to the present worth of costs. It represents the average earning capacity of an investment over the economic life period of the project. Mathematically it can be stated as he rate at which the NPW of project is equal to zero is nothing but internal rate of return (IRR). The net cash inflows were discounted to determine the present worth following the interpolation technique as mentioned under;

$$\text{IRR} = \left(\begin{array}{c}\text{Lower}\\ \text{discount}\\ \text{rates}\end{array}\right) + \left(\begin{array}{c}\text{Difference}\\ \text{between}\\ \text{the two}\\ \text{discount rates}\end{array}\right) * \left[\frac{\text{Present worth of cash flow at lower discount rate}}{\text{Absolute difference between present worth of the cash flow at the two discount rates}}\right]$$

The internal rate of return also ranks the different investment proposals for preference in the order of magnitude. The highest value of internal rate of return indicates the first and the lowest value being the last choice of preference. However, the internal rate of return should be more than the discount rate being considered for economic feasibility and financial soundness.

In evaluating the economic feasibility the long term investments certain assumptions were inevitable and the following assumptions were made in evaluating the investment in floricultural nurseries.

(1) The economic life period of floricultural nursery garden was assumed to be five years as indicated by the majority of the floricultural entrepreneurs and experts.

(2) The investment made in the first year was considered as establishment cost. The establishment cost is apportioned for the life span of the nursery and added as a component to fixed cost as annuity value.

(3) The cost incurred annually from second year onwards was considered as maintenance cost.

(4) The returns generated from the floricultural nurseries over the years were considered in monetary terms and this constituted the cash flow of the project.

(5) A discount rate of 12 per cent was assumed to be the opportunity cost of capital investment in the floricultural nursery gardens and the stream of cash inflows and cash outflows were discounted at this rate.

### 3.3.3 Functional Analysis

Regression analysis was employed using multiple linear regression to identify the factors affecting the output (gross income). The general form of multiple linear regression is given below.

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + ..... + b_n X_n$$

Where , $Y$ = Gross returns in rupees (Dependent variable)

$X_1$ to $X_n$ = Inputs (Independent variables)

$b_1$ to $b_n$ = Regression coefficients

$a$ = Constant

$X_1$ = Human labour expenditure

$X_2$ = Fertilizers expenditure

$X_3$ = Plant protection chemicals expenditure

$X_4$ = Polythene bags expenditure

$X_5$ = Planting material expenditure

### 3.3.4 Break - Even Point

At break-even point the farmer gets neither loss nor profit. To know the minimum level of turnover of a commercial floricultural nursery break-even point in value terms was calculated. The break-even point was located using the formula.

$$\text{Break-even output (in value terms)} = \frac{\text{Fixed cost}}{1 - (\text{Variable cost per unit} / \text{Average price per unit})}$$

### 3.3.5 Constraint Analysis

For analysing the problems faced by the floricultural nursery entrepreneurs in maintenance of plant nurseries, the floricultural nursery entrepreneurs of two categories were asked to assign the rank for each of the constraint/problem. Kendall's coefficient of concordance (W) test was used to determine the agreement among the entrepreneurs in ranking the constraints faced by them.

$$W = \frac{12\sum (R_i - \bar{R})^2}{K^2 (N^3 - N)}$$

$\chi^2$ (chi square) value is to be calculated to find the significance of the test.

$$\chi^2 = K (N-1) W \text{ at } (N-1) \text{ d.f.}$$

Where, K = number of respondents.

N = number of constraints.

W = Kendall's coefficient of concordance.

## Chapter IV

# AGRO-ECONOMIC FEATURES

The nature of the farming depends to a large extent on the location of the farm, rainfall, soil type, climate, irrigation facilities. Therefore the economic appraisal of farm requires knowledge of the physical environmental and agro-climatic features of the area under study. The nature of the farming broadly varies from region to region. Hence a brief description is presented below to have a comprehensive idea about the study area.

### 4.1 PHYSIOGRAPHY OF THE DISTRICT

East Godavari district is situated on North East of Andhra Pradesh in the geographical co-ordination of $16^0$ 30' and $18^0$ 20' of the Northern latitude and $81^0$ 30' and $82^0$ 36' of the Eastern longitude. The district covers a vast portion of the delta area of the Godavari river. The district is bounded on the North by Visakhapatnam district and the state of Orissa on the East, Bay of Bengal on the South and on the West by West Godavari district and Khammam districts. The district can be broadly classified into three natural zones the Delta, Upland and Agency tracks. The headquarters of East Godavari district is Kakinada, which is well connected by rail, road and Kakinada natural port with Coastal length of 144 kms.

As per 2001 Census, there are 1,344 inhabited villages, 60 un-inhabited villages and 22 towns. Total population is 49.01 lakhs and the geographical area is 10,807 sq. kms. East Godavari district is one of the densely populated districts in the State. The density of population was 454 per sq. kms. Out of the total population 23.50 per cent lives in urban areas remaining 76.50 per cent lives in rural areas. The district literacy rate was 65.50 per cent. A large section of the working population depends upon Agriculture for their livelihood. The population of scheduled castes was 8.82 lakhs and that of scheduled tribes was 1.92 lakhs arriving to 17.99 per cent and 3.91 per cent respectively to the total population of the district.

#### 4.1.1 Climate and Rainfall

The climate is comparatively equitable and although it is very warm in May with a maximum temperature of $39.6^0$C and with a minimum temperature of $28.2^0$C. The actual average rainfall received was 1,035 mm as against the normal rainfall 1,218 mm

for year 2008-09. The percentage of deviation over normal was 15 per cent. More than half of the annual rainfall 807 mm received during South West Monsoon period from June to September while the large portion of the rest i.e. 172 mm received during the North East Monsoon period i.e. from October to December 2008.

### 4.1.2 Soil

The main soils in the district are alluvial (clay loamy) red soils, sandy loams and sandy clay. The soils are the mostly alluvial in Godavari delta area accounting for 15 per cent of the total area and sandy clay at tail end portions of Godavari. There is red loamy soil in uplands and agency area of the district.

### 4.1.3 Land Utilization

As per table 4.1. the total geographical area of the district is 10.81 lakh hectares. During 2008-09 the area covered by forest is 3.23 lakh hectares, which forms 29.91 per cent to the total geographical area. The rest is distributed among 'Barren and uncultivable land' about 7.26 per cent and 'Land put to non-agricultural uses' about 12.89 per cent. The net area sown is 4.27 lakh hectares, forming 39.49 per cent to the total geographical area. The total cropped area in the district is 7.39 lakh hectares. The area sown more than once in 3.13 lakh hectares.

**Table 4.1. Land utilization pattern in East Godavari District for the year 2008-09.**

| S. No. | Category | Area in hectares | Percentage to total geographical area |
|---|---|---|---|
| 1 | Total geographical area | 10,80,700 | 100.00 |
| 2 | Forest | 3,23,244 | 29.91 |
| 3 | Barren and uncultivable land | 78,490 | 7.26 |
| 4 | Land put to non-agricultural uses | 1,39,345 | 12.89 |
| 5 | Cultivable waste | 17,770 | 1.64 |
| 6 | Permanent pastures and other grazing lands | 21,211 | 1.96 |
| 7 | Land under miscellaneous tree crops and grooves not included in net area sown | 8,453 | 0.78 |
| 8 | Current fallows | 26,973 | 2.49 |
| 9 | Other fallow lands | 32,830 | 3.04 |
| 10 | Net area sown | 4,26,765 | 39.49 |
| 11 | Total cropped area | 7,39,271 | 68.41 |
| 12 | Area sown more than once | 3,12,506 | 28.92 |

Source: Agriculture Census, Chief Planning Office, Kakinada, 2008-09.

### 4.1.4 Irrigation

A barriage across river Godavari at Dowleswaram near Rajahmundry is the biggest irrigation Project in East Godavari. The proposed Polavaram project across Godavari also serves the needs of East and West Godavari districts. The Yeleru irrigation channels covers Peddapuram, Pithapuram, Prathipadu, Jaggampeta, Kirlampudi and Yeleswaram Mandals. The Thandava and Pampa river channels supply water to a limited number of villages in Tuni and Thondangi mandals. In upland area there are a few irrigation tanks fed by hill streams. All other tanks, mainly depends on rain. A good number of tube wells were dug to supplement ground water irrigation. Lift irrigation and tanks irrigation is also there in Seetanagaram, Korukonda etc. like in uplands and agency mandals. Surampalem project is in use and Bhupathipalem, Musurumilli irrigation projects are also in progress at agency area.

As per the table 4.2. canals are major source of irrigation covering 3,40,382 hectares which accounts for 67.74 per cent of the total irrigated area. The other sources of irrigation are tube wells, filter points and tanks.

**Table 4.2. Area irrigated by different sources in East Godavari district for the year 2008-09.**

| S. No. | Source | Area in hectares | Percentage to gross irrigated area |
|---|---|---|---|
| 1 | Canals | 3,40,832 | 67.74 |
| 2 | Tanks | 35,362 | 7.03 |
| 3 | Tube wells & Filter Points | 1,14,045 | 22.67 |
| 4 | Other Wells | 193 | 0.04 |
| 5 | Lift Irrigation | 9,752 | 1.94 |
| 6 | Other Sources | 2,944 | 0.59 |
| 7 | Gross area irrigated | 5,03,128 | 100.00 |
| 8 | Area Irrigated more than once | 2,15,028 | 42.74 |
| 9 | Net Area Irrigated | 2,88,100 | 57.26 |

Source: Agriculture Census, Chief Planning Office, Kakinada, 2008-09.

### 4.1.5 Agriculture

The net area cultivated during 2008-09 was 4,32,384 hectares including fish ponds accounting 39.96 per cent of the total geographical area of the district. A large portion of area is irrigated by the canals. Area irrigated against the net area sown during 2008-09 was 66.98 per cent. The yield of rice per hectare in kharif was 2,983 kg and 4,690 kg in rabi.

**Table 4.3. Cropping pattern in East Godavari District for the year 2008-09 (hectare).**

| Crop | *Kharif* | *Rabi* | Total | Per cent to total area |
|---|---|---|---|---|
| Paddy | 2,40,231 | 1,69,861 | 4,10,092 | 58.4 |
| Jowar | 658 | -- | 658 | 0.09 |
| Bajra | 823 | -- | 823 | 0.12 |
| Maize | 1,602 | 6,581 | 8,183 | 1.17 |
| Ragi | 552 | 115 | 667 | 0.09 |
| Horsegram | 41 | 552 | 593 | 0.08 |
| Greengram | 315 | 43,577 | 43,892 | 6.25 |
| Blackgram | 995 | 31,934 | 32,929 | 4.69 |
| Redgram | 721 | - | 721 | 0.1 |
| Other pulses | 60 | 1,094 | 1,154 | 0.16 |
| Chillies | 553 | 702 | 1,255 | 0.18 |
| Sugarcane | 13,592 | 14,766 | 28,358 | 4.04 |
| Mango | 18722 | - | 18,722 | 2.67 |
| Banana | 15,363 | 6,770 | 22,133 | 3.15 |
| Cashew nut | 33,248 | - | 33,248 | 4.73 |
| Oil palm | 11,625 | - | 11,625 | 1.66 |
| Tapioca | 16,210 | - | 16,210 | 2.31 |
| Cotton | 7,432 | - | 7,432 | 1.06 |
| Ground nut | 35 | 451 | 486 | 0.07 |
| Sesamum | 715 | 969 | 1,684 | 0.24 |
| Coconut | 50,214 | - | 50,214 | 7.15 |
| Tobacco(n) | 1,594 | 1,009 | 2,603 | 0.37 |
| Tobacco(v) | 3,083 | 2,541 | 5,624 | 0.8 |
| Flowers | 1,062 | 1,031 | 2,093 | 0.3 |
| Other non food crops | 802 | - | 802 | 0.11 |
| Gross area sown | 4,20,248 | 28,1,95 | 7,02,201 | 58.4 |

Source: Agriculture Census, Chief Planning Office, Kakinada, 2008-09

### 4.1.6 Cropping Pattern

Area and production under important crops in the district are given in the table 4.3. It was observed from the table that paddy was the main crop in both kharif and rabi in the district. On experimental basis coffee, cocoa, rubber and pepper plantation are raised in the hilly tracts of Rampachodavaram mandal and the results are encouraging.

### 4.1.7 Infrastructural Facilities

Infrastructural facilities like banking, education, industries, transport and communication influence the extent of commercialization. Therefore an account of the above facilities in the district is given below.

#### 4.1.7.1 Banking

There are 426 bank branches are there in the East Godavari district, out of them 321 are nationalized, 47 co-operative banks, 16 are rural banks and 42 are private banks.

#### 4.1.7.2 Education

There are 3,533 primary schools, 634 upper primary schools, 857 high schools functioning in the districts under different managements. There are 9,533 teachers working in primary school, 3,944 working in the upper primary school and 8,976 teachers in high schools. There are 49 junior colleges employing 278 lecturers. Enrolment was 2,93,826 in elementary schools, 99,419 in upper primary school and 2,98,409 in high schools.

