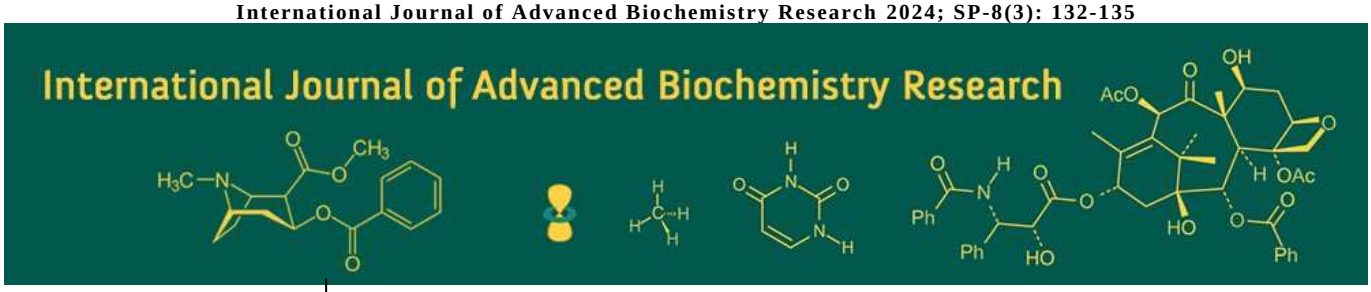

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Vikas Ashok Wali
PG Scholar, Kittur Rani Channamma College of Horticulture, Arabhavi, Karnataka, India

MG Kerutagi
Professor, Agriculture Economics, Department of Social and Allied Science KRCCH, Arabhavi, Karnataka, India

Kirankumar Gorabal
Assistant Professor and Head, Department of Postharvest Management, KRCCH, Arabhavi, Karnataka, India

Rudragouda Patil
Assistant Professor, Department of Floriculture, KRCCH, Arabhavi, Karnataka, India

Naveen M Puttaswamy
Assistant Professor, Department of Floriculture, HREC, University of Horticulture Sciences, Bagalkot, Karnataka, India

Corresponding Author:
Vikas Ashok Wali
PG Scholar, Kittur Rani Channamma College of Horticulture, Arabhavi, Karnataka, India

Production of marigold in Northern Karnataka: An economic analysis

Vikas Ashok Wali, MG Kerutagi, Kirankumar Gorabal, Rudragouda Patil and Naveen M Puttaswamy

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Abstract
Floriculture stands out as a significant commercial activity within the horticulture sector. Its potential as a viable agribusiness has garnered recognition. Varied agro-climatic conditions across the country allow for the commercial production of flower crops. This sector offers employment opportunities to millions. Given the potential market demand and the lucrative prices of flower crops, there has been a noticeable surge in their cultivation, especially in the regions like Bellary and Belagavi districts of Northern Karnataka. With the rise in production and the increasing popularity of contract farming, it becomes crucial to conduct a comparative study on the cost of cultivation between direct farming and contract farming. Therefore, this study focuses on examining the cost of cultivation in marigold production in both direct farming and contract farming in Northern Karnataka. The research exclusively relies on primary data collected from 30 sample respondents through survey conducted during the agricultural year 2022-2023. Descriptive statistics and tabular analysis were utilized to analyse the data. The cost of cultivation of marigold amounted to Rs. 66,942.55 and Rs. 53,105.18 in direct farming and contract farming, respectively. Furthermore, the net return obtained was Rs. 88,111.98 and Rs. 26,094.82 in direct farming and contract farming, respectively. The return per rupee of expenditure was found to be 2.31 and 1.49 in direct farming and contract farming, respectively. Therefore Marigold cultivation through direct farming was profitable compared to contract farming.

Keywords: Cost, returns, production, direct, contract

Introduction
In the era of globalization, floriculture has become a pivotal commercial endeavour within the horticulture sector. In India, the cultivation of both traditional and cut flowers plays a significant role. While traditional flowers are primarily grown by small and marginal farmers across the country and the production of cut flowers is concentrated in specific areas equipped with controlled environmental structure.

