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Factors affecting organic farming in Jiroft county: Multinomial logit model

Shoja Khajeh[1], Bahareh Parsa Motlagh[2*], Somayeh Naghavi[3], Omid Sharifi[4]

[1] MS of Agroecology, Department of Agronomy and Plant Breeding, Faculty of Agriculture, University of Jiroft, Jiroft, Iran
[2] Assistant Professor, Department of Agronomy and Plant Breeding, Faculty of Agriculture, University of Jiroft, Jiroft, Iran
[3] Associate Professor, Department of Agricultural Economic, Faculty of Agriculture, University of Jiroft, Jiroft, Iran
[4] Assistant Professor, Department of Agricultural Extension and Education, Faculty of Agriculture, University of Jiroft, Jiroft, Iran

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Corresponding author:
bparsam@ujiroft.ac.ir

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Abstract

This study aims to identify the economic, social, and environmental factors affecting organic farming from the perspective of experts and 150 farmers in Jiroft County. The results revealed that low government financial support for organic farmers (average rating of 3.81) is the most influential factor, in contrast, lack of adequate marketability (average rating of 2.67) is the least effective factor among the barriers to achieve organic agriculture. According to experts, organic farming serves as a tool for improving public health conditions (average rank of 11.66), and was determined as the most influential factor. However, this factor does not significantly contribute to self-sufficiency in agricultural production, with an average rank of 6.07, being the least influential factor among the factors affecting organic farming. Among the average ranks of the components of influential factors in organic farming (educational, economic, social-managerial indicators), the lowest ranking was seen for the government's financial support for organic farmers (average rank of 3.13), making it the most influential. Furthermore, the results showed that holding promotional and educational classes has a positive and significant impact on the acceptance of organic cultivation, as following the recommendations of promoters and having the necessary education can increase production and reduce costs.

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Introduction

Agriculture is the primary source of nourishment for the world's population, and it is a crucial aspect of human development (Moald, 2019). The development and expansion of sciences and technologies such as genetic engineering and biotechnology, the cultivation of high-yield varieties, and the excessive use of chemical fertilizers and pesticides have led to quantitative increases in agricultural production and the alleviation of food supply problems. However, this increase in production has consistently been accompanied by various environmental issues, including water and soil pollution, the spread of pests and emerging plant diseases, as well as various diseases among human communities due to the decreased quality of food (Papzan and Shiri, 2012).

Apart from the lack of nutrients and the inability of a part of the population to meet the minimum caloric requirements with their conventional diet, it can be clearly stated, based on the experience of the last decades, that people's health is seriously endangered when their daily diet is contaminated with chemical residues in soil and water, excess chemicals in food, residues of plant and animal poisons, herbicides, antibiotics, and plant and animal hormones in agricultural products. Therefore, due to the presence of chemical residues in agricultural products and the subsequent widespread health hazards for consumers, the production of healthy agricultural products (organic) has been discussed (Roodbari et al., 2017).

The term "organic" has various meanings, and one of them can be related to the concept of "organism" or a living entity. In the context of organic agriculture, a farm is considered as a living entity. This type of farming is regulated and based on specific ecological criteria (Khosh-Khui, 2016). The modern agricultural model emphasizes sustainable development by optimizing organic resources that are locally and nationally available. Organic farming is one form of sustainable agriculture (Chaminda and Herath, 2013).

Organic farming and its management rely heavily on knowledge and awareness, making education and access to it very important (Vaarst, 2010). However, despite its numerous advantages, research results indicate that the development of organic agriculture worldwide faces challenges and difficulties.Organic production is viewed as an approach that promotes sustainable development and food security (Adamtey et al., 2016; Seufert and Ramankutty, 2017; Reganold and Wachter, 2016; Gomiero et al., 2011; He et al., 2016). In other words, the increase in organic agriculture is recognized as a means to reduce greenhouse gases (Squalli and Adamkiewicz, 2018). This farming approach plays a significant role in reducing exposure to pesticides (Mohring et al., 2020; Muller et al., 2017), supporting beneficial insects (Adhikari and Medalled, 2020), and reducing soil erosion (Seitz et al., 2019).

The Food and Agriculture Organization has declared that agriculture has the potential to reduce or eliminate greenhouse gases by 80 to 88% (Ghorbannezhad et al., 2019). Reports indicate that the consumption of organic products, which are considered tastier, healthier, and more environmentally friendly compared to conventional products, has significantly increased in the past two decades, particularly in the last year (Oroian et al., 2017; Lotter, 2003).

