

COST-BENEFIT ANALYSIS OF MARIGOLD IN AMRITSAR DISTRICT OF PUNJAB, INDIA: AN ECONOMIC ANALYSIS

ABSTRACT

The present study entitled “Production and marketing of marigold in Amritsar District of Punjab: An economic analysis” was carried out in Amritsar district of Punjab. The study was conducted to analyze the returns of marigold growers. For this study, total sample of 25 different sized category farmers from 6 blocks were selected in the year 2020-21. The data was analyzed using multi-variate Regression model. The study brought out that majority of the marigold growers were middle aged (41-50 years) and educated. The result of the study indicates that the overall total variable cost incurred on growing marigold was Rs. 49,519.03 per acre and was the maximum under medium farms and minimum under small farms. The maximum expenses incurred were on human labour. The data revealed that irrespective to the farms size, the net income earned by farmers was Rs. 48,934.30 per acre and were highest on small marigold growers. The overall returns of small farmers were higher as compared to medium and larger farmers. It was observed in the study that at overall the major cost was the transportation charges followed by packing charges. The regression coefficients for the factors like farm size, planting material, age and variety sown were found to be having positive and significant effect on the returns of the marigold growers

Key words: Marigold, returns, cultivation, farmers, marketing, cost, area.

INTRODUCTION

Marigold (*Tagetes erecta* L.) is an immensely popular annual flower crop widely grown throughout the world. It is commonly known as ‘Genda phool’. The (*Tagetes erecta* L.), a member of the family “Asteraceae”, is a potential commercial flower and its demand is increasing in the subcontinent. Marigold is the native of Central and South America, especially Mexico (Abril *et al.* 2007). It was introduced in India in the sixteenth century and since then it has been naturalized in different agro-climatic regions of India in such a way that now it appears to be native of this country. Historically, marigold has been used all over India, China and Indonesia as a spice and medicinal agent (Ampai *et al.* 2013).

The species *Tagetes erecta* (African Marigold) and *Tagete spatula* (French Marigold) are under commercial cultivation in India. *Tagetes erecta* flower has bright color, an aromatic odor and distinctly bitter taste. It has the length of 2 -3 cm and of thickness 3 – 5.5 mm. The marigold plant required temperatures between 20°C and 30°C and considerable amount of

annual winter and rainfall to thrive (Singh *et al.* 2020). *Tagetes erecta* is the main species of commerce and distributed its flower in India, China, Sri Lanka, Indonesia, Jamaica, and Peru. Erode, a city in the South Indian state of Tamil Nadu is India's largest producer and the most important trading center for marigold (Majumder *et al.* 2014).

Marigold is one of the most important natural sources of xanthophyll for use as natural food additive to brighten egg yolks and poultry skin (Anamika *et al.* 1990). Marigold is also being used effectively to dye fabrics commercially, where its ethanol-based flower extract produces different colors on fabrics (Asif, 2008). In South Asia they are in great demand of marigold during religious festival, in ceremonies and weddings. Marigold is used in ayurvedic and homeopathic medicines to cure piles, asthma, pain in ears and teeth. Both leaves and flowers are equally important from the medicinal point of view (Bosma *et al.* 2003). Leaves are used as antiseptic and in kidney troubles, muscular pain, piles and applied to boils and carbuncles. The flower is useful in fevers, epileptic fits (Ayurveda), astringent, carminative, stomachic, scabies and liver complaints and is also employed in diseases of the eyes (Shetty *et al.* 2009). The essential oil obtained is anti-inflammatory, antiseptic, antispasmodic, astringent, diaphoretic and possess skin healing properties (Shiva *et al.* 2002). In the cosmetic industry, it is used in making creams, shampoos, lotions, deodorants, and toothpastes. It also works as repellent for some insects and acts as inhibitor of the growth of pathogens (Mazaro *et al.* 2013; Rigane *et al.* 2013).