#### 4.1.7.3 Industries

Rice mills, sugar, fertilizers, paper and textiles are the large and medium scale industries in the district. There are small-scale industries like agro-based industries, chemical, ceramic, light engineering, non-ferrous metals, leather etc. In the private sector there are 104 textile manufacturing units, two sugar factories, 40 paper and paper products manufacturing units, 323 wood and wood products factories, one Horlicks factory in the district besides others. There are two large-scale fertilizers and chemicals factories at Kakinada viz. Nagarjuna and Coromandal Fertilizers. There are five industrial estates in the District at Samalkota, Dowleswaram, Rampachodavarm, Kakinada and Gopalapuram. A number of edible oil packing industries are also established in Kakinada.

There are 193 large and medium scale industries existing in East Godavari district. They are functioning with a total investment of Rs.10,817 crores duly employing 26,660 workers. A total number of 2,608 factories are functioning which are registered under Factories Act, 1948. Under cottage industries 30 units are being operated with 335 workers during 2008-09.

#### 4.1.7.4 Transport and Communications

The district is served by rail line (broad guage) which is double line from Rajahmundry to Tuni and single line from Kakinada to Samalkota and Kakinada to Kotipalli covering a distance of 171.34 kms. People have to depend upon road transport. All most all the places in the district are connected with well laid roads. With the construction of the bridges across river Godavari at Alamuru and Siddantham and rail-cum-road bridge at Rajahmundry connecting East and West Godavari districts the movements of passengers and transport of goods to several parts of the state have become easy. Agricultural commodities like coconut and other marketing goods are carried through water transport system. There are 768 APSRTC buses in use. Yanam – Yedurulanka bridge on the river Godavari named as Balayogi Varadhi was opened in 2002 connecting Konaseema area to district head quarters. National Highway (NH-5) is passing through this district with a length of 304.77 kms. One air port also exists in Rajahmundry.

### 4.1.8 Agricultural Research and Extension Facilities

One of the important National Research Institute i.e. Central Tobacco Research Institute is located at Rajahmundry where the research is being done on tobacco on different aspects. Other important horticultural research stations are Coconut Disease Investigation Centre, Razole; Coconut Research Station, Ambajipeta and Government Fruit Farm, Sirigindalapadu which is located near Rampachodavaram. In the research stations research work is going on their respective aspects which are useful to the farmers.

## 4.2 SELECTED MANDAL

Kadiyam mandal was formed on 16-01-1987 and have 11 gram panchayats and 7 revenue villages. It is bounded by Godavari river on West, Mandapeta mandal on East, Alamuru and Razole mandals on South and North respectively. This mandal is situated at about 95 km from District Headquarters, Kakinada.

As per the 2001 census, the population of this mandal was 83,857 out of which 41,681 were males and the remaining 42,176 were females. The number of marginal farmers (<2.47 hectares) were 6,746, small farmers (2.47 – 4.93 hectares) were 1,065, semi-medium farmers (4.94 – 9.87 hectares) were 425, medium farmers (9.88 – 24.7 hectares) were 93 and large farmers (>9.88 hectares) were 7. Agricultural labours in this mandal were 18,615. The literacy rate of the mandal was 64.5.

### 4.2.1 Land Utilization

The total geographic area of Kadiyam mandal was 7,579 hectares. The details of the land utilization are presented in the table 4.4.

**Table 4.4. Land utilization pattern in Kadiyam mandal for the year 2008-09.**

| S. No. | Particulars | Area (ha) | Per cent to the total geographical area |
|---|---|---|---|
| 1 | Geographical area | 7,579 | 100 |
| 2 | Forest | - | - |
| 3 | Barren un-cultivable land | 249 | 3.29 |
| 4 | Land put to Non – Agricultural uses | 1,618 | 21.35 |
| 5 | Permanent pastures & other grazing lands | 25 | 0.33 |
| 6 | Miscellaneous tree crops & grooves not included in net area sown | 6 | 0.08 |
| 7 | Culturable waste | 253 | 3.34 |
| 8 | Other fallow lands | 31 | 0.41 |
| 9 | Current fallow lands | 0 | 0 |
| 10 | Net area sown | 5,379 | 70.97 |
| 11 | Total cropped area | 10,807 | 142.59 |
| 12 | Area sown more than once | 5,428 | 71.62 |

Source: Agriculture Census, Chief Planning Office, Kakinada.

### 4.2.2 Irrigation Sources

Irrigation water plays a vital role in the production of any crop. Any yield increasing practice can be exploited fully when they are used along with this resource. In the view of this, area irrigated by different sources in Kadiyam mandal were collected and presented in the table 4.5.

**Table 4.5. Area irrigated by different sources in Kadiyam mandal (2008-09).**

| S. No. | Particulars | Area in ha. |
|---|---|---|
| 1 | Canals | 2,403 |
| 2 | Tanks | 85 |
| 3 | Tube wells | 2,830 |
| 4 | Net irrigated area | 5,318 |
| 5 | Area irrigated more than once | 4,885 |
| 6 | Gross area irrigated | 10,203 |

Source: Agriculture Census, Chief Planning Office, Kakinada.

### 4.2.3 Cropping Pattern

The area under different crops in the selected mandals were given in the table 4.6. which revealed that in the selected mandal, paddy was the main food crop followed by other important crops like sugarcane, greengram, banana, coconut, blackgram and tobacco. The predominant soils in the selected mandal were clay loam, alluvial, sandy loam and black cotton soils.

**Table 4.6. Cropping pattern in the Kadiyam mandal during the year 2008-09.**

| S. No. | Crop | Area in ha | Per cent to total |
|---|---|---|---|
| 1 | Paddy | 5,674.00 | 52.50 |
| 2 | Floriculture | 1,555.00 | 14.39 |
| 3 | Sugarcane | 1,504.00 | 13.92 |
| 4 | Greengram | 746.00 | 6.90 |
| 5 | Banana | 296.00 | 2.74 |
| 6 | Coconut | 295.00 | 2.73 |
| 7 | Blackgram | 210.00 | 1.94 |
| 8 | Tobacco | 40.00 | 0.37 |
| 9 | Others | 487.00 | 4.51 |
| | Total | 10,807.00 | 100.00 |

Source: Agriculture Census, Chief Planning Office, Kakinada.

## 4.3 SELECTED VILLAGES

The village-wise information relating to area under floriculture nurseries was obtained from the Mandal Revenue Office, Kadiyam. The top four villages having the highest area under floriculture nurseries were selected from Kadiyam mandal for the purpose of the study (Table 3.1.). The villages selected are Kadiyapulanka, Vemagiri, K. Savaram and Muramanda.

The above discussion on agro-economic features provides a better understanding of the factors which tend to influence the commercial floricultural nursery business.


**Figure 1. Map of East Godavari District**

# Chapter V

# RESULTS AND DISCUSSION

In this chapter an attempt has been made to present the results obtained from the present investigation with critical discussion. For easy understanding this chapter has been divided into number of sub-heads. The first part deals with the basic characteristics of the selected holdings, the second part deals with the economic aspects of the floricultural nursery business, the third part deals with the investment analysis of the floricultural nursery business, the forth part deals with the resource use efficiency and the fifth part deals with the problems in nursery business.

## 5.1 BASIC CHARACTERISTICS OF THE SELECTED NURSERY ENTERPRISES

The present study covered 30 commercial floricultural nurseries; the general characteristics of the sample floricultural nurseries are presented under the following heads.

1. Resource position of the selected growers.
2. Educational status of the respondents.
3. Cropping pattern of the respondents.
4. Size-wise distribution of the floricultural nurseries in the selected villages.

### 5.1.1 Characteristics of the Selected Floricultural Nurseries

As observed from the table 5.1. the average size of the floricultural nursery of the selected entrepreneurs was 3.33 hectares. All the sample nurseries were irrigated by the borewells, so 100 per cent irrigation was provided through borewell. In the study area the average family size was 4.03 members, of which, 1.66 members were working on the farm and the remaining 2.37 members of them were dependents.

**Table 5.1. Characteristics of the selected entrepreneurs.**

| S. No. | Item | Unit | Quantity |
|---|---|---|---|
| 1 | Sample Size | Number | 30 |
| 2 | Average size of the floricultural nursery | Hectares | 3.33 |
| 3 | Source of irrigation | Percentage | |
| | (a) Borewell | | 100.00 |
| 4 | Family size | Number | 4.03 |
| 5 | Family members working on the farm | Number | 1.66 |

### 5.1.2 Educational Status of the Respondents

The educational status of the selected sample nursery entrepreneurs is given below in table 5.2. It could be inferred from the table 5.2. that 40 per cent of the sample entrepreneurs were educated upto primary level, 23.34 per cent of them were educated upto secondary level, the collegiate level were upto 16.66 per cent and the illiterates were upto 20 per cent but there were no floricultural nursery entrepreneurs educated upto university level.

**Table 5.2. Educational status of the respondents.**

| S. No. | Particulars | Number of members | Percentage to total |
|---|---|---|---|
| | Literacy level | | |
| 1 | Primary level | 12 | 40.00 |
| 2 | Secondary level | 7 | 23.34 |
| 3 | College level | 5 | 16.66 |
| 4 | University level | - | - |
| 5 | Illiterates | 6 | 20.00 |
| | Total | 30 | 100.00 |

### 5.1.3 Average Size of the Family

The details of the family size and the availability of family farm workers of the selected floricultural nurseries entrepreneurs category-wise are presented in the table 5.3.

It was observed from table 5.3. that, on an average the size of family was 3.11 for category I and 3.75 for category II nurseries with an overall average of 3.43 members. The average number of male adults was one for both the categories, while, the average number of female adults were one for category I nurseries and 1.22 for category II nurseries and the average number of children were 1.11 for category I and 1.53 for category II of nurseries.

On an average, the number of workers in the family varied from 1.43 for category I nurseries to 1.38 for category II nurseries. The average male participants were one for category I as well as category II nurseries, while the average female participants were 0.12 for category I nurseries and 0.05 for category II nurseries and the average number of children participants were 0.31 for category I nurseries and 0.33 for category II nurseries.

**Table 5.3. Family particulars of the selected nursery entrepreneurs.**

| S. No. | Particulars | Category I | Category II | Overall |
|---|---|---|---|---|
| | **Family composition** | | | |
| 1 | Male | 1 (32.15) | 1 (26.66) | 1 (29.16) |
| 2 | Female | 1 (32.15) | 1.22 (32.54) | 1.11 (32.36) |
| 3 | Children | 1.11 (35.70) | 1.53 (40.80) | 1.32 (38.48) |
| | Total | 3.11 (100.00) | 3.75 (100.00) | 3.43 (100.00) |
| | **Family farm workers** | | | |
| 1 | Male | 1 (69.94) | 1 (72.46) | 1 (71.17) |
| 2 | Female | 0.12 (8.39) | 0.05 (3.62) | 0.085 (6.05) |
| 3 | Children | 0.31 (21.67) | 0.33 (23.92) | 0.32 (22.78) |
| | Total | 1.43 | 1.38 | 1.405 |

Note: Figures in parentheses indicate percentage to total.

### 5.1.4 Cropping Pattern of the Selected Entrepreneurs

The cropping pattern in the study area is presented in the table 5.4. for the selected floricultural nursery entrepreneurs. It was observed from table 5.4. that floricultural nursery entrepreneurs were cultivating paddy, greengram, blackgram, vegetables along with the floricultural nursery.

The average cropped area of the selected floricultural nursery entrepreneurs was 4.36 hectares, of which the area under floricultural nursery was maximum representing 76.38 per cent, followed by paddy with 10.09 per cent. The other crops which were cultivated by the selected entrepreneurs were greengram constituting 6.42 per cent followed by vegetables and blackgram representing 3.09 and 3.21 per cent of average cropped area respectively.

**Table 5.4. Cropping pattern of the selected floricultural nursery entrepreneurs.**

| S. No. | Crop | Average area in hectares | Per cent to total |
|---|---|---|---|
| 1 | Paddy | 0.44 | 10.09 |
| 2 | Greengram | 0.28 | 6.42 |
| 3 | Blackgram | 0.14 | 3.21 |
| 4 | Vegetables | 0.17 | 3.90 |
| 5 | Floricultural nursery | 3.33 | 76.38 |
| | Total | 4.36 | 100.00 |

### 5.1.5 Value of the Farm Assets

The value of the farm assets possessed by the two size groups of selected floricultural nursery entrepreneurs are presented in table 5.5.

The value of farm assets including the value of land on an average was Rs. 1,70,81,700 per hectare for category I nurseries and Rs. 1,71,03,223 per hectare for category II nurseries.

The value of farm assets excluding the value of land on an average was Rs. 8,31,700 per hectare for category I nurseries and Rs. 8,53,223 per hectare for category II nurseries.

It was observed that, on an average, the value of the land per hectare was the highest and equal for both category nurseries accounting Rs. 1,62,50,000 representing 95.13 per cent in total for category I nurseries and 95.01 per cent in total for category II nurseries in the total value of farm assets.

Next to land comes the value of the borewell which was Rs. 3,20,000 (1.87 per cent) for category I nurseries and Rs. 3,25,000 (1.90 per cent) for category II nurseries.