According to the latest global statistics, the total area under organic crop cultivation in the world is approximately 69,845,243 ha, accounting for 1.4% of the world's total land area, with around 2,858,358 people actively engaged in this field. Asia, with an area of 6,116,834 ha, accounts for approximately 9% of the world's organic area. Australia, Argentina, China, Spain, and the United States have the highest areas under organic crop cultivation in the world, respectively. Despite the numerous benefits of organic agriculture, in African countries, only 0.2%, in Asian countries 4.0%, in Europe 2.9 %, in Latin American countries 1.1%, in North America 0.8%, and in Oceania 8.5% of their total land areas are allocated to organic farming (Willer & Lernoud, 2019). Organic farming is gradually increasing in Iran but at a slower pace. According to the latest global statistics, the total area of agricultural land under organic cultivation in Iran is 11,916 ha, accounting for approximately 0.03% of the country's total land area, with about 3879 people engaged in this field (Willer & Lernoud, 2019). Various studies have been conducted to investigate the factors influencing the adoption of organic farming.

Anderson et al. (2005) utilized the Logit model to investigate the factors influencing the adoption of organic farming in California. Similarly, Singh et al. (2015) studied 285 farmer households in Nepal to examine the factors affecting organic farming. Furthermore, Kujala et al. (2022) analyzed the impact of various factors on the regional distribution of organic agriculture. Tuomisto et al. (2012) and Mondelaers et al. (2009) also explored how while organic farming has fewer environmental effects per unit area, the results can vary when examining the effects on each unit of production. In another study, Orsini et al. (2020) examined the factors influencing the use of organic seeds in 20 European countries. Koesling et al. (2008) analyzed the factors affecting organic farming in Norway. Safi-Sis et al. (2021) focused on analyzing the factors influencing the behavioral intention towards the technology of organic products from the perspective of agricultural experts in East Azerbaijan Province.

Similarly, Olutokunbo and Bikunle (2011) highlighted that organic farming emphasizes the use of renewable natural resources and their recycling. Their study showed that the knowledge of Nigerian farmers about organic farming is high, and their perception of it is favorable. Moreovere, Azam and Shaheen (2019), and Cukur et al. (2019) investigated the influential factors on the adoption of organic farming in India and Turkey.

Iran possesses significant potential for organic farming. Considering the dry environmental conditions and the availability of a plentiful labor force, the production of organic products appears to be more economically viable and straightforward in Iran compared to other regions worldwide (Papzan and Shiri, 2012).Chand et al. (2022) examined the factors influencing the acceptance of organic farming in Nepal.

Iran can also produce by taking advantage of a targeted program and according to the existing potentials increase organic farming and have a major contribution in the production and supply of these types of products in the world. Considering the increasing demand for the production of organic products, awareness about the production of these products among experts, promoters, farmers and consumers is considered essential. On the other hand, limited studies have been conducted in this field, and considering that organic agriculture standards are regional, they cannot be generalized to all parts of the world, so the necessity and importance of regional researches is obvious. So far, no research has been done regarding the attitude of experts and farmers of Jiroft city in the production of organic products.

Materials and Methods

Study Area

This study was conducted in Jiroft County, located in the southern province of Kerman, Iran. Jiroft County lies at an altitude of 720 m above sea level and is characterized by a vast, wide valley surrounded by mountains. Due to its southern latitudes and moderate elevation, Jiroft experiences hot and relatively humid summers, as well as mild and short winters. In 2022, the total production of agricultural products in the southern province of Kerman was 2,609,512 tons, cultivated on 146,978 hectares.

Sampling method

A two-stage sampling method was employed to select farmers. Jiroft County was divided into various regions, with each region comprising multiple villages. Subsequently, using random sampling, the number of farmers was selected.

Data collection

This research, in terms of its objective and the method of data collection, is classified as field research with practical purposes. The required sample size was determined to be 150 agricultural households using the Cochran formula.

The data for this study were collected through questionnaires distributed to both farmers and experts from the Agricultural Jihad Organization. The experts' questionnaire consisted of four sections: 1) Experts' attitudes toward organic farming, 2) Effective educational factors in organic farming, 3) Economic factors influencing organic farming, and 4) Management factors and policies affecting organic farming. The farmers' questionnaire covered various aspects, including questions related to crop cultivation, and obstacles farmers face when transitioning to organic farming.

