“AN ECONOMIC STUDY OF FLORICULTURE IN PUNE DISTRICT”
SYNOPSIS SUBMITTED TO TILAK MAHARASHTRA VIDYAPEETH, PUNE FOR THE DEGREE OF DOCTOR OF PHILOSOPHY [PhD] IN ECONOMICS UNDER THE FACULTY OF SOCIAL SCIENCES BY P.H.KADAM M.A. (SET) MUDHOJI COLLEGE, PHALTAN (SATARA) UNDER THE GUIDANCE OF Dr. PRAVEEN JADHAV M.A, L.L.B, Ph.D. HEAD, DEPARTMENT OF ECONOMICS, TILAK MAHARASHTRA VIDYAPEETH, PUNE.411037 JUNE- 2012
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1.1.0 Introduction

Agriculture is the mainstay of the Indian economy and is the principle means of livelihood for over 60 per cent of the population. GDP was no more than 17.1 per cent during 2008-09 and dropped further to just around 16 per cent in 2009-10\(^1\). Even though, India is primarily an agricultural economy, with almost two-third of its population, make out their existence from farmland. However, challenges before agriculture has been increasing such as environmental and technological changes, hike in input price and fluctuation in output price these are the fundamental problems. Therefore, there is need to apply intensive technique and diversification through horticulture production.

Floriculture: The fast growing domain

Flower production, consumption and trade have been growing more folds in recent years. There has been tremendous growth in the demand and consumption of floriculture products in the last two decades. The total area under cultivation of different flowers was 144 thousand hectares in 2007-08\(^2\). Floriculture has finally begun to form an important component of commercial agriculture and with the increasing awareness of its potential, more and more people are getting associated with flora business.

At present study since relates to cultivation of flowers. Floriculture is major source of employment and income. There is vast scope at growing floriculture product in India, because total area under floriculture is very small. Last two decade there is increasing demand and supply of various types of flowers.

The climatic conditions of India are quite suitable for growing various types of flowers in various zones. Especially, Tamil Nadu, Karnataka, Andhra Pradesh, West Bengal, Maharashtra, Gujarat, Delhi those are the major developed states as far as concern to floriculture. India produced 870 thousand MT loose flowers and 43417.46 lakh numbers of
cut flowers in year 2007-08, with area of 160 thousand hectare. Maharashtra produced of about 69.45 thousand MT of loose flower and 5728.00 lakh numbers of cut flowers in year 2007-08³

. The major flowers grown in India are marigold, aster, roses, tuberose, gladiolus, jasmine and crossandra in open field while gerbera, carnation, roses, anthurium, orchids etc grown under green house conditions.

Floriculture was included in the EXIM policy of India as one of the thrust area for export. In the eighth five-year plan, the ministry of commerce has identified floriculture as on extreme focus segment. The Central Government and Government of Maharashtra started granting subsidies of green house owners. The developments of national level reflected in the horticulture sector in Maharashtra. Maharashtra state has well known for production of horticulture crops in the country. Now floriculture is on the agenda of development in horticulture sector of Maharashtra. The Government of Maharashtra took several steps to boost up this sector. The Government has launching of Horticulture Development Programmes. Under this programme, subsidies given to the producers and progressive farmers have taken to see the floriculture developments.

Definition of Floriculture

Floriculture is one of the branch of agriculture that known as horticulture. The term horticulture is derived from two Latin words ‘hortus’ meaning a garden, and ‘cultura’, meaning cultivation of crops within a protected enclose⁴. This called a garden. At present, fruits, vegetables, flowers and ornamentals are growing not only within the home grounds, but also in large quantities on a commercial scale. Floriculture deals with cultivation, marketing and arranging of flowers and foliage plants.

‘The floriculture industry consists in growing annual, biennial and perennial plants either under glass or outdoors, and in the disposal of the same in wholesale or retail market’.⁵

In general, business of traditional as well as non-traditional flowers and dry flower industry
is called floriculture industry. It includes production, processing and marketing of all types of flowers. There are two types of production i.e. open field cultivation and green house (controlled) cultivation, while processing is concern to dry flower processing units. Marketing includes local markets, regulated internal markets and international markets. Component of marketing channels are producer, hundekari, commission agents, wholesalers, retailers and consumers. Researcher considers the economics of open field cultivation.

1.2.1 Objectives of the Study

Present study carried out with the following objectives

1. To study the development of floriculture
2. To estimate per hectare cost and returns of selected flower crops under field cultivation
3. To estimate benefit-cost ratio of selected flowers
4. To examine the input-output relation of selected flowers
5. To check the relationship between farm size and efficiency of selected flower crops

1.2.2 Hypotheses of the Study

The following hypotheses tested in the course of study.

1. Flower cultivation is labour intensive farming and dependency of family labour is high.
2. Share of family labour decreases as size of farms increases.
3. Crop productivity per unit of land declines with an increase in farm size.
4. Larger the size of the farm, higher the returns.
5. Benefit cost ratio of flower cultivation seems to be higher.
1.3.0 Research Design

For this study, five flowers namely rose, chrysanthemum, tuberose, marigold and aster has chosen. Flowers taking into account as a criteria of maximum area under such a flowers in 2007/08. As per this criterion, Khed, Purandar Haveli, and Dound, tahsils were selected for, aster, marigold, rose, chrysanthemum and tuberose, respectively. Multistage random sampling adopted for the selection of sample units. Then, for each tahsil, two or three circles were selected, from each selected circles, one or two flower-growing villages covering a larger area under the flowers were selected as samples. Enough size of each flower growers was selected randomly. The following are the stages of selection of sample.

