Factors Influencing the Attitudes of Rice Farmers in Langrod County towards Organic Agriculture

Fatemeh Askari Bozayeh[1a], Shahab Nobakht Haghighi[1b], Hanif Amrulloh[2c], Hamed Kioumarsi[3d*], Seyed Mohammadreza Mahdavian[1e]

[1] Researcher Economic, Social and Extension Research Department, Gilan Agricultural and Natural Resources Research and Education Center, Agricultural Research, Education and Extension Organization (AREEO), Rasht, Iran.

[2] Department of Islamic Primary Teacher Education, Universitas Ma'arif Lampung, Metro, Indonesia.

[3] Department of Animal Science Research, Gilan Agricultural and Natural Resources Research and Education Center, Rasht, Iran

Email: [a] askari.fbz@gmail.com, [b] sh.nobakht@areeo.ac.ir, [c] amrulloh.h@umala.ac.id, [d*] h_kioumarsi@yahoo.com, [e] sm.mahdavian@yahoo.com

Abstract

This research seeks to answer these questions, what are the attitudes of rice farmers in the field of organic farming and what factors influence their attitudes. The statistical population consisted of 500 rice farmers from three mainly rice-growing villages of Langrod county, Gilan province, and the sample size was 211. To select this sample size, simple random sampling was used. The data was collected through a questionnaire. Its face validity was based on a survey of expert opinions. To determine the reliability of the measurement tool, face-to-face interviews were conducted with a sample of 30 people outside of the main sample, and the calculated Cronbach's alpha coefficients confirmed the research tool. Descriptive statistics, correlation tests, and factor analysis were used in SPSS 22 software to analyze the data. Deviation distance from the mean method was used to group the attitudes of rice farmers. The results showed that 18% of the respondents have a negative attitude towards organic agriculture, about 70% have a somewhat positive attitude, and about 12% have a completely positive attitude, and the attitude of the surveyed farmers is influenced by the factors of caring for nature and preserving the soil fertility, the quality and quantity of agricultural products, the value and importance of rural landscapes, traditionalism, the desire to preserve past customs and traditions, and the impact of personal experiences which account for 19.60, 11.44, 9.25, 9.06 and 8.98 percent of the explained variance, respectively.

Keywords*: *Attitude; Gilan; Langrod; Organic agriculture, rice farmers.*

Introduction

As a product of industrialization, modern agriculture has been influenced by the idea that yield of agricultural products can always be improved with the help of technology. As a result, conventional agriculture has been associated with the pollution of waterways, reduction of biodiversity, emission of greenhouse gases, soil erosion, etc. These are issues that endanger not only the future of the only planet we know, but also the future of agriculture itself. Environmental issues, along with a growing number of resulting regulations, now challenge the

productive intensive agricultural model. Since agriculture ultimately relies on the proper functioning of the natural ecosystems in which it is embedded, the destruction of natural habitats disrupts the future of agriculture [1]. Only two decades after the introduction of technology, the inappropriate use of chemical inputs has faced the production process in agriculture with new problems and crises, the consequences of which have been much greater and more acute than the conditions of lack of access to technology [2]. So far, different strategies have been proposed to solve conventional agricultural problems, among which organic agriculture can be mentioned [3]. Today, organic agriculture is rapidly growing and expanding, and many countries, especially European countries, have included the development of organic agriculture (up to about 20% of agricultural products) in their implementation plans and in the not-so-distant future, the most important and main feature of presence in global markets will be the supply of products free of chemical and organic compounds. In this context, Iran has a high potential in the production of organic products and this potential should be used as a bonus in the production of organic products. In our country, due to the dry environmental conditions and the abundance of labor, the production of organic products seems to be more economical and easier than in other regions of the world [4]. However, organic agriculture has not grown enough.

High diversity of crops and livestock has created many capacities and capabilities for the establishment and expansion of organic agriculture in Iran [5]. Therefore, if we take advantage of the potential of organic cultivation and remove its obstacles and bottlenecks, we can expect progress in the development of this type of cultivation. Rice cultivation in Gilan province is one of the main sources of farmers' livelihood. In the agricultural year 1397-1396, the number of sales of fertilizers and chemical pesticides in Guilan province was 65059 and 69033 tons respectively [6], and the consumption of these inputs has become inevitable as an important component in maintaining and sustaining production in the process of rice cultivation. The agricultural system of the country in the cultivation of rice as a main food item due to the excessive consumption of pesticides requires re-engineering. Since the adoption of organic farming is the result of common experiences, goals, knowledge, decision-making and organization of human beings, the decision of farmers to adopt this type of agricultural system is influenced by various factors, one of which is attitude [7], This research has sought to answer these questions: what are the attitudes of rice farmers in the field of organic farming? And what factors have influenced their attitude and what is their contribution? Grossman defines attitude as the tendency to respond to a specific idea or situation, which is often used as a concept to lead and guide people. Most researchers believe that attitude is the main factor in changing behavior, and if people's attitudes change, their behavior will change as well [8]. A person's behavior is determined by two factors; one is an individual's nature and the other is a reflection of social pressure. An individual factor is a positive or negative evaluation of a behavior [9]. Attitude as a stable system of positive and negative evaluations, emotional feelings and positive and negative tendencies towards social goals, causes the formation of a more or less fixed tendency to react positively or negatively to certain categories of people or things.