Traditional flowers hold immense cultural importance in India, serving aesthetic, social and religious purposes. Additionally, they are utilized in the extraction of essential oils and fragrances. Integral to Indian culture, these flowers are essential in religious ceremonies as well as everyday social celebrations. Globally, India ranks second position, following China, in terms of flower cultivation. However, despite this significant cultivation, India's share of global floriculture exports stands at a modest 0.61 per cent. In contrast, countries like the USA, Netherlands, UAE, UK and Germany dominate the global market, with export shares ranging from 4.36 per cent to 25.54 per cent

India's diverse agro-climatic zones provide ideal conditions for cultivating delicate and sensitive floriculture products. Following the liberalization period, the floriculture industry in India witnessed significant strides in the export market. This shift marked a transition from subsistence to commercial production. Currently, India cultivates floriculture products across 283 thousand hectares, yielding 2295 thousand tonnes of loose flowers and 833 thousand tonnes of cut flowers. Key states contributing to commercial floriculture include Karnataka (15.85 %), Tamil Nadu (15.16 %), Madhya Pradesh (13.66 %), and West Bengal (10.61 %). The industry encompasses a variety of flowers such as Rose, Tuberose, Gladiolus, anthurium, carnations and Marigold, cultivated in both open farm conditions and modern poly and greenhouses (Anon., 2021) [1].

Marigold holds significant global and Indian commercial value, representing more than half of the nation's loose flower production. Beyond ornamental uses, it serves diverse industrial purposes in food, pharmaceuticals, textiles, and as decorations for religious and social events. Marigold flowers are esteemed for their abundant carotenoid content, often cultivated extensively for extraction. Their natural pest repellent qualities have earned them "poor man's saffron." Moreover, these flowers act as natural colorants, lending a vibrant golden tint to dishes, with lutein extracted from African marigold (*Tagetes erecta*) commonly utilized as a food coloring agent (Kolambkar *et al.*, 2022) [5]. Marigold production in India is primarily concentrated in states such as Madhya Pradesh, Karnataka, Maharashtra, Gujarat, Andhra Pradesh and Haryana. Together, these states cover approximately 64.65 thousand hectares of land area contributed to marigold production and yield a substantial output, with a total production reaching 608.97 thousand million tonnes of loose flowers and 7.90 thousand million tonnes of cut flowers (Hinai *et al.*, 2022) [4]. In Karnataka, significant marigold cultivation is observed in key districts such as Chamarajanagar, Haveri, Belagavi, Mysore and Bellary. These districts, covering a combined area of 9.40 thousand hectares, produce a total yield of 77.20 thousand million tonnes of marigold. With increasing demand and attractive pricing for marigold, coupled with its potential as a raw material for various industries, there has been a notable surge in marigold cultivation through contract farming, particularly in the Bellary and Belagavi districts of Northern Karnataka. Therefore, the particular study focuses on estimating the costs and returns associated with Direct and contract farming of marigold production in Northern Karnataka.

Materials and Methods

The study relied on primary data, collected through personal interviews method. Additionally, secondary data were gathered from the records and various published reports of government institutions and other agencies. The study was conducted during 2022-2023 in specifically chosen districts of Northern Karnataka. Belagavi and Ballari districts were purposively chosen for this study due to their extensive marigold cultivation in Northern Karnataka. In Ballari district, Harappanahalli and Huvinahadagali taluks were selected, while in Belagavi district, Savadatti and Ramdurga were chosen for the study since these areas are the major taluks for marigold cultivation in Ballari and Belagavi districts. The selection of sample farmers was based on identifying villages with the highest number of growers and the largest areas under marigold cultivation. Consequently, 20 farmers were selected from Ramdurga and Savadatti taluks and the remaining 10 were chosen from Harappanahalli and Huvinahadagali taluks. The selection of farmers within each taluk was done randomly. As a result, the total sample size for the study consists of 30 farmers. The descriptive statistics and tabular analysis were used to estimate the cost and returns of marigold cultivation.