To prioritize various factors, the questionnaire used for experts and a portion of the questionnaire for farmers was the Friedman test. The analyses were conducted using SPSS16 software. The Friedman test can be calculated using Equation (1).

$$X_r^2 = \frac{12}{NK(K+1)} \sum R_i^2 - 3N(K+1)$$

Where N represents the number of rows, K is the number of columns, and R_i^2 is the square of the ranks for each group. The Friedman test is utilized for two-way analysis of variance (for non-parametric data) using a ranking method. It is also employed for comparing the mean rankings among different groups. The Friedman test is a non-parametric test, the equivalent of repeated measures analysis of variance (ANOVA) for within-group measurements. It is used to compare the mean ranks among k variables (groups).

The logistic models adopted in behavioral studies based on the Maximum Likelihood Theory, as proposed by Ben-Akiva and Lerman (1985), are categorized into two main classes: binary and multinomial logistic models (Esayas & Gecho, 2017; Gyau et al., 2016; Karlı et al., 2006; Zeweld et al., 2013; Zheng et al., 2012).

In this research, the dependent variable under consideration is characterized as a qualitative and virtual variable, which serves as an indicator of the agricultural inclination of farmers within the municipality of Jiroft towards cultivating organic crops.

The multinomial logit model is an extended version of logistic regression, designed to handle more than two response options. The model simultaneously calculates binary logit values for all possible pairwise comparisons, essentially creating a network of binary logit models that account for more influential data and logical relationships among parameters.

McFadden, (1974) demonstrated that the utility-based choice model, as proposed by Luce (1995), can be applied to both multinomial logit and conditional logit models. This choice model is based on the idea that individuals, in this context, farmers, will opt for the alternative that maximizes their desirability. When there are "j" choices available, the probability of selecting "m" can be expressed as:

$$P_i = (Y_i = m) = P(U_m > U_j) \ \forall \ J \neq m \qquad (1)$$

To calculate a multinomial logit model, the average desirability is determined as a linear combination of independent variables that influence farmers' attitudes toward cultivating organic crops.

$$\mu_{im} = x_i \beta_m \qquad (2)$$

In that case, the utility function for the ith farmer regarding the mth state of attitude is as follows (Noz et al., 2004).

$$U_{im} = u_{im+}\varepsilon_{im} = x_i\beta_m + \varepsilon_{im} \qquad (3)$$

In such a scenario, the probability of choosing the mt^{h} state of attitude will be as follows:

$$P(Y_i = m) = p(u_{im} > u_{ik}x.\forall\ k \neq m) = p(\varepsilon_{ik} - \varepsilon_{im} \leq x_\iota\acute{\beta}_m - x_\iota\beta_k\, x.\acute{\forall}\ k \neq m) \qquad (4)$$

Equation (4) is referred to as the utility function of the multinomial model. In this equation, $U_{im} = x_i\beta_m$, represents the specific utility of farmer i's choice of acceptance state m, given their characteristics denoted as x which is a part of ε_{im} constitutes the random component of a farmer's utility, signifying unaccounted-for attributes in the specified utility of the farmer. It is assumed to be independent for each specific farmer. X_i is a K×1 vector of explanatory variables, and β_m is a vector of coefficients. If $P_{im} = P(Y_i = m)$ represents the probability of farmer i selecting acceptance state m, the multinomial model can ultimately be expressed in probabilistic terms as follows (Ayuya et al., 2012):

$$p_{im} = \frac{e^{x_i\beta_m}}{\sum_{m=1}^{j} e^{x_i\beta_m}} = \frac{e^{x_i\beta_m}}{1+\sum_{m=2}^{j} e^{x_i\beta_m}} \qquad (5)$$

$$P(Y_i = 1) = \frac{1}{1+\sum_{m=2}^{j} e^{x_i\beta_m}} \qquad (6)$$

Following the estimation of the model, the Relative Risk Ratio (RRR) is calculated to determine the extent of each explanatory variable's influence on different levels of attitudes during the period. This metric is computed by exponentiating the model coefficients based on the number 'e' (e^{coef}). It indicates how the probability of selecting the compared group relative to the base group changes as a result of changes in the explanatory variable (Ferdousi et al., 2013).

