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ASSESSMENT OF FARMERS' EDUCATIONAL NEEDS REGARDING SAFFRON CULTIVATION AND PRODUCTION

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ABSTRACT

The level of farmers' knowledge, skills, and training in the field of agriculture can contribute significantly to effective production planning and to improving their technical abilities. One of the approaches to empowering farmers and increasing productivity in the agricultural subsectors of the country is the design and implementation of training programs based on farmers' needs; therefore, identifying their educational needs is essential. This research was conducted in the year 2025 with the aim of examining the educational needs of farmers regarding saffron cultivation and production, as well as the factors influencing these needs. The statistical sample consisted of 60 saffron farmers from Barnabad village in Ghoryan district, who were selected completely randomly and studied accordingly. This study employed an ex-post facto research method. Data collection was carried out using a pre-designed questionnaire, and data analysis was conducted using SPSS statistical software. The results showed that 64.11% of saffron farmers had high to very high levels of educational need. Farmers expressed the greatest need for training in the following areas: identification of saffron varieties, recognition of saffron plant diseases and pests and methods of controlling them, use of agricultural machinery for harvesting saffron, and product marketing. Correlation analysis further showed that the level of education had a significant negative relationship with educational needs; meanwhile, variables such as age, household size, land size, farming experience, and annual income showed weak and statistically insignificant relationships with educational needs. Based on the results, it is recommended that educational programs must be designed and developed in the following order: pest and disease identification and control, marketing and sales, planting, cultivation, harvesting, and post-harvest processes. It is also advised that training programs consider the personal and professional characteristics of saffron farmers.

Keywords: *Barnabad, cultivation, educational needs, Ghoryan, production, saffron*

INTRODUCTION

Saffron, with the scientific name (*Crocus sativus L.)*, belongs to the Iridaceae family. It is a perennial, stemless herbaceous plant. The saffron corm is nearly spherical, with a diameter of 3–5 cm and a brown outer covering. Saffron is one of the agricultural products that has gained increasing attention among Afghan farmers in recent years, and it is one of the most valuable agricultural crops capable of contributing to employment, investment, and economic development in the country. Achieving food security, stable income, export opportunities, and political and economic independence are among the most important reasons for investing in saffron production. Global demand for saffron is rising, and its export—considered a non-oil export—provides substantial foreign exchange earnings. Due to its high market value, long shelf-life, and ease of transport, saffron is regarded as a strategic and important product in the national economy. Moreover, sustainable agriculture, by emphasizing value-added creation and ensuring favorable living and income conditions for farmers—through the establishment of sales markets for agricultural products such as saffron—can contribute to the country's economic and social stability. Saffron cultivation and production, due to its specific climatic requirements, occur only in limited geographical latitudes. Given suitable climatic conditions, wide markets, high demand, and the strong capabilities of this product, saffron-exporting countries engage in intense economic competition globally, offering products of varying quality. The major saffron-producing countries are Iran, Spain, India, France, Greece, Algeria, Morocco, Australia, and Afghanistan (Shabani, 2019).

In recent decades, climate change has led farmers

to shift toward drought-resistant, low-water crops such as saffron. Although saffron cultivation in Ghoryan has a relatively long history and holds specific potential, it has not expanded as it should, and therefore its educational needs have not been identified. Identifying and prioritizing these needs from the perspective of saffron farmers is crucial. Considering that saffron cultivation is relatively new in Afghanistan, recognizing these needs increases the effectiveness of programs, encourages participation in training courses, prevents national capital loss, and ultimately increases farmers' income. The first step in designing and implementing planning is to determine educational needs. By identifying these needs, strategies can be developed to improve training and enhance farmer productivity. Improving farmers' knowledge and skills not only contributes to their economic conditions but also supports the sustainable development of saffron cultivation. In this research, the educational needs of saffron farmers will be examined, their priorities determined, and the role of identifying and prioritizing these educational needs in the production and performance of agricultural products, particularly saffron cultivation, will be assessed.

Majid Mir Gohar and colleagues (2008), in a study titled *Assessment and Prioritization of Farmers' Educational and Extension Needs using Moral Measurement of Technical Knowledge and Application Level*, found that crop rotation, seed rate per unit area, weed control, seed disinfection, and irrigation were the most important educational needs of wheat farmers. Seed rate, optimal fertilizer use, weed management, planting methods, crop rotation, irrigation frequency and timing, seed disinfection and cleaning, and pest and disease control were key extension priorities.

Saeed Fahli and colleagues (2011), in a study on factors influencing the knowledge of saffron farmers in Torbat-Jam regarding correct saffron cultivation practices, found that the average age of farmers was 50 years with a standard deviation of 11 years, and nearly half (83 farmers or 54.60%) were aged 50–70.