1.3.1 Selection of Sample Area

The present study was undertaken in Pune district, this district was selected purposively.

1.5.2 Tahsils as a first stage

Four tahsil such as Khed for aster (198 ha), Purandar for marigold (1154 ha) Haveli for rose (198 ha), Dound for chrysanthemum and tuberose (300ha&600 ha) were taking into consideration as a criteria of maximum coverage of area under respective flowers which shown in Table1.1

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Name of the tahsil</th>
<th>Aster</th>
<th>Chrysanthemum</th>
<th>Marigold</th>
<th>Rose</th>
<th>Tuberose</th>
<th>Others</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Khed</td>
<td>198*</td>
<td>06 (1)</td>
<td>220 (6)</td>
<td>04</td>
<td>06 (0.7)</td>
<td>-</td>
<td>434</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(6)</td>
</tr>
<tr>
<td>2</td>
<td>Purandar</td>
<td>-</td>
<td>90 (11)</td>
<td>1154* (31)</td>
<td>12</td>
<td>-</td>
<td>10 (9)</td>
<td>1266</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(19)</td>
</tr>
<tr>
<td>3</td>
<td>Haveli</td>
<td>110</td>
<td>40 (5)</td>
<td>380 (10)</td>
<td>110*</td>
<td>22 (2.5)</td>
<td>30 (27)</td>
<td>68</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(12)</td>
<td></td>
<td></td>
<td>(38)</td>
<td></td>
<td></td>
<td>(10)</td>
</tr>
<tr>
<td>4</td>
<td>Dound</td>
<td>-</td>
<td>300* (38)</td>
<td>700 (19)</td>
<td>40</td>
<td>600* (69)</td>
<td>25 (23)</td>
<td>1665</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(14)</td>
<td></td>
<td></td>
<td>(25)</td>
</tr>
<tr>
<td>5</td>
<td>Other tahsil</td>
<td>592</td>
<td>355 (45)</td>
<td>1283 (34)</td>
<td>123</td>
<td>247 (27)</td>
<td>45 (41)</td>
<td>3269</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(66)</td>
<td></td>
<td></td>
<td>(41.6)</td>
<td></td>
<td></td>
<td>(40)</td>
</tr>
<tr>
<td></td>
<td>District total</td>
<td>900</td>
<td>791 (100)</td>
<td>3737 (100)</td>
<td>289</td>
<td>875 (100)</td>
<td>110 (100)</td>
<td>6702</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(100)</td>
<td></td>
<td></td>
<td>(100)</td>
<td></td>
<td></td>
<td>(100)</td>
</tr>
</tbody>
</table>

Source:Talathi and circle office of respective villages(2007/08)
### 1.5.3 Circles/Villages as a second stage

The circles/villages selected according to covering a larger area under the flowers. From 4 tahsil, 11 circles and 16 villages (three villages same for two flowers) were selected such as 2 circle and 4 villages for aster crop, 3 circle and 5 villages for marigold crop, 3 circle and 3 villages for rose crop, 2 circle and 3 villages for chrysanthemum, 3 circle and 4 villages for tuberose which shown in Table 1.2.

**Table- 1.2 Villages along with area under flowers (Ha)**

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Name of Tahsil</th>
<th>Name of Circle</th>
<th>Name of Village</th>
<th>Area/ Ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Khed (Aster)</td>
<td>Bhose</td>
<td>Bhose</td>
<td>13.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bhose</td>
<td>Rase</td>
<td>12.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pimpalgaon</td>
<td>Vadgaon- Ghenand</td>
<td>11.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pimpalgaon</td>
<td>Koyali</td>
<td>5.0</td>
</tr>
<tr>
<td>2</td>
<td>Purandar (Marigold)</td>
<td>Shivari</td>
<td>Shivari</td>
<td>18.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shivari</td>
<td>Valunjgaon</td>
<td>7.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dive</td>
<td>Zendewadi</td>
<td>7.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Malshiras</td>
<td>Malshiras</td>
<td>14.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Malshiras</td>
<td>Pondhe</td>
<td>11.4</td>
</tr>
<tr>
<td>3</td>
<td>Haveli (Rose)</td>
<td>Hadapsar</td>
<td>Phurasungi</td>
<td>15.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Uruli-kachan</td>
<td>Sortapwadi</td>
<td>12.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Theur</td>
<td>Kunjeeewadi</td>
<td>9.4</td>
</tr>
<tr>
<td>4</td>
<td>Dound (Chrysanthemum)</td>
<td>Yavat</td>
<td>Yavat-centre</td>
<td>57.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yavat</td>
<td>Yavat-station</td>
<td>15.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kedgaon</td>
<td>Wakhari</td>
<td>20.4</td>
</tr>
<tr>
<td>5</td>
<td>Dound (Tuberose)</td>
<td>Yavat</td>
<td>Yavat-centre</td>
<td>49.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yavat</td>
<td>Yavat-station</td>
<td>12.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kedgaon</td>
<td>Wakhari</td>
<td>8.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Varwand</td>
<td>Varwand</td>
<td>5.0</td>
</tr>
</tbody>
</table>