$P_i = (Y_i = j) = P_{ij} \rightarrow \exp(x_{ij}\beta_j) \rightarrow RiskRatio$ (7)

$$\frac{\acute{P}_{ij}}{\acute{P}_{io}} = \exp(x_{ij} + 1)\beta_j) \quad (8)$$

$$\exp(\beta_j) = \frac{\frac{\acute{P}_{ij}}{\acute{P}_{io}}}{\frac{P_{ij}}{P_{io}}} \rightarrow RRR \quad (9)$$

If the RRR associated with an explanatory variable is greater than one, it signifies that if the explanatory variable increases by one unit, the probability of choosing the compared group relative to the base group will increase by the magnitude of the RRR coefficient. Conversely, if 1 < RRR, it indicates that the farmer is inclined to choose the base group (Long, 1997).

To assess goodness of fit in multinomial logit models, one cannot rely on the R-squared (R^2) as in linear models. It is more appropriate to use a goodness-of-fit measure based on likelihood ratio tests, which is as follows (Maddala, 1983):

$$R^2 = 1 - \left(\frac{L_W}{L_\Omega}\right)^{2/n} \quad (7)$$

An appropriate measure for model fit in this context is the Pseudo-R^2, which is presented as follows (Maddala, 1983):

$$R^2{}_{pseudo} = \frac{1-\left(\frac{L_W}{L_\Omega}\right)^{2/n}}{1-\left(\frac{L_W}{L_{\max}}\right)^{2/n}} = \frac{L_\Omega^{2/n}-L_W^{2/n}}{1-L_W^{2/n}} \quad (8)$$

The estimated parameters of the multinomial logit model, much like in regular logistic regression, cannot be directly interpreted for their corresponding explanatory variables in terms of the probability of selecting a particular outcome category "j". In other words, the parameters in the multinomial logit model are not always easily interpretable directly. To address this, the use of marginal effects of explanatory variables is employed. Marginal effects are the changes in the outcome due to changes in the explanatory variable values. To compute marginal effects for discrete or binary explanatory variables, the change from 0 to 1 in the binary variable is measured, and its mathematical representation is provided in equation (10). Essentially, the marginal effect is the slope of the probability curve associated with the probability function when all other variables are held constant (Ferdousi et al., 2013).

$$\frac{\delta P_r(Y_i = m|x)}{\delta x_k} = \Pr((Y_i = m|x)(\beta_{km} - \sum_{j=1}^{J}\beta_{kj}\Pr(Y_i = j|x)) \quad (9)$$

$$\frac{\delta P_r(Y_i = m|x)}{\delta x_k} = \Pr(Y_i = m|x.x_k = x_E) - \Pr(Y_i = m|x.x_k = x_s) \quad (10)$$

The elasticity of explanatory variables signifies the percentage change in the probability of choosing acceptance state p_{ij} for a one percent change in the specific explanatory variable of interest. It is calculated as follows (Ferdousi et al., 2013):

$$\varepsilon_{ij} = \frac{\delta P_{ij}}{\delta x_i}\frac{x_i}{P_{ij}} = x_i(\beta_j - \sum_{j=2}^{m} P_{ij}\,\beta_j) \quad (11)$$

Results and discussion

In this study, the barriers to the production of organic produce from the perspective of farmers were examined using the Friedman test. To assess the extent and intensity of these barriers from the viewpoint of farmers in the study area, 25 questions were utilized. The importance of each of these barriers was assessed using a 5-level Likert scale.

The results of prioritizing the obstacles to achieve organic farming from the farmers' perspective are shown in Table 1. Accordingly, the low level of financial support from the government for organic farmers is the most significant obstacle with an average rank of 3.81. While the lack of suitable market demand is the most influential factor with an average rank of 2.67, making it the least effective factor among the barriers to achieve organic farming according to farmers. Given the statistical significance of the Friedman test, the prioritization of obstacles to achieve organic farming from the perspective of farmers in the study area does not have uniform ranks and significance.