Somayeh Rahimzadeh and colleagues (2016), in a study comparing information-seeking behavior of exemplary and ordinary saffron farmers in South Khorasan province, found that most saffron growers needed more information about saffron bulbs, field labor, and pesticides, while information on agricultural machinery was less important.

Kiumars Zarafshani and colleagues (2021), in their study on saffron farmers' educational needs in Kermanshah district, found that the planting and post-harvest stages required strengthening, whereas pre-planting, cultivation, and harvesting processes did not require further training.

Omid Tokhi (2024), in a study titled *Assessment of Saffron Farmers' Production and Marketing Practices: Case Study of Gajeh Village, Pashtun-Zarghun District, Herat Province*, found that 13.33% of farmers had small families, 40% had medium-sized families, and 46.67% had large families of more than eight members.

Ezmarai Mahmoodi (2022), in a study assessing farmers' knowledge regarding saffron cultivation in Shakiban village of Zendajan district, found the most important challenges to be economic limitations in purchasing fertilizers, pesticides, and tools; water shortages; droughts; lack of proper markets; lack of credit sources; inadequate processing facilities; pest and disease presence; insufficient capital; and limited knowledge of modern production methods.

OBJECTIVES

(1) To assess the educational needs of farmers regarding saffron cultivation and production.

(2) To examine the relationships and effects of independent variables on educational needs.

(3) To evaluate the socio-economic profile of the respondents.

(4) To assess the problems and suggestions of the respondents.

METHODOLOGY

This study is an ex-post facto research (Ex-post facto research design). The ex-post facto method examines phenomena that have already occurred. Data were collected from a sample of 60 farmers who had previously been randomly selected from Barnabad village in Ghoryan district of Herat province, using pre-designed questionnaires. The questionnaires used in this study consisted of three main sections:

(1) Respondent characteristics

(2) General information related to the socio-economic profile of the farmers

(3) Components related to farmers' educational needs.

The collected data were analyzed statistically in order to obtain the expected results, and SPSS software was used for data analysis.

RESULTS AND DISCUSSION

The educational needs of saffron farmers were assessed using 15 items, and the prioritization of these needs is presented in Table (1)..

Table 1: Prioritization of farmers' educational needs related to saffron cultivation and production

(n = 60)

Sr. No.	Educational need	Mean	Standard deviation	CV	Rank
1	Identification and control of saffron plant diseases and methods of combating them	4.53	0.891	19.67	1
2	Identification and management of saffron plant pests and methods of combating them	4.50	0.853	18.96	2
3	Use of mechanized equipment and machinery in the saffron harvesting process	4.23	1.07	25.30	3
4	Marketing and sales strategies	4.21	0.845	20.07	4
5	Introduction and recognition of existing saffron varieties for planting	4.00	0.956	23.75	5
6	Methods of utilizing saffron by-products and their applications in different sectors	3.93	1.006	25.60	6
7	Various methods of saffron planting	3.81	1.18	30.97	7
8	Use of agricultural machinery for planting operations	3.76	1.04	27.66	8
9	Principles of saffron storage and preservation to maintain quality and reduce losses	3.70	1.03	27.84	9
10	Land preparation operations, including plowing, leveling, and soil preparation	3.63	1.24	34.16	10
11	Provision and preparation of saffron production inputs, including bulbs and other related materials	3.58	1.25	34.92	11
12	Scheduling saffron harvest based on growth and maturity stages	3.58	1.15	32.12	12
13	Irrigation methods and use of scientific irrigation techniques	3.56	1.18	33.15	13
14	Effective use of chemical and organic fertilizers	3.48	1.24	35.63	14
15	Product harvesting methods	3.30	1.19	36.06	15

Note: A five-point Likert scale (very high to very low) was used for each item, coded as follows: Very High = 5, High = 4, Medium = 3, Low = 2, Very Low = 1.

According to Table, the ten highest-priority educational needs reported by the farmers included: identification and control of saffron plant diseases and methods of managing them; identification and management of saffron pests and strategies for combating them; the use of mechanized equipment and machinery in the saffron harvesting process; marketing and sales strategies; introduction and identification of available saffron varieties suitable for cultivation; methods of utilizing saffron by-products and their applications in various sectors; different techniques of saffron cultivation; the use of agricultural machinery for planting operations; principles of storage and preservation to maintain product quality and reduce losses; and land preparation practices, including plowing, leveling, and soil conditioning. In contrast, the farmers reported lower educational needs in areas such as the provision and preparation of production inputs (including bulbs), scheduling of harvesting based on growth stages and crop maturity, irrigation methods and the application of scientific irrigation techniques, effective use of chemical and organic fertilizers, and methods of crop harvesting.

