

PROTECTED FLOWER CULTIVATION IS A BOON: AN ECONOMICAL ANALYSIS IN THE SIRMOUR DISTRICT OF HIMACHAL PRADESH

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Abstract

India is one of the key players in the global floriculture scene, according to research (Gharge et al., 2011). There is an obligation to use modern crop production methods like protected cultivation as a result of factors like population growth, climate change, increased demand for high-quality produce, shrinking land holdings and increased pressure on resources. The objective of this study is to discuss the socio economics status of flower growers, economics of protected cultivation technology of flower crops and problems faced by the growers in Sirmour District of Himachal Pradesh. In the study area, the average family size, sex ratio and literacy rate were found to be 5.14 persons, 761 and 92.45 per cent respectively. The Costs A_1 , B_2 , D, gross income, net income and output input ratio in case of carnation cultivation under protected conditions were ₹242.87, ₹255.67 and ₹302.75 per square metre, ₹898.45, ₹595.70 and 2.96 respectively, whereas, in case of lilies, Cost A_1 , B_2 , D, gross income, net income and output input ratio were ₹756.98, ₹853.86 and ₹954.34 per square meter respectively, ₹2675.88, ₹1721.54 and 2.80 respectively. The main problems faced in the study area were lack of availability of healthy planting material, Lack of availability of regulated market, Lack of availability of chemicals and irrigation and shortage of skilled labour.

Keywords: Flower crops, economics, returns, CACP concepts, profitability, problems.

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Introduction

There is a huge market for the export of high-value agricultural crops from India, in addition to meeting the rising demand in the domestic market, as a result of trade globalisation and economic liberalisation in India. Most important of these agricultural crops are flowers. To satisfy the demands of quality-conscious consumers, it is currently necessary to increase productivity and produce quality. It takes a revolution in production technology to ensure vertical productivity growth while also integrating quality metrics driven by the market into the production system. The industry with the greatest potential to create self-employment and lucrative wages for both small and marginal farmers is floriculture, which is booming in Asian nations like India. Since the beginning of time, flowers have been intimately linked to human existence and have been crucial to nearly every aspect of it, including birth, marriage, worship, decoration, and death (Ninama et al., 2016). The history of flower and ornamental plant cultivation parallels that of agricultural crops. At first, people used flowers for ritualistic and aesthetic purposes. Recent changes in urban wealth, lifestyles, and living standards have given floriculture a boost in economic standing. The fast-growing, dynamic, global industry of floriculture is distinguished by significant distribution network changes. There are many different kinds of plants and plant materials used in floral production. It includes the commercial production of landscape plants, cut flowers, loose flowers, cut greens, seeds, and bulbs as well as their marketing and the creation of value-added products from them. All plant parts that have been cut and whose economic value comes from the aesthetic appeal of their blossoms are generally referred to as cut flowers. India is the world's second-largest flower producer after China, and it comes in at number 14 in terms of exports of floriculture (Anumala and Kumar, 2021). Due to urbanisation and rising levels of disposable income, the demand for floriculture products has significantly increased (Singh, 2017). As a result, the demand for cut flowers such as roses, gladiolus, gerbera, orchids, carnations, and lilies has increased. With the help of technical advice from foreign companies, the Indian floriculture sector is getting ready to strengthen its position in international trade (APEDA, 2022). A better method of growing crops in a regulated environment is known as protected cultivation. By providing completely controlled conditions, the protected cultivation method lowers the biotic and abiotic stresses (Pattanaik and Mohanty, 2021). In protected cultivation, the surrounding microclimate is partially or completely controlled and the best conditions provided for the best growth of plants to achieve the highest yield and best quality produce (Chandra, 2001). Unemployed educated youths who are not interested in traditional agriculture are also displaying a strong interest in such agricultural technologies and may be further encouraged to do so. The most practical method for achieving the goal of protected cultivation is greenhouse technology (Nagarajan et al., 2002). The diverse agro-climatic conditions that Himachal Pradesh enjoys make it the perfect place for floriculture. Himachal is quickly becoming known as the flower state due to its favourable agro-climatic conditions for the year-round production of a variety of flowers under covers. Additionally, the government is paying attention by providing farmers with incentives to encourage them to adopt floriculture in order to boost their economies (Singh et al., 2014). With the help of the state and federal governments, protected cultivation has developed into a brand-new agribusiness for farmers. The current