Table 1. Obstacles to achieve organic farming from the perspective of farmers

	Questions	Mean	Max	Min	Average ranks
1	High cost of producing organic products	3.4067	5.00	1.00	14.27
2	Lack of sufficient knowledge in organic product production among farmers	3.3933	5.00	1.00	14.24
3	Lack of specific markets for selling organic products in the province	3.3867	5.00	1.00	13.66
4	Lack of effective information on the production and consumption of organic products	3.1867	5.00	1.00	12.37
5	Inability to produce organic products by farmers due to a lack of necessary knowledge and skills	3.2800	5.00	1.00	13.17
6	The indifference of experts toward the production method of organic products	2.8400	5.00	1.00	10.36
7	Difficulty distinguishing between organic and non-organic products	3.1400	5.00	1.00	12.20
8	Lack of clear policy at high organizational levels for production planning	3.5733	5.00	1.00	15.43
9	Failure to examine the obstacles to the production of organic products by experts and researchers	3.0800	5.00	1.00	11.97
10	Low awareness and familiarity of consumers about organic products	3.1867	5.00	1.00	12.92
11	The lack of knowledge of agricultural experts in the field of organic products	2.7867	5.00	1.00	9.79
12	Lack of effective communication between experts and villagers in introducing organic agriculture	2.8800	5.00	1.00	10.41
13	Lack of knowledge and certification centers for organic products in the province	3.2667	5.00	1.00	12.97
14	Low government financial support for organic farmers	3.8133	5.00	1.00	16.78
15	The unwillingness of production organizations such as unions to produce organic products	3.3200	5.00	1.00	13.59
16	Lack of guaranteed purchase of products by the government at the provincial level	3.4067	5.00	1.00	14.14
17	Lack of suitable packaging for organic products	3.2867	5.00	1.00	13.50
18	The low performance of organic agriculture in the production of products	3.2400	5.00	1.00	13.05
19	Failure to produce organic products in industrial or modified varieties due to their sensitivity to diseases and pests	3.1800	5.00	1.00	12.69
20	Insufficient attention of research centers to research related to organic agriculture	3.6133	5.00	1.00	15.65
21	Inability to produce organic products by farmers due to lack of government support	3.5000	5.00	1.00	14.85
22	Farmers' resistance to accepting the production of organic products	3.3667	5.00	1.00	14
23	The existence of numerous and strict laws and supervisors in the process of acquiring the brand of organic products	3.4933	5.00	1.00	14.84
24	The high rate of pests and diseases due to the non-use of poisons and chemical drugs in organic farming	2.6733	5.00	1.00	9.08
25	Lack of proper marketing	2.6733	5.00	1.00	9.08

$\chi^2 = 324.542 \quad sig = 0.000 \quad df = 24$

In the examination of the barriers and challenges in the development of organic agriculture, our findings have indicated that from the perspective of the studied farmers, obstacles, and issues such as infrastructural matters, economic concerns, farmers' knowledge and awareness deficiencies, technical and managerial challenges, supportive factors, and motivational and attitudinal impediments can be the main challenges of organic agriculture development (Papzan and Shiri, 2012).

The research findings have demonstrated that, according to producers of organic produce in the study, there are barriers such as financial, legal and administrative, infrastructural and supportive, educational, attitudinal and cultural, personal, market-related, and workplace environment, and problems related to production. Recommendations have been proposed regarding the importance of initiating and preserving organic agriculture (Dehnamaki et al., 2018). The results showed that high production costs of organic products, insufficient knowledge about organic product production among farmers, a lack of specific markets for the sale of organic products in the study region, ineffective information and advertising in the realm of organic product production, and consumption, and the inability of farmers to produce organic products due to a lack of necessary knowledge and skills are impediments to the development of organic agriculture. Moreover, age, education level, reduced chemical fertilizer usage, reduced pesticide usage, the impact of educational-promotional classes, the perception of healthier products, and subsidies for inputs and tools significantly affect organic cultivation development (Keshavarz and Mousavi, 2018). Another study focusing on influential factors in organic product production showed that consumer consumption levels, household economic status, consumer income, household population, and product nutritional value play a significant role (Aslam et al., 2020).

In research investigating the factors affecting organic production in the United States, the results indicated a positive relationship between the USDA budget and organic agriculture development. Therefore, through research support and the creation of economic infrastructure for production, substantial promotion of organic product production and supply can be significantly facilitated and supported (Hou et al., 2022).

Considering that consumers prefer to obtain organic products directly from producers, attention to the obstacles faced by farmers in production is essential. Subsequently, the attitudes of experts toward organic agriculture were examined using the Friedman test. As the results demonstrate, considering the statistical significance of the Friedman test, from the perspective of agricultural experts, organic agriculture is perceived as a tool for improving public health conditions (average rank of 11.66) and is regarded as the most influential factor. However, it is noteworthy that organic agriculture does not necessarily lead to self-sufficiency in agricultural product production (average rank of 6.07), making it the least influential factor.

