Indian Research Journal of Extension Education

RESEARCH ARTICLE

Organic Farming of Tulsi (*Ocimum species*): Motives and Satisfaction Level of Certified Organic Tulsi Growers of Bundelkhand Region of Uttar Pradesh

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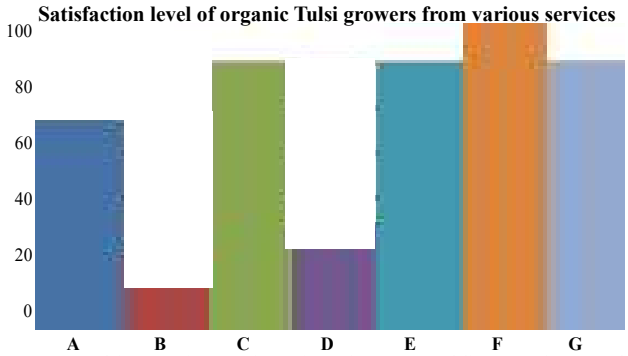
HIGHLIGHTS

- Knowledge related to Tulsi farming and assure marketing has increases the farmers' income and it is as a tool of socio-economic empowerment for small and marginal farmers.
- Lower cost of production, attractive marketing benefits and pre-determined quality parameters are the major motives of cultivation by Certified Organic Tulsi growers.
- Private players' provision of 'organic certification of farms and produce' enhances the satisfaction levels and cultivation area of organic Tulsi.

GRAPHICAL ABSTRACT



Motives: A-Advisory services; B-Diagnostic services; C-Input delivery D-Infrastructural services; E-Services to quality parameters; F-Organic certification; G-Crop insurance

ARTICLE INFO

Editor:
Dr. Mahesh B. Tengli

Key words:
Organic Farming, Tulsi, Motives, Association, Satisfaction

Received : 09.01.2024
Accepted : 24.02.*2024*
Online published : 01.04.2024

doi: 10.54986/irjee/2024/apr_jun/66-72

ABSTRACT

Introduction: Organic Farming is a system of farming which repair, maintains, and improves the ecological balance and fulfills the requirement of human being in sustainable way without any side effects.

Context: Bundelkhand region of Uttar Pradesh and its district Hamirpur has semi arid climatic condition with unique agro-ecological situation which is best suited for organic farming especially cultivation of medicinal and aromatic crops like Tulsi.

Objectives: It is necessary to find out the association between socio-economic variables and annual income from organic Tulsi; understand the Motives for opting Organic Farming of Tulsi and understand the Satisfaction level of Certified Organic Tulsi growers.

Methods: Study was purposively undertaken in four Tulsi growing blocks of district Hamirpur. A Simple random sampling method was followed for the selection of 100 organic Tulsi growing respondents from four villages. The appropriate statistical tools were used to collect, tabulate, classify, and analyze the data.

Results & Discussion: The study found a significant relationship between socio-economic variables such as social participation, access to agricultural information, and linkage with private players contributed to increased income. Organic farming has high potential for increasing farmers' income and empowering small and marginal farmers. Attractive marketing benefits and pre-determined quality parameters attracted certified organic Tulsi growers. Private players' facilities for organic certification increased satisfaction and cultivation area.

Significance: The study highlights the need for Government, FPOs, Farmers and Private value chain developers as well as policymakers to consider the export potential of organic Tulsi and launch suitable strategy for promotion of tulsi cultivation in this region.

Demographically, agriculture is the largest economic field and plays a significant role in India's entire socio-economic structure (Bojjagani and Annapurna, 2022). The 'Green Revolution' helped India reach a position of self-sufficiency in the production of food grains and achieve food security. However, the achievement was at the expense of ecology and the environment, which ultimately led to the detriment of the well-being of the people. Organic farming provides solutions for most of the problems related to ecology and the environment faced by contemporary issues in agriculture and food production. The principles of health, ecology, fairness, and care are the roots from which organic agriculture grows and develops. The International Federation of Organic Agriculture Movements (IFOAM) has defined organic agriculture as "a process that develops a viable and sustainable agro-ecosystem" (IFOAM, 2000). Organic products are richer in nutrients and largely free of pesticide residues and additives (Hammed, *et al.,* 2019). Organic farmers are aware that the health of people can be improved by avoiding chemical pesticides and fertilizers commonly used in farming (Pandiselvi, *et al.,* 2017). Thus, organic farming follows the circular causation theory and has arisen in response to concerns about health, climate, and sustainability (Udayan, *et al.,* 2021)

