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# Role of Extension and Education Programs in Development of Organic Farming in Lorestan Province, Iran

Jahanbakhsh Beiranvand[1], Ahmad Reza Ommani[1], Azadeh Noorollah Noorivandi[1], and Mohammad Reza Ardakani[2]

## ABSTRACT

**One of the most important environmental hazards that has created many challenges in recent years is the development of inorganic farming and the excessive use of chemical inputs in the agricultural sector. The purpose of this research was to evaluate the role of extension and educational programs in the development of Organic Farming (OF) in vegetable and summer crops in Lorestan Province, Iran. This research was quantitative in nature and applied research in terms of purpose. The population consisted of vegetable and summer crop farmers in Lorestan (N= 3,500). The sample size was determined based on Morgan table (n= 384). In order to determine the validity and reliability of the questionnaire, a panel of experts and a Ɵ coefficient of 0.85 were used. According to the results, the dimensions of OF were not optimal. From the ecological, health, fairness, care, social-cultural and production-economic aspects, there was a significant difference (P< 1%) between the current and the desired conditions. Farmers who participated in the programs of extension and educational class, field day, extension exhibitions, farmer field school, scientific seminars and demonstration farms had a significant difference (P< 1%) in all aspects of OF with those who did not participate. The most important factors affecting the development of OF dimensions included: (1) Development of technical knowledge and empowerment of farmers in OF, (2) Government support for OF methods and development of its dimensions, (3) Application of legal instruments for the development of OF, and (4) Changing consumers' views towards the use of organic foods.**

**Keywords:** Agricultural Development, Environmental hazards, Organic Matters, Sustainability.

## INTRODUCTION

Agriculture, as the main source of food security, is the main economic foundation of many developed and developing countries. Modern agricultural practices have a destructive effect on the environment such as water and nutrients cycle, soil erosion, forest destruction, carbon sequestration and other ecological patterns (Gamage *et al*., 2023). Organic Farming (OF) is an effective way to reduce the harmful environmental and ecological effects of development programs and projects in the agricultural sector. Using more organic inputs in agricultural activities can reduce adverse effects on the environment by protecting natural cycles and guarantee the health of humans and the environment (Zhou and Ding, 2022). Reducing poverty and hunger in the world, improving food security and extending sustainable agriculture are the main goals of the Sustainable Development Goals (SDGs) (Lu and Wu, 2022). Improving food security is not achieved by increasing the quantity of food, although that is important. Paying attention to the quality of food and producing healthy food is of great importance. Organic farming plays an

[1] Department of Agricultural Extension and Education, Shoushtar Branch, Islamic Azad University, Shoushtar, Islamic Republic of Iran.
[2] Department of Agronomy, Karaj Branch, Islamic Azad University, Karaj, Islamic Republic of Iran.
*Corresponding author; e-mail: ar.ommani@iau.ac.ir





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important role in this regard and helps humans in producing healthy food and reducing environmental pollution (Rani *et al*., 2023). It also plays an effective role in increasing farmers' resilience against adverse climate changes (Lu and Cheng, 2023), emphasizes soil and water conservation, and increases flexibility (Couthouis *et al*., 2023). Organic farming strategies that are compatible with environmental conditions are used and protection of natural cycles are emphasized (Figure 1) (Gamage *et al*., 2023). With the expansion of conventional agriculture, the emphasis on the indiscriminate use of chemical fertilizers, herbicides and insecticides has greatly expanded. One of the consequences of this overuse is the environmental crisis, which has become very dangerous at the present time. (Raven and Wagner, 2021). Organic agriculture is one of the important ways to protect people and the environment against risks (Lu and Cheng, 2023). This strategy is used to improve ecological performance, biodiversity, water and soil quality, increase productivity, human health and environment, human welfare, respect ethics with animals and plants, and other issues related to the ecosystem (Couthouis *et al*., 2023).

Due to the environmental, social and economic benefits, there is a global trend towards the extension of organic agriculture (Thapa and Rattanasuteerakul, 2011). In various studies, many researchers emphasized several indicators in the field of organic farming and their results, as mentioned in Table 1.