Table 2. Descriptive statistics of experts' attitudes toward organic farming

Questions	Mean	Max	Min	Average ranks
1. Organic farming is a tool to improve the health conditions of society.	4.5	5	1	11.66
2. Organic farming reduces soil pollution.	4.24	5	1	9.99
3. Organic products are more compatible with consumer health.	4.46	5	3	11.09
4. Organic products have more nutritional value compared to conventional products.	4.16	5	2	9.57
5. Organic farming preserves nutrients and soil microorganisms.	4.19	5	3	9.39
6. In the long term, organic farming helps maintain and increase soil fertility.	4.19	5	1	6.57
7. Compared to organic farming, conventional agriculture does not reduce soil microbial activities.	3.49	5	1	9.04
8. Organic farming makes it possible to protect the bank of various types of agriculture.	4.06	5	2	8.72

9. Soil erosion is better controlled in organic farming than in conventional farming.	3.96	5	1	8.11
10. The quality of organic food products is more uniform	3.88	5	2	6.36
11. Organic farming provides new opportunities for employment.	3.52	5	2	6.52
12. Organic farming does not lead to self-reliance in the production of agricultural products.	3.32	5	1	6.07
13. Organic farming is a tool for farmers to generate more income.	3.60	5	2	6.92
14. The production and supply of organic products is not so widespread.	3.78	5	2	7.72
15. Due to the high price of organic products, not everyone can afford these products.	3.83	5	1	8.09
16. The expansion of organic agriculture reduces the migration of villagers.	3.64	5	2	6.92

$\chi^2 = 149.89 \quad sig = 0.000 \quad df = 15$

The prioritization results of the effective educational factors in organic agriculture are presented in Table 3. The results indicated that conducting training courses for farmers (with an average rank of 4.60) is the most effective component among the educational factors. In contrast, this analysis identifies the least effective component within the dissemination of necessary books and articles area with an average rank of 3.85.

Table 3. The average rank of the effective factors in organic farming

Questions	Mean	Max	Min	Average ranks
Agricultural organizations (Jihad Keshavarzi's) support different methods of training farmers in the region	4.47	6	2	4.75
Holding training courses for farmers	4.60	6	2	5.20
Training through experts and professional consultants	4.46	6	2	4.65
Organizing an educational visit for farmers	4.49	6	2	4.93
Establishing a scientific association by the government	4.13	6	1	3.82
Holding a training course for experts	4.40	6	1	4.78
Introducing organic farming through the media	4.39	6	1	4.75
Publication of required books and articles	3.85	6	1	3.11

$\chi^2 = 51.04 \quad sig = 0.000 \quad df = 7$

Education is the principal driver of agricultural development, and nurturing a specialized and knowledgeable human workforce is the most crucial factor for the advancement of organic agriculture (Counntly, 2004). This human workforce encompasses policymakers, managers, researchers, promoters, farmers, and consumers (Rusly et al., 2011).

To examine the identification of influential factors on the educational requirements for the development of organic agriculture from the perspective of agricultural experts in East Azerbaijan, the results revealed that conducting training courses in the organic product production, marketing, and agricultural entrepreneurship areas centered around organic agriculture was recommended (Safi-Sis and Rezvanfar, 2020).

A lack of sufficient knowledge and information about organic agriculture leads to a decrease in trust in certifications, control, and labeling of products, thereby significantly affecting consumer behavioral intentions (Nuttavuthisit & Thøgersen, 2017). In Table 4, the results of prioritizing economic factors has been presented.

Table 4. Prioritization of economic factors

Questions	Mean	Max	Min	Average ranks
Approved price of organic products	3.52	5	1	2.60
Providing appropriate subsidies for the provision of inputs and tools	3.50	5	1	2.57
Providing suitable financial incentives for farmers	3.26	5	1	2.28
Providing credits and financial budgets	3.44	5	1	2.56
$\chi^2 = 3.86$ $sig = 0.277$ $df = 3$				

Friedman's statistic is not significant, so there is no preference between the questions. In Table 5, the results of prioritizing management factors has been presented. In general, based on the average ranks, adopting proper and suitable management on farms (average rank of 3.60) is the most effective factor while eliminating subsidies for chemical inputs (average rank of 3.14) is the least effective component among the management factors. Accordingly, it can be concluded that at a 99% confidence level, factors related to the indicators of management and effective policies in organic agriculture do not have uniform rankings.

