Overcoming Challenges in Scented Geranium Cultivation, Processing, and Marketing: A Case Study from Northern Karnataka, India

Abstract

Medicinal and aromatic crops play a pivotal role in the socio-cultural, economic, spiritual and health dimensions of India's rural population and have become an integral part of our culture and rituals. Karnataka is a major repository of aromatic and medicinal treasures of the country. The demand for aromatic plants in India surpasses the available supply, prompting the widespread commercial cultivation of major aromatic crops in various regions. Among these, scented geranium emerges as a vital perennial aromatic, cultivated for its leaves imbued with a captivating rose fragrance. The aromatic oil of scented geranium is increasingly replacing traditional rose oil and identified as one of the top 20 essential oils traded globally. The present study aims to identify challenges in cultivation, processing and marketing aspects of scented geranium in Northern Karnataka. Considering the area and concentration of scented geranium in the state, Belagavi district is purposively selected for the study. Primary data was collected through personnel interview of randomly selected geranium growers. The major challenges faced by the farmers in the production, processing and marketing aspects of scented geranium were analysed and prioritized through Garett ranking technique. Analysis of the data revealed that in production, high cost of planting material, lack of high yielding varieties and high wage rates, high cost of inputs and sensitivity of crop to heavy rains were identified as top five constraints. Whereas, in processing, significant hurdles were high working capital requirement, high capital investment in installation distillation unit and insufficient knowledge on operation of distillation units, low oil recovery and lack of efficient processing equipment. In marketing aspects, high price fluctuation, lack of marketing information and lack of competition in the market, non-existence of local

market and lack of adequate demand in nearby area were identified as major challenges in the study area. Educating farmers in nursery management and implementing mechanization techniques, particularly for harvesting, are crucial for enhancing productivity and profitability. Additionally, training on proper storage and transportation practices is essential to maintain the quality of volatile essential oils. This comprehensive strategy promotes sustainable and economically viable cultivation of scented geraniums in the region.

Key words: Scented geranium, Challenges, Processing, Essential oil and Study area

Introduction

Medicinal and aromatic plants (MAPs) are garnering significant global attention due to their ability to provide a diverse array of safe and cost-effective preventive and curative therapies, contributing to the pursuit of universal health. Scented geranium (*Pelargonium graveoloens*) is an important aromatic crop belongs to the family geraniaceae. The genus Pelargonium contains about 270 species placed under 16 sections (Miller, 2002; Rajeswara Rao, 2013). Geranium is mainly cultivating for its rose scented leaves from which essential oil produced through steam distillation, its essential oil ranks among the top 20 essential oils in the global market. This oil has a strong rose-like odour with a minty top note. Rhodinol *i.e.,* geranium oil has a delightfully sweet, fresh, rosy, uniform and tenacious aroma and is used extensively in perfumery (Jalali-Heravi *et al.,* 2006). Geranium essential oil has wider application like, in aromatherapy, it is used as a relaxant, a sedative for nervous tension and a treatment for bronchitis, laryngitis, and menopausal problems. Due to their substantial antibacterial and anti-fungal activity, geranium essential oils and its extracts can be used as effective novel food and cosmetic industries. The hydrosol (distillate water rich in hydrophilic fraction of oil) is sprayed on crops to combat pests and diseases (Verma *et al.*, 2016).

France, Spain and Italy; Algeria, Morocco and Egypt in North Africa, Congo in Central Africa and Kenya in East Africa; Madagascar and Reunion in the Indian Ocean; Russia, India and China are the major geranium producing countries. The global essential oils market size was valued at $10.47 billion in 2022 and is projected to grow from $11.41 billion in 2023 to $22.41 billion by 2030 (Annon, 2024). The demand for MAPs and their products is on the rise in the country, creating a significant opportunity

on imports to meet domestic needs. Though there are a number of important medicinal and aromatic plants, more number studies are limited to few common plants, such as menthol mint (*Mentha arvensis*), tulsi(*Ocimum*

basilicum), vetiver (*Vetiveria zizanioides*) *etc*. However, by considering the potential demand and remunerative price for scented geranium oil, there is a notable increase in the cultivation of geranium, especially in Northern Karnataka regions such as Belagavi, Bagalkot and Bidar. Despite this expansion, challenges persist, including scarcity of genuine planting material at reasonable prices, insufficient market information, notable price fluctuations in oil and a struggle to enhance productivity due to the lack of modern production techniques. The present study was conducted to examine the challenges in the production, processing and marketing of scented geranium in Northern Karnataka.