By aggregating individual scores and categorizing the farmers into three levels of educational need—high, medium, and low—it was determined that the majority of saffron farmers (64.11%) exhibited a high level of educational need. These findings are consistent with the results of the study conducted by Majid Mirgohar and colleagues in 2008. The results of this study are aligned with the findings of Somayeh Rahimzadeh and colleagues (2016), who conducted a study titled "Comparison of Information-Seeking Behavior of Sample Saffron Farmers with Ordinary Saffron Farmers in South Khorasan Province." Their study found that most saffron farmers required more information in areas related to saffron bulbs, farm labor, and pesticides, while information related to agricultural tools and machinery was of lower importance.

To examine the relationship between saffron farmers' educational needs and the variables under study, Spearman's correlation coefficient was used. The results showed that only the education level variable had a significant negative correlation with educational needs ($r = -0.285^*$, sig = 0.027). This indicates that as education level increases, the need for saffron-related training decreases, because educated individuals generally possess

Table 2 : Correlation between research variables and farmers' educational needs (n = 60)

Sr. No.	Independent variable	Type of correlation	Correlation value	Significance level
X_1	**Age**	Spearman	-0.013	0.920
X_2	**Education Level**	Spearman	-0.285*	0.027
X_3	**Household Size**	Spearman	0.004	0.979
X_4	**Land Size**	Spearman	-0.878**	0.009
X_5	**Farming Experience**	Spearman	0.021	0.871
X_6	**Annual Income**	Pearson	0.022	0.865
X_7	**Educational Need**	Spearman	1.000	—

greater technical and scientific knowledge related to saffron cultivation. Other variables—including age, household size, land size, farming experience, and annual income—showed weak and statistically insignificant relationships with educational needs. Overall, the findings suggest that education level is the most important determining factor in explaining the degree of educational need among saffron farmers, while other variables do not have meaningful effects in this regard (Table 2).

The findings of the study, as presented in Table (3), indicate that the majority of saffron farmers (43.33%) fall within the age group of 18–30 years. These results are not consistent with the findings of Saeed Fe'li and colleagues, who conducted their study in 2011. The lack of consistency may be due to differences in demographic structures, migration and workforce dynamics, and generational changes in agricultural activities between the two regions. Furthermore, 25% of the farmers surveyed—representing a frequency of 15 individuals—were illiterate in terms of educational attainment. An examination of demographic information related to household size revealed that the smallest proportion of respondents fell within the category of 1–3 members, whereas the majority belonged to the medium-sized household category of 4–8 members. which aligns with the findings of Omid Toukhi (2024). Overall, 55% of the individuals under study were classified as having large families (4–8 members). Data obtained on landholding size showed that most participants possessed relatively large agricultural land in the irrigated (Irrigated farming) category, with 36.67% cultivating between 4 and 10 *jeribs* of farmland. Based on the results, the majority of farmers (66.67%) had more than 10 years of agricultural experience in the cultivation and production of saffron. In terms of annual income, 23.33% (14 individuals) were categorized as having low income (less than 96,817.13 AFN), 63.33% (38 individuals) belonged to the medium-income group (96,817.13–670,682.87 AFN), and 13.33% (8 individuals) reported an annual income exceeding 670,682.87 AFN.

In line with this research, the findings show partial alignment and partial contrast with the study of Kiumars Zarafshani and colleagues (2021), who investigated the educational needs of saffron farmers in Kermanshah Province. One of the main factors behind these differences is the variation in climatic conditions, cultural contexts, and farmers' level of access to educational resources in the respective regions. Additionally, farmers' literacy level, practical farming experience, and the degree of support from extension and governmental institutions significantly influence farmers' educational needs. Therefore, it can be concluded that the differences in results are not due to deficiencies in the research, but rather stem from structural and environmental differences between the two study populations.

Table 3 : Socio-economic profile of the individuals (n = 60)

Sr. No.	Variables	Category	Number	Percent
1	**Age**	Young (18-30 years)	26	43.33
		Middle-aged (31-50 years)	21	35.00
		Elderly (over 50 years)	13	21.67
2	**Family Size**	Small (1-3 members)	06	10.00
		Medium (4-8 members)	33	55.00
		Large (more than 8 members)	21	35.00

Sr. No.	Variables	Category	Number	Percent
3	**Education level**	Illiterate	15	25.00
		Primary School (grades 1-6)	12	20.00
		Secondary School (grades 7-9)	10	16.67
		High School (grades 10-12)	09	15.00
		14th Grade (Seventeenth and Fourteenth)	04	06.00
		Bachelor's Degree	10	16.67
4	**Farming Experience**	Low (1-5 years)	06	10.00
		Medium (6-10 years)	14	23.33
		High (more than 10 years)	40	66.67
5	**Land holding**			
	Irrigated Land	Small Farmers (1-3 jeribs)	21	35.00
	Rainfed Land	Medium Farmers (4-10 jeribs)	22	36.67
		Large Farmers (more than 10 jeribs)	17	28.33
	Land Ownership	Small Farmers (1-3 jeribs)	06	10.00
		Medium Farmers (4-10 jeribs)	0	0
		Large Farmers (more than 10 jeribs)	02	03.33
	Orchards	Small Farmers (1-3 jeribs)	27	45.00
		Medium Farmers (4-10 jeribs)	04	06.00
		Large Farmers (more than 10 jeribs)	01	01.67
6	**Annual Income**	Low (less than 96,817.13 AFN)	14	23.33
		Medium (96,817.13–670,682.87 AFN)	38	63.33
		High (more than 670,682.87AFN)	08	13.33

