

RESEARCH PAPER

Economic analysis of scented geranium cultivation in Northern Karnataka

*P. S. POOJA¹, T. N. SACHINKUMAR², J. S. HIREMATH¹, M. G. KERUTAGI², K. SUDHEESH¹ AND VIJAY MAHANTHESH³

¹Department of Plantation, Spices, Medicinal and Aromatic crops, ²Department of Social and Allied Sciences

³Department of Agronomy, Kittur Rani Channamma College of Horticulture, Arabhavi-591 218

University of Horticulture Sciences, Bagalkot - 580 104, India

E-mails: ctapoojaps@gmail.com and tnsachin@gmail.com

(Received: March, 2024 ; Accepted: August, 2024)

DOI: 10.61475/JFS.2024.v37i3.16

Abstract: India possesses an extensive array of aromatic flowers, herbs, oils, spices and woods that play a crucial role in the formulation of globally renowned fragrances. Among these, scented geranium stands out, with its essential oil ranking among the top 20 essential oils worldwide. Nevertheless, given the potential market demand and lucrative price for scented geranium oil, there has been a noticeable surge in geranium cultivation, particularly in Northern Karnataka regions like Belagavi, Bagalkot and Bidar. Despite the increased production in the study area are grappling with various challenges in scented geranium cultivation. To address this, the current study aimed to evaluate the costs and returns associated with cultivating scented geranium in Northern districts of Karnataka. The findings are exclusively based on data collected from a primary survey conducted during the agricultural year 2023-24. This research employed descriptive analysis and tabular presentation for the analysis of the data. The study revealed that total cost of cultivation of scented geranium per year was approximately ₹ 1,30,000 per ac. and average total yield per acre was recorded to be 31.46 tonnes leaving the net returns of ₹ 22,194 per ac with the return per rupee of expenditure was 1.16.

Key words: Cost of cultivation, Distillation, Essential oil, Return per rupee of expenditure, Scented geranium

Introduction

India holds a prominent position as a major supplier of natural flavours and fragrance ingredients on the global market. The country meets 60 percent of the global demand for spice oleoresin and 80 per cent for mint extracts. Presently, a substantial 85 percent of domestically produced fragrance ingredients are directed towards international markets (Anon 2023a). The fragrance & perfume market size is estimated at USD 61.79 billion in 2023. It is anticipated to reach USD 84.02 billion by 2028, registering a CAGR of 6.34 percent during the forecast period (Anon 2023b).

Rose-scented geranium, a highly significant aromatic crop, is cultivated across various regions of the world for its delightful aromatic essential oil. This perennial semi shrub, native to South Africa, features leaves that find use in garlands, bouquets, and as flavouring agents in many food products and beverages. Additionally, the leaves are employed for perfuming bath water. The economic significance of rose-scented geranium primarily stems from its essential oil, and it is commercially cultivated in Algeria, Egypt, Morocco, Reunion Islands, France, China, and India. The essential oil extracted from rose-scented geranium is highly priced in the perfumery industry due to its delicate rose-like fragrance. It is utilized in a wide array of products, including perfumes, scents, flavours, cosmetic creams, soaps and toiletries. Notably, the oil serves as a cost-effective alternative to the more expensive rose (*Rosa damascena*) oil, earning it the colloquial designation of 'the poor man's rose oil' (Wells and Lis-Balchin, 2002). Farmers typically extract the oil on the farm through the distillation of fresh aerial biomass from rose-scented geranium cultivars. The essential oil derived from scented geranium is obtained through the distillation of biomass. While scented geranium cultivation is financially rewarding, there is a

lack of comprehensive studies addressing the standard costs associated with its cultivation. With this scenario the current study was taken up with objective of estimating cost and returns in cultivation of scented geranium in the Northern Karnataka.