Methodology

The study, conducted in the Belagavi district of Northern Karnataka during 2022-2023, utilized purposive sampling to select respondents involved in cultivating scented geranium and operating essential oil distillation units. Primary data was collected through structured interviews with 30 farmers and 15 distilleries, using a specially designed schedule. The descriptive analysis and tabular presentation technique was employed for analyzing the general, social and economic traits of the sample farmers, farm inventory possession and cropping pattern. The challenges faced by farmers were prioritized using Garrett's ranking technique, a method provided by Henry Garrett, in each category. The data were computed and compared with the help of suitable averages, percentage and ratios to obtain meaning-full conclusion.

$$\text{Per cent position} = \frac{100 \times (R_{ij} - 0.5)}{N_j}$$

Where,

R_{ij} = Rank given for i^{th} item by a j^{th} individual

N_j = Number of items ranked by j^{th} individual

Rank percentages were converted into scores using the Garrett table. For each factor, individual respondent scores were aggregated and divided by the total number of respondents. The mean scores for all factors were ranked, with the highest mean value determining the overall ranking.

Results and Discussion

The results revealed that, majority (76.67%) of the respondents were with in middle age class of 40-60 ages this suggested that, engaging in the cultivation and distillation of geranium involves substantial investment. Consequently, only farmers possessing both the maturity associated with age and the capacity to bear risks have chosen to pursue this venture. The results implied that, a substantial number of participants (93.33%) have families characterized by more than four members, categorized into the middle to large-sized family with an average family size of 6.1 individuals. This indicates that, households equipped to augment their labour force with family members have opted for geranium crop production and processing. The large proportions of farmers (96.7%) were found to be literate more than 56 per cent of respondents having collegiate education and graduate degree that means, education plays a crucial role in fostering awareness and encouraging them to engage in the cultivation of scented geranium. It was observed that, 73.30 per cent of the respondents are exclusively involved in agriculture, indicating that, agriculture is profitable enterprise in the study area. Results confirmed that, the percentage of the respondents having landholdings of 5 to 10 acres are maximum (46.6 %) indicating that farmers with relatively high land inventory are undertaking geranium crop cultivation. These indicators are almost align with the findings of Pergola *et al.*, 2024. Furthermore, farmers had guaranteed irrigation facilities from various sources, with over 56 per cent of them relying on multiple sources such as bore well and open well for perennial irrigation and canal for seasonal irrigation. Consequently, it can be inferred that geranium is a crop that requires consistent irrigation.

Table 1. Socio-economic characteristics of scented geranium cultivating farmers

(n=30)

Sl. No.	Particulars	Number	Percentage to total
A	**Age groups**		
1	Young age	7	23.33
2	Early middle age	15	50.00
3	Late middle age	8	26.67
4	Old age	-	-
5	Average age (Years)	**45.76**	
B	**Family size**		
1	Small	2	06.67

2	Middle	18	60.00
3	Large	10	33.33
C	**Family composition**		
1	Male	2.17	35.52
2	Female	1.67	27.32
3	Children	2.27	37.15
4	Average number of family members	**6.10**	
D	**Family Members available for Agriculture**		
5	Male	1.43	
6	Female	0.80	
E	**Educational status**		
1	Illiterate	1	03.30
2	Primary education	5	16.67
3	Secondary education	7	23.33
4	College education	7	23.33
5	Graduation education	10	33.33
F	**Occupation**		
1	Agriculture	22	73.33
2	Agriculture + subsidiary occupation	8	26.67
G	**Land holdings**		
1	Marginal farmers (<2.5ac)	4	13.33
2	Small farmers (2.5-5ac)	10	33.33
3	Medium farmers (5-10ac)	14	46.60
4	Large farmers (>10 acres)	2	06.67
H	**Source of Irrigation**		
1	Bore well	4	13.33
2	Open well	7	23.33
3	Tank	2	06.67
4	Canal + other sources	17	56.67