The need to examine people's attitudes is because it helps managers and executives to learn about people's way of thinking about specific issues and, if necessary, design programs to change their attitudes. Therefore, in the design of new agricultural-environmental programs and to reduce the use of chemical inputs, experts should also pay attention to the investigation and study of farmers' attitudes along with other factors [7]. People make a rational or logical decision to do or not to do a behavior based on their knowledge, attitude, and goals. Gordon Allport defined it as "a mental and neural state of readiness" Gagne and Briggs described the attitude as " An internal state which affects an individual's choice of action toward some object, person, or event. In simple words, attitude is the degree of liking or disliking something [10]. The findings of Jamshidi and Haji Mirrahimi [11], stated that greenhouse farmers in Alborz

province have a positive attitude towards sustainable agriculture at the rate of 41%, and a significant difference was observed between the attitudes of people with education related to agriculture and those not related to it. Also, the variable of sustainable agricultural knowledge was more effective than other variables on the attitude of the studied people, and with one unit change in the standard deviation of the variable of agricultural knowledge, 51% of the change in the standard deviation of the dependent variable of attitude towards agriculture can be predicted. However, the findings of Mousavi et al [12], on the attitude of vegetable growers of Bavi Conty in Khuzestan province indicated that 41% of the farmers have a very negative attitude, which is related to the five factors of lack of support facilities, economic, institutional, weak knowledge and agricultural awareness and explains about 51% of the changes in the dependent variable. The results of the study by Monfared et al [13], showed that the variables of knowledge about the principles of organic agriculture, access to production factors, age, and level of education, attitude towards the reference group, attitude towards preserving the environment, attitude towards the negative consequences of conventional agriculture, the attitude towards human health and the general attitude towards organic agriculture are factors influencing the adoption of organic farming practices.

The study report of Sulaiman et al [14], in the field of sustainable agricultural knowledge of potato farmers indicates the average attitude of the respondents in this field, and there is a positive and significant relationship between age, experience in agriculture, membership in a cooperative, type of agricultural system, amount of agricultural land, cultivated area, amount of production, attitude and level of sustainability of the exploitation unit and knowledge of sustainable agriculture. In their research, Alibaygi et al [15], concluded that the amount of use of specialized publications and the amount of attention to the recommendations of extension staffs and experts had the highest relationship with the attitude of farmers towards new agricultural teachings; and the variables of attention to the recommendations of extension staffs and agricultural experts, the desire to continue the education of children, the amount of use of new technologies in agriculture, the amount of reading specialized agricultural publications, the amount of participation in educational extension programs, the amount of participation of family members in the decision making in family and agriculture and the age of farmers have been introduced as factors affecting the attitude of farmers towards modern agricultural teachings. The results of Abbasian et al [16], on the knowledge and attitude of farmers in Kohdasht county towards soil protection showed that the attitude of farmers towards soil protection is directly related to the level of farmer's knowledge about soil protection, their age, and their level of education.

The results of the study by Herath and Wijekoon showed that attitude played a significant role in the acceptance of organic coconut cultivation in Chile, and awareness of organic agriculture, environmental aspects, age, education and time spent on agriculture have significantly contributed to the formation of attitudes [9]. In 2009, Durpoix examined the attitudes and behaviors of farmers regarding natural environments and concluded that those with native forests responded differently to various attitudes towards native forests compared to those without. Farmers who lack native forest tend to adopt a more cognitive approach, distinguishing between the native forest areas within and outside their farms. In contrast, those with native forest exhibit a more holistic perspective on the environment. According to him, a direct connection with nature, family interactions, and both objective and subjective knowledge significantly influence farmers' environmental attitudes [1]. Emmanuel et al.'s study [17], indicates a direct positive correlation for factors such as the level of education, and at the same time, an inverse relationship with the amount of agricultural land and cultivated area compared to organic agriculture. The results of the study by Murugan et al [18], Hasan et al [19], showed that farmers still have a negative attitude towards organic agriculture and their attitude is not

very satisfactory and they need to receive correct information from developed communities in the field of pest management system. Agriculture is a multidisciplinary academic discipline focused on exploring the scientific, technical, and managerial dimensions of agriculture and related fields. To enter a new era, we must adopt innovative methods and strategies for achieving success and sustainability [20–23].