Floriculture or flower farming is a discipline of horticulture concerned with the cultivation of flowering and ornamental plants for gardens and floristry, comprising the floral industry. Flowers properly grown can yield 15-20 times more returns than cereals and other crops (Sharma, 2014). The world production of marigold stands at around 6,00,000 tones, of which India has a share of approximately 75-80%. India consumes about 80% of its own Production. In India, marigold ranks first among the loose flowers followed by chrysanthemum, jasmine, tuberose, crossandra and barleria. In Punjab, the present area under flower cultivation is 1,619 ha, the average yield is 7,881 kg per ha and the total production is 12,759 MT (Singh *et al.* 2020). Keeping in view the current scenario of floriculture, the present study was undertaken to analyze the economics of production and marketing of marigold and the problems in production and marketing of marigold in Amritsar District of Punjab.

METHODOLOGY

This study was conducted in the Amritsar district of Punjab State in the year 2020-21. Amritsar District has nine blocks namely Majitha, Rayya, Tarsikka, Jandiala Guru, Attari, Ajnala, Chogawan, Harsha Chhina and Verka out of which all the farmers cultivating marigold were selected.

Multistage purposive sampling technique has been followed for the selection of farmers.

At the first stage, Amritsar District was selected. At second stage, six blocks from Amritsar District were selected. At third stage, twenty-five farmers were selected from the six selected blocks for the present study. The sampling design being followed for the study has been shown in (Table 1).

Table 1: Sampling design

Blocks	Small sized (0-3 acre)	Medium sized (3.1-6 acre)	Large sized (More than 6 acre)	Total
Chogawan	2	3	1	6
Verka	4	2	1	7
Tarsikka	3	-	1	4
Majitha	1	3	-	4
Jandiala Guru	2	1	-	3
Attari	1	-	-	1
Total	13	9	3	25

Source: Horticulture Department, Amritsar

A complete list of farmers cultivating marigold was prepared with the help of Horticulture Department, Amritsar. All farmers cultivating marigold were selected from the study area to estimate the production aspects of the study and to estimate the marketing aspect, data were also collected from market intermediaries such as: wholesalers, retailers, and middlemen.

It was found that no farmer took marigold as a sole crop but few growers who had grown marigold as cash crop were selected for the study purpose then they were categorized into small (0-3 acre), medium (3-6 acre) and large (above 6 acre) area. Totally 25 farmers were selected for the study comprising of 13 small, 9 medium and 3 large farmers.

Primary data was collected from the selected farmers to achieve the objectives of the study. Information was collected using a specially designed questionnaire about the cost of cultivation, marketing, and other related aspects. The intermediaries involved in the marketing of Marigold i.e., commission agents, commission agent-cum wholesalers and the retailers were contacted individually. Keeping in view the objectives of the study the secondary data were obtained from reputed published and unpublished sources.

The first objective relating to cost structure and returns from marigold was achieved by using the simple average and percentage. To identify factors affecting returns of farmer's multi-variate Regression model was used.

For analysis of socio-economic parameters of the study, simple statistical tools like frequencies, percentage, average etc. were used as well as to represent the data in the tabular form.

RESULTS AND DISCUSSION

Age Profile of Farmers

The study brought out that majority i.e., 48 per cent farmers were in the age group 41 to 50 years, 24 per cent of the farmers were in the age group of 31-40 years. About 4 per cent of them were below 30 years of age and 24 per cent were of above 50 years.

Education Status of Farmers

The study revealed that about 12 per cent of the respondents are uneducated and 88 per cent were educated. As much as 16 per cent of the respondents were educated up to primary level. There was about 48 per cent respondents who were educated up to secondary while only 24 per cent of the respondents were graduate and postgraduate. It indicates that the flower growers are generally progressive and educated.

Farm Size

There was total 25 flower growers out of which 13 were categorized as small sized farmers, 9 were medium sized only 3 were large sized farmers. The structure of the farm size as calculated showed that most of the farmers owned less than 3 acres of land.