Source- Talathi and circle offices of respective villages

### 1.5.4 Sample flower growers as a third and ultimate stage

At the first round of survey, researcher visited sample villages, list of flower growers growing aster, marigold, rose, chrysanthemum and tuberose obtained from the revenue records. Then the flower growers growing selected flower enlisted as per land holing. Then from the list, enough size of each flower growers selected randomly and grouped as small, medium and large size, which defines as below.
I  Small Farmer: Below 2.00 Ha  
II  Medium Farmer: 2.01 to 4.00 Ha  
III  Large Farmer: Above 4.00 Ha  

Survey conducted with villages and flower growers as the primary units of investigation during 2009-10. Total 214 flower growers selected as sample which shown in Table 1.3.

Table 1.3 Tahsil-wise distribution of sample flower grower by size class (%)

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Name of Tahsil</th>
<th>Name of the flower</th>
<th>No. of sample Villages</th>
<th>Small</th>
<th>Medium</th>
<th>Large</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Khed</td>
<td>Aster</td>
<td>4</td>
<td>20(49)</td>
<td>13(32)</td>
<td>8(19)</td>
<td>41(100)</td>
</tr>
<tr>
<td>2</td>
<td>Purandar</td>
<td>Marigold</td>
<td>5</td>
<td>18(44)</td>
<td>13(32)</td>
<td>10(24)</td>
<td>41(100)</td>
</tr>
<tr>
<td>3</td>
<td>Haveli</td>
<td>Rose</td>
<td>3</td>
<td>12(42)</td>
<td>10(35)</td>
<td>7(24)</td>
<td>29(100)</td>
</tr>
<tr>
<td>4</td>
<td>Dound-A</td>
<td>Chrysanthemum</td>
<td>4</td>
<td>24(47)</td>
<td>16(31)</td>
<td>11(22)</td>
<td>51(100)</td>
</tr>
<tr>
<td>5</td>
<td>Dound-B</td>
<td>Tuberose</td>
<td>3</td>
<td>23(44)</td>
<td>17(33)</td>
<td>12(23)</td>
<td>52(100)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>19</td>
<td>96(45)</td>
<td>70(32)</td>
<td>48(23)</td>
<td>214(100)</td>
</tr>
</tbody>
</table>

(Figures in the bracket indicate percentage to respective total)  
Source- Talathi and circle offices of respective villages

1.6.0 Data Collection

Following are the sources of data.

1.6.1 Secondary Data

The secondary data consist of published and unpublished source as follows.

A. Published Source

i) Government Reports-

ii) Books and Journals- Mainly focused on agriculture as well as horticulture.

iii) Web Sites-PDF files of APMC Pune., NHB Pune, and NHM Pune.

B. Unpublished Source

Data and information compiled from following unpublished sources

i) Government records

ii) Theses and Dissertations
1.6.2 Requirement of Primary Data

Primary data are those, which collected afresh, and the first time; thus, these data considered original. The different methods used for collecting the primary data i.e. questionnaires, interviews and observations. The researcher used the following methods to collect primary data.

A. Questionnaire

Questionnaire prepared according to objectives of research and information collected from educated member of sample farm family. The survey method used for the collection of data. For survey, a well-prepared schedule including of all necessary components is used.

1.5.0 Analysis of Data

Simple tabular analysis carried out to work out the labour utilization, cost of cultivation and cost of production. The collected data was compiled, tabulate and analyzed to accomplish the objectives of the study.

1.7.0 Chapter Scheme

Present study organizes in nine chapters, which can be justifying the title of research topic as below.

Chapter I: Introduction and Research Methodology

This chapter consists in two parts, first part discusses on the importance, uses, and concept of floriculture, second part deals with research methodology.

Chapter II: Review of Literature

In this chapter, an attempt has made to review of literature, which focused on floriculture. A brief review of past studies will enable us to understand the various aspects of floriculture.

Chapter III: Theoretical Framework and Conceptual Foundation

This chapter deals with the theoretical framework and conceptual foundation. This chapter discusses the economic analysis through theories, concepts and methods of statistical
analysis. Theoretical framework is the base of analytical view. While conceptual clarification is important for justification of results.

**Chapter IV: Floriculture in India**

This chapter deals with the development of floriculture this study enables to understand floriculture development.

**Chapter V: Agro-economy of Maharashtra and Floriculture**

The chapter fifth highlights the, agro-economy of Maharashtra- agro-climatic features, geographical features, land use pattern, state incentives and scheme, production and export position.

**Chapter VI: Profile of the Study Area: Pune District**

Agro-economic profile of of Pune district includes historical, geographical, demographic features have considered.

**Chapter VII: Cost and Returns Structure of Selected Flowers**

This chapter based on primary data, which covers all the aspect of cultivation of selected flowers. The detail of cost and returns of field cultivation i.e. item wise labour utilization, input use, item wise cost of cultivation and marketing of selected flowers analyzed with internal factors.

**Chapter VIII: Benefit Cost, Production Function and Comparative Analysis**

This chapter consist benefit cost analysis, production function analysis and results compared with relative criterion i.e. compares the requirement of human labour and other inputs, cost of marketing, per hectare cost and returns in terms of crop duration.