Baird [24], emphasize the study of socio-cultural aspects effective in the adoption of organic agriculture. The results of Kroma [25], indicate the impact of social learning on the organic knowledge system among Australian farmers and shows that despite the progressing institutionalization of the organic knowledge system in this country, agricultural networks continue to work as key factors in the production and dissemination of organic knowledge. The research conducted by Darnhofer [26], and Kioumarsi et al [27], highlights the significance of considering individuals' attitudes, preferences, goals, and their impacts within the fields of agriculture and food science. Cabrini dan Elustondo [28], regarding the attitude of Irish farmers to transition to organic agriculture concluded that although farmers do not have serious and strong views in the field of organic agriculture, they are aware of the inadequacy of their knowledge in the field of organic agriculture. They suggested the improvement of farmers' information mainly based on agricultural extension as a beneficial approach to substitute organic agriculture instead of conventional agriculture. This research seeks to answer these questions, what are the attitudes of rice farmers in the field of organic farming and what factors influence their attitudes.

Materials and methods

This study is characterized by its quantitative approach and practical application. The statistical population comprised rice farmers from three key rice-producing rural districts in Langrud *(Daryasar, Gelsefid, and Chaf)*, totaling 500 farmers. A sample size of 211 was determined. Data collection was conducted using a questionnaire, which was validated through consultations with experts in the field. To assess the reliability of the measurement tool, an interview was conducted with a sample of 30 individuals outside the main statistical population, resulting in a Cronbach's alpha coefficient of 0.7, confirming the reliability of the research instrument. Cronbach's alpha coefficient is used to measure the one-dimensionality of attitudes, judgments and other categories that are not easy to measure. In which: The k symbol is the number of questions or items in the questionnaire or test; the symbol S2 is the variance of the kth subtest and sigma S2 is the variance of the entire test.

$$\alpha = \frac{K}{K-1}\left(1 - \frac{\sum_{i-1}^{K}\sigma_1^2}{\sigma^2}\right) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \textit{(1)}$$

Statistical software version 22 of SPSS was used. To classify the attitude of the paddy farmers in the field of organic farming, interval of Standard Deviation from the Mean (ISDM) was used. It should be noted that the items related to the general aspects of organic agriculture were extracted from the review of domestic and foreign sources and the experiences of the researcher.

Results and Discussion

The descriptive results of the research show that the majority of the respondents were men with a share of 88.5%. The studied samples were divided into three age groups: young, middle-aged, and old, with a share of 13.7, 68.7, and 17.5 percent, respectively, and the majority of them were middle-aged. In terms of education, 37.4% were illiterate, 26.1% could read and write, 27% were at diploma level and 8.5% were above diploma. In connection with the history of rice farming, people with a history of less than 13 years as inexperienced, between 13 and 46

years as experienced farmers, and; Farmers with working experience of more than 46 years were considered as veteran farmers. Based on this, 23/7 was in the less experienced group, 56/9 was in the experienced group and 19/4 was in the veteran group (Table 1).

Table 1. Demographic Characteristics of the Studied Rice Farmers

Variable	Group	Frequency	Valid Percent
Gender	Male	24	11.5
	Female	185	88.5
Age (Year)	Adult	29	13.7
	Middle Aged	145	68.7
	Aged	37	17.5
Minimum: 24			
Education	Illiterate	79	37.4
	Reading and Writing	55	26.1
	Diploma	57	27
	Higher than Diploma	18	8.5
Rice cultivation	Amateur	50	23.7
	Old-Hand	120	56/9
	Veteran	41	19/4
Minimum: 1	Maximum: 70	Mean: 29/49	S.D: 16/62

To examine the attitudes of rice farmers towards organic agriculture, a set of 13 items covering various aspects of organic farming was utilized. The response data for each item is summarized in Table 2. A review of the information presented in this table reveals a strong positive attitude towards organic agriculture among the farmers. Based on the mean attitude score of 49.73 and a standard deviation of 4.68, respondents were categorized as follows: those with an attitude score below 45.05 were placed in the negative group; scores ranging from 45.05 to 54.41 were considered partially positive; and scores above 54.41 were classified as completely positive. As can be seen in Table 3, 18% of the respondents have a negative attitude towards organic agriculture, about 70% have a somewhat positive attitude, and about 12% have a completely positive attitude. The results of this research are in line with the study of Sandooghi et al [29] Jamshidi & Haji Mirrahimi [11], Sulaiman et al [14], pointed out that they have a moderate and positive attitude towards organic agriculture, and it is contrary to the results of the research of Mousavi et al [12], Murugan [18], Hasan et al [19].