Results and Discussion

The results in respect of the average quantities of inputs used per acre of marigold production in direct farming and contract farming situation are presented in Table 1. The results showed that for cultivation of one acre of marigold, farmers used 5,598 seedlings in direct farming and 2.5 seed packets in contract farming. They applied 0.5 TL of FYM per acre to maintain soil fertility and to achieve good yield. These results are in line with the findings of Farooqi and Vasundhara (2005) [2]. In the study area, farmers had applied 72.97 kg of chemical fertilizers believing that this would improve the yield levels and quality due to concerns about poor soil fertility status. Furthermore, farmers used only 1.9 kg of plant protection chemicals, likely due to the absence of serious pests and diseases in marigold cultivation. The farmers in the study area employed 60.65 man-days of human labour, 1.9 hours of machine labour per acre and they were using heavy machineries like cultivator or rotovator. This indicated that farmers were adopting modern farming practices in marigold cultivation.

Table 2 revealed the cost structure of marigold cultivation under direct farming method. The total cost of cultivation amounted to Rs. 66,942.55 per acre, comprising Rs. 42,476.97 of total variable costs and Rs. 22,343.08 of total fixed costs. Notably, human labour of Rs. 16,098.83 and seedling expenses of Rs. 9,190.61 stand out as the primary contributors among variable costs. On the other hand, within fixed costs, rental value of land make up Rs. 21666.7, followed by depreciation charges accounting for Rs. 638.38.

The cost structure of marigold cultivation under contract farming method was presented in Table 3.The total cost of cultivation accounted to Rs. 53,105 per acre, and it comprises of total variable costs (Rs. 28,639.60) and total fixed costs (Rs. 22,343.08). The human labour of Rs. 16,098.83 and seedling expenses of Rs .4,490.61 stand out as the key contributors among variable costs. And, within fixed costs, rental value of land make up Rs. 21666.7 per cent, followed by depreciation charges accounting Rs. 638.38.

In the context of contract farming situation (Table 3) the total cost of cultivation of marigold was less compared to direct farming. A little cost of cultivation was due to the fact that, the farmers did not spent on cost of loading, unloading and transportation because companies often had buyback system in their cultivation place. Under this system, the company did not charge marketing costs to the farmers, leading to a reduction in the overall cost of cultivation.

Table 3 indicates that the average yield of marigold was little higher in the contract farming (7.2 t/acre), compared to direct farming (5.2 t/acre). Farmers in contract farming were selling their produce at prevailing marketing price of Rs. 11,000 per tonne but in case direct farming farmers selling their commodity at the Rs. 29818.18 per tonne. The study found that contract farming yielded gross returns of Rs. 79,200, with a net income of Rs. 26,094.82, while direct farming resulted in gross returns of Rs. 155,054.53, and a net income of Rs. 88,111.98, aligning with findings from Rajawat *et al*. (2009) [6]. In the contract farming system, the company employs the buyback system, where they supply farmers with seeds, fertilizers and other essential inputs and in return, they purchase the flowers from the farmers at a rate of Rs. 11,000 per tonne. This resulted in a lower price per ton of marigold flower which in turn leads to lower net returns compared to direct farming.