The value of implements and machinery was Rs. 2,98,000 (1.74 per cent) for category I nurseries and Rs. 3,03,223 (1.77 per cent) for category II nurseries followed by value of farm buildings which was Rs. 2,13,700 (1.25 per cent) for category I nurseries and Rs. 2,25,000 (1.32 per cent) for category II nurseries.

Except for the value of land which was equal for both categories, other assets were higher for category II nurseries. On an overall comparison, value of assets of category II nurseries were higher than category I nurseries.

**Table 5.5. Farm asset structure of selected entrepreneurs (Rs. per hectare).**

| S. No. | Particulars | Category 1 | Category 2 | Overall |
|---|---|---|---|---|
| 1 | Value of land | 1,62,50,000 (95.13) | 1,62,50,000 (95.01) | 1,62,50,000 (95.07) |
| 2 | Value of the bore well | 3,20,000 (1.87) | 3,25,000 (1.90) | 3,22,500 (1.89) |
| 3 | Value of the farm buildings | 2,13,700 (1.25) | 2,25,000 (1.32) | 2,19,350 (1.28) |
| 4 | Value of implements and machinery | 2,98,000 (1.74) | 3,03,223 (1.77) | 3,00,611.50 (1.76) |
| | Value of total assets | 1,70,81,700.00 | 1,71,03,223.00 | 1,70,92,461.50 |
| (a) | Without land value | 8,31,700 (4.87) | 8,53,223 (4.99) | 8,42,461.50 (4.93) |
| (b) | With land value | 1,70,81,700 (100.00) | 1,71,03,223 (100.00) | 1,70,92,461.50 (100.00) |

Note: Figures in the parentheses indicate the percentage to the total value of assets with land value.

## 5.2 ECONOMICS OF FLORICULTURAL NURSERY

The results are presented under the following heads:

1. Cost of establishing floricultural nursery.
2. Cost of cultivation of commercial floricultural nursery.
3. Annual human labour utilization in floricultural nursery.
4. Costs and returns by concepts in different size groups of floricultural nursery.

### 5.2.1 Establishment Cost Floriculture Nursery

The cost of establishment of the floricultural nursery per hectare was estimated by using actual physical requirements and prevailing market input prices during the reference year 2010-11. The establishment cost includes the maintenance cost i.e., upto the end of first year. The establishment cost included (a) labour costs on operations like land preparation, planting, application of manures and fertilizers, irrigation, weeding and plant protection operations and (b) material cost which include the cost on items like plant material, planting implements, farm yard manures, fertilizers, plant protection chemicals, growth regulators, polythene bags, soil, borewell, farm building and implements and machinery. The details of establishment cost are presented in table 5.6.

The study revealed that a capital outlay of Rs. 25,14,299.89 per hectare for category I and Rs. 25,88,383.90 per hectare for category II with an overall establishment cost of Rs. 25,51,338.29 was incurred. Out of this, labour cost accounted for 7.21 per cent for category I, 7.04 per cent for category II and on an overall 7.12 per cent for floricultural nursery. Material cost accounted for 92.79 per cent for category I, 92.96 per cent for category II and on an overall 92.88 per cent for floricultural nursery of the total establishment cost.

Rameshkumar (1989) studied the economics of production and investment in jasmine flowers in Madurai district in Tamil Nadu reported that the total expenditure incurred by jasmine growers for establishing the jasmine garden in the first year was Rs. 13,700 per hectare. Subrahmanyam (1989) studied the economics of investment in jasmine in Kolar district in Karnataka reported the total cost of

cultivation in the first year was around Rs. 18,400 per hectare. Pavan and Goyal (1998) studied the cost of establishing the rose gardens in Sonepet district of Haryana state. The total cost of establishing the garden worked out to be Rs. 27,356 per hectare.

The major item of labour cost was planting which accounted for 3.14 per cent for category I, 3.06 per cent for category II and on an overall 3.10 per cent for floricultural nurseries of the total establishment cost followed by land preparation that accounted for 0.97 per cent and 0.95 per cent, manures and fertilizers accounted for 0.77 per cent and 0.75 per cent, irrigation accounted for 0.75 per cent and 0.73 per cent, weeding accounted for 0.55 per cent and 0.54 per cent, bed preparation accounted for 0.54 per cent and 0.53 per cent and plant protection accounted for 0.49 per cent and 0.47 per cent of the total establishment cost for category I and II nurseries respectively.

The plant material cost was the major item of material cost that accounted for 25.09 per cent and 25.00 per for category I and category II nurseries respectively of the total establishment cost followed by soil accounting for 22.41 and 22.42 per cent, borewell accounting for 12.73 and 12.56 per cent, implements and machinery 11.85 and 11.71 per cent, farm building accounting for 8.50 and 8.69 per cent, polythene bags accounting for 4.80 and 4.74 per cent, fertilizers accounting for 2.37 and 2.47 per cent, farm yard manure accounting for 2.07 and 2.13 per cent, plant protection chemicals accounting for 1.65 and 1.83 per cent and growth regulators accounting for 1.31 and 1.40 per cent for category I and category II nurseries respectively of the total establishment cost.

The major item of total establishment cost was plant material which accounted for 25.09 and 25.00 per cent for category I and II nurseries respectively. The study conducted by Rameshkumar (1989) reported similar results in jasmine that among the different items of establishment, planting and plant material accounted for the major portion i.e., about 31 per cent of establishment cost. Studies on establishing rose gardens by Pavan and Goyal (1998) in Sonepet district of Haryana reported the cost of seedlings of rose formed the single largest cost item accounting for 63.97 per cent of total establishment cost.

**Table 5.6. Establishment cost of commercial floricultural nursery (Rs. per ha).**

| S. No. | Cost particulars | Category I | Category II | Overall |
|---|---|---|---|---|
| A. | **Labour cost** | | | |
| 1 | Land preparation | 24,500.00 (0.97) | 24,666.65 (0.95) | 24,583.33 (0.96) |
| 2 | Bed preparation | 13,583.32 (0.54) | 13,666.65 (0.53) | 13,624.99 (0.54) |
| 3 | Planting | 79,000.00 (3.14) | 79,166.67 (3.06) | 79,083.34 (3.10) |
| 4 | Manures and fertilizers | 19,333.32 (0.77) | 19,500.00 (0.75) | 19,416.66 (0.76) |
| 5 | Weeding | 13,750.00 (0.55) | 14,083.32 (0.54) | 13,916.66 (0.55) |
| 6 | Irrigation | 18,833.32 (0.75) | 18,916.65 (0.73) | 18,874.99 (0.74) |
| 7 | Plant protection | 12,333.32 (0.49) | 12,166.65 (0.47) | 12,249.99 (0.48) |
| | Total labour cost | 1,81,333.28 (7.21) | 1,82,166.59 (7.04) | 1,81,749.94 (7.12) |
| B. | **Material cost** | | | |
| 1 | Planting material | 6,30,833.32 (25.09) | 6,47,166.65 (25.00) | 6,38,999.99 (25.05) |
| 2 | Farm yard manure | 52,041.00 (2.07) | 55,100.00 (2.13) | 53,570.50 (2.10) |
| 3 | Fertilizers | 59,709.31 (2.37) | 63,990.67 (2.47) | 61,849.99 (2.42) |
| 4 | Plant protection chemicals | 41,375.32 (1.65) | 47,437.00 (1.83) | 44,406.16 (1.74) |
| 5 | Polythene bags | 1,20,666.67 (4.80) | 1,22,666.67 (4.74) | 1,21,666.67 (4.77) |
| 6 | Growth regulators | 33,041.00 (1.31) | 36,200.00 (1.40) | 34,620.50 (1.36) |
| 7 | Soil | 5,63,500.00 (22.41) | 5,80,333.32 (22.42) | 5,71,916.66 (22.42) |
| 8 | Borewell | 3,20,000.00 (12.73) | 3,25,000.00 (12.56) | 3,22,500.00 (12.65) |
| 9 | Farm building | 2,13,700.00 (8.50) | 2,25,000.00 (8.69) | 2,19,350.00 (8.60)0 |
| 10 | Implements and machinery | 2,98,000.00 (11.85) | 3,03,223.00 (11.71) | 3,00,611.50 (11.78) |
| | Total material cost | 23,32,959.40 | 24,06,217.31 | 23,69,588.36 |
| | | (92.79) | (92.96) | (92.88) |
| | **Establishment cost (A+B)** | 25,14,292.68 | 25,88,383.90 | 25,51,338.29 |
| | | (100.00) | (100.00) | (100.00) |

Note: Figures in the parentheses indicate the percentage of items to total establishment cost

### 5.2.2 Cost of Cultivation of Commercial Floricultural Nursery per Hectare

An in depth analysis was made by using the cost concepts explained in the methodology chapter by defining under two heads such as (1) variable cost, and (2) fixed cost.

**Table 5.7. Cost of cultivation of commercial floricultural nursery (Rs. per ha).**

| S. No. | Particulars | Category I | Category II | Overall |
|---|---|---|---|---|
| **A** | **Operational costs:** | | - | |
| 1 | Human Labour | 2,16,961.67 (12.02) | 2,17,029.83 (11.67) | 2,16,995.75 (11.85) |
| | a)Hired labour | 1,88,961.67 | 1,92,029.83 | 1,90,495.75 |
| | b)Owned labour | 28,000.00 | 25,000.00 | 26,500.00 |
| 2 | Machine Labour | 10,115.65 (0.56) | 11,916.65 (0.64) | 11,016.15 (0.60) |
| 3 | Manures | 27,916.65 (1.55) | 29,000.00 (1.56) | 28,458.33 (1.56) |
| 4 | Fertilizers | 48,165.50 (2.67) | 50,333.33 (2.71) | 49,249.41 (2.69) |
| 5 | Plant Protection Chemicals | 23,800.65 (1.32) | 25,166.65 (1.35) | 24,483.65 (1.34) |
| 6 | Polythene bags | 1,29,169.83 (7.16) | 1,37,246.50 (7.38) | 1,33,208.16 (7.27) |
| 7 | Growth Regulators | 11,525.00 (0.64) | 12,791.65 (0.69) | 12,158.33 (0.67) |
| 8 | Plant material | 1,31,547.00 (7.29) | 1,37,031.33 (7.37) | 1,34,289.16 (7.33) |
| 9 | Soil | 63,854.21 (3.54) | 70,154.13 (3.77) | 67,004.17 (3.66) |
| 10 | Interest on working capital | 82,882.02 (4.59) | 86,333.76 (4.64) | 84,607.89 (4.62) |
| | Total operational cost | 7,45,938.17 (41.33) | 7,77,003.82 (41.79) | 7,61,471.00 (41.56) |
| **B** | **Fixed cost** | | | |
| 1 | Rental value of land | 2,06,833.33 (11.46) | 2,06,833.33 (11.12) | 2,06,833.33 (11.29) |
| 2 | Depreciation | 71,458.35 (3.96) | 71,991.65 (3.87) | 71,725.00 (3.92) |
| 3 | Interest on fixed capital | 83,170.00 (4.16) | 85,322.30 (4.59) | 84,246.15 (4.38) |
| 4 | Annuity value of establishment cost | 6,97,491.26 (38.64) | 7,18,042.88 (38.62) | 7,07,767.07 (38.63) |
| | Total fixed cost | 10,59,011.15 (58.67) | 10,82,248.36 (58.21) | 10,70,629.76 (58.44) |
| | **Total costs (A+B)** | 18,04,949.32 (100.00) | 18,59,252.18 (100.00) | 18,32,100.75 (100.00) |

Note: Figures in the parentheses indicate the percentage of items to total cost of cultivation

The classification was done to know the relative importance of different cost components in floricultural nursery of two size groups and the details are shown in table 5.7. and depicted in fig. 2.

**5.2.2.1 Operational Costs**

Operational costs include labour costs and materials like farm yard manures, fertilizers, plant protection chemicals, growth regulators, polythene bags, planting material and interest on working capital.

Among the different operations, cost of human labour accounted for the major portion of the operational costs in both the categories of nursery. The amount spent on human labour varied from Rs. 2,16,961.66 per hectare for category I to Rs. 2,17,029.83 per hectare for category II and on an overall Rs. 2,16,995.75 per hectare for floricultural nursery.

The next important item for category I nurseries was plant material that accounted for 7.29 per cent followed by polythene bags that accounted for 7.16 of total cost of cultivation.

In category II nurseries the item that was next to human labour was polythene bags that accounted for 7.38 per cent followed by plant material that accounted for 7.37 per cent of total cost of cultivation.

The interest on working capital was the fourth item in the operational cost. It accounted for 4.59 and 4.64 per cent followed by the expenditure on fertilizers that was 2.67 and 2.71 per cent, manures 1.55 and1.56 per cent for category I and II nurseries respectively of total cost of cultivation.

The other minor items of operational cost were growth regulators accounting for 0.64 and 0.69 per cent and machine labour 0.56 and 0.64 per cent for category I and category II nurseries respectively of the total cost of cultivation.

It can be inferred from the above discussion that the operational cost cultivation of category II nurseries were higher than category I nurseries.

### 5.2.2.2 Fixed Costs

It includes rental value of owned land, interest on fixed capital, depreciation and annuity value of establishment cost.