Table 2. Frequency Distribution of Users' Answers for Items Related to Organic Farming Attitude (Percentage) of The Sample Size

Row	Question	Absolutely Disagree	Disagree	Fairly	Agree	Absolutely Agree
1	The disappearance of trees such as pears and apples in Gilan is due to neglect of nature and the excessive use of pesticides and chemical fertilizers.	2.8	8.1	21.8	53.1	14.2
2	It is important to consult experts for recommendations on fertilizers and pesticides after identifying any pests or diseases.	4.3	4.7	5.7	72.5	11.8

Table 2. Continue

Row	Question	Absolutely Disagree	Disagree	Fairly	Agree	Absolutely Agree
3	Nature is our primary home and refuge; without it, our lives would be devastated.	0	0	4.8	78.1	17.1
4	The excessive use of chemical fertilizers will ultimately weaken the soil in the long run.	3.2	6.2	8.1	51.7	30.8
5	To increase agricultural production, the use of chemical fertilizers is often necessary.	10.4	7.1	10.9	39.8	31.8
6	Our water and soil reserves are finite, and we must use them carefully.	0.5	1.4	7.6	75.8	14.7
7	Agricultural lands are a legacy entrusted to our children and grandchildren.	0.5	0.5	6.6	76.8	15.6
8	If we pay attention to the health of our water and soil and avoid excessive use of pesticides and chemical fertilizers, agriculture can be a viable source of income.	24.2	7.6	3.3	40.3	24.6
9	Rural landscapes should not be destroyed under the guise of farming.	1.9	0.9	7.1	77.7	12.3
10	I enjoy farming and working with the basic tools used by our ancestors, even if it results in lower income.	20.4	6.6	11.4	46.9	14.7
11	Currently, many fruits and products are cultivated for their attractive appearance, lacking in flavor.	5.2	2.4	5.2	34.6	52.6
12	I believe that producing high-quality products and selling them at a premium price is more economical than mass-producing inferior products that are hard to sell.	3.8	2.8	4.3	60.2	28.9
13	I dislike the overuse of machinery, which contributes to the unemployment of farmers.	24.2	7.1	3.8	42.7	22.3

To assess the attitudes of the farmers under study in relation to the dichotomous variables of gender, primary occupation in agriculture, ownership status, and participation in organic training courses, an independent t-test for mean comparison was conducted (see Table 4). The findings indicated that there are no statistically significant differences between the

attitudes of the respondents and the specified variables. These results are contrary to the findings of the research of Sandooghi et al [29] Monfared et al [13], Sulaiman et al [14], Herath and Wijekoon [9], who pointed out the effect of these characteristics on the attitude of the surveyed farmers.

Table 3. The state of attitude of the studied rice farmers towards organic farming

Group	Frequency	Percent	Valid Percent
Negative	38	18	18
Fairly positive	147	69.7	87.7
Absolutely positive	26	12.3	100
Total	211	100	

As seen in Table 5, there is no statistically significant relationship between the level of education, the attractiveness of training courses, the level of access to information sources and agricultural recommendations, agricultural history, the number of plots of land, the distance to extension service centers, the amount of production, the knowledge of organic agriculture and the attitude towards organic agriculture. These results are contrary to the findings of the research of Sandooghi et al [29], Jamshidi and Mirrahimi [11], Monfared et al [13], Sulaiman et al [14], Herath and Wijekoon [9] and Shams et al [7], who pointed out the existence of a relationship between some of these elements and the attitude of organic agriculture.

Table 4. Demographic characteristics of the studied rice farmers

Dependent Variable	Class	Mean	S.D.	T Statistic	P-Value
Gender	Male	50.29	5.46	0.6	0.551
	Female	49.58	4.48		
Agriculture as a main career	Yes	49.41	4.84	-1.04	0.3
	No	50.08	4.49		
Land ownership	Private	49.79	4.41	0.26	0.791
	Rental	49.6	5.27		
Participate in an organic training course	Yes	50.13	5.51	0.81	0.414
	No	49.59	3.93		

The research questionnaire included 13 questions on the attitude of people in relation to organic agriculture in general, and these 13 variables were used to obtain the factors. Factor analysis does not have predetermined dependent variables, and the use cases of this test can be divided into two general categories: exploratory and confirmatory purposes. In exploratory purposes, the goal is to summarize a set of data or to find existing variables or constructs of a set of measured variables. To achieve this goal, the method of common factor analysis or principal component analysis is used by using the correlation or covariance matrix of the measured variables. In confirmatory purposes, the researcher's goal is to confirm a special factor structure. A hypothesis is clearly expressed about the number of factors and the fit of the factor structure intended in the hypothesis with the covariance structure of the measured variables is tested [30].

