



# Estimating Marigold Cultivation Costs and Returns per Hectare in Raipur District, Chhattisgarh, India

Neelam Sunil Tigga<sup>a,b,++\*</sup>, Sanjay Kumar<sup>a,b,#</sup>  
and Ajay Kumar Rai<sup>a,b,†</sup>

<sup>a</sup> Department of Agricultural Economics, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj – 211007, Uttar Pradesh, India.

<sup>b</sup> Department of Agricultural Economics and Statistics, Kulbhaskar Ashram PG College, Prayagraj – 211007, Uttar Pradesh, India.

## Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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## ABSTRACT

"Economic Analysis of Marigold Production in Raipur, Chhattisgarh" is the topic of the current study. The sample was chosen using a multistage random sampling design. The Raipur district's 1 Block, 5 Villages, and 80 marigold producers were all included in the study. By using the personal interview method, the main statistics for the season of 2023 were gathered. Different secondary sources were used to gather information on the region, production, and productivity. Tabular analysis was heavily used to achieve the study's numerous goals. The study's key findings showed that marigold production costs per 100 kilograms and cost of cultivation per hectare were respectively Rs. 68874.54 and Rs. 1003.16. There was a total net profit of Rs. 130258.8 per

<sup>++</sup> Research Scholar;

<sup>#</sup> Assistant professor;

<sup>†</sup> Professor;

\*Corresponding author: E-mail: [neelamsuniltigga@gmail.com](mailto:neelamsuniltigga@gmail.com);

hectare. The return on investment was 1.89 rupees. Farmers' responses to the problems with marigold production, such as the high cost of fertilizers and pesticides, a lack of labor, and pest and disease attacks.

*Keywords: Cost of cultivation; cost concepts; gross returns; benefit-cost ratio.*

## 1. INTRODUCTION

India's third most common flower after roses and chrysanthemums is the marigold, which is a member of the Asteraceae family. It is an American native. Marigold is a high-value crop that requires a lot of labor and is grown on a modest scale by the majority of farmers. Knowing how much it will cost to grow marigolds and how much it will yield will help farmers plan their operations and allocate their resources profitably. The farmer's primary source of income is the proceeds from growing marigolds [1-3]. The farmers in this region have been growing marigolds for more than 10 years, but in the beginning, they only used the traditional method, and they also don't have adequate knowledge of the new, more sophisticated method. They encountered the issue of decreased marigold output as a result of their ignorance of and disregard for contemporary management techniques and ineffective and discriminatory use of inputs [4-6]. Not only are marigolds grown for their beauty as cut flowers and landscaping plants, but they are also grown for their natural carotenoid pigment, which is used in chicken feed. In Chhattisgarh, the area planted with marigolds grew during the years 2020–2021 to 2022–2023 from 5.097 ha to 5.797 ha (anonymous NHM Chhattisgarh database). The state of Chhattisgarh occupied a considerable area for the purpose of commercial flower growing. Most of the land is concentrated in and around cities and towns [7-10]. In Raipur, Durg, and Bilaspur, flower growing is becoming more visible as a commercial crop. Due to its huge profits, floriculture has become one of the most lucrative business professions today [11,12]. In India, there were roughly 322 thousand hectares under cultivation in 2020–2021, and 2980,000 metric tons of flowers were produced. According to a record maintained by the Agriculture Ministry, there were 28327 hectares of flower-producing land at that time, and 312823 metric tons of flower were produced.

## 2. METHODOLOGY

### 2.1 Sampling Design

The selection of the district as the first stage unit, the block as the second stage unit, the villages

as the third stage units, and the farm holding as the final and ultimate stage units were done using a multi-stage sampling design.

### 2.2 Selection of the Districts

The state is divided into 33 districts, and Raipur district was specifically chosen to be the focus of the current study's marigold research.

### 2.3 Selection of Blocks

There are 4 blocks in Raipur District. Out of them Abhanpur block was selected purposively for this study.

### 2.4 Selection of Villages

The relevant Gram Panchayat provided a complete list of all the villages, and 5% of them were randomly chosen. In order to choose the villages from these districts for the study, Raipur was randomly chosen as having Marigold. A list of villages that grow marigolds was created after getting in touch with the block development officer. based on the pre-prepared data regarding the chosen districts, blocks, villages, and respondents. The communities of Kanhera, Mundra, Tekari, Raweli, and Julum.

### 2.5 Selection of Respondents/ Farmers

Gram Pradhan provided a list of farmers who grow marigold in particular villages. Following that, these farmers were divided into groups according to farm size. Out of those, 10% of respondents were chosen at random for the study based on marigold cultivation. Farmers were divided into five groups based on the size of their holdings, i.e.

From this list 80 respondents were selected randomly through proportionate allocation to the population.

### 2.6 Analysis of Data/ Analytical Tools Used

The main data were assembled and analyzed to determine the cost of production and marketing of marigold. The secondary data from a chosen

district were analyzed to get estimates of growth rates in area, production, and productivity of marigold.