Fixed costs accounted for Rs. 10,58,952.93 per hectare forming 58.67 per cent for category I nurseries and Rs. 10,82,190.16 per hectare forming 58.21 per cent for category II nurseries of the total cost of cultivation.

Annuity value of establishment cost was the major cost in total fixed costs and it was Rs. 6,97,491.26 per hectare for category I, Rs. 7,18,042.88 for category II and Rs. 7,07,767.07 per hectare on an overall for floricultural nursery. Hymajyothi and Raju (2002) conducted a study to estimate the costs and returns in cultivation in rose and jasmine crops in Kadiyam mandal of East Godavari district of Andhra Pradesh and revealed the annuity value of establishment cost per hectare for jasmine and rose were Rs. 7,512.70 and Rs. 22,911.01 respectively.

Rental value of land was the next highest fixed costs item in floricultural nursery in both the categories I and II. The per annum rental value owned of land was Rs. 2,06,833.32 per hectare for both category I and II nurseries forming 11.49 and 11.12 per cent for category I and II respectively of the total cost of cultivation.

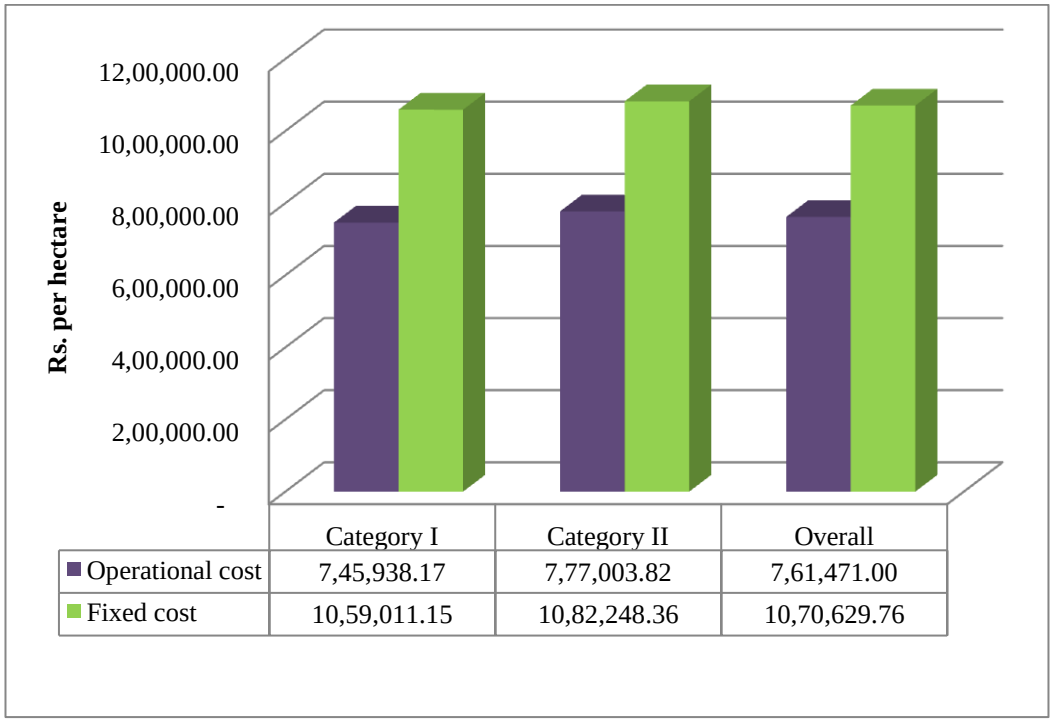
The other costs in fixed cost were interest on fixed capital accounting Rs. 83,170 (4.61 per cent) and Rs. 85,322.30 (4.59 per cent) per hectare followed by depreciation accounting Rs. 71,458.35 (3.69 per cent) and Rs. 71,991.65 (3.87 per cent) for category I and category II nurseries respectively of the total cost of cultivation.

From the table 5.7. and fig. 2. the variable costs as well as fixed cost of category II nurseries are ahead of the category I nurseries. This difference in variable and fixed costs between the category II and category I nurseries was due to intensive maintenance of the floriculture nursery gardens by category II nursery entrepreneurs.

When compared the operational costs and fixed costs as the percentage of total cost of both the categories of nurseries, it remains same with very minor difference between category I and category II.

The results showed that the cost of cultivation of category II was higher than category I nurseries. Similar results were obtained by Hemakumari (1992) in chrysanthemum in East Godavari district, Andhra Pradesh. The study revealed that the per hectare total cost of cultivation of chrysanthemum gardens were Rs. 43,645.37, Rs. 57,992.20 and Rs. 76,065.64 on small, medium and large size gardens respectively.

**Fig. 2. Cost of cultivation of commercial floricultural nursery per hectare.**




| | Category I | Category II | Overall |
|---|---|---|---|
| Operational cost | 7,45,938.17 | 7,77,003.82 | 7,61,471.00 |
| Fixed cost | 10,59,011.15 | 10,82,248.36 | 10,70,629.76 |

### 5.2.3 Annual Human Labour Utilization for Different Operations in Floricultural Nursery

The total human labour required for floricultural nursery consisted of labour for operations like planting, irrigation, weeding, application of manures and fertilizers and plant protection. For our convenience sake all the women labour employed was converted into standard mandays of eight hours on the basis of wage ratio.

Thus, 1.5 women days were considered as equivalent to one manday. An economic analysis by Rameshkumar (1989) on jasmine crop used wage ratio 1.88 to convert all women labour employed into standard mandays of eight hours.

The labour required for cultivation of one hectare of floricultural nursery and operation-wise labour use is presented in table 5.8.

**Table 5.8. Annual human labour utilized in floricultural nursery - operational-wise (Mandays per hectare).**

| S. No. | Operation | Total mandays | Per cent to total |
|---|---|---|---|
| 1 | Planting | 230 | 31.80 |
| 2 | Weeding | 148 | 20.46 |
| 3 | Application of manures and fertilizers | 89 | 12.30 |
| 4 | Plant protection | 73.3 | 10.14 |
| 5 | Irrigation | 183 | 25.30 |
| | Total | 723.30 | 100.00 |

Floricultural nursery business is labour intensive requiring 723.30 mandays of labour per hectare. It could be seen from the table 5.8. that planting which involves placing the plants in the polythene bags, budding, grafting, layering and sowing was the most labour consuming operation requiring 230 mandays of labour which formed 31.80 per cent of total labour requirement. The next labour intensive operation was irrigation which required 183 mandays of labour which formed 25.30 per cent of total labour requirement. This was followed by weeding using 148 mandys accounting for 20.46 per cent of total labour requirement. Application of manures and fertilizers required 89 mandays accounting for 12.30 per cent of total labour requirement. For plant protection 73.3 mandays were required in floricultural nursery which formed 10.14 per cent of total labour requirement.

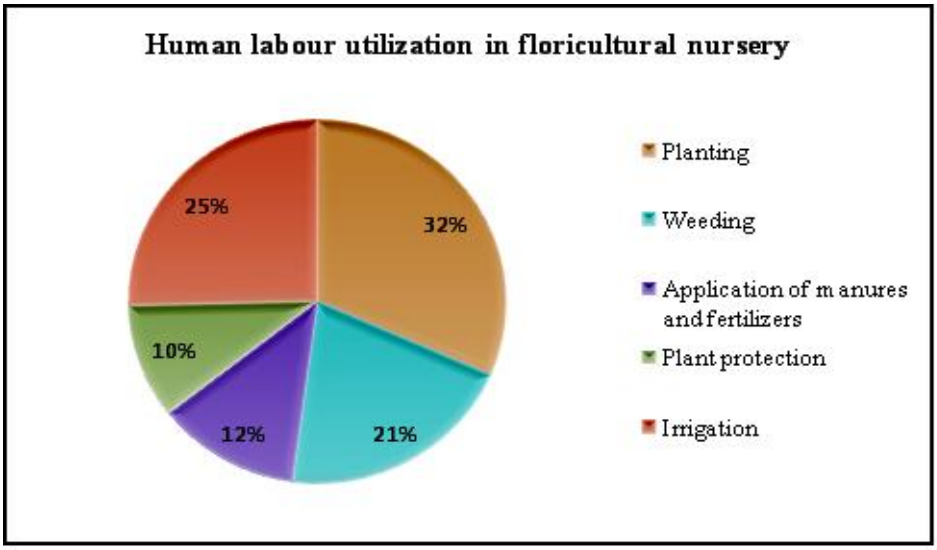
Unlike the other annual crops labour can find employment throughout the year in the floricultural nurseries. From the analysis of data it was estimated that 723.30 mandays per hectare were required per year for carrying out various maintenance operations. As per the table 5.7. the labour cost on an overall for floricultural nursery accounted for 11.85 per cent of the total operational cost. Studies conducted by Sharma (2001) on flower seed production indicated that human labour accounted for 59.04 per cent of the total cost. Hind Agri-Horticultural Society (2007) studied the economic feasibility of cultivating marigold, gladiolus, chrysanthemum, rose and tuberose.

Results revealed that the total mandays required were 141.83 per acre for rose, 89.37 per acre for gladiolus, 86.41 per acre for tuberose, 64.08 per acre for chrysanthemum, and 61.33 per acre for marigold. The total labour requirement in floricultural nursery per acre was 289.32 mandays (723.30 mandays per hectare), which shows that floricultural nursery more labour intensive project when compared to rose, gladiolous, tuberose, chrysanthemum and marigold. Hence the results obtained are in conformity with the first hypothesis.

The labour use pattern shows the operations like planting, irrigation and weeding were the most labour consuming operations. Large percentage of labour used in floricultural nursery goes to planting (31.80 per cent), as it was also in the fig. 3. Planting is a regular activity in the floricultural nurseries which involves keeping the plantlets in the polythene bags, budding, grafting, layering of plants and sowing of seeds.

Irrigation was the next labour intensive operation in labour requirement which required 183 mandays that accounted for 25.30 per cent of total labour requirement. Irrigating the plants is also a regular activity in the nursery which is given through rose water cans or water tubes, as the plants in the polythene bags are small and tender, water should be given carefully with low force at the root zone.

**Fig. 3. Human labour utilization in floricultural nursery operation-wise (mandays per hectare).**



Weeding was performed periodically to keep the nursery free from weeds. Mostly women labourers are employed for this operation and labour used for this operation varied with the frequency of weeding to be done. In floricultural nursery about 148 mandays (222 women days) were used for weeding which formed 20.46 per cent of total labour used.

The application of manures and fertilizers protects plants from the deficiencies of nutrients and help in good growth. The labour used for application of manures and fertilizers was 89 mandays that accounts for 12.30 per cent of total labour.

The floricultural nursery is more or less facing the problems with pests and diseases. The plants in the nursery are young and tender which makes them easily liable to be attacked by pests and diseases, so to keep the pests and disease under control plant protection chemicals must be used. The labour used for this operation was 73.30 mandays which accounts for 10.14 per cent of total labour requirement.

Of late the labour in the study area is getting scarce. As the nursery is a labour intensive enterprise, the floricultural nursery entrepreneurs are facing a great deal with labour problem.

### 5.2.4 Costs and Returns of Floricultural Nursery by Cost Concepts

The costs and returns of floricultural nursery in different size groups were worked out by using different cost concepts viz., cost '$A_1$', cost '$A_2$', cost 'B' and cost 'C'. These estimates were presented in 5.9.

Cost '$A_1$' includes all the variable costs (excluding the imputed value of family labour) + interest on working capital + depreciation. The cost '$A_1$' in case of category I nurseries was worked out to be Rs. 7,89,396.52 per hectare and Rs. 8,23,995.47 per hectare in case of category II nurseries with an overall average of Rs. 8,06,696.0 per hectare. The higher value of Cost '$A_1$' in category II nurseries could be due to more expenditure incurred on items like human labour, machine labour, manures and fertilizers and plant protection chemicals etc.

Cost '$A_2$' includes cost '$A_1$' plus rental value of leased in land, but unfortunately the sample floricultural nursery entrepreneurs have not taken land on lease basis. So cost '$A_2$' was same as that of cost '$A_1$'.

Cost ‘B’ includes cost ‘$A_2$’ plus rental value of owned land, interest on fixed capital and annuity value of establishment cost. Cost ‘B’ in case of category I nurseries was Rs. 17,76,949.32 per hectare and for category II nurseries was worked out to be Rs. 18,34,252.18 per hectare. The overall average was worked out to be Rs. 18,32,100.75 per hectare.

Cost ‘C’ includes cost ‘B’ plus imputed value of family labour and was found to be Rs. 18,04,949.32 per hectare for category I nurseries and Rs. 18,59,252.18 per hectare for category II nurseries with an overall average of Rs. 18,32,100.75 per hectare. This cost ‘C’ is the commercial cost of cultivation. It indicates the total cost of cultivation of floricultural nursery. The is a most important cost for all practical purposes and the returns obtained should cover this cost for the enterprise to be viable and continued in the long run. The cost of cultivation of the nursery ranging from Rs. 18,04,949.32 to Rs. 18,59,252.18 per hectare depending on the size. This clearly indicates the capital intensive nature of the floricultural nursery business. The cost of cultivation of the commercial floricultural nursery by cost concept was shown in fig. 4.