**Cost and Returns: A Comparison**

In this chapter, inter and intra level results of selected flowers compared with relative criterion i.e. compares the requirement of human labour and other inputs, cost of marketing, per hectare cost and returns in terms of crop duration.
Chapter IX: Findings and Conclusions

Eventually, the study ends with the outcome of the research includes findings and conclusion. Theoretical implications and testing of hypotheses have validated. At the end of chapter, some valuable suggestions are given.

Review of Literature

Several studies having direct or indirect bearing on the objectives of the present investigation were reviewed. In this chapter, an attempt has made to collect the reviews on different aspects of cultivation of flowers under green house and field. These have presented under different subheads. Researcher had reviewed 12 Books, 10 Journal and magazines, 3 Govt. reports and 9 Theses. After review of past study, several are related to economic aspect of floriculture. However, most of them related to green house floriculture and few of them related to field cultivation of flower. After review of literature, we observed some issues in general and particular about floriculture.

18.0 Major findings

The results obtained after the analysis of the data and findings has briefly summarized as under.

Findings- Regarding Cost of Cultivation

i) Per-hectare cost A

1. The per hectare cost A of aster was worked out about Rs. 29,400 (53.05%), Rs. 34,788 (60.70%) and 39,264 (65.25%) for small, medium and large size groups of aster farms, respectively. Among the different items of costs at overall level, it observed bullock and machine labour 10.92 per cent, seedlings 4.76 per cent, irrigation charges 2.45 per cent, insecticides and pesticides 11.64 per cent, land revenues 0.26 per cent and interest on working capitals 2.42 per cent.
2. The per hectare cost of marigold was worked out about Rs. 26,095 (58.81%), Rs. 28,133 (61.86%) and 32,331 (69.30%) for small, medium and large size groups of farms, respectively. Among the different items of cost at overall level observed bullock and machine labour 12.85 per cent, seedlings 6.40 per cent, irrigation charges 1.74 per cent, insecticides and pesticides 5.03 per cent, land revenues 0.33 per cent, interest on working capitals 3.13 per cent.

3. The per-hectare cost of chrysanthemum was worked out about Rs. 68,325 (44.11%), Rs. 87,766 (50.68%) and Rs. 15,878 (65.45%) for small, medium and large size groups of farms, respectively. Among the different items of cost at overall level observed bullock and machine labour 4.68 per cent, seedlings 7.91 per cent, irrigation charges 1.28 per cent, insecticides and pesticides 5.09 per cent, land revenues 0.11 per cent, interest on working capitals 4.35 per cent.

4. The per-hectare cost of rose was worked out about Rs. 185925 (65.50%), Rs. 195321 (65.40%) and 226380 (72.40%) for small, medium and large size groups of farms, respectively. Among the different items of cost at overall level observed apportioned establishment cost 28.54 per cent, irrigation charges 0.98 per cent, insecticides and pesticides 10.76 per cent, land revenues 0.06 per cent, interest on working capitals 1.43 per cent.

5. The per-hectare cost of tuberose worked out about Rs. 110164 (52.12%), Rs. 128303 (56.96%) and 137488 (58.13%) for small, medium and large size groups of farms, respectively. Among the different items of cost at overall level observed apportioned establishment cost 21.13 per cent, irrigation charges 1.53 per cent, insecticides and pesticides 10.76 per cent, land revenues 0.08 per cent, interest on working capitals 1.67 per cent. Thus, the similar trend of per hectare cost of cultivation as well as item wise cost observed among the different size groups of farms at the overall level.

ii) Per-hectare cost B
6. The per hectare cost B of aster was worked out about Rs 38400 (68.13%), Rs 43213 (75.40%), Rs 47874 (79.57%) for small, medium and large size groups of farms, respectively. Net cost on item of B found Rs 8500(15.9%), Rs 8425(14.70%), and 8610(14.32%) for small, medium and large size groups of farms, respectively.

7. The per hectare cost B of marigold was worked out about Rs 34695 (67.86%), Rs 36623 (70.11%), Rs 40920 (76.62%) for small, medium and large size groups of farms, respectively. Net cost on item of B found Rs 8600 (16.82%) Rs 8490(16.25%) (14.70%), and 8589 (16.09%) for small, medium and large size groups of farms, respectively.

8. The per hectare cost B of chrysanthemum was worked out about 110792 (71.52%), 132717 (76.64%), 162691 (91.89%) for small, medium and large size groups of chrysanthemum farms, respectively. Net cost on item of B found Rs 42467 (27.42%), Rs 44951 (25.96%), and Rs 46813 (26.44%) for small, medium and large size groups of farms, respectively.

9. The per hectare cost B of rose was worked out about 229534 (80.86%), 238623 (79.90%), 270262 (86.44%) for small, medium and large size groups of rose farms, respectively. Net cost on item of B found Rs 43609(15.4%), Rs 43302(14.5%), and Rs 43882 (14.03%) for small, medium and large size groups of farms, respectively.