Table 5. Prioritization of management factors and effective policies in organic agriculture

Questions	Mean	Max	Min	Average ranks
Having proper and appropriate management in farms	3.60	5	1	3.90
Creating special standards for product marketing	3.46	5	1	3.53
Approval of laws related to organic farming program	3.44	5	1	3.45
Having correct and appropriate management in organizations	3.52	5	1	3.77
Removal of subsidies for the preparation of chemical inputs	3.14	5	1	3.02
Providing opportunities for cooperation with related organizations	3.37	5	1	3.22
$\chi^2 = 14.32$ $sig = 0.014$ $df = 5$				

In Table 6, we present the overall ranking of all three factors.

Table 6. Ranking of all 3 educational, economic, and managerial & policy-making factors

Questions	Mean	Max	Min	Average ranks
Effective educational factors in organic farming	34.81	48	13	2.93
Effective economic factors in organic farming	17.08	25	5	1.07
Management factors and effective policies in organic farming	20.55	30	11	2
$\chi^2 = 106.62$ $sig = 0.000$ $df = 2$				

As seen in Table 6, based on the average ranks, the components of educational, economic, and management and policy factors can all play a significant role in organic agriculture product production. The effective educational factors in organic agriculture have an average rank of 2.93, the economic factors have an average rank of 1.07, and the management and policy factors have an average rank of 2.00. The collected data were analyzed using the multinomial logit regression model in Stata 12 and its results are shown in Table 7. In our study, three distinct categories of farmers were considered: 1) Farmers who are not inclined to accept organic farming. 2) Farmers who are inclined to accept organic farming. 3) Farmers who are indifferent or neutral about the acceptance or non-acceptance of organic farming.

Table 7. Defintion of variables

Definition	Variable
1= They do not tend to accept organic farming. 2= They tend to accept organic farming (basic group). 3= They are indifferent to accepting or not accepting organic agriculture.	Dependent variable: Y
	Independent variable:
1=20-30, 2=31-40, 3= 41-50, 4= 51-60, 5= ≥60	Age
Continuous variable	Agricultural history
Continuous variable	Cultivation area
Very low=1, low= low, 3= medium, 4= high, 5= very high	The effect of participating in promotional and educational courses
Very low=1, low= low, 3= medium, 4= high, 5= very high	Providing subsidies for inputs and tools
Very low=1, low= low, 3= medium, 4= high, 5= very high	Information about organic farming
Continuous variable	Use of chemical fertilizers
Continuous variable	Use of chemical poisons

The model derived for the present research is as follows:

$$Y_i = \beta_0 + \beta_1 \text{Age} + \beta_2 \text{Farming experience} + \beta_3 \text{Land area} + \beta_4 \text{Participation in extension} + \beta_5 \text{Subsidy} + \beta_6 \text{Information} + \beta_7 \text{Fertilizer} + \beta_8 \text{Pesicides} + \varepsilon$$

Table 8 presents the results of estimating the multinomial logit regression model. The estimated coefficients merely depict the relationship between the dependent variable and the explanatory variables. However, better guidance for determining the extent of the independent variable's impact on the dependent variable is the marginal effect of the variable. In other words, the marginal effect indicates the probability of a farmer's acceptance or indifference to organic farming compared to the reference or baseline group. Since no specific criterion is used for selecting the baseline group, in this study, the second group was chosen as the baseline group.

As observed, the LR statistic is statistically significant at the 5% significance level, indicating the overall significance of the regression. The obtained R-squared values do not have a direct interpretation like traditional R-squared values. It can be stated that the multinomial logit model provides a good fit, and the explanatory variables used in the model explain a relatively high amount of variation in the farmers' propensity towards accepting organic farming.

The findings indicate that in the first group, variables such as age, experience, and having information about organic farming do not affect significantly the willingness to accept organic farming. In the first group, as the level of cultivation area increases, the probability of a farmer being in the first group as opposed to the baseline group decreases. In other words, increasing the cultivation area does not encourage farmers to accept organic farming. This could be due to the increased labor demand and higher expenses associated with larger cultivation areas. Khaledi et al. (2011) also concluded that an increased cultivation area does not lead to a willingness to accept organic farming. In the first group, the more a farmer participates in promotional and educational classes, the higher the probability that they will belong to the second group. In other words, the positive impact of promotional and educational classes on a farmer's motivation to accept organic farming is evident. Therefore, it can be noted that holding such classes in the study area can significantly impact consumer health in terms of producing and consuming healthy products.