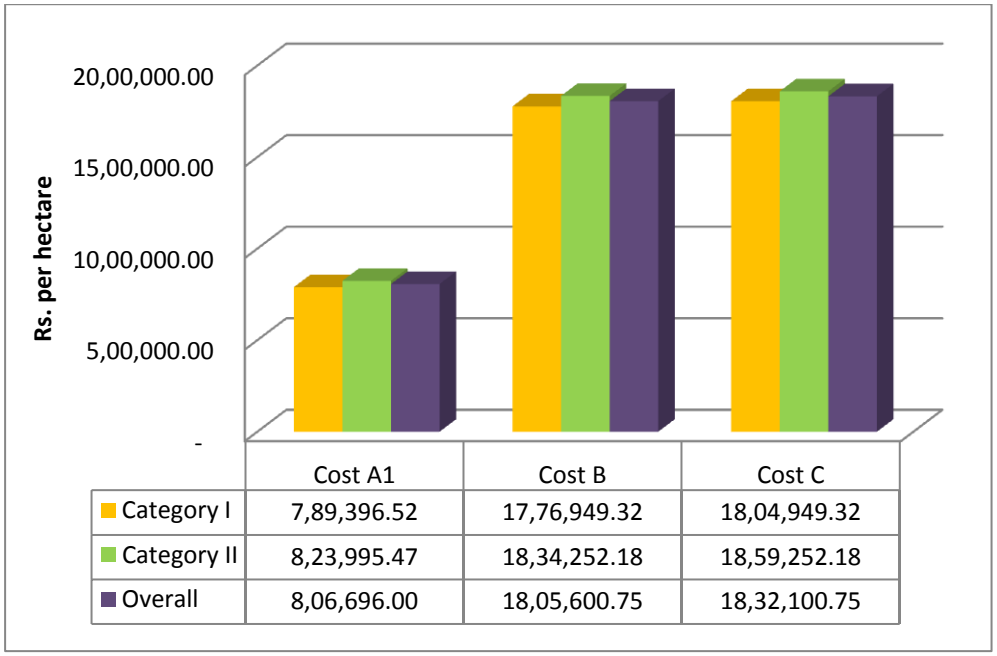
The cost of cultivation of the category II nurseries is higher than category I nurseries, this may be due to higher investment in plant material, polythene bags and other inputs.

Perke *et al.* (2009) studied economic analysis of mogra flower production in Nanded district of Maharashtra. The results revealed that cost ‘A’ was Rs.49,617.39 per hectare and cost ‘C’ was Rs.87,248.78 per hectare. Patil *et al.* (2010) worked out the costs of spider lily and kagda flowers in Thane district of Maharashtra. Total cost of cultivation for the maintenance of a kagda garden (cost ‘C’) was determined to be Rs. 2,83,348.15, whereas cost ‘A’ and cost ‘B’ were Rs. 1,40,368.19 (49.54 %) and Rs. 2,26,058.54 (79.78%), respectively. The per hectare total cost of maintenance of a spider lily garden (cost ‘C’) was worked out to be Rs. 1,39,723.11, whereas cost ‘A’ and cost ‘B’ were Rs. 85,447.44 (61.15%) and Rs. 1,31,178.37 (93.88%), respectively. The results of present study revealed that the cost of maintenance of commercial floricultural nursery much higher when compared cost of cultivation of mogra, kagda and spider lily.

**Table 5.9. Costs and returns of floricultural nursery by cost concepts (Rs. per ha).**

| Particulars | Category I | Category II | Overall |
|---|---|---|---|
| Cost of maintaining per hectare floricultural nursery | | | |
| Cost $A_1$ | 7,89,396.52 | 8,23,995.47 | 8,06,696.00 |
| Cost B | 17,76,949.32 | 18,34,252.18 | 18,05,600.75 |
| Cost C | 18,04,949.32 | 18,59,252.18 | 18,32,100.75 |
| Gross returns | 22,67,312.75 | 24,87,302.33 | 23,77,307.54 |
| Net returns | 4,62,363.43 | 6,28,050.15 | 5,45,206.79 |

**Fig. 4. Cost of cultivation of commercial floricultural nursery by cost concepts (Rs./ ha).**




From the table 5.9. it can clearly understood that all the costs exhibited direct relationship with nursery size i.e., with the increase in the size of the nursery the costs also increased.

The returns over the cost 'C' were Rs. 4,62,363.43 per hectare for category I and Rs. 6,28,050.15 per hectare for category II nurseries with the overall average of Rs. 5,45,206.79 per hectare. This was the net returns realised after meeting the imputed value of family labour. The net returns over the cost 'C' should be positive for any enterprise to be profitable and continue in short run. In long run the floricultural nursery is profitable because of the reasonable returns over cost 'C' is being generated by the nurseries. Similar results were observed by Subrahmanyam (1989) in the study on jasmine flower in Karnataka.

The returns over costs bear a direct relationship with the size of the floricultural nursery i.e., with the increase in the size of the nursery the returns also increases. Hence, the results obtained are in conformity with the second hypothesis.

## 5.3 FARM BUSINESS ANALYSIS

An important element in farm business management and decision making relates to the manner in which available resources were allocated. A measuring stick is necessary to provide guidance and standards for appraising accuracy of the use of the resources. To achieve this objective various farm efficiency measures, viz., gross income, net income, farm business income, family labour income and farm investment income were worked out and presented in the table 5.10 and were also showed in the fig.5.

### 5.3.1 Gross Income

From the table 5.10 it was observed that on an average the floricultural nurseries obtained gross income of Rs. 23,77,307.75 per hectare. Within the two size groups the gross income varied from Rs. 22,67,312.75 per hectare in category I to Rs. 24,87,302.75 per hectare in category II.

### 5.3.2 Net Income

Net income per hectare of floricultural nursery on an average was Rs. 5,45,206.79 on overall size groups of nurseries. The highest net income per hectare was in category II nurseries accounting Rs. 6,28,050.15, while it was Rs. 4,62,363.43 per hectare in category I nurseries.

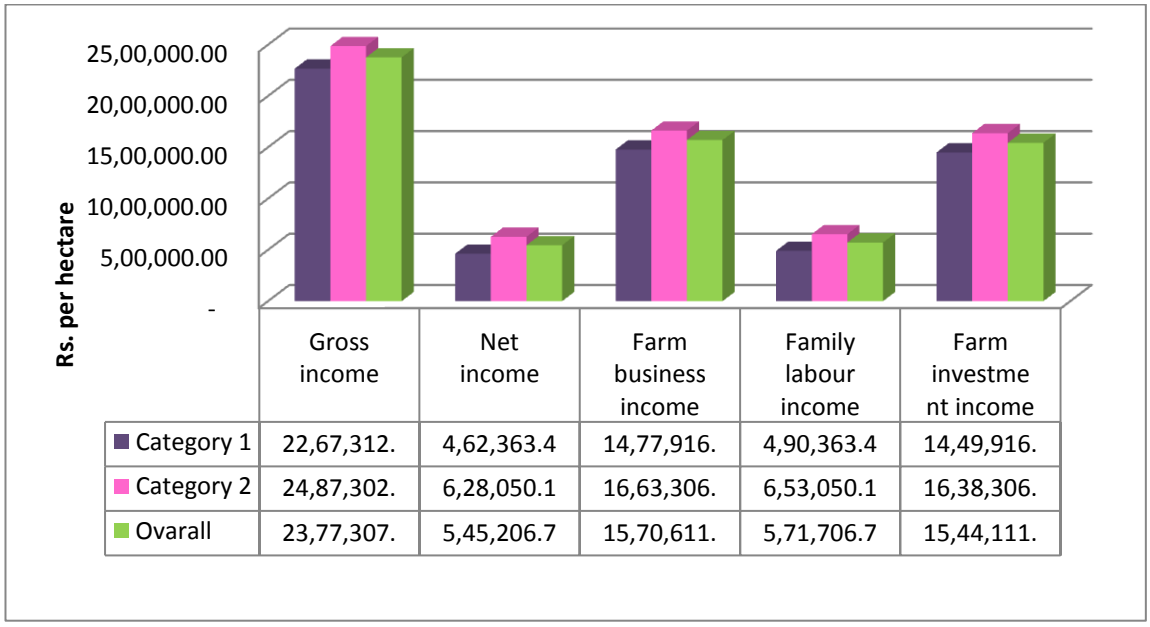
### 5.3.3 Farm Business Income

The farm business income was higher in case of category II nurseries accounting for Rs. 16,63,306.86 per hectare, while category I nurseries accounted for Rs. 14,77,916.23 per hectare. The overall farm business income accounted for Rs. 15,70,611.54 for both the categories taken. The attributable reason for high farm business income in category II was mainly due to higher gross income when compared to category I.

**Table 5.10. Farm business measures (Rs. per hectare)**

| S. No. | Particulars | Category I | Category II | Overall |
|---|---|---|---|---|
| 1 | Gross income | 22,67,312.75 | 24,87,302.33 | 23,77,307.54 |
| 2 | Net income | 4,62,363.43 | 6,28,050.15 | 5,45,206.79 |
| 3 | Farm business income | 14,77,916.23 | 16,63,306.86 | 15,70,611.54 |
| 4 | Family labour income | 4,90,363.43 | 6,53,050.15 | 5,71,706.79 |
| 5 | Farm investment income | 14,49,916.23 | 16,38,306.86 | 15,44,111.54 |

**Fig. 5. Farm business measures per hectare**




### 5.3.4 Family Labour Income

The family labour income per hectare was higher in category II nurseries with Rs. 6,53,050.15 when compared to Rs. 4,90,363.43 in category nurseries and with overall average for the categories was Rs. 5,71,706.79.

### 5.3.5 Farm Investment Income

Farm investment income which is a measure of income for nursery to the fixed capital investment on the different nursery sizes was presented in the table 5.10. It was noticed that the farm investment income per hectare was higher in category II nurseries Rs. 16,38,306.86, while in case of category I nurseries was Rs. 14,49,916.23 with an overall pooled farm investment income of Rs. 15,44,111.54.

## 5.4 INVESTMENT ANALYSIS

Feasibility of investment in floricultural nursery in East Godavari district of Andhra Pradesh was studied by using the evaluation criterion such as pay-back period, net present worth, benefit-cost ratio and internal rate of return, the discounted establishment cost and operational cost and gross returns were considered over the economic life span of the nursery. The results of investment techniques were presented in table 5.11.

The assumption made in calculating the various values are explained in the methodology chapter. For analysing the economic feasibility of business like floricultural nursery, where the major investment is made during the initial years of the business and returns are obtained over a period of time, the future value of costs and returns have to be taken into account for this purpose. The discounted cash flow technique is considered to be the most appropriate.

### 5.4.1 Pay-Back Period

It is the period required to repay the initial investment incurred in establishing the floricultural nursery. The pay-back period for floricultural nursery was found to be 2.92 and 2.52 years for category I and category II nurseries respectively and on an overall 2.72 years. This indicates that the floricultural nursery entrepreneurs were in a position to recover the establishment cost in about three years.

The study conducted by Subrahmanyam (1989) on jasmine revealed the pay-back period of 2 years. The study conducted by Vanishree (2007) in jasmine showed pay period of 3.09 years.

However, since the pay-back period technique does not take into account the time value of money, it cannot be used with much confidence for assessing the financial feasibility of the floricultural nursery units.

**Table 5.11. Economic analysis of investment pattern in commercial floricultural nurseries.**

| S. No. | Investment appraisal techniques | Category I | Category II | Overall |
|---|---|---|---|---|
| 1 | Pay-back period (years) | 2.92 | 2.52 | 2.72 |
| 2 | Net present worth discounted @ 12% (Rs. / ha) | 27,03,004.31 | 32,62,576.45 | 29,82,790.38 |
| 3 | Benefit-cost ratio discounted at 12% | 1.59 | 1.69 | 1.64 |
| 4 | Internal rate of return (percentage) | 113.09 | 133.95 | 123.52 |

### 5.4.2 Net Present Worth

The difference between the present value of the future costs and returns gives the net present worth of investment in floricultural nursery business. The net present worth discounted at 12 per cent per hectare was found to be Rs. 27,03,004.31 for category I, Rs. 32,62,576.45 for category II nurseries and on an overall was Rs. 29,82,790.38. The higher and positive NPW indicates the future net returns are worth to compare with present investment and returns.

Singh (2011) in damask rose plantation found net present worth of Rs. 59,842 per acre. Similarly, Vanishree (2007) studied the investment appraisal analysis in jasmine and revealed that the net present value of investment was Rs. 5,36,212.40 per acre at 12 per cent discount rate.

This clearly indicates that the investment in floricultural nursery is economically feasible and financially sound. This criterion since does not indicate explicitly the rate of return from investment, the benefit-cost ratio criterion was considered.