10. The per hectare cost B of tuberose was worked out about 153283 (72.51%), 171870 (76.29%), 181730 (76.83%) for small, medium and large size groups of tuberose farms, respectively. Net cost on item of B found Rs 43119 (20.4%), Rs 43567 (19.3%), and Rs 44242 (18.70%) for small, medium and large size groups of farms, respectively.

iii) Per-hectare cost C

11. The per hectare cost C of aster was worked out about Rs 56362(72 per cent), Rs 57313 (71%), Rs 60167 (70.6%) for small, medium and large size groups of aster farms, respectively. At overall level, it was about Rs 57848 of which 38 per cent (12.48% hired
& 25.38% family) cost contributes human labour. Second major item was manure and fertilizer together 13.68 percent (6.68% + 7%) followed by insecticide and pesticide 11.64 percent, bullock and machine labour 10.92 per cent. Net cost on family labour contributes 25.38 per cent.

12. The per hectare cost C of marigold was worked out about Rs 51125 (72%), Rs 52231 (71.3%), Rs 53406 (70.5%) for small, medium and large size groups of farms, respectively. At overall level, it was about Rs 52254 of which 42.51 per cent (13% hired & 28.46% family) cost contributes human labour. Second major item was manure and fertilizer together 17.73 percent (10% + 7.73%) followed by, bullock and machine labour 12.85 per cent. Net cost on family labour contributes 28.46 per cent.

13. The per hectare cost C of chrysanthemum was worked out about Rs 154892 (75.7%), Rs 173166 (76%), Rs 177041 (76.3%) for small, medium and large size groups of chrysanthemum farms, respectively. At overall level, it was about Rs 168366 of which 39.83 per cent (20.25% hired & 19.58% family) cost contributes human labour. Second major item was rental value of land 22.27 per cent followed by, seedlings 7.91 per cent. Net cost on family labour contributes 19.58 per cent.

14. The per hectare cost C of rose was worked out about Rs 283834 (71.6%), Rs 298623 (71.1%) and Rs 312637 (71%) for small, medium and large size groups of rose farms, respectively. At overall level, it was about Rs 298364.7 of which 30.47 per cent (12.97% hired & 17.50% family) contributes human labour. Second major item 28.54 per cent contributes apportioned establishment cost followed by rental value of land 12.56 per cent, manure and fertilizer together 10.90 percent (5.10 + 5.80%), insecticides and pesticides 10.76 per cent. Net cost on family labour contributes 17.50 per cent.

15. The per hectare cost C of tuberose was worked out about Rs 211383, Rs 225270, and Rs 236530 for small, medium and large size groups of tuberose farms, respectively. At
overall level, it was about Rs 224387 of which 38.6 per cent (13.82% hired & 24.78% family) contributes human labour. Second major item 21.13 per cent contributes apportioned establishment cost followed by rental value of land 16.74 per cent, fertilizer 8.81 per cent. Net cost on family labour contributes 24.78 per cent.

**Findings- Regarding Marketing Cost**

16. The significant item of cost was the commission of commission agent contributing to around 66.8 per cent, 55.81 per cent, 68.25 per cent, 55.22 per cent and 61.29 per cent for aster, marigold, chrysanthemum, rose and tuberose, respectively of the total marketing cost. Second important item of cost found transportation charges around 15.46 per cent, 25.73 per cent, 21.17 per cent, 21.10 per cent and 30.33 per cent followed by packing and grading charges around 11.06 per cent, 12.87 per cent, 3.73 per cent, 18.15 per cent and 2.24 per cent for aster, marigold, chrysanthemum, rose and tuberose, respectively of the total marketing cost.

**Findings- Regarding Cost of Production**

17. The cost of production of aster at overall level was Rs. 81,309 of which major item of cost was the human labour (26.7%). Second important item of cost found marketing cost (21.72%). It was Rs. 78,378, Rs. 80793 and Rs. 84,755 for small, medium and large size group of farms, respectively.

18. The cost of production of marigold at overall level was Rs. 73344.33 of which major item of cost was the human labour (28.33%). Second important item of cost found marketing cost (21.63%). It was Rs71021, Rs 73295 and Rs. 75717 for small, medium and large size group of farms, respectively. It indicates that, trends of cost of production increased with size group of farms increases.

19. The cost of production of chrysanthemum, at overall level was Rs. 221486 of which major item of cost was the human labour (30.28%). Second important item of cost
found marketing cost (16.39%). It was Rs 204470, 227979 and Rs 232010 for small, medium and large size group of farms, respectively.

20. The cost of production of rose at overall level was Rs. 419083 of which major item of cost was the human labour (21.70%). Second important item of cost found marketing cost (21.67%) followed by apportioned establishment cost (20.32%). It was Rs 396266, 419774 and Rs 441212 for small, medium and large size group of farms, respectively.

21. The cost of production of tuberose, at overall level was Rs. 302636 of which major item of cost was the human labour (28.33%). Second important item of cost found marketing cost (21.63%) followed by apportioned establishment cost (18.43%). It was Rs 284829, 303545 and 319534 for small, medium and large size group of farms, respectively.

**Findings- Regarding Per Hectare Yields**

22. Per-hectare total yield obtained from aster at the overall level was 21,125 pairs. Among the size groups of farms, the yield got 20,000, 20,625 and 22,750 pairs in small, medium and large size groups of farms, respectively.