Tulsi is the most common and beneficial herb cultivated as a non-timber forest product (NTFP) under medicinal and aromatic plants (MAPS), which can be grown, harvested, and processed into high-value products. Historically, it is known for its healing power, which dates back over thousands of years in Ayurveda. The plant acts as a natural anti-stress agent and boosts the immune system (Sai, 2014). Today, it is commonly consumed as Tulsi-Tea with or without other natural herbs and products to combat lifestyle disorders and diseases. In District Hamirpur, there are several public and private players who are encouraging the farmers to practice the organic farming of Tulsi. They also provide facilities for cultivating the crop organically.

The Bundelkhand region of Uttar Pradesh consists of seven districts, including Hamirpur. It comes under the Central Plain Zone (Bundelkhand) climate and has a unique agro-ecological situation best suited for rainfed agriculture, where medicinal and aromatic crops and plants are grown in a natural way. Hot climate, undulating topography, residual and low depth of soil, and land impermeable rock on the surface also characterize this region. The monsoon brings more than 90% of the annual rainfall between the months of June and September. The economy of this region is mainly based on agriculture and traditional farming patterns. Due to soil conditions and a lack of adequate irrigation facilities, generally, mono-cropping is prevalent. Therefore, the State Agriculture Department started promoting organic farming in Hamirpur in 2016–17 and got favorable results. In this line, Banda University of Agriculture and Technology is also involved in promoting technology transfer for farmers (Dainik Jagran,2020). The agriculture department has prepared a roadmap to promote chemical-free farming in the Bundelkhand region and encourage organic farming. For this purpose, districts Hamirpur and Banda have been selected as the immediate beneficiaries of the plan, and the state government has allocated a budget of Rs. 4.68 crore for improving the condition of the soil, providing subsidies, and providing training and resources to farmers in more areas of the districts (The Times of India, 2022).

Presently, over 2500 small and marginal farmers in the drought-hit districts (Banda, Mahoba, Jhansi, Jaloun, and Hamirpur) of the Bundelkhand region of UP cultivate Tulsi as a cash crop in addition to their routine agriculture and earning their livelihood. Today, several private players are active in this region for the purchase of Tulsi. Some of them are involved in organic tulsi farming through certified organic tulsi growers. A few private players are taking pride in training the farmers. These private players commitment goes beyond the farm to help enhance the lives of their farmers through a fair market wage, access to health care, empowerment and gender equality programmes, as well as empowerment in infrastructure development. Therefore, the cultivation of Tulsi in this region has high potential in terms of farmers' income and scope for global markets (Pandey, 2009).

In this background, it is important to study the (i) socio-economic profile of certified organic tulsi growers and find out the association between socio-economic variables and annual income from organic tulsi; (ii) to understand the motives for opting for organic farming of tulsi and the satisfaction level of certified organic tulsi growers.

METHODOLOGY

The present research work was purposively undertaken in district Hamirpur (Latitude 25^0 57.2069'N and Longitude 80^0 8.7859') under

Fig.1. Study area of district Hamirpur

Bundelkhand agro-climatic zone of Uttar Pradesh (as depicted in Fig.1.) during 2023. Out of seven development blocks, four Tulsi growing blocks namely Rath, Sarila, Muskara and Gohand and their one Tulsi growing village were purposively selected for the study. The selected villages namely Mavai (Rath), Chilli (Gohand), Jitkiri (Sarila) and Bihuni (Muskara) farmers cultivated Tulsi as a main crop during rainy season. From each village twenty five certified organic Tulsi growers who cultivating Tulsi from last 3-4 years or more were randomly selected through lottery method from the prepared list and interviewed the concerning respondents. Thus, accordingly, total four blocks and their four villages and 25 respondents from each village (total 100 certified organic Tulsi growers) which follow the standard of Internal Control System (A documented quality assurance system that allows an external third-party certification), were selected as sample size. The Socio-economic variables namely age, education, gender, type of family, Agricultural practicing duration, Size of organic land holding, social participation, Access of Agricultural Information for Tulsi, and Linkage with private players preference was studied to find out the association with annual Income from organic Tulsi. To know the Motives for Opting Organic Farming of Tulsi and understand the Satisfaction level of Certified Organic Tulsi growers structured schedules were developed. The data were collected from each individual personally with the help of pretested structured interview schedule. The tabulated data were classified and analyzed with the help of suitable statistics like Chi-square test, frequencies, percentage, mean, rank order, etc. in the light of objectives.