### 5.4.3 Benefit-Cost Ratio

It indicates the net returns per rupee of investment during the economic life period of floricultural nursery. The benefit-cost ratio in the present study was found to be 1.59 for category I, 1.69 for category II and 1.64 on an overall for floricultural nursery. This indicates that the investment in floricultural nursery is economically feasible and financially sound. The study conducted by Singh (2011) in damask rose plantation revealed benefit-cost ratio of 1.54. Rameshkumar (1989) evaluated the investment in jasmine gardens and found the benefit-cost ratio of 1.6. This shows that investment in floricultural nurseries is equally desirable as that of the damask rose plantation and jasmine gardens.

Generally the returns realised over the years from long term investment in floricultural nursery could be used for further investment. This aspect of reinvestment and the possible returns from such activity is absent in the criterion, so to examine this aspect, the internal rate of return was calculated.

### 5.4.4 Internal Rate of Return

The internal rate of return measures the rate of return that can be realised in the nursery. This technique has been indicated as important and scores over the other techniques of evaluation, since it considers the reinvestment opportunities which are absent in other criteria. The internal rate of return usually depends on the magnitude of net returns realised in each year over economic life period and more particularly in the initial years of economic life period which may not have an impact on the net present worth and the benefit-cost ratio techniques. In the present study the internal rate return that can be obtained by investment in floricultural nursery was found to be 113.09 per cent and 133.95 per cent for category I and category II nurseries respectively and for overall sample 123.52 per cent. Since the IRR for commercial floricultural nursery was very high it was considered as economically feasible.

Vanishree (2007) studied the investment appraisal analysis in jasmine in Chitradurga district, Karnataka, revealed an internal rate of return of 250 per cent. The studies conducted by Subrahmanyam (1989) on jasmine and Singh (2011) on damask rose revealed the internal rate of return as 50 per cent and 12.70 per cent respectively.

## 5.5 FUNCTIONAL ANALYSIS

The multiple linear regression analysis was used to assess the factors influencing the changes in gross returns of the commercial floricultural nursery. The independent variables taken were expenditure on human labour, fertilizers, plant protection chemicals, polythene bags and plant material were used for analyzing the impact on gross returns of commercial floricultural nursery.

The functional analysis for overall sample nurseries is presented in table 5.12. It is evident that for overall sample nurseries the coefficient of multiple determination ($R^2$) was found to be 80.83 per cent. It indicated that 80.83 per cent variation in the dependent variable (gross returns) was explained by taken independent variables.

**Table 5.12. Results of multiple linear regression analysis for overall sample.**

| S. No. | Variables | Notation | Standard error | Coefficients | t- value | $R^2$ Value |
|---|---|---|---|---|---|---|
| 1 | Constant | A | 46,235.04 | 4,24,374.65 | 9.18 | 0.8083 |
| 2 | Human labour expenditure | $X_1$ | 0.50 | $2.14^{**}$ | 4.26 | |
| 3 | Fertilizers expenditure | $X_2$ | 0.99 | $0.99^{NS}$ | 1.00 | |
| 4 | Plant protection chemicals expenditure | $X_3$ | 1.01 | $0.77^{NS}$ | 0.76 | |
| 5 | Polythene bags expenditure | $X_4$ | 0.43 | $1.03^{*}$ | 2.42 | |
| 6 | Plant material expenditure | $X_5$ | 0.73 | $1.80^{*}$ | 2.47 | |

Number of observations = 30

**Significant at one percent level

*Significant at five per cent level

NS non-significant

Model = $Y= 4,24,374.65 + 2.14 X_1^{**} + 0.99 X_2 + 0.77 X_3 + 1.03 X_4^{*} + 1.80 X_5^{*}$

The production factor of human labour was positively significant at one per cent probability level and plant material and polythene bags were found to be positively significant at five per cent probability levels, indicating their significant impact on gross returns of floricultural nursery enterprise. It implied that one per cent increase in expenditure on human labour, plant material and polythene bags could increase the

gross returns by 2.14, 1.80 and 1.03 per cent respectively, when all the other factors were kept constant at their geometric mean levels. The coefficients of other variables viz., fertilizers and plant protection chemicals were found to be positive but not significant and have lesser influence on gross returns.

Biju (1999) studied the resource productivity in orchids and anthurium using functional analysis. The results revealed that area under orchids in cents, the number of mandays of labour and the media and material cost were found to be exerting significant influence on returns. Similarly the area under anturium, irrigation, plant protection costs, number of mandays of labour and the media and material cost were found to have significant influence on returns. Hemakumari (1995) studied resource productivity in chrysanthemum using functional analysis and found that in case of pooled farm situation seed, manures and fertilizers, machines labour and human labour were found to influence gross returns significantly.

### 5.6 Break-Even Analysis

Break-even analysis is an important tool to study the profitability of the enterprise. In fact this break-even analysis technique is used with a view to locate the level of output that equals the total revenue and total cost. The results of break-even analysis are presented in the table 5.13. and depicted in fig. 6, 7 & 8.

On an average break-even output in value per hectare of commercial floricultural nursery was Rs. 15,78,250.04 for category I, Rs. 15,73,923.41 for category II and Rs. 15,76,086.73 for overall sample.

**Table 5.13. Break-even analysis**

| Particulars | Category I | Category II | Overall |
|---|---|---|---|
| Fixed cost (Rs.) | 10,59,011.15 | 10,82,248.36 | 10,70,629.76 |
| Variable cost (Rs.) | 7,45,938.17 | 7,77,003.82 | 7,61,471.00 |
| Gross income (Rs.) | 22,67,312.75 | 24,87,302.33 | 23,77,307.54 |
| Total output (No. of plants) | 95,926.00 | 99,546.00 | 97,736.00 |
| Price per unit (Rs.) | 23.64 | 24.99 | 24.31 |
| Variable cost per unit (Rs.) | 7.78 | 7.81 | 7.79 |
| Break-even output (Rs.) | 15,78,250.04 | 15,73,923.41 | 15,76,086.73 |

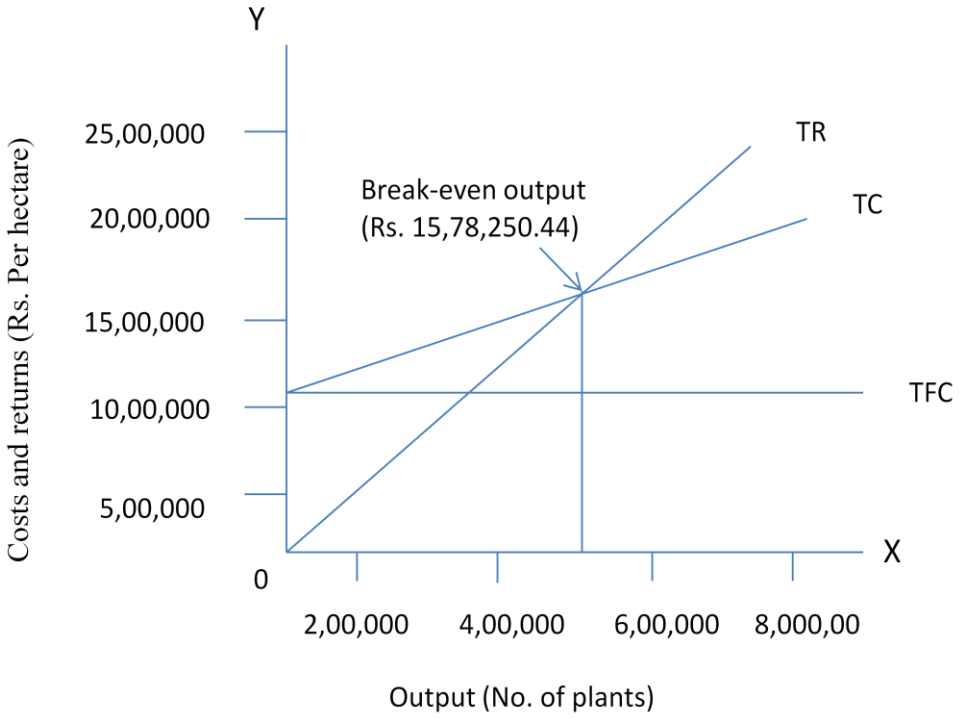



**Fig. 6. Break-even output for category I**

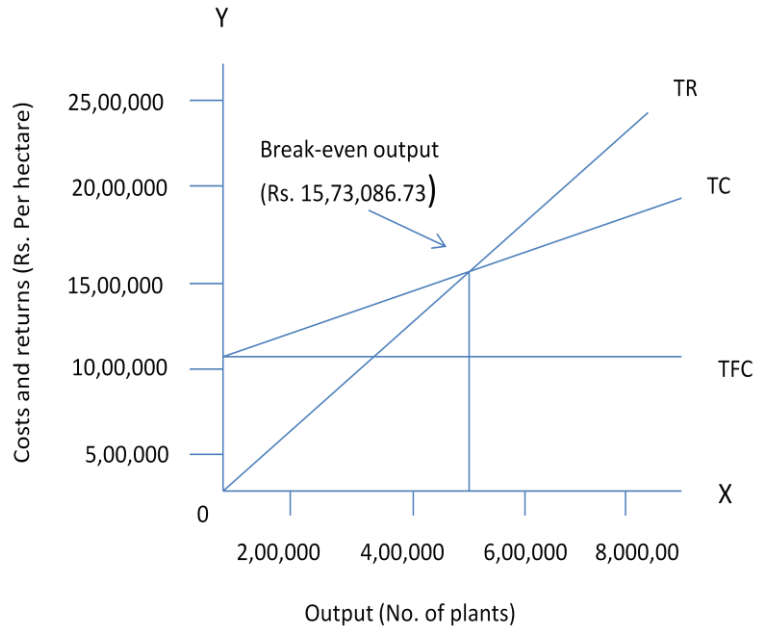



**Fig. 7. Break-even output for category II**

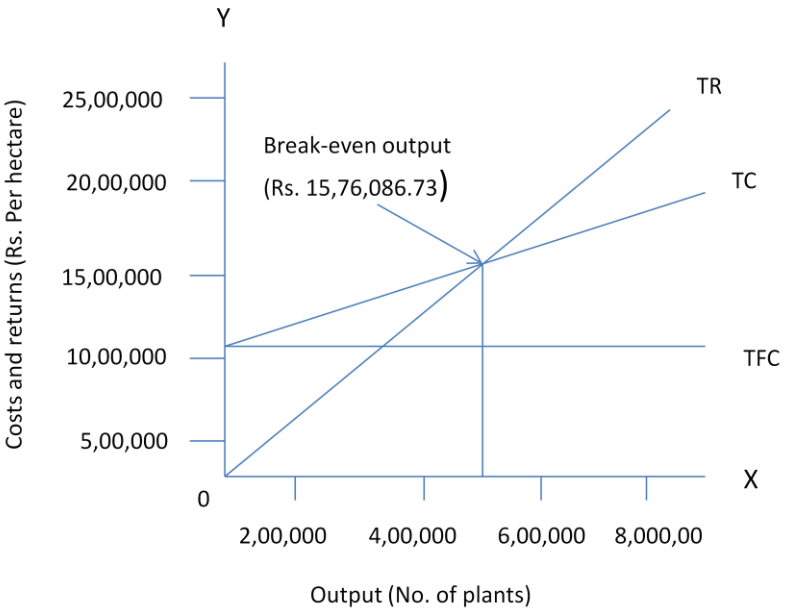



**Fig. 8. Break-even output for overall sample**

## 5.7 CONSTRAINT ANALYSIS

In the present study an attempt has been made to analyse the problems faced by the floricultural nursery entrepreneurs in maintaining the commercial floricultural nursery business through opinion survey.

For analysing the problems faced by the entrepreneurs in maintenance of floricultural nurseries, the entrepreneurs of two categories were asked to assign the rank for each of the constraint. Kendall's coefficient of concordance (W) test will be used to determine the agreement among the floricultural nursery entrepreneurs in ranking the constraints faced by them.

The problems faced by floricultural nursery entrepreneurs were peculiar in comparison to other perennial crops due to the following facts.

1. The floricultural nursery needs labour throughout the year unlike other perennial crops
2. The floricultural nursery requires irrigations daily all through the year.
3. It requires very high investment.

**Analysis of problems faced by commercial floricultural nursery entrepreneurs**

Different constraints were identified in the present study by using a pre tested schedule, analysed and ranked as per the preference of floricultural nursery entrepreneurs.

Constraints identified were:

1. Inadequate availability of labour.
2. Lack of continuous supply of electricity.
3. Inadequate availability of sufficient water for irrigation.
4. Inadequate availability of credit facilities.
5. Lack of adequate availability of transportation facilities.
6. Inadequate availability of suitable soil for filling the polythene bags.
7. Marketing problems.
8. Problems with pests and diseases.
9. Mortality of plants
10. Price fluctuations for saplings.

The floricultural nursery entrepreneurs were asked to rank the identified constraints in the order of their preference. Kendall's coefficient of concordance (W) test was applied to verify whether the respondents were in agreement in ranking the constraints. The results are presented in table 5.14.