Table 5. The degree of correlation of research variables with the variable of attitude towards organic agriculture

Variable	Test	Correlation Coefficient	Sig
Education level	Spearman	0.059	0.198
Attractiveness of organic training courses	Spearman	0.032	0.324
Amount of access to information resources and agricultural advice	Spearman	0.011	0.435
Age	Pearson	-0.003	0.481
Agricultural experience (history)	Pearson	0.031	0.329
Number of land plats	Pearson	0.003	0.484
Distance to extension service centers	Pearson	0.016	0.411
Acreage under cultivation	Pearson	-0.068	0.164
Production rate	Pearson	-0.015	0.415
Knowledge of organic agriculture	Pearson	0.029	0.338

Select suitable variables for factor analysis, two methods can be used, and the use of correlation matrix is one of those methods. Since the basis of the factor analysis method is based on the correlation between variables, but of a non-causal type, therefore, in using this method, the correlation matrix between the variables must also be calculated. Another method is the KMO test, whose value always fluctuates between 0 and 1. If this index is less than 0.50, the data will not be suitable for factor analysis, and if its value is between 0.50 and 0.69, factor analysis can be done with more caution. But if its value is greater than 0.70, the correlations between the data will be suitable for factor analysis. On the other hand, Bartlett's test should be used to ensure the appropriateness of the data for factor analysis that the correlation matrix that is the basis of factor analysis in society is not equal to zero [5]. In this research, both of the above methods were used and the results indicate that the data are suitable for conducting the factor analysis test (Table 6).

Table 6. KMO and Bartlett test results

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.68
Bartlett's test	Approx.Chi-Square	318.812
	DF	78
	Sig	0.00

In factor analysis, four methods can be used to extract suitable factors, which include the eigenvalue criterion and cutoff testing. In principal component analysis, only factors whose eigenvalue is greater than one are considered as significant factors. The cut-off criterion is obtained by drawing the eigenvalue graph against the number of factors extracted in order, and through the state or shape of the diagram, the point of determining the number of agents is determined [5]. In this research, the eigenvalue criterion and cutoff test were used to determine the number of factors. In Table 7, the total variance of 13 extraction factors and their eigenvalues are shown by rotation. Since the eigenvalues above 1 are considered as the basis, we are dealing with 5 factors in this field, which have been able to Explain 58% of the subject under investigation.

Table 7. Total Variance Explained

Component	Initial Eigenvalues			Rotation Sums of Squared Loading		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.587	19.899	19.899	2.548	19.6	19.6
2	1.552	11.938	31.837	1.488	11.44	31.043
3	1.216	9.352	41.189	1.203	9.254	40.298
4	1.152	8.865	50.054	1.178	9.06	49.358
5	1.077	8.287	58.34	1.168	8.982	58.34

According to the results of the factor analysis, the variables related to the remaining questions (13 items) (Table 7) were divided into 5 main factors. The relationship between the factors and variables is determined through the rotated matrix of the components (Table 8). So that this matrix contains the factor loadings of each of the variables in the remaining factors after rotation. The higher the absolute value of these coefficients, the greater the role of the relevant factor in the total changes (variance) of the desired variable.

Table 8. Components affecting the attitude towards organic agriculture

Factor	Variable	Factor Loading
1	Destruction of native trees due to disregard for nature and excessive use of pesticides and chemical fertilizers	0.531
1	Unjustified spraying immediately after the occurrence of pests and diseases	0.539
1	Importance of nature as the main home and refuge of humans	0.775
1	Reduction in soil fertility due to excessive use of pesticides and chemical fertilizers	0.423
5	The inevitability of using chemical fertilizers to improve the capacity of farms	0.827
1	Predicting the depletion of natural reserves in the long-term	0.653
4	Preserving agricultural lands for future generations	0.742
3	The impact of water and soil health on maintaining and improving agricultural income	0.67
3	Unjustified destruction of natural landscapes due to agricultural work	0.648
4	Tendency to cultivate and work in the way of the ancestors and with primitive tools	0.836
2	The unimportance of agricultural products that are visually appealing but lack flavor.	0.744
2	More income generation from agricultural activity through attention to the production quality	0.782
5	The unjustified farmer unemployment resulting from the adoption of modern agricultural tools and equipment.	0.439

Table 9 shows the Components affecting the attitude of the studied rice farmers in the field of organic agriculture and explains the reasons for the rice farmers' tendency to produce organic rice. The data obtained in this field show that the attitude of the surveyed farmers is

affected by factors including attention to nature and preserving the power of the land, priority of quality over quantity of agricultural products, appreciation of the value and importance of rural landscapes, traditionalism and the desire to preserve customs of the past, and the influence of personal experiences which account for 19.60, 11.44, 9.25, 9.06 and 8.98 percent of the explained variance, respectively. Farmers have maintained their survival in harmony with nature for centuries, they have clearly developed adjustable strategies that need to be recovered and used as a basis for future planning; because they are conscious decision makers who know what works and what doesn't [31]. These results are in line with Durpoix's study in 2010 on the attitude and behavior of farmers towards natural environments, which pointed out the impact of direct connection with nature, interaction with family, and objective and subjective knowledge in predicting farmers' environmental attitudes. It is also consistent with the results of Ghosh et al [32], research, which reported a positive and significant relationship between the cosmopolitan character of farmers and the attitude towards organic agriculture. Therefore, in their evolutionary process, farmers have reached a mechanism of interaction with nature that goes beyond their personal actions and inherent characteristics and it continuously leads them to a deep understanding of the climatic environment and the changes in it in the shadow of collective actions and working groups and for progress and maximum utilization of available resources, it advances in the path of innovation.