23. Per-hectare total yield obtained from marigold at the overall level was 4607 kg. Among different size groups of farms, the yield was 4325 kg, 4620 kg and 4851 kg in small, medium and large size groups of farms, respectively.

24. Per-hectare total yield got from chrysanthemum at the overall level was 7684.5 kg. Among the difference size group of farms, yield was 7225, 7947.5 and 7881 kg from small medium and large size groups of farms, respectively.

25. Per-hectare total yield got from rose at the overall level was 836390 numbers. Among the difference size groups of farms the yield was 766500, 839300 and 903370 numbers in small medium and large size groups of farms, respectively.
26. Per-hectare total yield obtained from tuberose at the overall level was 9581 kg. Among the difference size groups of farms the yield was 9125, 9581 and 10037 kg from small, medium and large size groups of farms, respectively.

**Findings- Regarding Per Hectare Gross and Net Returns**

27. The gross returns received from aster were Rs. 1, 19,553 at the overall level. It observed to be Rs. 1, 15,000 Rs. 1, 18,594 and Rs. 1, 18,594 from small, medium and large size group of farms, respectively, large sized group of aster farms received highest per hectare gross returns followed by medium and small sized group of farms. The net returns received at overall level of Rs 32284. It was Rs 36322,Rs 37801,Rs 40308 from small, medium and large size groups of farms, respectively. Per-hectare net return was the highest in large sized group of farms followed by medium and small sized group of farms.

28. The gross returns received from marigold were Rs. 94213 at the overall level. It observed to be Rs. 88958, Rs. 94479 and Rs. 99203 from small, medium and large size group of farms, respectively. The large sized group of marigold farms received highest per hectare gross returns followed by medium and small sized group of farms. The net returns received at overall level of Rs 20889. It was Rs 17937, Rs 21118, Rs 23446 from small, medium and large size groups of farms, respectively. Per-hectare net return was the highest in large sized group of farms followed by medium and small sized group of farms.

29. The gross returns received from chrysanthemum was Rs 247672 at the overall level. It was observed to be Rs 232862,Rs 256148 and Rs 254005 from small, medium and large size groups of farms respectively. Medium sized farms received highest per hectare gross returns followed by large and small size groups of farms. The net returns received at overall level of Rs 26186. It was Rs 28932,Rs 28169,Rs 21995 from small, medium and large size groups of farms respectively. Per-hectare net return was the highest in small sized group of farms followed by medium and large sized group of farms.
30. The gross returns received from rose were Rs 501834 at the overall level. It observed to be Rs 459900, Rs 503700 and Rs 542025 from small, medium and large size groups of farms, respectively. Large sized farms received highest per hectare gross returns followed by medium and small size groups of farms. The net returns received at overall level of Rs 82750. It was Rs 63364, Rs 83926 and Rs 100815 from small, medium and large size groups of farms, respectively. Per-hectare net return was the highest in large sized group of farms followed by medium and small sized group of farms.

31. The gross returns received from tuberose were Rs 342041.7 at the overall level. It observed to be Rs 325762.5, Rs 342041.7 and Rs 358320.9 from small, medium and large size group of farms, respectively. Large sized farms received highest per hectare gross returns followed by medium and small size groups of farms. The net returns received at overall level of Rs 39414. It was Rs 40938, 38502, 38802 from small, medium and large size groups of farms, respectively. Per-hectare net return was the highest in small sized group of farms followed by large and medium sized group of farms.

**Findings- Regarding Returns at Cost A, Cost B and Cost C**

32. It appears from analysis that, returns of aster at overall level observed to be Rs 84799, Rs 76390 and Rs 61705 at level of cost A, cost B and cost C, respectively. The returns at cost A were highest Rs 85799 at large sized group followed by small sized Rs 85100 and medium sized Rs 83806. The returns at cost B were highest Rs 77189 at large sized group followed by small sized Rs 76600 and medium sized Rs 75381. The returns at cost C were highest Rs 65196 at large sized group followed by medium sized Rs 61281 and small sized Rs 58638.

33. It appears from analysis that, returns of marigold at overall level observed to be Rs.65360, Rs.56833 and Rs.41959 at level of cost A, cost B and cost C, respectively. The returns at cost A were highest Rs. 66872 at large sized group followed by medium sized
Rs.66346 and small sized Rs.62863. The returns at cost B were highest Rs.58283 at large sized group followed by medium sized Rs.57856 and small sized Rs.54263. The returns at cost C were highest Rs 45799 at large sized group followed by medium sized Rs 42248 and small sized Rs 37833.

It appears from analysis that, returns of chrysanthemum at overall level observed to be Rs 157015, Rs 112272 and Rs 79306 at level of cost A, cost B and cost C, respectively. The returns at cost A were highest Rs168382 at medium sized group followed by small sized Rs 164537 and large sized Rs 138187. The returns at cost B were highest Rs 123431 at medium sized group followed by small sized Rs 122070 and large sized Rs 91314. The returns at cost C were highest Rs 82982 at medium sized group followed by small sized Rs 77970 and large sized Rs 76964.

35. It appears from analysis that, returns of rose at overall level observed to be Rs 329034, Rs 285437 and Rs 233212 at level of cost A, cost B and cost C respectively. The returns at cost A were highest Rs 346729 at large sized group followed by medium sized Rs 337597 and small sized Rs 302900. The returns at cost B were highest Rs 302847 at large sized group followed by medium sized Rs 294295 and small sized Rs 259291. The returns at cost C were highest Rs 260472 at large sized group followed by medium sized Rs 234295 and small sized Rs 204991.