## 2.7 Analytical Techniques Employed

For achieving the stated objectives, following analytical procedure was adopted:-

## 2.8 Cost of Cultivation

The various cost items included under each cost concept, along with their procedures.

1. Cost - A1: This includes the value of the following items:
  - a) Imputed value of machine charges (hired and owned)
  - b) Bullock charges (hired and owned)
  - c) Cost of seeds
  - d) Cost of manure and fertilizers
  - e) Cost of plant protection chemicals
  - f) Miscellaneous charges
  - g) Interest on working capital
  - h) Description of fixed resources
  - i) Land revenue paid to the government
  - j) The sum of all these cost items constitutes Cost A1.
2. Cost - A2: This includes all the items from Cost A1, along with the rent paid for leased-in land, if any.
3. Cost - B: This includes all the items from Cost A2, along with the imputed rental value of own land and interest on own fixed capital.
4. Cost - C: This includes all the items from Cost B, along with the imputed value of family labor.
5. Cost C represents the total cost of cultivation or Gross income.

## 2.9 Cost Concept

The wages of hired human labor were determined using the local average hourly rates for male and female labor. Calculated at the going rate in the relevant localities were the costs of bullock labor, both owned and hired. If a product was purchased, the real price paid was taken into account for FYM.

Chemicals for plant protection and fertilizer were valued at the prices that farmers actually paid for them.

## 2.10 Income Measure

Following income measure will be used.

1. Gross income= It is the total value of main product and by- product.

$GI = (Q_m \times P_m) + (Q_b \times P_b)$  Where, GI = Gross Income.

$Q_m$  = Quantity of main product.  $P_m$  = Price of main product.

$Q_b$  = Quantity of by-product.  $P_b$  = Price of by-product.

2. Farm business income = Gross income - Cost A2.
3. Farm investment income = Net income + rental value of owned land plus interest on fixed capital.
4. Net income = Gross income - cost C.
5. Family labor income = Gross income - cost B.
6. Input-output ratio (cost-benefit ratio) = Gross income divided by Cost C.
7. Cost of Production per quintal = Total Cost of cultivation divided by total yield.

## 3. RESULTS AND DISCUSSION

The farm is the most crucial research component at the moment. The farm is typically thought of as a socioeconomic entity that supports the farmer's life and livelihood. It is the land that a farmer or group of farmers cultivate. As a matter of fact, the resource, i.e. land, labor, capital, and management control the farm business, the farming that is practiced in the tract depends greatly on the regional conditions, type of soil, irrigation facilities, and technical expertise of the farming family. Table 1 details the marigold crop's economics. It unmistakably demonstrates the cost of marigold seed production per hectare of cultivation. Overall, the cost of growing one hectare of marigolds was marginally 70137.65 rupees, little 69045.25 rupees, medium 67440.73 rupees, and overall 68874.54 rupees.

### 3.1 Cost Concept at Sample Households

Table 2 details the costs and profits related to the manufacture of Marigold using the cost concept. Overall Cost-A1, Cost-A2, Cost-B, and Cost-C for marigold on the sample farms were Rs. 32874.28 per ha., Rs. 32874.28 per ha., Rs. 66233.06 per ha., and Rs. 68874.54 per ha., respectively. Marginal farms had the highest costs overall, followed by small and medium farms.

### 3.2 Yield, Cost and Return of Marigold at the Sampled Farms

Table 3 shows the yield, output value per hectare, and production cost per quintal of marigold on the study farms. It shows that the

sample farms' average marigold production per hectare was 68.66 quintal. Rs. 68874.54 was the total cost of agriculture per hectare. The gross return was 199133.3 and the net return was Rs. 130258.8.

**List 1. Group of respondents**

Sr. No.	Category	Size - Class
1	Marginal	Below 1.00 hectare
2	Small	1.00-2.00 hectare
3	Semi medium	2.00-4.00 hectare
4	Medium	4.00-10.00 hectare
5	Large	10.00 hectare & above