RESULTS:

Socio-economic profile certified organic Tulsi growers: Table 1 describes the association between socio-economic variables and annual income from organic Tulsi. Chi-square test is used to calculate X^2-value, degrees of freedom at 5 per cent level of significance with P value is P>0.05 (accepted, it means significant difference) while P<0.05 (rejected, it means non-significant difference). The result showed that non-significant association between annual income from organic Tulsi and variables i.e. age, education, gender, type of family, agricultural practicing, and size of organic land holding at 5 per cent level of significance. It can be inferred that there is no matter of age group,

Table 1. Association between socio-economic variables and annual income from organic Tulsi (N=100)

Socio-economic variables	Classification	No.	%	χ^2 statistic
Age	Up to 30 yr	13	13	0.095^{NS}
	30 to 60 yr	68	68	
	<60 yr	19	19	
Education	Illiterate	09	09	0.082^{NS}
	Up to 10+2	38	38	
	UG & PG	48	48	
	Professional	05	05	
Gender	Male	91	91	2.312^{NS}
	Female	09	09	
Type of Family	Nuclear	28	28	3.254^{NS}
	Joint	72	72	
Agricultural practicing	Full time	79	79	4.243^{NS}
	Part time	21	21	
Size of organic land holding	Up to 01 ha	56	56	3.955^{NS}
	01 to 02 ha	39	39	
	> 02 ha	05	05	
Social participation	Low	19	19	13.460^{NS}
	Medium	35	35	
	High	46	46	
*Access of Agricultural Information for Tulsi	Public ext.	12	12	21.454^{NS}
	Only private ext.	95	95	
	Internet connectivity-based platform	63	63	
	Traditional media	54	54	
	Friends & relatives	95	95	
	Others	16	16	
Linkage with private players	Low level	22	22	10.644^{NS}
	Medium level	42	42	
	High level	36	36	

*Multiple response;
NS= Significant at 5% level of significance

Table 2. Distribution of respondents based on motives for opting organic farming of Tulsi (N=100)

Reasons/ motives to opting organic farming of Tulsi	No.	%	Rank order
Suitability of agro-ecological situations and chances of crop losses due to biotic and abiotic stresses			
Agro-ecological conditions are most suited for organic Tulsi cultivation	82	82	iii
Less sensitive to Biotic stress (especially insect pest and diseases)	87	87	ii
Minimum chances of crop losses due to abiotic stress	92	92	i
Suitability of 'agro-ecological situations and chances of crop losses due to biotic and abiotic stresses'	87	87.00	IV
Eco-friendly production practices			
Consciousness about human health	57	57	vii
Soil health improvement	78	78	iii
Environmental consciousness	67	67	v
Groundwater saving	73	73	iv
Additional benefits	60	60	vi
Easy to add in Crop rotation	92	92	ii
Chemical free cultivation	98	98	i
'Eco-friendly production practices'	75	75.00	VI
Attractive marketing benefits			
Comparatively more net profit per unit area due to assured purchase rate of Tulsi.	92	92	iv
Hurdle less supply/ sale on pre-determined parameters or Easy and assure marketing (contract farming)	95	95	ii
Easy, assure and fair payment process within week	93	93	iii
More demand in market due to many purchasing players	90	90	v
Supply of all stock of Tulsi leaves as per agreement	90	90	v
Surplus income increases Socio-economic status of farmers.	100	100	i
Negligible storages losses compare to other crops / commodities.	87	87	vi
'Attractive marketing benefits'	92.42	92.42	II
Availability of innovative technology			
Assured advisory services	53	53	iv
Assured diagnostic services	88	88	ii
Assured input delivery services	100	100	i
Assured Infrastructural development services	72	72	iii
Availability of Innovative Technology'	78.25	78.25	V
Pre-determined quality parameters of organic certification			
Availability of advisory services related to quality parameters.	97	97	i
Lower chances of reduction of quality in harvested Tulsi	82	82	ii
Facility of organic certification of farm and produces	97	97	i
Pre-determined quality parameters	92	92.00	III
Lower cost of production and management			
Simple and easy cultivation practices	100	100	i
Only few and cheaper agro- inputs are required	95	95	ii
Need less care and management	95	95	ii
No use of complex technology to grow the tulsi	93	93	iii
Due to rainy season crop, it requires less or no irrigation	95	95	ii
Not the chances of Tulsi crop failure.	100	100	i
Lower cost of production and management'	96.33	96.33	I
Safety and security of Tulsi from 'Anna Pratha' and other losses / risks.			
Negligible chances of losses due to human risks and other losses.	92	92	-
Negligible chances of crop losses due to 'Anna Pratha' and wild animals.	92	92	-
Safety and security of Tulsi from 'Anna Pratha' and other losses / risk'	92	92	III