Table 2. Landholding pattern of sample respondents in the study area

Sl. No.	Particulars	Area (Acres)	Percentage to total
1	Owned land	7.20	80.36
2	Leased in land	1.76	19.64
	Total land	**8.96**	**100.00**
3	Area under scented geranium crop	3.20	35.60

The results depicted in Table 2 confirmed that, the average land holdings of the sample respondents was 8.96 acres out of it, owned land accounts for 80.36 per cent and the remaining 1.76 acres was leased in land by this it was confirmed that, sample farmers in the study area were undertaking land for lease to practice agriculture activities, this showing the lucrativeness of agriculture in the study area. The average area under geranium crop being 3.2 acres indicating that geranium being the high remunerative crop and geranium herbage is a major raw material used in processing, the distillers preferred to meet the major part of their raw material requirement by producing geranium in their own fields.

Table 3. Cropping pattern followed by sample respondents in the study area

Sl. No.	Particulars	Area (Ac)	Percentage to gross cropped area
A	**Kharif**		
1	Maize	1.56	12.66
2	Soybean	1.13	09.17
3	Vegetables	0.44	03.57
4	Others (Pluses *etc*.)	0.23	01.87
	Sub total-A	**3.36**	**27.27**
B	**Rabi**		
1	Maize	1.63	13.23
2	Wheat	0.92	07.47
3	Vegetables	0.62	05.03
4	Others (Pluses *etc*.)	0.19	01.54
	Sub total-B	**3.36**	**27.27**
C	**Annual crops**		
1	Geranium	3.20	26.97

2	Sugarcane	1.92	15.58
3	Other (Turmeric, fruit crops, *etc.*)	0.48	03.90
	Sub total-C	**5.60**	**45.45**
D	Gross cropped area	**12.32**	-
E	Net cropped area	**8.96**	-
F	Cropping intensity %	**137.50**	-

The analysis revealed that, farmers in the study area have predominantly allocated their land holdings to commercial crops, resulting in a cropping intensity of 137.50 per cent, a typical pattern for irrigated regions. Over 60 per cent of the net cropped area is dedicated to commercial crops such as scented geranium, sugarcane, turmeric, and fruit crops like guava, mango and sapota. Sugarcane constitutes a fixed component in the cropping pattern, covering about 20 per cent of the net cropped area to ensure stable income for farmer households. Notably, 35.71 per cent of the net cropped area is under geranium cultivation, as the study deliberately focuses on farmers engaged in geranium cultivation. These findings align with the results reported by Khot and Sabanna (2017).

Table 4. Constraints in production of scented geranium in study area

Rank	Particulars	Score
1	High cost of planting material	64.80
2	Lack of high yielding varieties	60.33
3	High wage rates	58.13
4	High cost of inputs	54.10
5	Sensitivity of crop to heavy rains	52.77
6	Lack of standardized production practices	51.30
7	Lack of extension and awareness about the crop	50.63
8	Labour shortage in peak period	48.67
9	Non availability of genuine planting material	43.03
10	Lack of support from government	35.43
11	Irregular power supply	33.13

High cost of planting material (64.80 score), lack of high yielding varieties (60.33 score), high wage rates (58.13 score) are three major challenges expressed by the geranium growers regarding the crop cultivation. From the analyses of constraints in production of scented geranium it could be concluded that, the recent introduction

of the geranium crop in the area has resulted in a shortage of geranium planting material, this scarcity is further exacerbated by the growing demand. Due to this scarcity, farmers paying high costs for procurement of planting materials from nearby districts in Maharashtra, these findings were in-line with findings of Macaluso *et al*., 2024. Moreover, the engagement of the labour force in diverse farming activities, common in irrigated areas, results in both labour scarcity and increased labour costs combined with rising input costs, this renders geranium cultivation a capital-intensive venture in the study area.