36. It appears from analysis that, returns of tuberose at overall level observed to be Rs 216732, Rs 173089 and Rs 108263 at level of cost A, cost B and cost C respectively. The returns at cost A were highest Rs 220833 at large sized group followed by small sized Rs 215599 and medium sized Rs 213740. The returns at cost B were highest Rs 176591 at large sized group followed by small sized Rs 172480 and medium sized Rs 170172. The returns at cost C were highest Rs 116772 at medium sized group followed by small sized Rs 114380 and large sized Rs 109820.
Findings- Regarding Benefit Cost Ratio

37. It observed that, at the overall level B: C ratio of aster cultivation was Rs.1:1.48 while cost A, cost B and cost C level it was Rs. 1:3.48, Rs. 1:2.79 and Rs. 1:2.07 respectively. At cost of production level, the cost benefit ratio found to be more in large size group (Rs-1:1.48) followed by medium and small size group (Rs-1: 1.47). it clarified that the aster cultivation was also profitable.

38. It observed that, at the overall level B:C ratio of marigold cultivation was Rs.1:1.28 while cost A, cost B and cost C level it was Rs. 1:3.29, Rs. 1:2.51 and Rs.1:1.80 respectively. At cost of production level, the cost benefit ratio found to be more in large size group (Rs. 1:1.31) followed by medium (Rs 1:1.28) and small size group (Rs1: 1.25). it clarified that the marigold cultivation was also profitable.

39. At the overall level B:C ratio of chrysanthemum cultivation indicate that profitability of investment was observed to be 1:2.83 at cost A, 1:1.86 at cost B and 1:1.47 at cost C, Whereas at cost of production level it was 1:1.11. The output-input ratio was greater than unity. Among the different size groups of farms the output-input ratio at cost C was highest of small sized group followed by medium and large sized group of farms, it clarified that the chrysanthemum cultivation was profitable. It was highest in small (1:1.13) followed by medium (1:1.12) and large (1:1.09) size groups of farms.

40. It appears that, the B:C ratio of rose cultivation indicate that profitability of investment observed to be 1:2.91 at cost A, 1:2.46 at cost B and 1:1.87 at cost C. The output-input ratio was greater than unity indicating thereby the cultivation of rose was profitable. Among the size groups of farms the output-input ratio at cost C was highest in large sized group followed by medium and small sized group of farms. The output-input ratio at cost of production was 1:1.19 at the overall level, it clarified that the field rose cultivation was also
It was highest in large (1:1.22) followed by medium (1:1.19) and small (1:1.16) size groups of farms.

41. It appeares that, at the overall level, the B:C ratio of tuberose indicate that profitability of investment was observed to be 1:2.75 at cost A, 1:2.02 at cost B and 1:1.52 at cost C and 1:1.22 at cost of production level, the output-input ratio was greater than unity indicating thereby the cultivation of tuberose was profitable. Among the size groups of farms the output-input ratio at cost C was highest in large sized group followed by medium and small sized group of farms. The output-input ratio at cost of production was 1:1.22 at the overall level, it clarified that the tuberose cultivation was profitable. It was highest in small (1:1.43) followed by medium (1:1.12) and large (1:1.12) size groups of farms.

**Hypothesis testing**

This research study presented the following hypotheses that tested as below.

1. **Hypothesis No. 1** 'Flower cultivation is labour intensive farming and dependency of family labour is high'.

The result of present study revealed that cost on human labour was high proportion. Following analysis clarified that selected all flowers were labour intensive.

- **Aster**

  At overall level, cost of cultivation of aster crop (Cost C) worked out to Rs. 57,848 per hectare, of which Rs 25907(45%) required for human labour.

- **Marigold**

  At the overall level, cost of cultivation of marigold (Cost C) worked out to Rs. 52254 per hectare of which crop Rs 20779 (41%) required for human labour. for small, medium and large sized groups of farms, respectively.

- **Chrysanthemum**
At the overall level, the cost of cultivation of chrysanthemum (Cost C) worked out to Rs 168366. The major items of cost were aggregate human labour Rs 67080 (39.83%) of which family labour formed 19.58 per cent while hired labour formed 20.25 per cent.

- Rose

Cost of cultivation of rose (Cost C) worked out to Rs 298365. The major items of cost were aggregate human labor Rs 90950 (30.48%) of which family labour formed 17.50 per cent while hired labour formed 12.97 per cent. Tuberose

The cost of cultivation of tuberose (Cost C) worked out to Rs 224387. The major items of cost were aggregate human labour Rs 86533.33 (37.01%) of which family labour formed 24.78 per cent while hired labour formed 13.82 per cent.

*Hence, the hypothesis: ‘Flower cultivation is labour intensive farming and dependency of family labour is high’ stands valid.*

**Hypothesis No. 2. ‘Share of family labour decreases as size of farms increases’.

The details about labour utilization carried out to assess the above hypothesis and find out as below.