need of formal education, gender, type of family, agricultural practicing, and size of organic land holding to start business related to organic Tulsi farming. But Social participation, access of agricultural information for Tulsi and linkage with private players had significant association with annual income from organic tulsi. This implies sharing of knowledge related to farming of tulsi and marketing has increase the income of farmers who engaged them in farming of organic tulsi.

Motives for opting organic farming of Tulsi: Table 2 contains seven major groups of motives (A to G) guiding farmers in the organic farming of Tulsi. Among the motives, 'lower cost of production and management' was ranked Ist (96.33%), followed by 'attractive marketing benefits' ranked IInd with 92.42 per cent views, and 'pre-determined quality parameters' and safety and security of Tulsi from 'Anna Pratha' and other losses and risks' ranked IIIrd with 92.00 per cent views, as well as 'agro-ecological situations and chances of crop losses due to biotic and abiotic stresses'; 'availability of Innovative Technology'; and 'eco-friendly production practices' having rank IVth, Vth, and VIth respectively with percentages of 87.00 per cent, 78.25 per cent, and per cent. Group-wise sub-motives for opting for organic farming in Tulsi were shown in another picture related to some special reasons regarding the farming of Tulsi, including 'not the chances of Tulsi crop failure, simple and easy cultivation practices, surplus income increases. Socio-economic status of farmers and assured input delivery services were responsible sub-motives with 100 per cent views.

Satisfaction level of Tulsi growers from various Services: The data in Table 3 depicts the satisfaction level of certified organic tulsi growers with various services. Facility of Services related to quality parameters was having the highest mean score (2.90) with rank Ist, followed by Facility of organic certification of farm and produces, and Facility related to marketing or contract were having rank IInd with mean score value 2.89, and Assured advisory services were having rank IIIrd with mean score 2.88. The other statements related to the satisfaction level of certified organic tulsi growers from various sources also indicated a lower mean value ranging from 2.87 to 2.44, with rank IV to VII in decreasing order, showing lower satisfaction towards various services.

DISCUSSION

Association between socio-economic variables and annual income: Information is essential in the current global environment to hasten the expansion and improvement of the rural agriculture sector. Appropriate and timely information is essential for the production, sharing, and application of knowledge in the digital age. It has been widely acknowledged in recent years that information gives people the right and solid knowledge foundation, enhancing their ability to think critically and make decisions in a variety of circumstances. The dissemination of information from one node to another through shared social relationships is known as agricultural information flow in social networks (Pradhan, *et al.,* 2024). Zain, *et al.* (2022) also stated that the exchange of knowledge can lead to improved farming techniques, increased productivity, and sustainable agricultural practices.

In the present study, social participation, access to agricultural information, and linkage with private players significantly increase annual income from organic Tulsi

Table 3. Satisfaction level of Tulsi growers from various services (N=100)

Satisfaction level of Tulsi growers from various services	Satisfaction level				Rank order
	Not satisfied	Partially satisfied	Fully satisfied	Mean value	
Assured advisory services	01	09	90	2.88	III
Assured diagnostic services	04	15	81	2.77	VI
Assured input delivery services	00	13	87	2.87	IV
Assured Infrastructural development services	13	30	57	2.44	VII
Services related to quality parameters	02	06	92	2.90	I
Facility of organic certification of farm and produces	01	09	90	2.89	II
Facility of crop insurance	*	*	*	-	-
Facility related to marketing / contract	01	09	90	2.89	II
Availability of skilled labors	01	10	88	2.85	V

*Not availed by farmers.

farming, suggesting knowledge sharing and marketing boost farmers' income. In this line, Pradhan, *et al.* (2024) also reported that access to market information, including prices, demand trends, and market regulations, helps farmers in their decision-making. This enables farmers to make informed decisions about when and where to sell their produce (Brown *et al.,* 2022).