Nowadays, agricultural extension and education is necessary to empower farmers and transfer useful information to them. It plays an important role in convincing farmers to apply technology and agricultural innovations (Alotaibi *et al.,* 2021). Qiao *et al.* (2022) concluded that agricultural extension programs play a significant role in organic farming development. By improving farmers' awareness, this program can stimulate farmers' willingness to green production. Kassem *et al.* (2021) explained that agricultural extension programs play an

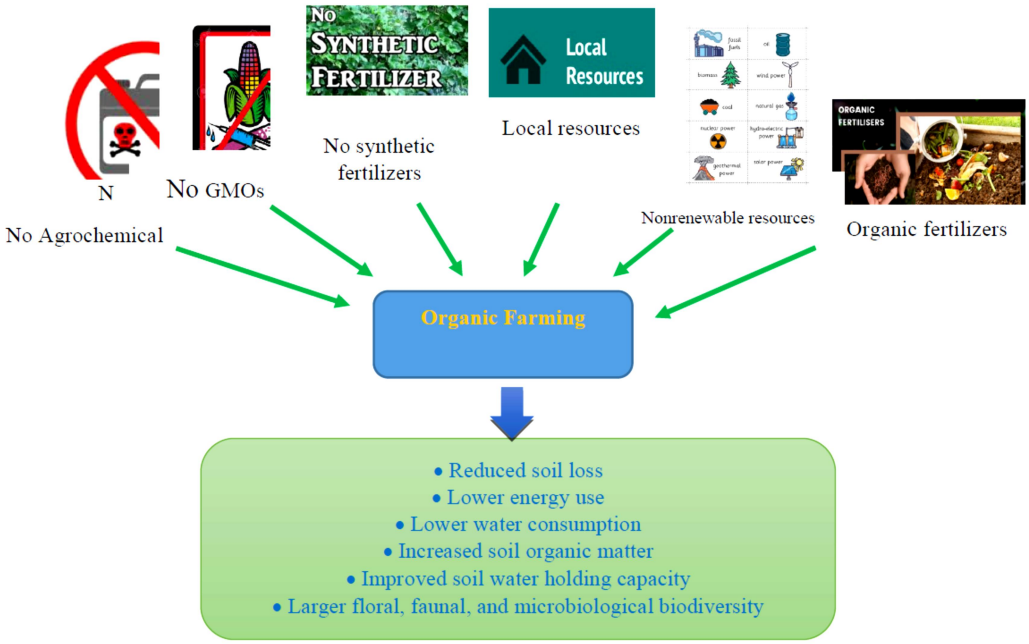


**Figure 1**. The main practices and effects of organic farming (Gamage *et al*., 2023).





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**Table 1**. Indicators in the field of organic farming and their results.

| Indicators | Sub indicators | Results | Resources |
|---|---|---|---|
| Ecological | Conservation of Biodiversity: Plant and animal<br>Environmental cycles: Nitrogen cycle, Phosphorus cycle, Water cycle<br>Conservation of production | Clean water, ecotourism, nutrition, food security and sustained livelihoods, N surplus, P surplus | Lu and Cheng (2023); Rotchés-Ribalta *et al*. (2023) |
| Health | Use of manure,<br>Use of green manure,<br>Use of biological fertilizers,<br>Use of crop rotation<br>Use of zero tillage | Water and soil health, plant health, animal health and livestock welfare, attention to human health and well-being, attention to the integrated ecosystem | Yang *et al.* (2023); Chausali and Saxena, (2021) |
| Fairness | Considering fairness and ethics and not harming animals<br>Considering fairness and ethics and not harming plants | No beating, no kicking, no hitting, no small cages or boxes, no with tied legs no shout at animals. Give animals' shelter, shade, access to water and feed, and protect them from enemy animals. Let mother animals be with their offspring as long as possible. Transport animals calmly. Never move an animal from light into darkness.<br>Do not break the new branches of plants<br>Not turning the forest into a farm<br>Not cutting down living trees, which have the right to life | Rizzo *et al.* (2020); Krieger *et al.* (2020) |
| Care | Caring for plants<br>Caring for animals<br>Caring for basic resources<br>Caring for people's health | Caring for plants such as feeding and preserving the life of different plant species<br>Caring for different animal species and dealing with them appropriately<br>Taking care of basic production resources such as water, soil and ecosystems<br>Taking care of human health in the current and future generations | Łuczka *et al*. (2021); Kowalska and Matysiak (2023) |
| Social-cultural | Social participation<br>Social justice<br>Social Welfare | Participation in decisions, implementation and evaluation of agricultural affairs<br>Justice between producers and consumers, between humans and the environment, between humans and plants and animals<br>Providing conditions for human life | Damayanti *et al.* (2018); Kociszewski *et al.* (2020) |
| Production-economic | Increase profitability<br>Increase productivity<br>Reducing production costs<br>Optimal use of resources | Efficient use of water, nutrients, fuel, labor and capital<br>Increase income<br>Reaching the current production capacity to nominal<br>Increasing the output of the production system to the input | Durham and Mizik (2021); Raimondo *et al.* (2021); Reddy *et al.* (2022); Javier and Sison (2023); Scuderi *et al.* (2023) |