Variety sown

The details of varieties sown by sample farms have been depicted in Table 5. It is evident from the Table that, 64% of producers was sowing hybrid variety of marigold and only 36% of marigold growers sow local varieties of marigold.

Land utilization pattern

The overall average total holding was 4.88 acres out of which the cultivated area was 4.66 acres. Average gross cropped area was found to be 13.98 acres. The cropping intensity worked out to be 300 per cent that can be seen in table 2.

Table 2: Land utilization pattern on the sample farms

(acres)

S.No.	Land use pattern	Small	Medium	Large	Overall average
1.	Avg. Size of land holding	1.99 (100 %)	4.34 (100 %)	8.33 (100 %)	4.88 (100 %)
2.	Cultivated area	1.91 (95.97 %)	4.15 (95.62 %)	7.92 (95.07 %)	4.66 (95.55 %)
3.	Uncultivated area	0.08 (4.03 %)	0.19 (4.38 %)	0.41 (4.93 %)	0.22 (4.45 %)
4.	Irrigated area	1.91 (95.97 %)	4.15 (95.62 %)	7.92 (95.07 %)	4.66 (95.55 %)
5.	Gross cropped area	5.73 (287.91 %)	12.45 (286.86 %)	23.76 (285.21 %)	13.98 (286.65 %)
6.	Cropping intensity	300 %	300 %	300 %	300 %

Note: Figure in parenthesis indicates percentage of total.

Source: Field survey

Cropping Pattern

The cropping pattern at sampled farms is presented in Table 3. The total cropped area was observed to be, 1.91, 4.15 and 7.92 acres at small, medium, and large farms respectively. Whereas on overall basis total cropped area was found out to be 4.66 acres.

Table 3: Cropping pattern on the sample farms**(acres)**

S.No.	Particulars	Farm Size			
		Small	Medium	Large	Overall average
		1.91	4.15	7.92	4.66
	Kharif				
1.	Marigold	1.32	2.76	2.64	2.24
2.	Paddy	0.59	1.39	5.28	2.42
3.	Others	-	-	-	-
	Rabi				
1.	Marigold	1.17	2.3	7.92	3.8
2.	Wheat	0.44	1.38	-	0.61
3.	Others	0.30	0.47	-	0.25
	Zaid				
1.	Marigold	1.91	3.69	5.28	3.62
2.	Others	-	0.46	2.64	1.04

Source: Field survey**Cost of cultivation of marigold**

The main purpose of the study is to assess the costs, returns and profitability of marigold cultivation. In production, cost of cultivation plays a dominant role in farmer's decision-making process and in realizing of maximum profit, The production costs of marigold flower included the cost of plantlet, seed, labour, fertilizer, manure, irrigation, insecticides, and others. The data can be seen in table 4.

Table 4: Cost of inputs used on the sample farms**(Rs. /acre)**

S.No.	Resources	Sample farm			
		Small	Medium	Large	Overall
1.	Human labour	21038.46	23944.44	26333.33	23,772.07
2.	Machine power	2295	2620.72	2635	2,516.90
3.	F.Y.M.	3692.30	5166.67	5500	4,786.32
4.	Planting material (Seed and seedlings)	9538.46	14666.67	14666.67	12,957.26
5.	Fertilizers	2711.53	2972.22	3333.33	3,005.69
6.	Plant protection	2192.30	2583.33	2666.67	2,480.76
7.	Family labour	7363.46	-	-	7363.46
8.	Yield (Qtls.)	48.26	47.76	51.66	49.22

Source: Field survey

* Constant 7% interest on variable costs included

Economics of marigold production

The yield, value of output per acre and cost of production per quintal of marigold on the sample farms have been worked out in Table 5. This indicates that the average yield per acre of marigold flower was 49.22 quintals of the sample farms. Average cost of production of marigold was worked out in Rs/q and found to be Rs. 1004.78 irrespective to the farm size. While it was the maximum under medium farms followed by large farms and small farms. The average value of output per acre came to Rs. 98,453.33.