study was carried out in the Sirmour district of Himachal Pradesh keeping in mind the significance of protected flower cultivation in the economy of the households. It is a temperate area with perfect growing conditions for several floral species and apples. The residents of Sirmour district cultivate various flower species under protected cultivation in partnership with the horticultural department. It will not only protect farmers from unpredictable weather, but it will also give the state's educated unemployed youth many options for a better way of life. The area's most notable features are its magnificent flowers. Carnations and Lilies are the main commercial flowers grown in the valley under protected cultivation. The main objectives of the study are to analyse the socio-economic characteristics of sampled flower growers, economics of protected flower cultivation and problems faced by the farmers.

Materials and Methods

Practically every district in Himachal Pradesh practises protected cultivation. The Sirmour district of was chosen for the current study due to the concentration of growers of protected flowers. In the study area, protected flower cultivation is a quickly expanding business that is gaining popularity. Carnation and Lilies are the two main flower crops grown under protected conditions in the study area. The sampling units were chosen using a straightforward random sampling technique. The Directorate of Horticulture provided a list of growers who are protected from producing flowers. For the purpose of gathering the necessary data, 150 growers of protected flowers were randomly chosen as a sample. Primary information was gathered from the chosen growers using a personal interview method according to a pretested, carefully designed schedule. Secondary information about the production was gathered from various government agencies, the Department of Horticulture/Agriculture as well as other published materials and websites.

Analytical Framework

Socioeconomic status, economics and growers' perceptions of the production and marketing issues associated with protected cultivation were all examined using simple tabular analysis. To compare, contrast, and interpret the findings, basic statistical techniques including averages and percentages were used.

The following type of indices has been used for estimation of different parameters.

Sex ratio

$$\text{Sex ratio} = \frac{\text{Number of females}}{\text{Number of males}} \times 1000$$

Literacy rate

$$\text{Literacy rate} = \frac{\text{Total no. of literate person}}{\text{Total population}} \times 100$$

Cost Analysis

Farm management cost concepts was used to estimate the cost and returns form flowers with the following formulae:

(i) Cost A₁ includes:

- 1) Seed/Seedling cost
- 2) Value of manures, fertilizers and plant protection chemicals
- 3) Hired human labour
- 4) Bullock labour
- 5) Owned and hired machinery
- 6) Irrigation charges
- 7) Depreciation on implements, farm buildings and irrigation structures
- 8) Interest on working capital
- 9) Other miscellaneous charges.

(ii) **Cost A₂:** Cost A₁ + rent paid for leased in land

(iii) **Cost B₁:** Cost A₁+ interest on the fixed capital

(iv) **Cost B₂:** Cost B₁ + rental value of owned land

(v) **Cost C₁:** Cost B₁ + imputed value of family labour

(vi) **Cost C₂:** Cost B₂ + imputed value of family labour

(vii) **Cost D:** Cost C₂ + value of management input (10% of Cost C₂).

Analysis of Production and Marketing Issues

It is assumed that the severity of a given issue varies from location to location and grower to grower in order to study the various issues related to the cultivation and marketing of flowers. For analysis, the numerous responses from producers describing various issues were taken into account.

a) **Garrett's Method of Ranking:** In this method the constraints were focused on the response of all sample farmers. The respondents were asked to rank the problems related to production and marketing. It was used to study the growers' problems towards the climate change with the following:

$$\text{PercentPosition} = \frac{(R_{ij} - 0.5)}{N_j}$$

Where:

R_{ij} = Rank given to ith position by the jth individual

N_j = Numbers of problems ranked by jth individual.

b) Chi-square test:

To test whether there is any significant difference among marginal and small flower growers for the problems faced by them. Chi-square test in m x n contingency table was applied where m and n are the number of marketing problem faced by the farmers. The detail of approximate Chi-square test (χ^2) is given as under:

$$\chi^2 = \sum_{i=1}^k \frac{(O_i - E_i)^2}{E_i} \sim \chi^2 (K-1) d.f.$$

Where,

- O_i = Observed values
- E_i = Expected values
- K = number of farm size groups.