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important role in developing farmers' knowledge and skills to move from conventional to organic farming. Mancini & Jiggins (2008) stated that Farmer Field School (FFS) was an effective educational approach among farmers to accept organic farming.

Unfortunately, one of the problems that exists in the researched area is the uncoordinated implementation of educational and extension programs in the field of organic farming development. For this reason, the necessity of carrying out this research with the purpose of evaluating the role of extension and educational programs in the development of organic farming dimensions in vegetable and summer crops cultivation in Lorestan Province, Iran, is very important.

## MATERIALS AND METHODS

The purpose of this research was to evaluate the role of extension and educational programs on the development of organic farming dimensions in vegetable and summer crops cultivation in Lorestan Province, Iran. This research is quantitative in nature and applied research in terms of purpose. The method used was descriptive and Correlative. The population consisted of vegetable and summer-crop farmers in Lorestan (N= 3,500). The sample size was determined based on Morgan table (n= 384). In order to determine the validity of the questionnaire, a panel of experts was used, including 30 experts and faculty members of agricultural extension and education. The dimensions and variables mentioned in the text were chosen based on the literature review and experts' view. Also, to determine the reliability, Ɵ coefficient was considered to be 0.85. The Wilcoxon test was used to evaluate the significance of the difference between the ecological, health, fairness, care, socio-cultural and production-economic indicators between the current and the desired conditions (King and Eckersley 2019). The meant by desirable status of the dimensions was what it should be. The distance between what is and what should be, which is expressed according to farmers' opinion, indicates the unfavorable status of organic farming dimensions. This issue adds to the need to pay attention to agricultural extension and education activities. The data collection tool in this research was a questionnaire that had 4 sections as follows:

### Demographic characteristics

Current and desirable status of organic farming development indicators

Participation in extension and educational programs

Role of extension and educational programs in the development of organic farming

Also, the mentioned indicators were compared through the Mann-Whitney test among farmers who participated in the extension and educational programs and those who did not participate. For correlation analysis between the variables, the Spearman correlation coefficient was used. In addition, ordinal regression was used to measure the role of the independent variables of the research on the dependent variable that had an ordinal scale. In order to summarize the variables raised in the field of factors affecting the development of organic farming dimensions, factor analysis was used. The value of KMO in this research was 0.896, which indicated the suitability of the data for factor analysis (Shrestha, 2021). Also, the significance of Bartlet's test with a value of 4.564 shows that the correlation matrix has significant data and the necessary conditions for factor analysis exist (Rossoni *et al*., 2016).

## RESULTS AND DISCUSSION

### Demographic Characteristics of Farmers

As shown in Table 2, the average age of the selected farmers in the study areas was 41.25 and the standard deviation was 5.89.