Table 9. Effective components on the attitude of the studied rice farmers in the field of organic agriculture

Row	Component	Proportion of explained variance	The number of variables included
1	Concern for nature and the preservation of the land's potential	19.6	5
2	A priority on the quality of agricultural products versus quantity	11.44	2
3	An awareness of the value and importance of rural landscapes	9.25	2
4	A commitment to traditionalism and the preservation of past customs	9.06	2
5	The influence of personal experiences	8.98	2

Therefore, although according to the results of the research, the personal characteristics of each of the farmers did not have a significant effect on their tendency towards organic farming, but the creation of group work organizations and collective organizations strengthens the purpose of this motivation in farmers. Creating motivation among farmers to pay attention to the environment will be a factor that will ultimately lead to organic farming methods and maintaining the sustainability of the environment by reducing the use of pesticides. This view confirms the results of Baird [24], emphasizing the role of cultural-social aspects on the adoption of organic agriculture. And it is consistent with the findings of Kroma [25], which shows the impact of social learning on the organic knowledge system among Australian farmers, which shows that despite the growing institutionalization of the organic knowledge system in this country, agricultural networks continue to work as key factors in the production and dissemination of organic knowledge. And it is in line with Darnhofer [26], which shows the importance of paying attention to farmers' attitudes and preferences, goals and its effects on the choice of agricultural methods. In this regard, from the findings of previous researchers and the results of this research, it is clear that organic agriculture has a unique effect on the health of the environment through the creation of alternative food chains and as a healthy model of nature-

friendly production, it ultimately lays the foundation for sustainable rural development. Undoubtedly, production is not the only consideration of organic cultivation, but the health of food and the environment is one of the essential requirements of organic cultivation, which is the result of using new ideas and combining them with local knowledge, which creates a great diversity in the activities of farmers and in the end, it leaves them to the future generations by preserving, sustaining and optimally using the natural resources.

Conclusions

The study concludes that the country's rice cultivation system, heavily reliant on pesticides, needs re-engineering towards sustainable organic practices. However, organic farming faces numerous challenges, including farmers' mixed attitudes. This research found that while 18% of rice farmers hold negative views on organic farming, around 70% are somewhat positive, and 12% are fully supportive. Farmers' attitudes are shaped by factors like concern for nature, soil fertility, product quality, rural landscape value, traditionalism, and personal experiences. Interestingly, individual agricultural characteristics showed little impact on their attitudes, suggesting a broader set of influences. Given that most farmers show flexibility and a positive inclination toward organic methods, targeted efforts—such as offering incentives, establishing local management networks, enhancing market confidence, and using informal education to highlight successful organic practices—could help change attitudes. Leveraging agricultural extension experts to support production zoning and increase farmer engagement is another promising approach to expand organic farming within rural communities.

References

[1]   D. Durpoix, *Farmers' attitudes and behaviour towards the natural environment: a New Zealand case study*, 1 ed. Palmerston North, New Zealand, 2010. https://mro.massey.ac.nz/handle/10179/2192

[2]   B. Askari, Ghanadamooz. F. M.S, dan F. Keshavarzshal A., "Investigating the impact of integrated pest management extension activities in Lahijan and Amlash regions. Agricultural Research," *Agric. Res. Educ. Ext. Organ. Iran*, 2016.

[3]   P. Abdolhamid dan S. ematollah, "Study of Barriers toward Development of Organic Farming," *J. Space Econ. Rural Dev.*, vol. 1, no. 1, hlm. 12, 2012.

[4]   G. Dinpanah dan E. Akhavan, "Factors Influencing on Knowledge of Organic Farming among Greenhouse Owners in Varamin Township," vol. 7, no. 1, 2014. https://www.sid.ir/paper/189802/en

[5]   S. Soltani, H. Azadi, H. Mahmoudi, dan F. Witlox, "Organic agriculture in Iran: Farmers' barriers to and factors influencing adoption," *Renew. Agric. Food Syst.*, vol. 29, no. 2, hlm. 126–134, Jun 2014, doi: 10.1017/S1742170513000069.