Results and Discussion

Socio-Economic Characteristics of Sampled Flower Growers

The management and organisation of farms as well as the adoption of new and improved technologies are influenced by the socioeconomic characteristics of farmers. According to Table 4.1, there were 5.14 families on average. The average number of males and females in the study area were 56.78 and 43.22 respectively. The sex ratio of 761 was found in the study area. The literacy rate was found to be 92.45 per cent. Near about 10.17 per cent of the area was under protected cultivation of flowers here also, the main flower crops grown were carnation and lilies accounting for 535.80 and 43.74 square meter area respectively.

Economics of Protected Flower Cultivation in the Study Area

One of the most famous cut flowers in the world and its status as a highly desired flower has been elevated by the wide range of colours it comes in and its superior keeping qualities. High light levels during the winter and mild summer temperatures are conducive to the production of premium carnations in these regions. One carnation crop was grown for three to four years in each of the chosen polyhouses. The plants immediately started to produce flowers and continued to do so up until the third or fourth year after cultivation, proving that carnations can be grown for a very long time. However, lilies is one of the most significant perennial or annual bulbs grown primarily at higher altitudes. It is admired for both its many colours and excellent keeping qualities. The majority of the times, flowers are used as decorations or to make bouquets. A total of four to five bloom production are observed in case of lilies. As a result, farming in the study area is profitable when cutting flowers. Carnation seedlings cost between ₹15 and ₹18, depending on the size. The results of a study on the cost factors of growing carnations under various farm categories are shown in Table 2. The Costs A1, B2, and D, at an overall level were ₹242.87, ₹255.67, and ₹302.75 respectively per square metre, according to the table. The estimates of the output input ratio (2.96), gross income (₹898.45), and net income (₹595.70) were also calculated in order to assess the relative profitability of the crops in the study area. In

the study area, Lilies bulbs cost between ₹31 and ₹38. Overall, the cost for lilies was ₹756.98, ₹853.86, and ₹954.34 per square metre, respectively. Also estimated to determine the relative profitability of crops in the study area were gross income, net income, and output input ratio, which were discovered to be ₹2675.88, ₹1721.54, and 2.80 respectively.

Table 1. Socio-Economic Analysis of Flower Growers in the Study Area

Sr. No.	Particulars	Value
1.	Average size of the Family (number)	5.14
2.	Number of males	56.78
3.	Number of Females	43.22
4.	Literacy rate	92.45
5.	Sex Ratio	761
6.	Total Land holding (ha)	0.59
7.	Cultivated area under protected flowers (%)	10.07
8.	Orchards + Vegetables land (%)	69.31
9.	Barren land (%)	4.59
10.	Pasture/ghasnis (%)	6.83
11.	Land put to non-agriculture use (%)	9.20
12.	AREA UNDER MAIN FLOWERS (square mt)	
(a)	Carnation	535.80
(b)	Lilies	43.74

Table 2. Average Cost and Returns of Carnation and Lilies in the Study Area (₹/Square Metre)

Particulars	Carnation	Lilies
Cost A ₁	242.87	756.98
Cost B ₂	255.67	853.86
Cost D	302.75	954.34
Gross Income	898.45	2675.88
Net Income	595.70	1721.54
Output input ratio	2.96	2.80

Problems Faced by Farmers in the Study Area

In the study area, protected cultivation has become more prevalent over time. However, because certain flowers are bulky and perishable, growers are having a lot of issues with the production and marketing of flowers. It is assumed that the severity of a given problem varies from location to location and grower to grower in order to study the various problems related to the flowers. The majority of farmers experienced multiple issues in each area, which is why there are multiple solutions available.

Using the chi square test and garret ranking, issues within farm categories are found. Significant problems indicate that farmers' responses to problems were very different for each category, whereas non-significant problems suggested that farmers' responses to problems were essentially the same for each category. Table 3 displays the outcomes of the responses made by the farmers to the issues.

Table 3. Farm Category wise Problems Faced by Flower Growers in the Study Area (Multiple Response Per Cent)

Sr. No.	Problem	Overall	Chi square
1.	Lack of availability of healthy planting material	0.27 (7.89)	0.02
2.	Lack of availability of chemicals and irrigation	0.73 (21.05)	10.32*
3.	Lack of availability of regulated market	0.64 (18.42)	9.42*
4.	Lack of knowledge	0.27 (7.89)	0.80
5.	High transportation cost and higher commission	0.64 (18.42)	0.07
6.	Lack of inadequate price	0.55 (15.79)	0.22
7.	Shortage of skilled labour	0.36 (10.53)	2.92

(Figure in the parentheses is percentage of total)

It can be inferred from Table 3, that there were many problems related to production of flowers such as lack of availability of healthy planting material, lack of availability of chemicals and irrigation, shortage of skilled labour and lack of knowledge. But the significant constraints related to production in the study area were only lack of availability of regulated market and lack of availability of chemicals and irrigation.