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**Table 2.** Characteristics of vegetable and summer crop farmers.

| Personal and economic characteristics | | Mean | SD |
|---|---|---|---|
| Age (Year) | | 41.25 | 5.89 |
| Level of education[a] | | 2.6 | 0.83 |
| Farm size (Hectares) | | 4.9 | 1.09 |
| Income (Dollar) | | 2480 | 53.24 |
| Personality and cognitive characteristics | Items | Mean of total items | SD |
| Organic farming awareness[b] | 10 | 2.243 | 0.65 |
| Attitude toward organic farming[c] | 10 | 2.109 | 0.79 |
| Organic farming knowledge[b] | 10 | 2.542 | 0.81 |
| Access to information sources[b] | 5 | 3.541 | 0.84 |
| Willingness to creativity[b] | 5 | 2.952 | 0.79 |
| Risk oriented[b] | 6 | 2.064 | 0.82 |

[a] 0= Illiterate, 1= Preliminary, 2= Guidance school, 3= High school, 4= Diploma and above.
[b] The Domain of Each Item: 0= None; 1= Very low; 2= Low; 3= Average; 4= High; 5= Very High.
[c] The Domain of Each Item: 1= Strongly disagree, 2= Disagree, 3= Unsure, 4= Agree, 5= Strongly agree.
Source: Research findings (2022).

The average level of education was 2.6. It means the rank average. 0= Illiterate, 1= Preliminary, 2= Guidance school, 3= High school, 4= Diploma and above Also, the average farm size was 4.9 hectares. The main occupation of all of them was farming and 65 farmers had a second job in addition to farming. Their average income from agricultural activities was 2,480 dollars per year. Each dollar equals 500,000 Rials at the time of the research. The mean rank of organic farming awareness, attitude toward organic farming, organic farming knowledge, access to information sources, willingness to creativity and risk oriented respectively were, 2.243, 2.109, 2.542, 3.541, 2.952 and 2.064 (Table 2).

## Evaluation of the Current and Desirable Status of Organic Farming Development Indicators

In order to evaluate the current and the desirable status of indicators and sub-indicators of organic farming development in Lorestan Province, the status of the mentioned indicators was evaluated. The results are shown in Figure 2 and Table 3. According to the average of each indicator, it is clear that there is a gap between the two mentioned situations. Wilcoxon test was used to evaluate the significance of this difference. Based on the results from the ecological, health, fairness, care, social-cultural and production-economic aspects, there was a significant difference (P< 1%) between the current and the desired conditions.

## Status of the Farmers' Participation in Extension and Education Programs

In Table 4, the status of farmers in educational and extension programs implemented at the Lorestan Province was evaluated. Among 384 farmers, 124 people participated in extension and educational class. According to the results, the status of participating in educational and extension programs was less than one third of the studied people. In some cases, such as scientific seminars, it was less than 10%.

## Role of Extension and Educational Programs in the Development of Organic Farming

In order to measure the role of educational and extension programs in the status of organic farming indicators, the mentioned indicators were examined among the farmers who participated in the programs and those who did not, using the Mann-Whitney test.





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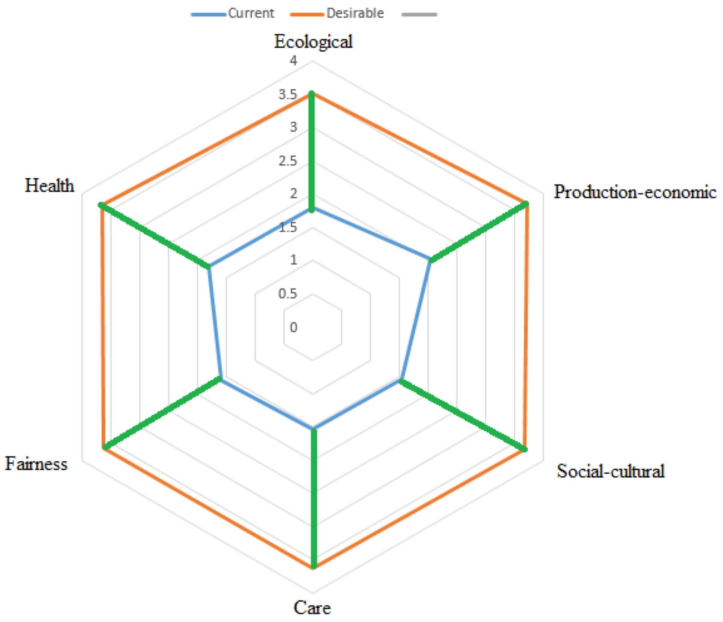