Material and methods

Belagavi district of Northern Karnataka, which is having highest area under geranium crop was purposively selected for the present study. Further, in consultation with the officials of state department of horticulture considering the concentration of the crops in different taluks such as of district 30 geranium cultivating farmers were randomly selected from the taluks of Hukkeri, Chikkodi, Gokak, Athani and Khanapur of Belagavi district. The study relied on primary data, gathered through personal interviews. Additionally, secondary data were sourced from records and various published reports of government institutions and other agencies.

Analytical techniques

The descriptive analysis and tabular presentation techniques were employed to estimate the cost of cultivation and returns from scented geranium cultivation per year and results are interpreted with suitable averages, ratios and percentages to draw meaningful conclusion by following standard cost concepts.

Results and discussion

Establishment cost of scented geranium crop

Geranium, a perennial aromatic crop can be cultivated for 4-5 years with proper maintenance, producing three herbage harvests annually at intervals of 3-4 months. Calculating the

Table 1. Establishment cost of scented geranium plantation in the study area (₹/ Ac)

Particulars	Quantity	Amount (₹)	Percentage to total cost
A. Variable cost			
Rooted stem cuttings (Numbers)	6,394	31,852	34.58
FYM (tonne)	2.72	7,793	8.46
Labour			
a. Women labour (Labour days)	17.21	4,905	5.33
b. Men labour (Labour days)	16.78	6,533	7.09
c. Tractor (hr.)	15.12	8,827	9.58
Total labour		20,265	22.00
Miscellaneous		500	0.54
Interest on working capital @ 7%		4,229	4.59
I Total variable cost		64,639	70.19
B. Fixed cost			
Drip irrigation	-	9,000	9.77
Depreciation of farm assets	-	487	0.53
Land revenue	-	25	0.03
Rental value of land	-	15,000	16.29
Interest on fixed capital @ 12%	-	2,943	3.20
I Total fixed cost		27,455	29.81
III Total Cost (I+II)		92,094	100

Table 1. (Fig 1) revealed that the average cost of establishing a geranium plantation is ₹ 92,094, with 70.19 per cent (₹ 64,639) attributed to variable resources and the remaining from fixed costs (₹ 27,455). The major expenses are in planting material (34.58%), labour costs (22.00%) and land rental (16.29%) constituting around 73 per cent of the total establishment cost. The high cost of planting material is because of the procurement of the rooted cuttings from the private nurseries who were charging very high price (5-6 rupees) which could be brought down to the 50 per cent of the cost if the planting materials are produced on farm. It is also observed that, the farmers are following varied spacing (60 × 60 cm to 120 × 90 cm) where the lowest spacing of 60 × 60 cm requires 11,111 plants, which leading to higher cost of cultivation hence, there is need to carry out the studies on optimum spacing requirement of geranium crop. Farmers may be encouraged to produce the planting material on their own by giving vocational training on preparation and management of planting material.

Labour utilization pattern in scented geranium crop

Table 2. represents the labour utilization for establishing and maintaining the geranium plantation. The analysis indicates a total of 77.75 human labour hours, including 33.42 man-days for male labour, 44.33 hours for female labour and 22.05 hours for machine labour from establishment to main crop harvest. Notably, family members contributed 55 per cent (18.25 man-days) of male labour and 23 per cent (10.34 women-days) of female labour. Maintaining the ratoon crop necessitated an average of 42.10 labour days, family labour contributed 53 per cent (10.81 men days) and 20.68 per cent (4.87 women days) for men and women, respectively, while all machine labour (100%) was hired externally. These findings align with Sunil (2010) results, machine labour was limited to land preparation and other intercultural operations with 42 labours employed in each ratoon season, providing seasonal employment to rural households.