Garret Ranking Technique

From Table 4, it is inferred that the major problems were Lack of availability of regulated market(I) with garret mean score of 49.76 per cent, followed by shortage of skilled labour (II) with a score of 49.11, lack of availability of healthy planting material (III) having score of 48.84, lack of irrigation facilities (IV) with a score of 46.19 and Insect pest attack(V) scoring 44.63.

Other problems in study area were lack of inadequate price(VI), Availability of the means of transportation (VII), high labour charges (VIII), lack of knowledge(IX) with garret score of 44.57, 39.58, 38.79 and 38.24respectively.

Table 4. Farmers’ Perceptions and Problems Faced by Flower Growers in The Study Area

Sr. No.	Problems	Mean Score	Rank
1.	Lack of availability of regulated market	49.76	I
2.	shortage of skilled labour	49.11	II
3.	Lack of availability of healthy planting material	48.84	III
4.	lack of irrigation facilities	46.19	IV
5.	Insect pest attack	44.63	V
6.	lack of inadequate price	44.57	VI
7.	Availability of the means of transportation	39.58	VII
8.	Higher labour wages	38.79	VIII
9.	lack of knowledge	38.24	IX

Conclusion

It may be concluded that the costs incurred in protected cultivation of flower crops were lesser as compared to the returns obtained from these flower crops i.e. carnation and lilies. The input output ratio of 2.96 in case of carnation and 2.80 in case of lilies show that it is economical to grow flower crops under protected cultivation. It indicated that by investing one rupee, we get 2.96 rupees and 2.80 rupees respectively in carnation and lilies. If we talk about the problems, lack of availability of healthy planting material, Lack of availability of regulated market, Lack of availability of chemicals and irrigation and shortage of skilled labour were the main problems in the study area.

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References

- Anumala, N.V. and Kumar, R. (2021). Floriculture section in India: current status and export potential. *J. Horti. Sci. Biotech.*96:673-80.
- APEDA. (2022). *Annual report of APEDA 2021-22*. Ministry of Commerce and Industry, Government of India. www.apeda.gov.in.
- Bahirat, J.B. and Jadhav, H.G. (2011). To study the cost, returns and profitability of rose production in Satara district, Maharashtra. *Asian J. Hort.* 6(2): 313-15.
- Chandra, P. (2001) In: Protected cultivation of vegetable crops. *Kalyani Publisher, New Delhi*. Pp3.
- Gharge, C.P. Angadi, S.G. Basavaraj, N. Patil, A.A. Biradar, M.S. and Mummigatti, U.V. (2011). Performance of standard carnation varieties under naturally ventilated poly house. *Karnataka J. Agri. Sci.* 24 (4): 487-89.

- Kumar, M. Kohli, U.K. Gupta, S.K. and Vikram, A. (2007). Effect of growing media irrigation regime, fertigation and mulching on productivity of tomato in naturally ventilated polyhouse in hills. *Indian J. Agri. Sci.* 77(5):32-40.
- Mishra, G.P., Singh, N., Kumar, H., and Singh, S.B. (2010) Protected Cultivation for Food and Nutritional Security at Ladak. *Def. Sci. J.*61(2): 219-25.
- Nagarajan, M. Santhilvel, S. and Planysamy, D. (2002). Material substitution in greenhouse construction. *Kisa. World.* 11:57-58.
- Ninama, A.P. Sipai, S.A. Khadayata, K.G. and Patel, P.C. (2016). Floriculture in India: problems and prospect. *Life Sci. Adv.*5:1150-53.
- Pattnaik, R.K. and Mohanty, S. (2021). Protected cultivation: importance, scope and status. *FSR* 2:19-21.
- Singh, P. (2017). Production and marketing of floriculture in Himachal Pradesh: a paradigm shift. *Int. J. Inn. Res. Multidiscip. Fld.*3:179-87.
- Singh, S.P. Kumar, N. and Sharma, P.K. (2014). An economic analysis of gladiolus cultivation in Jammu district of J&K state. *Econ.*59:515-19.