**Figure 2.** The current and the desirable status of organic agriculture development indicators.

**Table 3.** Comparative analysis of the current and desirable status of organic agriculture development indicators.

| Indicators | Number of sub-indicators | Current status | | | Desirable status | | | Z | Sig |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean | SD | CV | Mean | SD | CV | | |
| Ecological | 4 | 1.80 | 0.30 | 0.169 | 3.51 | 0.42 | 0.119 | 6.564 | 0.0001 |
| Health | 5 | 1.81 | 0.34 | 0.189 | 3.65 | 0.39 | 0.106 | 6.585 | 0.0001 |
| Fairness | 4 | 1.59 | 0.29 | 0.182 | 3.62 | 0.42 | 0.115 | 6.651 | 0.0001 |
| Care | 4 | 1.54 | 0.31 | 0.204 | 3.62 | 0.38 | 0.106 | 5.534 | 0.0001 |
| Social-cultural | 7 | 1.55 | 0.36 | 0.232 | 3.68 | 0.41 | 0.110 | 6.225 | 0.0001 |
| Production-economic | 7 | 2.04 | 0.33 | 0.164 | 3.72 | 0.52 | 0.140 | 5.658 | 0.0001 |

Farmers who participated had a better condition in terms of organic agriculture indicators and the difference between the two groups was significant (P< 1%).

### 1) Role of Extension and Educational Classes on the Development of Organic Farming

Based on the results, farmers who participated were significantly different (P< 1%) in ecological (U= 3.42), health (U= 3.25), fairness (U= 5.61), care (U= 4.24), social-cultural (U= 3.56) and production-economic (U= 3.94) indicators with farmers who did not participate in (Table 4). This result is in line with those of Fatemi *et al.* (2022), Maulu *et al.* (2021), and Alotaibi *et al.* (2021a).

### 2) The Role of Field Day on the Development of Organic Farming:

Farmers who participated in field day event were significantly (P<1%) different in ecological (U= 2.98), health (U= 3.54), fairness (U= 4.19), care (U= 3.06), social-cultural (U= 5.04) and production-economic





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(U= 4.35) indicators at 1% level with farmers who did not participate (Table 4). This result is in line with those of Emerick and Dar (2021), Maertens *et al.* (2020), and Murphy *et al.* (2019).

### 3) Role of Extension Exhibitions on the Development of Organic Farming:

According to the results, farmers who participated in extension exhibitions were significantly *(P< 1%)* different in ecological (U= 3.01), health (U= 3.27), fairness (U= 4.31), care (U= 3.69), social-cultural (U= 4.02) and production-economic (U= 5.13) indicators with farmers who did not participate (Table 4). This result is in line with those of Mir Salimi *et al*. (2016), and Ranjbar and Omidi Najafabadi (2014). According to farmers' point of view, holding extension exhibitions for farmers has an effective role in optimal use of resources, social participation, attention to human health, and environment.

### 4) Role of Farmer Field School on the Development of Organic Farming

Based on the results, farmers who participated in farmer field school were significantly ($p$ <1%) different in ecological (U= 3.21), health (U= 3.59), fairness (U= 4.01), care (U= 4.65), social-cultural (U= 3.21) and production-economic (U= 3.52) indicators with farmers who did not participate (Table 4). This result is in line with those of Karimi and Niknami (2020) and Berg *et al.* (2020).

### 5) Role of Scientific Seminars and Workshop on the Development of Organic Farming

The results of the Mann-Whitney test showed that, farmers who participated in scientific seminars and workshop were significantly (P< 1%) different in ecological (U= 3.05), health (U=3.54), fairness (U= 4.16), care (U= 3.65), social-cultural (U= 3.54) and production-economic (U= 2.96) indicators with farmers who did not participate (Table 4). This result is in line with those of Maertens *et al.* (2020), and Murphy *et al.* (2019).