**Table 5.14: Ranks assigned by the floricultural nursery entrepreneurs for the constraints identified in floricultural nursery business.**

| Constraints identified | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Floricultural nursery entrepreneurs** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| **1** | 1 | 2 | 4 | 8 | 7 | 3 | 6 | 9 | 5 | 10 |
| **2** | 1 | 3 | 4 | 10 | 5 | 2 | 7 | 8 | 6 | 9 |
| **3** | 1 | 2 | 3 | 9 | 7 | 4 | 6 | 8 | 5 | 10 |
| **4** | 1 | 2 | 4 | 9 | 7 | 3 | 6 | 10 | 5 | 8 |
| **5** | 1 | 2 | 4 | 10 | 6 | 3 | 5 | 8 | 7 | 9 |
| **6** | 1 | 2 | 4 | 10 | 7 | 3 | 6 | 8 | 5 | 9 |
| **7** | 1 | 2 | 5 | 10 | 6 | 4 | 7 | 8 | 3 | 9 |
| **8** | 1 | 2 | 4 | 9 | 7 | 3 | 6 | 8 | 5 | 10 |
| **9** | 1 | 4 | 3 | 10 | 7 | 2 | 6 | 8 | 5 | 9 |
| **10** | 1 | 2 | 4 | 10 | 8 | 3 | 7 | 6 | 5 | 9 |
| **11** | 1 | 2 | 3 | 9 | 7 | 4 | 6 | 8 | 5 | 10 |
| **12** | 1 | 2 | 3 | 9 | 7 | 4 | 6 | 8 | 5 | 10 |
| **13** | 1 | 2 | 4 | 10 | 5 | 3 | 7 | 8 | 6 | 9 |
| **14** | 1 | 4 | 2 | 10 | 7 | 3 | 6 | 8 | 5 | 9 |
| **15** | 1 | 2 | 4 | 9 | 7 | 3 | 6 | 8 | 5 | 10 |
| **16** | 1 | 3 | 2 | 10 | 6 | 4 | 5 | 8 | 7 | 9 |
| **17** | 1 | 3 | 4 | 10 | 8 | 2 | 6 | 7 | 5 | 9 |
| **18** | 1 | 2 | 4 | 10 | 6 | 3 | 7 | 8 | 5 | 9 |
| **19** | 1 | 2 | 4 | 9 | 7 | 3 | 6 | 8 | 5 | 10 |
| **20** | 1 | 2 | 3 | 9 | 7 | 4 | 6 | 8 | 5 | 10 |
| **21** | 1 | 2 | 4 | 10 | 8 | 3 | 7 | 6 | 5 | 9 |
| **22** | 1 | 3 | 4 | 10 | 7 | 2 | 6 | 8 | 5 | 9 |
| **23** | 1 | 2 | 3 | 9 | 8 | 4 | 6 | 7 | 5 | 10 |
| **24** | 1 | 2 | 3 | 10 | 7 | 4 | 5 | 8 | 6 | 9 |
| **25** | 1 | 3 | 4 | 10 | 7 | 2 | 6 | 8 | 5 | 9 |
| **26** | 1 | 3 | 5 | 9 | 7 | 2 | 6 | 8 | 5 | 10 |
| **27** | 1 | 4 | 2 | 10 | 7 | 3 | 4 | 8 | 6 | 9 |
| **28** | 1 | 2 | 3 | 10 | 8 | 4 | 6 | 7 | 5 | 9 |
| **29** | 1 | 2 | 4 | 9 | 7 | 3 | 8 | 5 | 6 | 10 |
| **30** | 1 | 2 | 4 | 10 | 6 | 3 | 8 | 7 | 5 | 9 |
| **Total (Ri)** | 30 | 72 | 180 | 287 | 206 | 93 | 185 | 232 | 157 | 280 |

$$W = \frac{12 \sum (R_i - \bar{R})^2}{K^2 (N^3 - N)}$$

$\bar{R}$ = 30+72+180+287+206+93+185+232+157+280 = 165

$$\sum (R_i - \overline{R})^2 = (30 - 165)^2 + (72 - 165)^2 + \ldots\ldots\ldots\ldots\ldots\ldots + (280 - 165)^2 = 70050$$

$$W = \frac{12 * 70050}{900 ((10)^3 - 10)}$$

The Kendall's coefficients of concordance (W) was calculated by using the ranks assigned by the sample nursery entrepreneurs was:

$$W = 0.943.$$

$\chi^2$ was calculated to test the significance of the test.

$\chi^2$ calculated value = 254.73.

$\chi^2$ table value = 9 df at 1 per cent level of significance = 21.666.

Since the calculated $\chi^2$ value (254.73) was greater than the $\chi^2$ table value (21.666) at one per cent level of significance, it was concluded that the value was significant and that all the floricultural nursery entrepreneurs were in agreement in ranking the constraints.

The constraint study revealed that the floricultural nursery entrepreneurs were facing the problems in maintenance of the nursery. The major problems as ranked in order of preference were inadequate availability of labour followed by lack of continuous supply of electricity, inadequate availability of suitable soil, inadequate availability of water for irrigation, mortality of plants and lack of transportation facilities. The other minor problems were marketing problems, pests and diseases, price fluctuations and lastly the inadequate availability of credit.

Bagade *et al.* (2008) studied cut flower production in Ratnagiri district, Maharashtra. The major production constraints observed were availability of credit, labour, suitable planting material and manures and fertilizers. Gowda *et al.* (2006) conducted a study to know constraints in cultivation and marketing of cut flowers in Belgaum District, Karnataka. The major problems in production and marketing of cut flowers were pests and disease attack, high investment cost, exploitation by the middlemen, fluctuation in prices and low price of the flowers.

Hence, from the above results it can be inferred that the costs and returns increase with the increase in the size of the floricultural nursery. The results showed that floricultural nursery is profitable and is labour intensive requiring large human labour for carrying out the nursery operations. But in recent times this requirement is not being met, so the nursery entrepreneurs are experiencing the problem with availability of human labour.

## Chapter VI

# SUMMARY AND CONCLUSIONS

Agriculture and horticulture are vital sciences as they suffice the very basic needs of human beings. Qualitative and quantitative produce can essentially be produced from healthy plants which in turn are produced only when their seedlings/saplings are vigorous and healthy. Nursery is consequently the basic need of horticulture. Nursery is the place where plants are grown to a usable size either from seed or from vegetative parts. Floricultural nurseries are those nurseries which produce flower and ornamental plants from seeds or vegetative parts to healthy plants plantlets.

The present study entitled "Economic Analysis of Commercial Floricultural Nursery Management in East Godavari District of Andhra Pradesh" intended to examine the economic aspects, investment pattern, resource-use-efficiency and problems in the commercial floricultural nurseries in East Godavari district of Andhra Pradesh.

The following are the specific objectives of the present study:

1. To study the costs and returns involved in maintenance of commercial floricultural nurseries.
2. To study the capital investment pattern of commercial floricultural nurseries.
3. To analyze the factors affecting the returns in floricultural nursery management.
4. To identify and analyse the constraints faced by the entrepreneurs in maintaining the commercial floricultural nurseries.

This investigation was carried in Kadiyam mandal of East Godavari district as it has highest area under floricultural nurseries in the district. The present study is based on the data elicited from 30 commercial floricultural nursery farmers selected from top four villages under floricultural nursery area in selected mandal in East Godavari district. Two different size categories were made in the sample respondents based on the mean nursery area i.e., category I having less than one hectare nursery area and category II having nursery area more than one hectare. Form each category 15 nursery enterprises were selected randomly, making total sample size of 30 floricultural nursery enterprises for the present study.

For evaluating the investment pattern, investment appraisal methods like pay-back-period, net present worth, benefit-cost ratio, and internal rate of return were computed.

For economic analysis of data the costs were divided into two main groups viz., (1) establishment cost and (2) maintenance cost.

The establishment cost include the cost incurred for ploughing, digging pits, bed preparation, planting, planting material in establishing the floricultural nursery.

Maintenance cost includes the cost incurred from year to year for maintaining the floricultural nursery during the economic life span like weeding, manures and fertilizer application, plant protection, etc., and also other fixed expenses like land revenue, depreciation, rental value of land, interest on fixed assets and annuity value of establishment cost.

To know the minimum level of turnover of a commercial floricultural nursery, break-even output was calculated for two categories of nurseries separately.

In order to know the resource-use-efficiency of different independent factors on returns, for overall sample floricultural nurseries, multiple linear regression analysis was used.

The constraints faced by the floricultural nursery farmers were identified and nursery farmers were asked to rank the constraints in the order of their priority. The data was then analysed using Kendall's coefficient of concordance test to determine the agreement among the nursery farmers in ranking the constraints.

**THE RESULTS OF THE STUDY**

The average size of the holding of selected nursery farmers was 3.33 hectares and on an average 100 per cent of the total holding was irrigated through bore well.

The educational status of the sample nursery farmers given that 40 per cent of the sample farmers were educated up to primary level, 23.34 per cent of them were educated up to secondary level, the collegiate level were upto 16.66 per cent and the illiterates were up to 20 per cent but there were no farmers educated up to university level.

The total cropped area of selected nursery farmers was 131 hectares, of which the area under floricultural nursery was maximum at 99.94 hectares followed by paddy with an area of 13.25 hectares. The other crops cultivated them were greengram with an area of 8.43 hectares, vegetables and blackgram with area of 5.36 and 4.02 hectares.

The average size of family was 3.11 for category I nurseries and 3.75 for category II nurseries with an overall average of 3.43 members.

The value of farm assets including the value of land on an average was Rs. 1,70,81,700.0 per hectare for category I nurseries and Rs. 1,71,03,223.0 per hectare for category II nurseries.

The total expenditure incurred by floricultural nursery entrepreneurs for establishing the floricultural nursery was Rs. 25,14,299.89 per hectare for category I and Rs. 25,88,383.90 per hectare for category II with an overall establishment cost of Rs. 25,51,338.29 was incurred. Out of this labour cost accounted for 7.21 per cent for category I and 7.04 per cent for category II nurseries and material cost accounted for 92.79 per cent for category I and 92.96 per cent for category II nurseries.

The cost of cultivation of floricultural nurseries was Rs. 18,04,891.10 and 18,59,193.98 for category I and II nurseries respectively. Out of the total cost of cultivation the operational cost accounted for 41.33 and 41.79 per cent and fixed cost accounted for 58.67 and 58.21 per cent for category I and II nurseries respectively.

According to cost concepts the total cost of maintaining floricultural nursery (cost 'C') which include cost 'B' plus imputed value of family labour was 18,04,949.32 per hectare for category I nurseries and Rs. 18,59,252.18 per hectare for category II nurseries with an overall average of Rs. 18,32,100.75 per hectare. Out of the total cost, floricultural nursery entrepreneurs have to spend around Rs. 7,89,396.52 and Rs. 8,23,995.47 per hectare for category I and II nurseries respectively with an overall average of Rs. 8,06,696.0 per hectare towards the cost of inputs (cost '$A_1$') and the rest was shared by cost 'B' which was Rs. 17,76,949.32 and Rs. 18,34,252.18 per hectare for category I and II nurseries respectively. It was observed that these costs have increased with increase in the size of the nursery.

The net returns were Rs. 4,62,363.43 per hectare for category I and Rs. 6,28,050.15 per hectare for category II nurseries with the overall average of Rs. 5,45,206.79 per hectare. These results show that floricultural nursery is a profitable business. This also reveals that with increase in the size of the nursery the returns also increase.

The study indicated the floricultural nursery needs 781.30 mandays of labour annually per hectare showing its labour intensive nature. The most labour consuming operations were planting, irrigation and weeding.

The results of investment appraisal techniques showed the pay-back-period for floricultural nursery was found to be 2.92 and 2.52 for category I and category II nurseries respectively. The net present worth discounted at 12 per cent was found to be Rs. 27,03,004.31 per hectare for category I nurseries and Rs. 32,62,576.45 per hectare for category II nurseries. The benefit-cost ratio was found to be 1.59 for category I nurseries and 1.69 for category II nurseries. The internal rate of return that can be obtained by investment was found to be 113.09 per cent and 133.95 per cent for category I and category II nurseries respectively.

The functional analysis was done to know the factors influencing the gross returns of commercial floricultural nursery. For overall sample the production factor of human labour was positively significant at one per cent probability level and plant material and polythene bags were found to be positively significant at five per cent probability levels, indicating their significant impact on gross returns of floricultural nursery enterprise. It implied that one per cent increase in expenditure on human labour, plant material and polythene bags could increase the gross returns by 2.14, 1.80 and 1.03 per cent respectively, when all the other factors were kept constant at their geometric mean levels. The coefficients of other variables viz., fertilizers and plant protection chemicals were found to be positive but not significant and have lesser influence on gross returns.

The break-even analysis has been done to assess the profitability. On an average break-even point per a hectare of commercial floricultural nursery was Rs. 15,78,250.04 for category I and Rs. 15,73,923.41 for category II.

The constraints analysis revealed the problems encountered by nursery entrepreneurs in maintenance of nursery business. The major problems as ranked in order of preference were inadequate availability of labour followed by lack of continuous supply of electricity, inadequate availability of suitable soil, inadequate availability of water for irrigation, mortality of plants and lack of transportation facilities.

## 6.2 CONCLUSIONS

The following conclusions can be drawn from the results of the present study.

1. In accordance with the second hypothesis, the study indicated that the commercial floricultural nursery business at present is profitable as revealed by farm income measures.