Cost of cultivation of scented geranium

Given that geranium is a perennial crop, the expenses associated with establishing the garden were distinctly calculated and are detailed in the table. In the study area, the sampled respondents harvesting three crops annually. Consequently, the cultivation costs for the primary crop and the subsequent two ratoon crops were computed and are outlined in the Table 3 (Fig 2) below. The total cultivation cost for the main crop (₹ 46,216) slightly exceeded that of ratoon crops (₹ 42,337), primarily due to the higher labour requirement for weeding during the establishment phase, adding an additional ₹ 3,879. These findings are aligned with conclusions drawn by Aswini *et al.* (2020). In both main and ratoon crops, labour costs constitute a significant portion of the variable cost, accounting for 38.81 per cent and 34.50 per cent respectively, mainly due to elevated wage rates in the study area. A substantial labour force is engaged in harvesting operations, making it a key area for potential cost reduction through proper mechanization techniques, potentially cutting labour costs by 30-40 per cent. Despite fertilizer costs

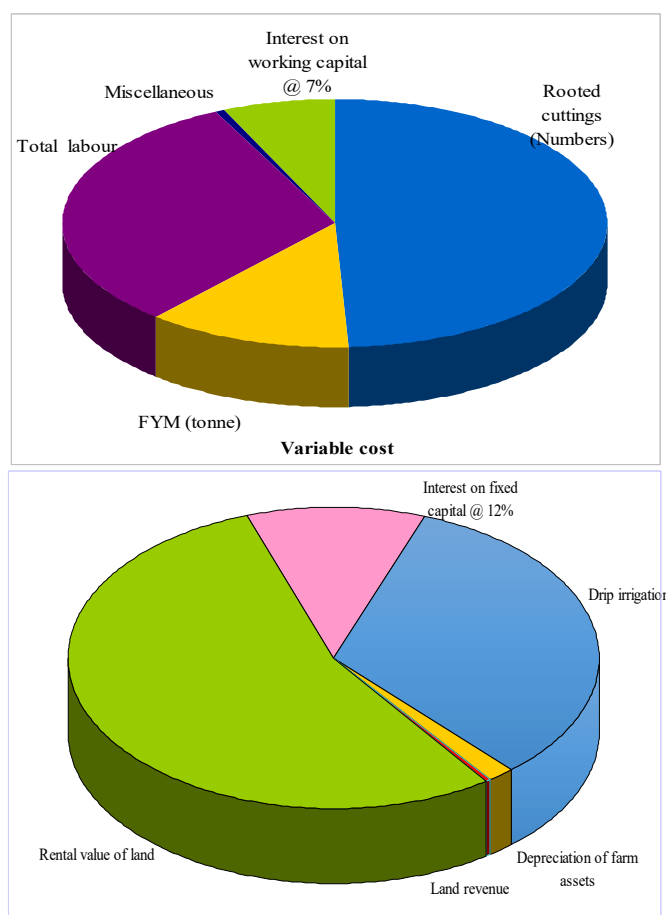


Fig 1. Establishment cost of scented geranium plantation

garden’s establishment cost is essential for determining the amortized cost of crop establishment, facilitating the computation of cultivation costs for each crop.

Table 2. Labour utilization pattern in scented geranium crop in the study area (Human labour in labour days, Machine labour : hr.)

Type of operations	Main crop (Including establishment of the plantation)						Ratoon crops							
	Family labours		Hired labours		Total		Machine labour (hrs)		Family labours		Hired labours		Total	
	M	W	M	W	I men	Total women	Total human labour	M	W	M	W	I men	Total women	Total human labour
Land preparation	2.00	-	0.33	-	2.33	-	11.33	-	-	-	-	-	-	-
FYM/compost (transportation & application)	3.00	-	3.03	-	6.03	-	3.78	-	-	-	-	-	-	-
Planting & gap filling	2.33	3.13	2.04	9.57	4.37	12.70	-	-	-	-	-	-	-	-
Fertilizers application	1.00	-	2.67	0.77	3.67	0.77	4.43	-	1.16	2.67	0.76	3.83	0.76	4.59-
Weeding	0.77	4.17	0.03	12.00	0.80	16.17	-	-	00.56	0.03	-	0.60	11.6	12.2-
Intercultural operation/ Earthing up	0.57	0.07	0.27	-	0.83	0.07	2.10	-	1.80	0.30	-	2.10	0.06	2.17 1.50
PPC spraying	2.20	-	1.20	-	3.40	-	3.40	-	1.37	1.10	-	2.47	-2.47	-
Harvesting	2.38	2.97	2.77	11.10	5.15	14.07	-	-	2.34	1.67	8.87	5.00	10.53	5.53 -
Irrigation	3.00	-	-	-	3.00	-	3.00	-	2.56	-	-	2.56	-2.56	-
Transportation	1.07	-	2.77	0.57	3.83	0.57	4.40	4.83	1.00	-	1.00	2.00	0.57	2.57 4.63
Total	18.25	10.34	15.17	33.99	33.42	44.33	77.75	22.05	10.81	4.87	7.76	18.56	23.53	42.10 6.13