### 6) Role of Demonstration Farms on the Development of Organic Farming

Farmers who visited demonstration farms were significantly ($p$ <1%) different in ecological (U= 3.05), health (U= 2.98), fairness (U= 3.68), care (U= 4.08), social-cultural (U= 5.13) and production-economic (U= 4.03) indicators with farmers who did not participate (Table 5). This result is in line with those of Huang *et al.* (2023) and Colbert (2020).

### Correlation between Variables

According to the results obtained from the correlation analysis between the variables, there was a significant (P< 1%) relationship between the level of access to information sources, extension services, social participation, technical knowledge, attitude, income, willingness to creativity and risk

**Table 4.** Frequency of the studied farmers according to participation in extension and educational programs.

| Educational and extension programs | Participated units? | | Not participated units? | |
|---|---|---|---|---|
| Extension and educational class | 124 | 32.29 | 260 | 67.71 |
| Field day | 115 | 29.95 | 269 | 70.05 |
| Extension exhibitions | 56 | 14.58 | 328 | 85.42 |
| Farmer field school | 62 | 16.15 | 322 | 83.85 |
| Scientific seminars | 32 | 8.33 | 352 | 91.67 |
| Demonstration farms | 46 | 11.98 | 338 | 88.02 |





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oriented with organic farming indicators (Table 6).

## Ordinal Regression

To perform ordinal regression, those variables were included in the ordinal regression analysis that had a significant relationship with the dependent variable based on the correlation coefficient. The dependent variable was the level of using organic farming indicators and the independent variables included access to information sources, extension services, social participation, technical knowledge, attitude, income, willingness to creativity and risk oriented. Table 7 shows the information about the appropriateness of the log-log complementary model. In this table, the null hypothesis was tested using the Chi-square statistic. Due to the fact that the chi-square statistic, which compares the difference between two probabilities, was significant at the 5% level, the null hypothesis was rejected. Therefore, the test confirms the appropriateness of the model. In Table 7, the -2 Likelihood of the model with only intercept is 712.438 while the -2 Likelihood of the model in specified model (Final) is 234.813. That is, the difference (Chi-square statistics) is 712.438 – 234.813= 477.625, which is significant at 0.01 (P> 0.001). Therefore, we can conclude that there is association between the dependent and independent variables. By using the Chi-square statistic, the observed and expected frequencies in groups with different levels of using organic farming have been compared in terms of Pearson and Goodness of Fit. Based on this test, the model is suitable when the significance level is high and the numerical value of the Pearson's statistic and the Goodness-of-Fit deviation are small. Therefore, according to the statistics in this table, it can be concluded that the model is suitable.

The significance of the parallel lines test means rejecting the null hypothesis. Therefore, the null hypothesis is rejected. Nagelkerke's $R^2$ index is reported as a rank regression coefficient. Therefore, 75% of dependent variable changes can be explained through predictor variables. According to the results of the appropriateness test of the log-log complementary model, the relevant equations were adjusted (Reinsel *et al*., 2022).

According to Table 8, the extracted regression equations can be displayed as below:

$$\ell n(-\ell n(1-\gamma))= \alpha_0+\alpha_1x_1+\alpha_2x_2+\alpha_3x_3+\alpha_4x_4+\alpha_5x_5+\ldots+\alpha_kx_k$$

$$\ell n(-\ell n(1-\gamma))= 4.671+3.548x_1+2.654x_2+4.891x_3+3.281x_4+3.608x_5+5.091x_6+3.094x_7+4.009x_8$$

$$\ell n(-\ell n(1-\gamma))= 3.098+3.548x_1+2.654x_2+4.891x_3+3.281x_4+3.608x_5+5.091x_6+3.094x_7+4.009x_8$$

$$\ell n(-\ell n(1-\gamma))= 5.009+3.548x_1+2.654x_2+4.891x_3+3.281x_4+3.608x_5+5.091x_6+3.094x_7+4.009x_8$$

$$\ell n(-\ell n(1-\gamma))= 3.621+3.548x_1+2.654x_2+4.891x_3+3.281x_4+3.608x_5+5.091x_6+3.094x_7+4.009x_8$$

These equations show the probability of occurrence of the research dependent variable for different levels. The variables included in the regression equation are access to information sources, extension services, social participation, technical knowledge about organic farming, attitude about organic farming, income, and willingness to creativity and risk oriented.