Table 1: Input utilisation pattern of marigold under direct and contract farming situation (per acre)

Sl. No.	Particulars	Unit	Quantity	
			Direct farming	Contract farming
a)	Seedling /seed packets	Numbers	5598	2.5
b)	Farmyard manures (FYM)	TL	0.51	0.51
c)	Chemical fertiliser A) Urea B) MOP C) DAP D) Total	Kg	 30.00 24.40 18.57 72.97	 30.00 24.40 18.57 72.97
d)	Labour i. Human labour	Man day	60.65	60.65
	ii. Machine hour	Hour	1.9	1.9
e)	Plant protection chemicals	Kg	1.8	1.8

Table 2: Cost structure in marigold cultivation under direct farming situation (n=11)

Sl. No.	Costs	Value (Rs/acre)	Percentage
1.	**Variable cost**		
A	FYM (₹/TL)	1155.275	1.73
B	Seedling (₹/No)	9190.61	13.73
C	Fertilizer (Rs/Kg)	1788.04	2.67
D	PPC (Rs/Kg)	1100.26	1.64
E	Human Labour	16098.83	24.05
F	Machine labour	2006.86	3.00
i.	Cost of loading	411.43	0.61
ii.	Cost of transportation	646.54	0.97
iii.	Cost of unloading	380.33	0.57
iv.	Cost of packing	258.61	0.39
v.	Marketing commission	6476.64	9.67
G	Total marketing cost	8173.56	12.21
H	Total working capital	39513.46	59.03
I	Interest on working capital @ 7.5%	2963.51	4.43
	Total variable cost	42476.97	63.45
2.	**Fixed Cost**		
A	Depreciation	638.38	0.95
B	Land water tax	38	0.06
C	Rental value of land	21666.7	32.37
D	Total FC	22343.08	33.38
E	Interest on fixed capital @9.5%	2122.5	3.17
	Total fixed cost	24465.58	36.55
3.	Total cost of cultivation	66942.55	100.00

Table 3: Cost structure in marigold cultivation under contract farming situation (n=19)

Sl. No.	Cost	Value (Rs/acre)	Percentage
1.	**Variable cost**		
A.	FYM (Rs/TL)	1155.27	2.18
B.	Seedling (Rs/Pack)	4490.61	8.46
C.	Fertilizer (Rs/Kg)	1788.04	3.37
D.	PPC (Rs/Kg)	1100.26	2.07
E.	Human Labour	16098.83	30.31
F.	Machine labour	2006.86	3.78
i.	Cost of loading	0	0.00
ii.	Cost of transportation	0	0.00
iii.	Cost of unloading	0	0.00
iv.	Cost of packing	0	0.00
	Total marketing cost	0	0.00
G.	Total working capital	26639.9	50.16
	Interest on working capital @ 7.5%	1999.7	3.77
H.	Total variable cost	28639.6	53.93
2.	**Fixed Cost**		
A.	Depreciation	638.38	1.20
B.	Land water tax	38	0.07
C.	Rental value of land	21666.7	40.80
D.	Total FC	22343.08	42.07
E.	Interest on fixed capital @ 9.5%	2122.50	4.00
F.	Total fixed cost	24465.58	46.07
3.	Total cost of cultivation	53105.18	100.00

Table 4: Yield and returns structure of marigold growers

Sl. No.	Particulars	Direct farming (n=11)	Contract farming (n=19)
		Values	
1.	Average Yield (ton/ acre)	5.20	7.20
2.	Average Price (₹ /ton)	29818.18	11000
3.	Gross return (₹ /acre)	155054.53	79200
4.	Total cost (₹)	66942.55	53105.18
5.	Net return (₹)	88111.98	26094.82
6.	Benefit cost ratio	2.31	1.49

Conclusion

The current study revealed that, the major source of earning for farmers in the study area was agriculture. Marigold cultivation through direct farming has been found to give a higher return to the farmers compare to contract farming. Hence, government has to support marigold cultivation by providing input subsidies, farmer training, new variety research and improved irrigation. Since, the cost of cultivation of marigold is high, so farm universities and the government of Karnataka should focus on reducing production costs, particularly in the context of flower harvesting and providing quality seedlings. Furthermore, there is a need to support contract farming by promoting agreements, ensuring fair prices, providing timely payment and offering technical assistance. By doing so, the cultivation of flowers can become a highly lucrative agribusiness venture for farming communities.

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Conflict of Interest

The authors have declared that no conflict of interest exists.

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