[6]   S. M. W. Al Halawani, M. Al-Khasawneh, M. Abuhashesh, dan M. T. Alshurideh, "The Impact of Information and Communications Technology (ICTs) on Food Security in Jordan," dalam *Sustainable Horizons for Business, Education, and Technology*, H. Alshurafat, A. Hamdan, dan J. Sands, Ed., dalam Contributions to Environmental Sciences & Innovative Business Technology. Singapore: Springer Nature Singapore, 2024, hlm. 269–278. doi: 10.1007/978-981-97-2981-4_20.

[7]   S. Ali, V. Elham, dan A. Zeinab, "Study of Farmers' Attitude towards Sustainable Agriculture and Its Relation with Their Chemical Input Use in Asadabad Township," *Iran. Agric. Ext. Educ. J.*, vol. 11, no. 1, hlm. 197–210, 2015, doi: 20.1001.1.20081758.1394.11.1.13.7.

[8] S. A. F. Ghadimi dan A. Asadi, "Investigating Factors Affecting Farmers' Attitudes toward Organic Farming (Case Study: Faridane County)," *J. Agric. Ext. Educ. Res.*, vol. 50, no. 2, Jun 2019, doi: 10.22059/ijaedr.2019.216520.668321.

[9] C. S. Herath dan R. Wijekoon, "Study on attitudes and perceptions of organic and non-organic coconut growers towards organic coconut farming," *Idesia Arica*, vol. 31, no. 2, hlm. 5–14, Jun 2013, doi: 10.4067/S0718-34292013000200002.

[10] A. H. Wasil, J. Arif Shah, dan N. B. Mohamed Haris, "The Relationship between Knowledge, Attitude, and Practice toward Organic Fertilizer Adoption among Almond Smallholder Farmers in Uruzgan, Afghanistan," *Int. J. Acad. Res. Bus. Soc. Sci.*, vol. 12, no. 10, hlm. Pages 2895-2914, Okt 2022, doi: 10.6007/IJARBSS/v12-i10/15108.

[11] J. Omid dan M. Haji, "Factors Affecting Attitude of the Greenhouse Owner towards Sustainable Agriculture in Alborz province," *Rural Dev. Strateg.*, vol. 3, no. 2, Agu 2016, doi: 10.22048/rdsj.2016.38658.

[12] M. Mousavi, B. Khosravipour, dan A. Sorkhi, "Identify Factors Affecting on Attitude of Vegetable Growers at Bavi city in Khuzestan province Towards Organic Farming," *Rural Dev. Strateg.*, vol. 1, no. 4, hlm. 105–118, Des 2014, doi: 10.22048/rdsj.2015.9687.

[13] M. Fatemi, N. Monfared, K. Rezaei-Moghaddam, dan F. Badzaban, "Factors Affecting the Extension and Development of Organic Farming Activities," *Karafan J.*, vol. 18, no. 4, hlm. 13–32, 2022, doi: 10.48301/kssa.2021.129161.

[14] M. Sulaiman, "An Overview of Natural Plant Antioxidants: Analysis and Evaluation," *Adv. Biochem.*, vol. 1, no. 4, hlm. 64, 2013, doi: 10.11648/j.ab.20130104.12.

[15] A. H. Alibaygi, M. Dareh Zereshki, dan M. Khaki, "Farmers' Attitude towards New Agricultural Knowledge: The Case of Mehriz and Khatam Townships," *Iran. J. Agric. Econ. Dev. Res.*, vol. 42–2, no. 4, Sep 2012, doi: 10.22059/ijaedr.2012.28588.

[16] L. Haji, Y. Momenpour, dan S. Choobchian, "Moving toward salvaging Iran's groundwater: A psychological analysis of blocking unauthorized agricultural wells," *Agric. Water Manag.*, vol. 303, Okt 2024, doi: 10.1016/j.agwat.2024.109035.

[17] G Emmanuel, A I Zubairu, M B Danji, C K Hassan, B W Bakari, dan Danji Magaji Bitrus, "Adoption of Organic Farming Practices Among Vegetable Farmers in Jalingo Local Government Area of Taraba State, Nigeria," 2024, *Unpublished*. doi: 10.13140/RG.2.2.20721.08808.

[18] P. P. Murugan, S. M. G, A. Ks, dan J. R. A, "Farmer's attitude towards organic vegetable cultivation practices in Western zone of Tamil Nadu," *Int. J. Agric. Ext. Soc. Dev.*, vol. 7, no. 1, hlm. 581–585, Jan 2024, doi: 10.33545/26180723.2024.v7.i1h.258.

[19] M. M. Hasan, Md. G. Farouque, dan Md. A. Sarker, "An assessment of using eco-friendly crop production practices by the project beneficiaries and non-beneficiaries in Bangladesh," *Discov. Agric.*, vol. 2, no. 1, hlm. 21, Jun 2024, doi: 10.1007/s44279-024-00034-1.