2. Among the operational costs, cost on human labour took the lion's share in both the categories (as many of the operations are to be performed by skilled human labour) confirming the hypothesis one.

3. The floricultural nursery business is highly capital intensive and requires huge amount for establishing the nursery (Rs. 25,51,338 per hectare).

4. The total cost of cultivation of the floricultural nursery is also very high (Rs. 18,32,100.75 per hectare).

5. The gross returns per hectare was Rs. 23,77,307.54 and net returns per hectare was Rs. 5,45,206.79.

6. The investment in commercial floricultural nursery was found to be economically feasible when compared to other perennial horticultural crops. The pay-back-period is about three years, net present worth was Rs. 29,82,790.38, benefit-cost ratio was 1.64 and internal rate of return was 123.52 per cent.

7. Among the selected independent variables, expenditure on human labour, plant material and polythene bags shown significant and positive impact on gross returns of floricultural nursery enterprise.

8. The major constraints faced by the floricultural nursery entrepreneurs were unavailability of labour, lack of continuous supply of electricity and inadequate availability of suitable soil.

## 6.3 SUGGESTIONS

1. Floriculture is a financially viable and profitable enterprise, hence more farmers can be encouraged to take up the floriculture and nursery raising as an alternative to unviable agriculture crop enterprises, particularly in Godavari

district of Andhra Pradesh where farmers declared ‘crop holiday’ in more than one lakh acres during 2010-11 crop year.

2. Banks should be encouraged to provide more loans to small scale nurseries and floriculture cultivation.
3. Almost all the farmers do not maintain any records of day to day transactions and resource use due to fear of income tax raids. It is suggested that the incentives provided by NHB to maintain records and documents should be popularized among floricultural nursery entrepreneurs.
4. The floricultural entrepreneurs are facing labour scarcity hence it is suggested to adopt less labour required cultivation practices besides use of improved mechanization.

# LITERATURE CITED


Agriculture Census, Chief Planning Office, Kakinada.

Bagade, A.D., Talathi, J.M., Naik, V.G and Kamble, S.H. 2008. Production and marketing of cut flower. *Agriculture Update*. 3 (1/2): 131-136.

Bagade, A.D., Talathi, J.M and Kamble, S.H. 2008. Profitability in cut flower production. *Agriculture Update*. 3 (1/2): 31-32.

Banerjee, B.N and Ali, M.H. 2000. Economics of annual Chrysanthemum var. Cherrygold (*Chrysanthemum carinatum*) flower in West Bengal. *Environment and Ecology*. 18 (1): 167-170.

Bhattacharaya. 1997. Horticulture Management. *Hort. Today*. 2 (7): 15-23.

*Biju, C. 1999. An economic analysis of production and marketing of orchids and anthurium in Southern districts of Kerala and Tamil Nadu. *M.sc. (Agri.) Thesis*. Tamil Nadu Agricultural University, Coimbatore.

Chengappa. 1998. Cut flower industry in Karnataka: Analysis of trade constraints. Research Report. University of Agricultural Sciences, Bangalore.

Department of Horticulture, Government of Andhra Pradesh.

Gajanana, T.M and Subramanya, K.V. 1999. Economics of production and marketing of Anthuriums in Karnataka. *Agricultural Economics Research Review*. 12 (1): 48-55.

Gowda, B.T., Angadi, J.G and Hirevenkangoudar, L.V. 2006. Adoption and marketing pattern of cut flowers in Belgaum District. *Karnataka Journal of Agricultural Sciences.* 19 (3): 603-608.

Haque, M.A., Monayam Miah, M.A and Rashid, M.A. 2007. An economic study of plant nursery business in Gazipur and Jessore district of Bangladesh. *Bangladesh Journal of Agricultural Research*. 32(3):375-385.

Hemakumari, V. 1999. Resource productivity and resource-use-efficiency in chrysanthemum cultivation in East Godavari district of Andhra Pradesh. *Agricultural Situation in India*. 52 (9): 603-308.

Hind Agri-Horticultural Society. 2007. Exploring floriculture potential in Haryana. *Asian Journal of Horticulture.* 2 (1): 227-230.

Hymajyothi, S. 1996. Economics of floriculture in East Godavari district of Andhra Pradesh. *M.sc. (Agri.) Thesis*. Acharya N.G. Ranga University, Hyderabad.

Hymajyothi, S and Raju, V.T. 2002. A study on costs and returns in cultivation of jasmine, rose and crossandra in East Godavari district of Andhra Pradesh. *The Andhra Agricultural Journal.* 49 (3 &4): 346-350.

*Ingle, S.G., Pawar, B.R., Tawale, J.B And Jagde, S.A. 2009. Economics of production of jasmine in Maharashtra. *International Journal of Commerce and Business Management.* 2 (1): 40-42.

Jagadishkumar and Prakashkumar, K. 2008. Contract farming: Problems, Prospects and its effect on Income and Employment. *Agricultural Economics Research Review.* 21 (1-2): 243-250.

Mandal Revenue Office, Kadiyam, East Godavari district.

Nagarajan, S.S. 1992. Soundarya Kanakambaram. *Kisan World*. 19 (12): 21-26.

National Horticulture Board, Ministry of Agriculture, GOI.

*Neerajadevi, K. 1990. Economics of production and marketing of kakada (Jasminum multiflorum Andr.) flowers in Bangalore district Karnataka. *M.Sc. (Agri.) Thesis*. University of Agricultural Sciences, Bangalore.

*Parab, P.G. 2004. Economics of production of cut flowers in polyhouse in South Konkan region of Maharashtra. *M.Sc. (Agri.) Thesis*. Dr. Babasaheb Sawant Konkan Krishi Vidhyapeeth, Dapoli, Maharashtra.

*Patil, J.B. 2001. Economics of selected commercial flowers in Thane district of Maharashtra. *M.Sc. (Agri.) Thesis*. Dr. Babasaheb Sawant Konkan Krishi Vidhyapeeth, Dapoli, Maharashtra.

Patil, J.B., Patil, E.R and Jadhav, J.D. 2010. Work out of the cost, return and profitability of selected flowers in Thane district of Maharashtra. *International Journal of Commerce and Business Managaement.* 3 (1): 65-69.

Patil, S.T and Hiremath, K.C. 1985. Production and marketing of chrysanthemum in Dharwad district, Karnataka - An economic analysis. *Agricultural Economics Research Bulletin 16* : College of Agriculture, Dharwad.

Pavan, K.D. and Goyal, S.K., 1998, Economic feasibility of rose cultivation in Haryana. *Agricultural Economics Research Rev*iew. 11 (1): 66-71.

Perke, D.S., Singarwad, P.S., Tawale, J.B and Jawale, S.V. 2009. Economic analysis of mogra flower production in Nanded district of Maharashtra. *International Journal of Commerce and Business Managaement.* 2 (1): 15-17.

Rakeshkumar, Reddy, A.R and Sen, C. 2004. Marketing of marigold, rose and jasmine in U.P. *Indian Journal of Agricultural Marketing*. 18 (1): 130-132.

*Rameshkumar, S.C. 1989. Economics of production and investment in Jasmine flowers in Madurai district in Tamil Nadu. *M.Sc. (Agri.) Thesis*. University of Agricultural Sciences, Bangalore.

Rao, P.M. 1990. Production and marketing of jasmine flowers in Guntur district of Andhra Pradesh – An economic analysis. *M.sc. (Agri.) Thesis*. Acharya N.G. Ranga University, Hyderabad.

Rao, P. M., Shareef, S.M and Raju, V.T. 1992. Costs and returns of jasmine cultivation in Guntur-district, Andhra Pradesh. *South Indian Journal of Horticulture*. 40 (2): 100-104.

Ravinder, S.D.H.S and Joshi, A.S. 2006. Contract farming of floriculture in Punjab - problems and prospects. *Journal of Ornamental Horticulture*. 9 (3): 153-158.

*Ravindrakumar. 1996. Problems and prospects of production and marketing of cut flowers in selected regions of South India. *M.Sc. (Agri.) Thesis*. Tamil Nadu Agricultural University, Coimbatore.

Sharma, R.G.J.L. 2001. Economics of flower seed production in Punjab. *Journal of Research, Punjab Agricultural University.* 38 (3/4): 288-293.

Shedage, M.N and Borude, S.G. 1992. Economic analysis of flower production in Thane district of Maharashtra. *South Indian Journal of Horticulture*. 40 (4): 218-223.

*Shivaprasad, P.R. 2002. Project report for Anthurium cultivation at Hakattu, Medikeri taluk, Coorg district, Karnataka.

Singh, C and Vasisht, A.K. 1994. Resource allocative efficiency of various sizes of farms in Salem district (Tamil Nadu). *Agricultural Economics Research Review.* 7 (2): 141-145.

Subrahmanyam, K.V. 1986. Economics of production and marketing of Chrysanthemum flowers in Karnataka. *Indian Journal of Horticulture*. 43 (3&4): 281-286.

Subrahmanyam, K.V. 1989. Economics of cultivation of horticultural crops in South India. *Technical Bulletin No. 7*. Indian Institute of Horticultural Research, Bangalore.

Singh, S.S.V. 2011. Economics of Damask rose plantation in Punjab State of India. *Journal of Non-Timber Forest Products*. 18 (4): 281-284.

Tale, B.N and Kalamkar, S.S. 2003. Economics of production of flowers. *Bioved*. 14 (1/2): 61-68.

*Vanishree, M. 2007. Production and marketing of jasmine in Chitradurga district, Karnataka – An economic analysis. *M.Sc. (Agri.) Thesis*. University of Agricultural Sciences, Dharwad.

*** Originals not seen**

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**Note:** The literature is cited as per the "Thesis Guidelines" prescribed by Acharya N. G. Ranga Agricultural University, Rajendranagar, Hyderabad-30.

# APPENDIX-I

**State-wise area of flowers in India during 2008-09.**

| State | Area ('000 Hectares) | Per cent in total |
|---|---|---|
| Tamil Nadu | 29.10 | 17.48 |
| Karnataka | 26.02 | 15.63 |
| West Bengal | 21.07 | 12.65 |
| Andhra Pradesh | 19.45 | 11.68 |
| Maharashtra | 16.81 | 10.10 |
| Uttar Pradesh | 13.53 | 8.13 |
| Gujarat | 9.70 | 5.83 |
| Others | 30.82 | 18.51 |
| Total | 166.50 | 100 |

(http://nhb.gov.in/area%20_production.html)

Source: National Horticultural Board, Ministry of Agriculture, GOI

# APPENDIX-II

**State-wise production of loose and cut flowers in India during 2008-09.**

| State | Loose flowers ('000 tonnes) | Per cent to total | Cut flowers ('000 tonnes) | Per cent to total |
|---|---|---|---|---|
| Tamil Nadu | 233.70 | 23.67 | - | - |
| Karnataka | 203.86 | 20.65 | 5,867.00 | 12.24 |
| West Bengal | 52.01 | 5.27 | 21,232.00 | 44.29 |
| Andhra Pradesh | 124.98 | 12.66 | 3.03 | 0.01 |
| Maharashtra | 89.40 | 9.05 | 5,728.00 | 11.95 |
| Uttar Pradesh | 24.33 | 2.46 | 3,467.00 | 7.23 |
| Gujarat | 49.50 | 5.01 | 5,063.00 | 10.56 |
| Others | 209.62 | 21.23 | 6,581.97 | 13.73 |
| Total | 987.40 | 100.00 | 47,942.00 | 100.00 |

(http://nhb.gov.in/area%20_production.html)

Source: National Horticultural Board, Ministry of Agriculture, GOI.

# APPENDIX-III

**District-wise area and production of flowers in Andhra Pradesh during 2006-07.**

| District | Area (ha) | Production (M.Ts.) |
|---|---|---|
| Srikakulam | 107 | 448 |
| Vizianagaram | 387 | 1,354 |
| Visakhapatnam | 1,448 | 5,050 |
| East Godavari | 1,867 | 10,016 |
| West Godavari | 54 | 318 |
| Krishna | - | - |
| Guntur | 1,474 | 8,021 |
| Prakasam | - | - |
| Nellore | 364 | 1,682 |
| **Coastal Area** | **5,701** | **26,889** |
| Chittoor | 2,330 | 14,130 |
| Cuddapah | 929 | 9,007 |
| Anantapur | 4,030 | 18,005 |
| Kurnool | 4,240 | 18,033 |
| **Rayalaseema Region** | **11,529** | **59,175** |
| **Andhra Region** | **17,230** | **86,064** |
| Mahabubnagar | 332 | 1,175 |
| Ranga Reddy | 2,642 | 21,899 |
| Hyderabad | - | - |
| Medak | 560 | 2,853 |
| Nizamabad | 59 | 221 |
| Adilabad | 636 | 3,098 |
| Karimnagar | 57 | 326 |
| Warangal | 64 | 228 |
| Khammam | 68 | 314 |
| Nalgonda | 15 | 62 |
| **Telangana Region** | **4,433** | **30,176** |
| **Andhra Pradesh** | **21,663** | **1,16,240** |

Source: Department of Horticulture, Govt. of Andhra Pradesh.