## Factor Analysis

In order to summarize the variables, the factor analysis was used. To determine the number of factors in factor analysis, a criterion called the eigenvalue criterion is used. In this regards, the Kaiser method was used and the factors whose eigenvalue was higher than 1 were selected (Kaufman and Dunlap, 2000). According to the results of the factor analysis, four factors that had the ability to explain a significant amount of the total variance of the variables were extracted. After factor





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**Table 5**. Role of educational and extension programs on the status of organic farming indicators.

| Programs→ Indicators ↴ | Extension class | | U | Sig. level | Field day | | U | Sig. level | Extension exhibitions | | U | Sig. level | Farmer field school | | U | Sig. level | Scientific seminars | | U | Sig. level | Demonstration farms | | U | Sig. level |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Yes | No | | | Yes | No | | | Yes | No | | | Yes | No | | | Yes | No | | | Yes | No | | |
| Ecological | 3.12 | 1.96 | 3.42 | 0.01 | 3.27 | 2.05 | 2.98 | 0.01 | 3.40 | 2.08 | 3.01 | 0.01 | 3.30 | 1.99 | 3.21 | 0.01 | 3.81 | 2.03 | 3.05 | 0.01 | 3.25 | 2.13 | 2.98 | 0.01 |
| Health | 3.61 | 2.09 | 3.25 | 0.01 | 3.16 | 1.97 | 3.54 | 0.01 | 3.29 | 1.95 | 3.27 | 0.01 | 3.98 | 2.31 | 3.59 | 0.01 | 3.67 | 2.11 | 3.54 | 0.01 | 3.54 | 2.09 | 3.68 | 0.01 |
| Fairness | 2.99 | 2.01 | 5.61 | 0.01 | 4.12 | 2.18 | 4.19 | 0.01 | 3.81 | 2.01 | 4.31 | 0.01 | 4.14 | 2.18 | 4.01 | 0.01 | 4.09 | 2.13 | 4.16 | 0.01 | 3.95 | 2.17 | 4.08 | 0.01 |
| Care | 3.09 | 1.95 | 4.24 | 0.01 | 3.96 | 1.97 | 3.06 | 0.01 | 4.05 | 2.11 | 3.69 | 0.01 | 4.03 | 2.31 | 4.65 | 0.01 | 3.98 | 1.96 | 3.65 | 0.01 | 3.99 | 2.01 | 3.99 | 0.01 |
| Social-cultural | 3.58 | 1.89 | 3.56 | 0.01 | 4.02 | 2.34 | 5.04 | 0.01 | 4.11 | 2.14 | 4.02 | 0.01 | 4.31 | 2.01 | 3.21 | 0.01 | 3.97 | 2.09 | 3.54 | 0.01 | 4.11 | 2.54 | 5.13 | 0.01 |
| Production-economic | 4.11 | 2.12 | 3.94 | 0.01 | 3.97 | 2.11 | 4.35 | 0.01 | 3.67 | 2.15 | 5.13 | 0.01 | 4.11 | 1.98 | 3.52 | 0.01 | 3.68 | 1.35 | 2.96 | 0.01 | 3.68 | 2.01 | 4.03 | 0.01 |

**Table 6**. Correlation analysis between the variables.

| Variables 1 | Variable 2 | Spearman Correlation coefficient | Sig. level | Result |
|---|---|---|---|---|
| Access to information sources | Level of using organic farming indicators | 0.785 | 0.01 | Confirmation of correlation |
| Extension services | | 0.811 | 0.01 | Confirmation of correlation |
| Social participation | | 0.912 | 0.01 | Confirmation of correlation |
| Technical knowledge | | 0.789 | 0.01 | Confirmation of correlation |
| Attitude | | 0.711 | 0.01 | Confirmation of correlation |
| Income | | 0.632 | 0.01 | Confirmation of correlation |
| Willingness to creativity | | 0.689 | 0.01 | Confirmation of correlation |
| Risk oriented | | 0.712 | 0.01 | Confirmation of correlation |
| Age | | 0.098 | 0.251 | Non-confirmation of relation |