**Table 1. Cost per input for the production of marigold flowers. (Rs/ha)**

Sr. No.	Particulars		Units	Marginal	Small	Medium	Overall
1	Hired Human Labour	Male	DAYS	10267.20	5148.95	7507.04	7641.063
		Female	DAYS	4444.44	6250.50	4598.59	5097.843
		Total	DAYS	14711.64	11399.45	12105.63	12738.91
2	Bullock Labour	Hired	DAYS	1489.41	1567.42	1653.73	1570.187
		Owned	DAYS	510.58	3187.50	850.98	1516.353
		Total	DAYS	1999.99	4754.92	2504.71	3086.54
3	Machine	Hired	Hrs	2867.73	2687.00	0.00	1851.577
		Owned	Hrs	0.00	0.00	2690.14	896.7133
		Total	DAYS	2867.73	2687.00	2690.14	2748.29
4	Seed		KGS.	972.80	950.00	870.00	930.9333
5	Manure		QTLS.	5481.48	5510.59	5429.57	5473.88
6	Fertilizer	N	KGS.	1917.98	1879.95	1875.84	1891.257
		P	KGS.	454.03	478.24	442.67	458.3133
		K	KGS.	912.93	775.13	909.48	865.8467
		Total		3284.94	3133.32	3228.00	3215.42
7	Irrigation	Cost	RS.	2800.00	2000.00	2300.00	2366.667
8	Plant protection	Cost	RS.	697.04	612.50	712.32	673.9533
9	Miscellaneous	Cost	RS.	728.89	404.21	938.96	690.6867
10	Int. On Working Capital	Cost	RS.	962.17	984.55	900.28	949
11	COST "A"		RS.	34506.68	32436.54	31679.61	32874.28
12	Rental Value Of Land		RS.	30000.00	30000.00	30000.00	30000
13	Int. On Fixed Capital		RS.	1000.00	1000.00	1000.00	1000
14	Depreciation On Fixed Capital	Cost	RS.	2200.00	2200.00	2200.00	2200.00
15	Land Revenue	Cost	RS.	158.97	158.71	158.67	158.7833
16	COST "B"		RS.	67865.65	65795.25	65038.28	66233.06
17	Family Human Labour	Male	DAYS	1748.00	2050.00	1494.00	1764
		Female	DAYS	524.00	1200.00	908.45	877.4833
		Total	DAYS	2272.00	3250.00	2402.45	2641.483
18	COST "C"		RS.	70137.65	69045.25	67440.73	68874.54

**Table 2. Cost on the basis of cost concept at sample households (Rs./ha.)**

S. No.	Particulars	Farm size			
		Marginal	Small	Medium	Overall
1.	Cost A1	34506.68	32436.54	31679.61	32874.28
2.	Cost A2	34506.68	32436.54	31679.61	32874.28
3.	Cost B	67865.65	65795.25	65038.28	66233.06
4.	Cost C	70137.65	69045.25	67440.73	68874.54

**Table 3. Yield cost and return of Marigold on the sample farm (Rs./ha.)**

S.No.	Particulars	Farm size			
		Marginal	Small	Medium	Overall
1.	Average yield	68.00	69.00	69.00	68.66667
2.	Cost of Production Per Qtl	1031.43	1000.65	977.40	1003.16
3.	Cost of Cultivation	70137.65	69045.25	67440.73	68874.54
4.	Gross Return	197200	200100	200100	199133.3
5.	Net Income	127062.35	131054.75	132659.27	130258.8
6.	Family labor Income	129334.35	134304.75	135061.72	132900.3
7.	Farm business income	162693.32	167663.46	168420.39	166259.1
8.	Farm investment income	160421.32	164413.46	166017.94	163617.53
9.	Input – Output Ratio	1:2.81	1:2.89	1:2.97	1:2.89

**Table 4. Income over different cost at sampled farms (Rs./ha.)**

Income over Different Cost	Size group			
	Marginal	Small	Medium	Overall
Cost "A"	162693.32	167663.46	168420.39	166259.1
Cost "B"	129334.35	134304.75	135061.72	132900.3
Cost "C"	127062.35	131054.75	132659.27	130258.8

### 3.3 Income over Different Cost at Sampled Farms

The incomes over different costs were also worked out (Table 4). The overall per hectare income over Cost-A, Cost-B, and Cost-C calculated was Rs. 166259.1, Rs. 132900.3 and Rs.130258.8 respectively.

### 4. CONCLUSIONS

In conclusion, the analysis of Marigold production on the sample farm reveals several key findings. The per hectare cost of cultivation of marginal group farmers at cost 'A', cost 'B' and cost 'C' was Rs 34506.68 , Rs 67865.65 and 70137.65, respectively. The per hectare cost of cultivation of small group farmers at cost A', cost B' and cost 'C' was Rs. 32436.54, Rs. 65795.25 and Rs. 69045.25, respectively. The per hectare cost of cultivation of medium group farmers at cost 'A', cost 'B' and cost 'C' was Rs. 31679.61, Rs.65038.28 and Rs.67440.73, respectively. The per hectare cost of cultivation in overall level, at cost 'A' , cost 'B' and cost 'C 'was Rs. 32874.28 , Rs.66233.06 and Rs.68874.54, respectively. At overall level, average gross return worked out to Rs. 199133.3.. In marginal size group average gross return was Rs. 197200.00. In small size group average gross return was Rs. 200100.00. In medium size group average gross return was Rs.200100.00.The highest input-output ratio at cost 'C' was recorded in medium size group i.e. 1:2.97 and lowest input-output ratio at cost 'C' in marginal size group i.e. 1:2.81. At overall input-

output ratio at cost 'C' was 1:2.89. Farmers can use this information to make informed decisions regarding their production strategies and maximize their profitability.

### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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