Table 5: Economics of the marigold crop on sample farms

S.No.	Particulars	Units	Sample farm			
			Small	Medium	Large	Overall
1.	Input cost	Rs.	41,468.05	51,954.05	55,135	49,519.03
2.	Production	Q/acre	48.26	47.76	51.66	49.22
3.	Price per quintal	Rs.	2,000	2,000	2,000	2,000
4.	Value of production	Rs.	96,520	95,520	1,03,320	98,453.33
5.	Cost of Production	Rs. /Q	859.26	1,087.81	1,067.26	1004.78

Source: Field survey

Returns in marigold cultivation

The net income, input-output ratio, and benefit: cost ratio was worked out in Rs/acre by farm size of holding and presented in Table below. It reveals that irrespective to the farms size, the net income earned by farmers was Rs. 48,934.30 per acre. The input-output ratio was found to be 1:2.01. The net income earned by small farmers was found to be more than the medium and large farmers. The benefit to cost ratio was found to be 1.32, 0.83 and 0.87 of small, medium, and large farms respectively.

Table 6: Returns structure from production of marigold on one acre farm size

S.No.	Particulars	Units	Sample farm			
			Small	Medium	Large	Overall
1.	Input cost	Rs.	41,468.05	51,954.05	55,135	49,519.03
2.	Output value	Rs.	96,520	95,520	1,03,320	98,453.33
3.	Net income	Rs.	55,051.95	43,565.95	48,185	48,934.30
4.	Input-Output ratio	-	1:2.32	1:1.83	1:1.87	1:2.01
5.	B:C ratio	-	1.32	0.83	0.87	1.01

Source: Field survey

Marketing of marigold

The Amritsar district of Punjab lacks infrastructural development for the marketing of agricultural commodities especially for the flowers. During study, producers, village merchants, wholesalers and retailers were generally engaged in assembling of marigold and their marketing. The major quantity of flower's is sold at Hathi Gate area in Amritsar district. Generally, packing of flowers is done in jute gunny bags with 40-45 kg capacity.

Marketing channels

The three marketing channels that were observed in the study area:

Channel (I) – Producer - Consumer

Channel (II) – Producer – Wholesaler – Retailer – Consumer

Channel (III) – Producer – Retailer – Consumer

Marketing charges

It can be seen in the table 7 that at overall the major cost was the transportation charges contributing to the extent of 60 per cent and 66.67 per cent of the total marketing cost in channel II and channel III respectively followed by packing charges. The cost of packing material (jute gunny bags) is usually Rs. 5-10 per bag.

Table 7: Cost structure of marketing of marigold**(Rs. /q)**

S.No.	Particulars	Channel I	Channel II	Channel III
Producer				
1.	Transport Charges	-	150	200
2.	Mandi fees	-	-	-
3.	Loading – unloading	-	-	-
4.	Packing	20	20	20
5.	Others	-	-	-
	Subtotal	20	170	220
Wholesaler				
1.	Transport charges	-	-	-
2.	Packing / Weighing	-	20	-
3.	Mandi fees	-	-	-
4.	Loading - unloading	-	-	-
5.	Others	-	10	-
	Subtotal	-	30	-
Retailer				
1.	Transport Charges	-	30	-
2.	Mandi fees	-	-	-
3.	Loading - unloading	-	-	-
4.	Packing	-	50	50
5.	Others	-	20	20
	Subtotal	-	100	100
	Total	20	300	320

Source: Field survey

Price spread in marketing of marigold

It was noticed that the price received by marigold producer was Rs. 2000 in channel I, II and III. Net price received by marigold producers was Rs.1950 per quintal in channel I, Rs.1800 per quintal in channel II and Rs.1700 per quintal in channel III. The sold-out marigold by farmers was ultimately reached to the consumers through different market functionaries and consumers paid the price of Rs.2050, Rs. 3000 and Rs.2600 in channel I, II and III respectively. The marketing margins noticed in channel II was 20% on wholesaler and 16.67% on retailer while in channel III the marketing margin on retailer was found out to be 23%. The data can be seen in the table below.