[20] M. Habibi, K. J. Khorshidi, E. G. J. Shooran, dan H. Kioumarsi, "The Effect of Replacing Sorghum Grains with Corn Along with Phytase and NSP Enzymes on Yield and Blood Parameters of Broilers," *J. Biota*, vol. 10, no. 1, hlm. 24–34, 2024, doi: 10.19109/Biota.v10i1.19160.

[21] H. Kioumarsi *dkk.*, "Estimation of Relationships Between Components of Carcass Quality and Quantity in Taleshi Lambs," *Asian J. Anim. Vet. Adv.*, vol. 3, no. 5, hlm. 337–343, Agu 2008, doi: 10.3923/ajava.2008.337.343.

[22] S. M. Mahdavian, F. Askari, H. Kioumarsi, R. Naseri Harsini, H. Dehghanzadeh, dan B. Saboori, "Modeling the linkage between climate change, CH4 emissions, and land use with Iran's livestock production: A food security perspective," *Nat. Resour. Forum*, hlm. 1477-8947.12532, Jun 2024, doi: 10.1111/1477-8947.12532.

[23] L. Kalavari, N. Nasiri, F. Ahmadian, dan H. Kioumarsi, "Enrichment of Doogh with Olive Leaf Extract and Investigation of Its Physicochemical, Microbial, and Sensory Properties during Storage at Room Temperature and Refrigerator," *J. Multidiscip. Appl. Nat. Sci.*, vol. 3, no. 1, hlm. 34–42, Agu 2022, doi: 10.47352/jmans.2774-3047.143.

[24] I. G. Baird, "'Organic' rice: different implications from process and product environmental verification approaches in Laos and Thailand," *Agric. Hum. Values*, Mar 2024, doi: 10.1007/s10460-024-10556-5.

[25] M. M. Kroma, "Organic Farmer Networks: Facilitating Learning and Innovation for Sustainable Agriculture," *J. Sustain. Agric.*, vol. 28, no. 4, hlm. 5–28, Okt 2006, doi: 10.1300/J064v28n04_03.

[26] I. Darnhofer, "Organic Farming and Rural Development: Some Evidence from Austria," *Sociol. Rural.*, vol. 45, no. 4, hlm. 308–323, Okt 2005, doi: 10.1111/j.1467-9523.2005.00307.x.

[27] H. Kioumarsi, K. J. Khorshidi, Z. S. Yahaya, M. Van Cutsem, Zarafat, dan W. A. Rahman, "Customer satisfaction: The case of fresh meat eating quality preferences and the USDA yield grade standard," dalam *In Int'l Journal of Arts & Sciences (IJAS)*, 2009.

[28] S. M. Cabrini dan L. Elustondo, "Organic agriculture in Argentina's Pampas. A case study on *Pampa Orgánica Norte* farmers," *Renew. Agric. Food Syst.*, vol. 37, no. 1, hlm. 5–13, Feb 2022, doi: 10.1017/S1742170521000338.

[29] A. Sandoghi, A. Yousefi, dan A. M. Amini, "Evaluation of factors affecting cucumber-and- tomato greenhouse farmers' attitudes toward healthy crops production in Isfahan Township," *J. Sci. Technol. Greenh. Cult.*, vol. 6, no. 2, hlm. 95–106, Agu 2015, doi: 10.18869/acadpub.ejgcst.6.2.95.

[30] H. Khajeh Hosseini, Science and Research Branch, Islamic Azad University, Tehran, Iran, N. Farrokhi, Department of Assessment and Measurement, Faculty of Psychology and Educational Sciences, Allameh Tabataba'i University, Tehran, Iran, H. Asadzadeh, dan Department of Educational Psychology, Faculty of Psychology and Educational Sciences, Allameh Tabataba'i University, Tehran, Iran, "Comparison of Moral Reasoning among Students with and without Visual Impairment," *Q. J. Child Ment. Health*, vol. 6, no. 2, hlm. 151–160, Jul 2019, doi: 10.29252/jcmh.6.2.17.

[31] Y. A. Aluko, "Women's Use of Indigenous Knowledge for Environmental Security and Sustainable Development in Southwest Nigeria," *Int. Indig. Policy J.*, vol. 9, no. 3, Agu 2018, doi: 10.18584/iipj.2018.9.3.2.

[32] M. K. Ghosh, M. H. Sohel, N. Ara, F. T. Zahara, S. B. Nur, dan Md. M. Hasan, "Farmers Attitude towards Organic Farming: A Case Study in Chapainawabganj District," *Asian J. Adv. Agric. Res.*, hlm. 1–7, Jul 2019, doi: 10.9734/ajaar/2019/v10i230026.