Table 4 : problems reported by respondents (n = 60)

Sr. No.	Reported Problems	Frequency	Percentage	Rank
1	**Water shortage**	41	68.30	I
2	**Lack of advanced agricultural equipment**	21	35.00	II
3	**Lack of international and domestic markets for selling saffron**	16	26.67	III
4	**Economic difficulties**	16	26.67	IV
5	**Shortage of improved bulbs**	15	25.00	V
6	**Presence of pests and diseases**	14	23.33	VI
7	**Lack of saffron processing facilities**	13	21.67	VII
8	**Climate change**	03	05.00	VIII

Multiple respondents analysis

Table 4 shows the problems reported by the respondents. In order of priority, these include: Water shortage, lack of advanced agricultural equipment, lack of national and international markets for selling saffron, economic difficulties, shortage of improved bulbs, presence of pests and diseases, lack of saffron processing facilities, and climate change. These results are consistent with the findings of Ezmarai Mahmoodi (2022).

Table 5 shows the suggestions provided by the respondents. In order of priority, these include:Conducting more training classes related to saffron cultivation and production, government support for farmers, provision of credit and loan facilities, mechanization of agriculture, water storage and management in winter, distribution of improved agricultural bulbs, construction and rehabilitation of irrigation canals, and increased government focus on markets.

Table 5 : Suggestions provided by respondents (n = 60)

Sr. No.	Suggestions Provided	Frequency	Percentage	Rank
1	**Conducting more training classes related to saffron cultivation and production**	21	35	I
2	**Government support for farmers**	14	23.33	II
3	**Provision of credit and loan facilities**	13	21.67	III
4	**Mechanization of agriculture**	13	20	IV
5	**Water storage and management during winter**	10	16.67	V
6	**Distribution of improved agricultural bulbs**	10	16.67	VI
7	**Construction and rehabilitation of irrigation canals**	08	13.33	VII
8	Increased government focus on markets	06	10	VIII

Multiple respondents analysis

CONCLUSION

Saffron is the most valuable agricultural crop on earth. Previous research shows that high-value crops, including saffron, can bring social change, stimulate the rural economy, and provide a desirable source of income for poor and vulnerable rural populations. However, in recent years, saffron farmers have faced challenges related to saffron productivity, including decreased yield, quality, and price—issues that may lead to instability in farmers' economic and social conditions. One of the main factors that disrupts the production cycle is farmers' lack of knowledge about various agricultural operations during different stages of production. Therefore, this study was conducted to assess the educational needs of farmers regarding saffron cultivation and production in Barnabad village, Ghoryan district. The results showed that farmers face a wide range of educational needs, attention to which can play a crucial role in improving productivity, reducing losses, and increasing profitability. The findings indicate that the greatest educational needs of farmers are in identifying plant diseases, managing pests, and effective control methods—areas where insufficient knowledge can significantly reduce crop yield and quality. Additionally, educational needs related to the proper use of machinery and equipment during the saffron harvesting process are among farmers' top priorities, as improper use of tools directly affects the final quality of saffron stigmas and the amount of marketable product. The results further showed that marketing strategies, sales methods, and access to markets are among the areas where farmers require more training—domains that strengthen saffron's position in domestic and regional markets and increase producers' income. In other areas, farmers generally possess sufficient mastery, as many of these activities are common across other crops, and farmers already have adequate knowledge and experience in performing them.

RECOMMENDATIONS

(1) Conduct appropriate training and extension classes related to the cultivation and production of agricultural crops, especially saffron.

(2) Identify the educational needs and production challenges of agricultural producers.

(3) To address the educational needs of saffron farmers and provide correct technical methods, organize training courses and workshops using skilled extension agents and experts.

(4) Provide the latest cultivation methods for saffron, freeze-drying techniques, greenhouse cultivation, hydroponic cultivation, etc.

(5) Since the management of saffron plant diseases and pests was the highest educational priority, it is recommended that the Directorate of Agriculture, Irrigation, and Livestock place these two topics at the top of its educational and extension planning.

(6) Introduce various marketing strategies to saffron farmers.

(7) Mechanize saffron processing through the use of advanced agricultural machinery that can properly clean saffron and prevent time losses.

CONFLICT OF INTEREST

All authors express no conflict of interest in any part of the research.

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