Table 8: Price spread

(Rs/q)				
S.No.	Particulars	Channel I	Channel II	Channel III
Producer				
1.	Producer's sale price	2000	2000	2000
2.	Transportation cost	50	200	300
3.	Net price received by producer	1950	1800	1700
Wholesaler				
1.	Purchase price	-	2000	-
2.	Transportation cost	-	50	-
3.	Net price of wholesaler	-	2050	-
4.	Selling price	-	2500	-
5.	Profit	-	450	-
	Market margin	-	500	-
Retailer				
1.	Purchase price	-	2500	2000
2.	Transportation cost	-	50	100
3.	Net price	-	2550	2100
4.	Selling price	-	3000	2600
5.	Profit	-	450	500
	Market margin	-	500	600
	Consumers price	2000	3000	2600

Source: Field survey

Table 8 shows that producer's share in consumer rupee was 95.12%, 60% and 65.38% in channel I, II and III respectively. Based on above results the hypothesis that large marketing channels reduced producer's share in consumer rupee is accepted.

Factors Responsible for returns of farmers

STATA 15 was used for multi-variate regression analysis to identify factors responsible for returns of farmers. Table 9 represents coefficients; p- values and R- square of the factors were explained by explanatory variables that were included in the model.

Coefficients of farm size have been worked out to be positive and highly significant ($p < 0.001$). Coefficient of planting material was found significant at ($p < 0.05$) level which means that increase in these factors affect positively toward the returns of the farmers. Coefficient of variety sown worked out to be positive and non-significant at ($p < 0.1$), whereas coefficient of age worked out to be negative and non-significant. On the other hand, education, fertilizers, human labour, machine power, manures, marketing place and plant protection were found to be non-significant.

Table 9: Factors Responsible for returns of farmers

Factors	Coefficients	t value	p value
Age	-135.8062	-2.075	0.0584.
Education	-209.1879	0.522	0.6107
Farm size	2187.2311	5.897	0.00005264***
Fertilizers	-4.0206	-1.443	0.1726
Human labour	-0.4556	-1.630	0.1271
Machine power	-3.0775	0.059	0.9537
Manures	498.2359	0.631	0.5387
Marketing place	-350.6467	-0.385	0.7065
Plant protection	-921.1461	-1.302	0.2154
Planting material	-2658.3187	-2.961	0.0110*
Variety sown	3241.5532	2.133	0.0525.

R square value	0.9149
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Note ‘*’, ‘***’ and significant at < 0.05 , < 0.001 , 0.1 level of significance respectively.

Constraints

The major problems in the production of flowers faced by the growers were electricity supply (76 per cent), lack of technical guidance (72 per cent) and high prices of plant protection materials (64 per cent). In case of labour, non-availability of skilled labour in time and high wage rates were the serious problems in production of flower which was expressed by 24 per cent and 48 per cent farmers respectively. The high cost of seedlings (40 per cent) and sometimes the unavailability of good quality seedlings (20 per cent) were the other major problems faced by the farmers. Unavailability of subsidies (44 per cent) and credit (32 per cent) for small farmers were also observed as a major problem.

The fluctuation of flower prices was the major problem (60 per cent) faced by the farmers followed by unavailability of processing plants/infrastructure (48 per cent). In case of less price for produce or no guarantee for price (28 per cent), high transport cost (32 per cent) and lack of market information (36 per cent). Also further, farmers stated the other problems, such as unavailability of transport facilities (28 per cent) etc. were the serious problems in marketing of flowers.

CONCLUSION

The study concluded that the inputs (seed, manure, N, P and K) were used as per the recommended levels. The per acre total human labour requirement for marigold cultivation increased with the increase in size of holdings. Female labour requirement is more than male labour for each size group.