The impact of variables related to the use of chemical fertilizers and pesticides on the willingness to accept organic farming is negative and significant among the first group. To clarify, as farmers in this group increase their use of chemical fertilizers and pesticides, the probability of them being in the first group as opposed to the baseline group decreases. This suggests that farmers in this group are more knowledgeable about the best practices for pest and weed control. Furthermore, they prefer using fewer chemical fertilizers and pesticides, but due to a lack of alternative income sources and risk aversion, they tend to use more chemical fertilizers and pesticides.

From the standpoint of farmers, the influence of the subsidy allocation for agricultural inputs has a noteworthy and favorable effect on their willingness to accept organic farming. To put it differently, when the government allocates higher subsidies to farmers for securing agricultural inputs such as fertilizers and pesticides, it enhances the probability of farmers falling into the first group rather than the baseline group. This heightened subsidy notably promotes the excessive and inefficient utilization of chemical fertilizers and pesticides among agricultural farmers.

The findings indicate that in the third group, variables such as age, the provision of subsidies for inputs and tools, and the use of chemical fertilizers do not have a significant effect on the willingness to accept organic farming.

Furthermore, in the same group, as a farmer's agricultural experience increases, the probability of them being in the third group as opposed to the baseline group decreases. In other words, increasing the agricultural experience of farmers encourages them to accept organic farming.

Similarly, in the third group, as the cultivation area increases, the probability of a farmer being in the third group as opposed to the baseline group increases. In other words, increasing the cultivation area does not motivate farmers in this group to accept organic farming.

In the same group, the positive impact of promotional classes on a farmer's motivation to accept organic farming is evident in this group. Moreover, as farmers possess a higher level of knowledge about organic farming, their likelihood of belonging to the third group, in contrast to the baseline group, decreases. Indeed, the influence of increased knowledge about organic farming is perceived positively by farmers in terms of their inclination toward adopting organic agriculture.

Likewise, the impact of the variable "chemical pesticide usage" on the inclination to adopt organic farming practices among farmers in this group is both positive and statistically significant. In simpler terms, as farmers increase their use of chemical pesticides, the probability of them being in the third group, rather than the baseline group, increases. This implies that farmers in this group are more knowledgeable about employing the most effective methods for pest and weed control, favoring the use of herbicides and chemical pesticides.

The studies conducted by Mojaradi et al. (2014) and Rajabi et al. (2013) have both reported four influential factors, including education, information dissemination, supportive and monitoring services, and economic aspects, regarding the acceptance of organic products. Furthermore, an examination of the challenges in organic agriculture from the perspective of experts at the Jihad Agriculture Organization in West Azerbaijan province has ranked obstacles to organic product production. These obstacles include the lack of proper marketing for organic products, uncertainty about the yield of organic products, the need for enhanced management and maintenance in comparison to conventional agriculture, the concentration of certification companies and consultancies in major cities, and the inaccessibility of these entities in rural areas (Mirloo et al., 2021).

Conclusion

Beyond its profitability, organic agriculture provides benefits that justify government support and can enhance its economic viability. Its positive environmental impact and potential to improve the living conditions of rural communities and society at large make organic agriculture a worthwhile investment. Considering the importance of the role of farmers in moving towards sustainable agriculture and especially organic agriculture and helping to preserve the environment and produce healthy food to preserve human health, in this study, has been investigate the economic and social factors on the development of organic crops in Jiroft city.

The results indicated that the provision of promotional and educational classes positively and significantly affects the acceptance of organic cultivation practices. By increasing adherence to recommended practices and providing essential training, it is possible to boost farmers' knowledge and reduce associated costs. Following the increase in awareness, farmers will be more willing to adopt organic farming practices.

The absence of government support and the lack of sufficient technology for organic cultivation were identified as major challenges facing farmers in this region. Additionally, consumer unawareness regarding the quality and availability of organic products, higher pricing of these products, and the absence of market infrastructures were among the other factors reducing farmers' motivation to engage in organic cultivation in the study area. Consequently, the government must enhance consumer awareness and support producers to promote organic agriculture effectively. The research results are notably significant for agricultural producers, as they highlight the importance of governments creating appropriate infrastructure, marketing, and rural development. The expansion of organic agriculture can be a good opportunity to achieve sustainable agricultural development, because it seeks to maintain ecological balance along with the prosperity of agricultural economy, which is also the goal of sustainable agricultural development.

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