- **Aster** - The comparison of per hectare cost of cultivation in different size groups of farms clarify that human labour formed at large of total cost in all the size groups of farms. Of which family labour formed Rs. 17,962 (31.8%) Rs. 14,100 (24.6%) and Rs. 11,993 (19.9%) for small, medium and large sized groups of farms, respectively. It revealed that share of family labour decreased as size of farms increased.

- **Marigold** - For marigold cultivation, family labour formed Rs. 16430 (32.13 per cent) Rs. 15608 (29.88 per cent) and Rs. 12486 (23.37 per cent) for small, medium and large sized groups of farms, respectively. It revealed that share of family labour decreased as size of farms increased.
Chrysanthemum- For chrysanthemum cultivation it showed that, share of family labour of Rs 44100(28.46 per cent), Rs 40449(23.34 per cent) and Rs 14350(8.10 per cent) for small, medium and large sized groups of farms, respectively it is clear that share of family labour decreased as size of farms increased.

Rose- For rose cultivation, it showed that share of family labour of Rs Rs 54300 (19.14per cent), Rs 60000(20.09 per cent) and Rs 42375(13.55 per cent) for small, medium and large sized groups of farms, respectively. It indicates that small farms utilized more quantity of family labour than large farms.

Tuberose- For rose cultivation, it showed that share of family labour of Rs 58100(27.4 per cent), Rs 53400(23.7 per cent) and Rs 54800(23.1 per cent), for small, medium and large sized groups of farms, respectively. It is clear that share of family labour decreased at large sized groups of farms.

Therefore, hypothesis ‘Share of family labour decreases as size of farms increases’ stands valid.

Hypothesis No. 3. ‘Crop productivity per unit of land declines with an increase in farm size’.

A large number of studies during the 1960s and 1970s provided evidence that crop productivity per unit of land declined with an increase in farm size (Sen1962, 1964; Mujumdar 1965; Khusro1968; Hanumant Rao 1968; Saini1971). However, analysis of present course of study showed that, flower crop productivity increase with the size of farms increases. Following results proven that as below-

- Aster crop has investigated in present course of study and per hectare yield found 20,000, 20,625 and 22,750 pairs from small, medium and large size group of farms, respectively.
- Marigold found 4325, 4620 and 4851 kg from small, medium and large size group of farms, respectively.
- Chrysanthemum found 7225, 7947.5 and 7881 kg from small, medium and large size group of farms, respectively.
- Rose found 76650, 83930 and 90337 from small, medium and large size group of farms, respectively.
- Tuberose found 9125, 9581 and 10037 kg from small, medium and large size group of farms, respectively.

Above results showed that yield per hectare increased as size of farm increased.

*Therefore, the hypothesis ‘Crop productivity per unit of land declines with an increase in farm size’ stands invalid.*

**Hypothesis No.4 ‘Larger the size of the farm, higher the returns’**

Present course of study estimated the cost and returns. Profitability measured by the surplus of output over costs, including the imputed value of labour, and estimated cost and returns thereby result found as below.

- **Aster**-The gross returns received from aster were Rs. 1, 19, 553 at the overall level. It observed to be Rs. 1, 15,000 Rs. 1, 18,594 and Rs. 1, 18,594 in small, medium and large size group of farms, respectively, large sized group of aster farms received highest per hectare gross returns followed by medium and small sized group of farms.
- **Marigold**-The gross return received from marigold were Rs. 94213 at the overall level. It observed to be Rs. 88958, Rs. 94479 and Rs. 99203 from small, medium and large sized group of farms, respectively.
- **Chrysanthemum**- The gross returns received from chrysanthemum were Rs 247672 at the overall level. It observed to be Rs 232862, 256148 and 254005 from small, medium and large size groups of farms, respectively.
- **Rose**- The gross returns received from rose were Rs 501834 at the overall level. It observed to be Rs 459900, Rs 503700 and Rs 542025 in small, medium and large size groups of farms, respectively.
**Tuberose** - The gross returns received from tuberose was Rs 342041.7 at the overall level. It observed to be Rs 325762.5, 342041.7 and 358320.9 in small, medium and large size groups of farms, respectively.

Above analysis revealed that, large sized farms received highest per hectare gross returns followed by medium and small size groups of farms.

- *Hence, the hypothesis ‘larger the size of farm higher the returns’ stands valid.*

### 6.3.5 Hypothesis No.5  Benefit cost ratio of flower cultivation seems to be higher’

- **Overall level**

  At the overall level B: C ratio of aster was Rs. 1.48, marigold was Rs. 1.28, chrysanthemum was 1.11, rose was 1.19 and tuberose was 1.13.

- **At cost A and B**

  At cost A and cost B level the benefit cost ratio of aster Rs 3.47 & 2.77, marigold Rs 3.26 & 2.51, chrysanthemum Rs 2.73 & 1.82 rose Rs 2.91 & 2.32, tuberose (Rs 2.72 & 2.02).

- **At cost C** At cost C level the benefit cost ratio was found, of aster Rs 2.07, chrysanthemum Rs 1.47, rose Rs 1.81, marigold Rs 1.80, tuberose Rs 1.52.

  The output-input ratio was greater than unity. It concluded that the benefit cost ratio in all the levels of cost and groups more than one.

- *Hence, the hypothesis ‘Benefit cost ratio of flower cultivation is higher’ stands valid*