Table 3. Cost of cultivation of scented geranium crop in the study area

Particulars	Main crop(A)		Ratoon crop-I (B)		Ratoon crop-II (C)		% to T		₹ / Ac)	
	Qtt	Amt.(₹)	Qtt	Amt.(₹)	Qtt	Amt.	% to T	Qtt	Total(A+B+C)	Amt.(₹)
A. Variable cost										
Labour										
a.Women labour (human days)	18.5	5,273	23.53	6,707	23.53	6,707	15.84	65.56	18,687	
b.Men labour (human days)	25.08	9,764	18.56	7,226	18.56	7,226	17.07	62.2	24,216	
c.Tractor(hr)	4.04	2,899	0.96	689	0.96	689	1.63	5.96	4,277	
Total labour		17,936		14,622		14,622		34.50	47,180	
Fertilizers										
a.Urea (kg)	78	463	47.62	254	47.62	254	0.60	173.24	971	
b.DAP (kg)	38.75	957	35	1233	35	1233	2.91	108.75	3,423	
c.Potash (kg)	44.17	875	25	496	25	496	1.17	94.17	1,867	
Total fertilizer	160.92	2,295	107.62	1,983	107.62	1,983	4.68	376.16	6,261	
Cost of PPC	3.82	1,804	3.82	1,804	3.82	1,804	4.26	11.451	5,412	
Irrigation charges		500		500		500	1.18	1,500	1,500	
Miscellaneous		500		500		500	1.18	1,500	1,500	
Interest on working capital @ 7%		1,612		1,359		1,359	3.21	4,330	4,330	
I.Total Variable cost		24,647		20,768		20,768	49.05	66,183	66,183	
B.Fixed cost										
Amortized establishment cost		14,186		14,186		14,186	33.51	42,558	42,558	
Depreciation of farm assets		487		487		487	1.15	1,461	1,461	
Land revenue		25		25		25	0.06	75	75	
Rental value of land		5,000		5,000		5,000	11.81	15,000	15,000	
Interest on fixed capital @ 9.5%		1,871		1,871		1,871	4.42	5,613	5,613	
II.Total fixed cost		21,569		21,569		21,569	50.95	64,707	64,707	
III.Total cost (I+II)		46,216		42,337		42,337	100.00	1,30,890	1,30,890	