Table 5. Constraints in processing of scented geranium in study area

Rank	Particulars	Score
1	High working capital requirement	61.60
2	High capital investment in installation distillation unit	60.77
3	Insufficient knowledge on distillation unit operation	59.13
4	Low oil recovery	55.40
5	Lack of efficient processing equipment	51.90
6	Lack of institutional support	48.53
7	Lack of training/ extension activities	43.87
8	Non availability of skilled labour	37.53
9	Non availability of buyers for by-product (Hydrosol)	36.75
10	Insufficient availability of quality raw materials	35.27
11	Management of spent material after processing	31.03

In the realm of geranium processing, distillers in the study area face notable challenges, particularly high working capital requirement (61.60 score), high capital investment on distillation unit (60.77 score) and insufficient knowledge on distillation unit operation (59.13 score) resulted were reflected as in findings of Rao SGR and Radhika RM. The elevated installation expenses are primarily due to the use of high-quality construction materials and components, essential for ensuring product quality and labor safety. Additionally, increased operating costs were contributed from the raw material, *i.e*., herbage. Another key constraint highlighted by respondents is lower oil recovery, linked to insufficient knowledge about distillation unit operation, a shortage of skilled labour for efficient equipment management and various factors affecting herbage production leading to reduced oil recovery and impacting distillation unit profitability.

Table 6. Constraints in marketing of scented geranium in study area

Rank	Particulars	Score
1	High price fluctuation	64.47
2	Lack of marketing information	62.40
3	Lack of competition in the market	57.73
4	Non-existence of local market	56.80
5	No adequate demand in nearby area	55.57
6	Lack of information on storage and transportation	49.93
7	Un-organized marketing	49.23
8	High marketing cost	48.07
9	Delayed payment for sale of produce	39.10
10	No assessment of quality while sale of essential oil	38.56

Most of respondents felt that high price fluctuation was the major constraints in marketing of geranium essential oil which was assigned first rank with 64.47 garret score followed by lack of marketing information (62.40 score) and lack of competition in market (57.73 score). Results were aligned with findings of Carrubba *et al.*,2022. The notable fluctuations in oil prices in the marketing are primarily attributed to limited market information and the absence of competition in the essential oil market. The dominant presence of Kelkar Keva Fragrance and Perfume Company in Mumbai, holding a monopsony position and serving as pioneers in the fragrance and perfume market in South India, contributes to the lack of alternative markets in the study area. Consequently, essential oil prices fluctuated significantly, ranging from `8,000 to `11,000 during the study period, making distillation ventures precarious. Sensitivity analysis, reflecting a 10 per cent decline in prices, supports the need for market regulation practices, including linking prices to essential oil quality, establishing transparent payment procedures and assessing demand and supply dynamics. Such measures aim to ensure the sustainability of essential oil distillation ventures.

Conclusions

The study revealed that the socioeconomic characteristics of the respondents played a significant role in influencing the decision to engage in scented geranium cultivation. This research primarily concentrated on identifying obstacles in the production, processing, and marketing of the crop, emphasizing the urgent need to address these challenges to enhance the economic status of geranium growers in the study area by educating and training farmers in nursery management for producing

authentic planting material is crucial. Additionally, implementing mechanization techniques, especially in harvesting can significantly reduce labour requirements in geranium cultivation. This dual approach aims to enhance efficiency, to address labour-related challenges and make scented geranium cultivation economically viable for regional farmers. Introducing a standardized package of practices is essential, covering guidelines for spacing, fertilizer dosage and crop management during the rainy season. This holistic approach is expected to boost productivity and consequently, increase profitability. It's also imperative to educate farmers on proper storage and transportation practices due to the volatile nature of essential oil, which can compromise its quality during these processes. This comprehensive strategy ensures a sustainable and economically viable cultivation of scented geraniums in the region.

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