The major items of cost of cultivation in marigold were human labour, seeds, and plant protection measures. The cost of cultivation increased with increase size group of holdings. The benefit-cost ratio at the overall level, for marigold was greater than unity; therefore, marigold is a profitable enterprise. Among the various factors of production human labour, manures, planting material and fertilizers were observed to be the most important factors influencing the productivity of marigold flower. In general, even though the more arrivals, the prices for marigold were more in month of February, November and due to the festival months.

The major problems faced by marigold growers in production and marketing of marigold were unavailability of planting material, high labour cost, high fertilizer cost, price variation in market and high transport charges.

Policy implication

- Self or co-operative marketing should be encouraged for getting maximum returns.
- In view of the production and marketing constraints regarding marigold growers Punjab Horticulture Department should encourage them through advanced training, demonstration, technical knowhow and provide assured marketing by opening various marigold centers in different levels so that all the marigold growers must receive remunerative amount for their produce within the state.
- Financing at reasonable interest rates should be provided especially to small farms in marigold cultivation.
- To improve the marigold marketing system an immediate step should be taken to regulate the market, which not only helps in raising income of producers but also helps in providing greater satisfaction to the consumer and minimizing the price fluctuation.

REFERENCES

- Abril A, D Baleani, N Casado-Murillo, L Noe (2007) Effect of wheat crop fertilization on nitrogen dynamics and balance in the Humid Pamps. *Argentina Agric Ecosyst and Environ* **119** pp: 171-176.
- Ampai P, Kiattisin K, Pensak J, Chansakaow S, Vejabhikul S, Leelapornpisid P (2013). Appraisal of biological activities and identification of phenolic compound of African marigold flower extract. *Pak. J. Pharmaceutical Sci.* **26** pp: 1071-1076.
- Anamika, ML Lavania (1990) Effect of nitrogen, phosphorus and potassium on growth, yield, and quality of rose. *Haryana J Horti Sci* **19** pp: 291-298.
- Asif M (2008) Effect of Various NPK Levels on Growth, Yield and Xanthophyll Contents of Marigold. MSc Thesis. *Inst of Horti. Sci, Uni. Agri.* Faisalabad, Pakistan, pp: 95.

- Bosma TL, JM Dole, NO Maness (2003) Crop ecology, management, and quality: Optimizing marigold (*Tagetes erecta* L.) petal and pigment yield. *Crop Sci* **43**: 2118-2124.
- Mazaro SM, Fogolari H, Wagner Júnior A, Citadin I, Santos I (2013). Potencial de extratos à base de *Calendula officinalis* L. na indução da síntese de fitoalexinas e no efeito fungistático sobre *Botrytis cinerea*, in vitro. *Rev. Brasileira Plantas Med.* **15**(2): 208-216.
- Majumder J, Rai P, Perinban S, Singh B (2014). Guidelines for production of marigold in North Indian condition. *Directorate Flori. Res.* **11** pp: 1-3.
- Rigane G, Ben Younes S, Ghazghazi H, Ben Salem R (2013). Investigation into the biological activities and chemical composition of *Calendula officinalis* L. growing in Tunisia. *Int. Food Res. J.* **20**(6) pp: 3001-3007.
- Sharma, Manoj Kumar (2014). Economic analysis of commercial flower cultivation in Sirmaur District of Himachal Pradesh. Ph.D. Thesis Submitted to Chaudhary Sarwan Kumar Himachal Pradesh Krishi Vishwavidyalaya, Palampur (H.P).
- Shetty LJ, Harikiran H, Fernandes J (2009). Pharmacological evaluation of ethanolic extract of flowers of *Tagetes erecta* on epilepsy. *J. Pharmacy Res.* **2** pp: 1035-1038.
- Shiva, M.P., Lehri, A. and Shiva, A. (2002) Aromatic and Medicinal Plants. Yielding Essential Oil for Pharmaceutical, Perfumery, Cosmetic Industries and Trade. International Book Distributors, Dehradun, 219-222.
- Singh Y., Gupta A., Kannoja P., (2020) *Tagetes erecta* (Marigold) – A review on its phytochemical and medicinal properties. *Curr. Med. Drug Res.* **4**(1) pp: 1-6.