Motives for opting organic farming of Tulsi: Choosing organic farming offers several benefits for the farmers, such as economic, environmental, human health, and the overall sustainability of agriculture. In the changing scenario towards health consciousness and income motives, the future of organic production depends upon lower production costs, and management practices as well as attractive marketing benefits also play an important role in the cultivation of any crop. Here, we discuss some key reasons why farmers opt for organic farming.

In our study, the top reasons for choosing organic farming in Tulsi include lower production and management costs, attractive marketing benefits, pre-determined quality parameters, safety and security, innovative technology, agro-ecological situations, and eco-friendly practices. Special reasons include avoiding crop failure, simple cultivation practices, surplus income, socio-economic status, and assured input delivery services. It means the agro-ecological conditions of this region and organic practices favour lower costs of production and management, while attractive marketing benefits were the next important motives for organic farming of tulsi. This is supported by Koesling, *et al.* (2008), who reported that economic motives to adopt organic farming practices are of high importance, particularly a focus on higher profits, subsidies, or a premium price for products. Supportive social networks, such as associations and the direct contacts that guided farmers through the process of certification, were mentioned as good examples of motives to convert to organic farming (Laura, and Kimberle (2018). In this line, Chandre, *et al.* (2019) also observed that ecological considerations were the dominant motives for the majority of organic farmers, although a reduction in the cost of cultivation and realising a better price in the market did motivate farmers. Laura, and Kimberle, (2018) also find out that the motives in financial capital seem to be more important for converting to organic farming in the literature than in our interviews, where economic incentives were important to support the decision to convert to organic farming but were not the driving factor in cases where the ideology was more important. Sangeetha, K.G. *et al.* (2018) reported that organic farmers have better adaptive capacity than conventional farmers.

Satisfaction level of Tulsi growers from various services: In the present time, the preferences of customers are also towards certified quality parameters, especially for organic produce. The organic farm and their produce certification process is an initial-level process, and it is a guarantee for consumers regarding their safety. Therefore, the facility of organic certification of farms and products is of prime importance for the sale of any produce, but it is a complex, lengthy, and knowledge- and experience-oriented process that involves many precautions and technicalities.

The study also clarifies that Tulsi growers were fully satisfied with various services related to organic quality parameters, organic certification of farm and produces, marketing, and other related services provided by private players. In this regard, Carlos, P.B. *et al.* (2012) also reported that the majority of respondents seem to be satisfied with the organic certification process. While Satyajeet *et al.* (2019) reported that 'lack of knowledge about organic farming' and 'organic registration process is costly and complicated'. Similar kinds of findings were reported by Jaganathan, *et al.* (2010). But there is slightly variation in satisfaction level of various services which indicated that the package of services played important role in promoting cultivation of any crop.

CONCLUSION

The output of the findings envisages that social participation, agricultural information access, and private partnerships significantly increase organic tulsi farmers' income, suggesting knowledge sharing and marketing boost their farming activities. Organic farming in Tulsi has high potential in terms of increasing farmers's income, job creation, and socio-economic empowerment of small and marginal farmers. Attractive marketing benefits and pre-determined quality parameters are the major motives for Tulsi cultivation. Facility of organic certification of farm and produce provided by private players, which increases the satisfaction level and cultivation area of organic Tulsi. Thus, it may be concluded that organic farming in Tulsi plays a visible role not only for livelihood security but could also help in doubling farmers's income. Therefore, it is necessary for the government, private value chain developers, farmers, agricultural graduates, other policymakers, etc. to

rethink about making organic Tulsi hubs in this region and explore export opportunities.

Funding Source: Not funded by any organization.

Declaration of competing interest: The authors have no conflicts of interest.

Data availability: Data would be available on request.

Appendix: The supplementary data, table, graph in jpeg format for online visibility to the readers are submitted as an appendix.

Authors' contribution: The first author is responsible for the identification of problems, conceptualization, and collection of data. The second and fourth authors contributed to the content of the manuscript. The third author helps with data analysis and the development of figures.

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