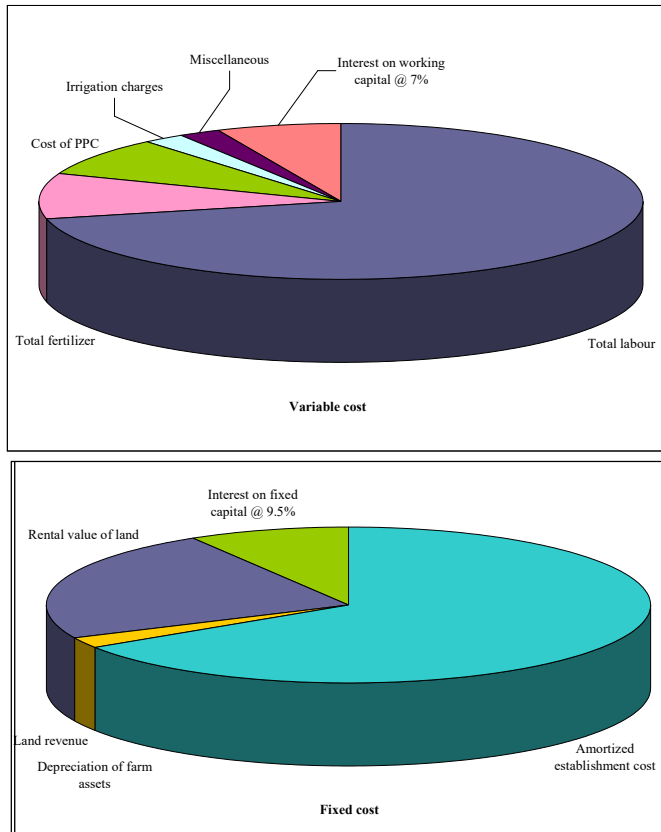


Fig 2: Cost of cultivation of scented geranium crop in the study area (₹ /Ac)

representing a relatively low proportion in both crops (4.97% and 4.68%, respectively), farmers in the study area apply nearly double the recommended fertilizer dosage. Urgent attention is needed to study optimal fertilizer utilization, considering the crop’s high responsiveness and to raise awareness about the adverse effects of indiscriminate fertilizer use on soil health—a concern consistent with Nandimath’s (2008) findings of sugarcane production.

The main crop’s cost of cultivation was ₹ 46,216, comprises of ₹ 24,647 (53.33%) variable costs and ₹ 21,569 (46.67%) fixed costs. Labour expenses constituted the highest share at 38.81 per cent followed by the amortized establishment cost of the

geranium garden at 30.69 per cent, making up around 70 per cent of the total cost. The cost structure for ratoon crops followed similar patterns. The comprehensive cost for each ratoon, combining total fixed costs (₹ 21,569) and total variable costs (₹ 20,768), equivalent to ₹ 42,337. Labour costs constituted the most substantial part at 34.50 per cent, closely followed by the amortized establishment cost of geranium at 33.51 per cent, contributing approximately 68 per cent of the total cost. The total cost of cultivating the geranium crop per year added up to ₹ 1,30,890 for three crops in a year.

Returns from scented geranium crop

For any investment to sustain in long run it must recover at least variable cost in short run hence, the net return over a variable cost were worked out assess the sustainability of the investment in scented geranium in short run the results are presented in Table 4 (fig 3). The total cost of cultivating the main crop amounted to ₹ 46,216, while for the subsequent ratoon crops, it was ₹ 42,337, bringing the total to ₹ 1,30,890 per year. The main crop yielded an average of 9.86 tonnes per acre, while the ratoon crops recorded a yield of 10.80 tonnes, equivalent to 31.46 tonnes per annum. Gross returns were ₹ 47,979 from the main crop and ₹ 52,553 from subsequent ratoon crops, at ₹ 4,866 per tonne, resulting in a net return of ₹ 1,53,085 annually and the net return over variable cost was recorded as ₹ 23,332 for the main crop and ₹ 31,785 for the ratoon crop, leading to a total net return of ₹ 86,902. The net return over total cost was ‘1,762 for the main crop and ₹ 10,216 for ratoon crops. The overall net return obtained for the year was ₹ 22,194. The return-per-rupee expenditure was 1.04 for the main crop and 1.24 for the ratoon crop. On average, the return-per-rupee expenditure was 1.16 from the three geranium crops per year. The overall net return per rupee of expenditure was higher for both main and ratoon crops emphasizing the profitability and economic feasibility of geranium cultivation. These results align with Raghu’s (2006) findings.

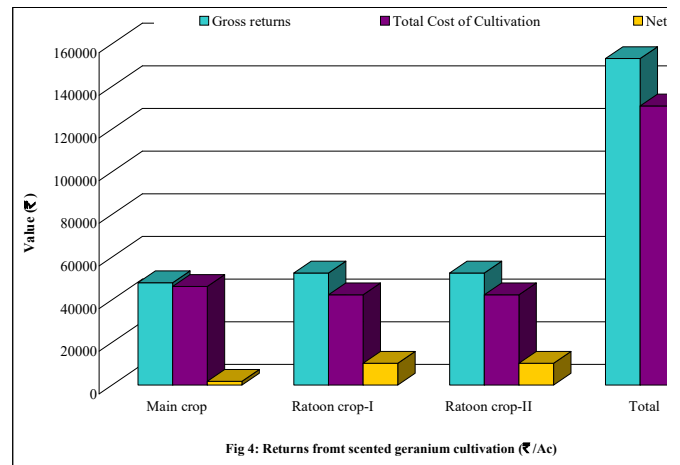


Fig 4: Returns from scented geranium cultivation (₹ /Ac)

Table 4. Cost and returns from scented geranium cultivation in the study area (₹ /Ac)

Particulars	Main crop(A)	Ratoon-crop I(B)	Ratoon-crop II(C)	Total cost (A+B+C)
Total variable cost (TVC)	24,647	20,768	20,768	66,183
Total fixed cost (TFC)	21,569	21,569	21,569	64,707
Total cost of cultivation TC (₹)	46,216	42,337	42,337	1,30,890
Herbage yield (tonne.)	9.86	10.80	10.80	31.46
Price (₹ /tonne)	4,866	4,866	4,866	4,866
Gross returns (₹)	47,979	52,553	52,553	1,53,085
Net returns on VC (₹)	23,332	31,785	31,785	86,902
Net returns on TC (₹)	1,762	10,216	10,216	22,194
Returns per rupee of expenditure on TVC	1.95	2.53	2.53	2.34
Returns per rupee of expenditure on TC	1.04	1.24	1.24	1.16

Conclusion

The study has revealed that the major source of earning of farmers in the study area was agriculture and geranium crop has been found to give a higher return to the farmers. The main crop incurred higher cultivation costs compared to the ratoon crops, whereas the gross and net returns from the ratoon crops were observed to be higher. The cultivation of scented geranium in the study area was found to be profitable with the net returns per a year of ₹ 22,194 with the returns per rupee of expenditure

of 1.16. It was found that, majority of the cultivators in the study area were following ad hoc recommendations for geranium cultivation, especially with respect to spacing and fertilizer application hence there is need to take up research studies on these aspects. Though, the geranium cultivation was found to be a profitable venture in the study area, there is a need to educate geranium cultivators to use optimum level of inputs. This would help in reducing the cost of cultivation in turn helping to improve the profitability.

References

- Anonymous, 2023a, Global demand uncorks Made in India fragrances, <https://msme.gov.in/fragrance-flavour-industry-India>.
- Anonymous, 2023b, Fragrance & Flavour Industry in India, <https://msme.gov.in/fragrance-flavour-industry-India>.
- Aswani J S, Pushpa T N, Srikanthprasad D, Gangaraddi V, Patil C P and Biradar I B, 2020, Assessment of yield and economics of menthol mint (*Mentha arvensis* L.) with different biofertilizers and organics. *International Journal of Cosmetic Science*, 8(6): 1747-1750.
- Nandimath S T, 2008, Economics of jaggery production in Karnataka, *M.Sc. (Agri.) Thesis*, University of Agricultural Sciences, GKVK, Bangalore (India).
- Raghu C, 2006, Economics of production and marketing of patchouli in north Karnataka, *M.Sc. (Agri.) Thesis*, University of Agricultural Sciences, Dharwad (India).
- Sunil H R, 2010, Economics of production and value addition to vetiver in coastal Karnataka, *M.Sc. (Agri.) Thesis*, University of Agricultural Sciences, Dharwad (India).
- Wells R and Lis-Balchin M, 2002, Perfumery and cosmetic products utilising Geranium oil. In *Geranium and Pelargonium*, CRC Press: 259-262.