**Table 7.** Examining the appropriateness of the selected complementary Log-Log regression model.

| Appropriateness of the selected Complementary log-log regression model | | | |
|---|---|---|---|
| Model | -2 log Likelihood | $X^2$ | P |
| Intercept Only | 712.438 | 215.54 | 0.001 |
| Final | 234.813 | | |
| Goodness-of-fit | | | |
| Statistic | $X^2$ | Sig | |
| Pearson | 267.233 | 0.324 | |
| Deviance | 311.315 | 0.358 | |
| Parallel lines test | | | |
| Model | -2 log Likelihood | $X^2$ | Sig |
| Null Hypothesis | 436.312 | 276.232 | 0.004 |
| General | 342.431 | | |
| Cox and Snell $R^2$= 0.716, Nagelkerke $R^2$= 0.754, McFadden $R^2$= 0.756 | | | |

**Table 8.** Ordinal regression coefficients and significance levels.

| | Variable | β | Sig. level |
|---|---|---|---|
| 1 | Access to information sources | 3.548 | 0.003 |
| 2 | Extension services | 2.654 | 0.009 |
| 3 | Social participation | 4.891 | 0.002 |
| 4 | Technical knowledge about organic farming | 3.281 | 0.003 |
| 5 | Attitude about organic farming | 3.608 | 0.003 |
| 6 | Income | 5.091 | 0.001 |
| 7 | Willingness to creativity | 3.094 | 0.003 |
| 8 | Risk oriented | 4.009 | 0.002 |
| Constant | Level 1 | 4.671 | 0.002 |
| | Level 2 | 3.098 | 0.003 |
| | Level 3 | 5.009 | 0.001 |
| | Level 4 | 3.621 | 0.003 |

rotation in the Varimax method, it was found that these 4 factors explained 80.1% of the variance of the factors affecting the development of organic farming dimensions. These four factors and their share of variance are shown in Table 9 and include the followings:

(1) Development of technical knowledge and empowerment of farmers in the field of organic farming,

(2) Government support for the use of organic farming methods and development of its dimensions,

(3) Application of legal instruments for the development of organic agriculture,

(4) Changing consumers' views towards the use of organic foods.

In order to identify the variables related to each factor and to make the factors more interpretable, the factor load matrix of the variables was used (Table 10). Variables that had a factor load greater than 0.5 had a very favorable significance level with their factor.

## CONCLUSIONS

According to the results about organic farming indicators, it is clear that there is a gap between the current and favorable situations. Based on the results from the ecological, health, fairness, care, social-cultural and production-economic aspects, there was a significant (P< 1%) difference between the current and desired conditions. Therefore, one should try to reduce the gap between these two situations in terms of all aspects by implementing different programs.

In order to measure the role of educational and extension programs on the status of organic farming indicators, the mentioned indicators were examined among the farmers who participated in the programs and those





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**Table 9**. Factors extracted from factor analysis.

| Factors | Eigenvalue | % Explained variance | % Cumulative variance |
|---|---|---|---|
| First Factor | 8.951 | 32.581 | 32.581 |
| Second Factor | 6.897 | 21.512 | 54.093 |
| Third Factor | 5.881 | 15.524 | 69.617 |
| Fourth Factor | 5.614 | 10.498 | 80.115 |

**Table 10.** Extracted factors and variables of each factor.

| Factors | Variables | Factor load |
|---|---|---|
| Development of technical knowledge and empowerment of farmers in the field of organic farming | Participation in organic farming training courses | 0.69 |
| | Visiting demonstration farms of organic farming methods and results | 0.58 |
| | Distribution of organic farming educational bulletins | 0.71 |
| | Creating favorable changes in the attitude towards organic farming | 0.66 |
| Government support for the use of organic farming methods and development of its dimensions | Facilitative support of the government for the cultivation of organic products | 0.64 |
| | Financial support of the government for the cultivation of organic products | 0.79 |
| | Spiritual support for cultivation organic crops | 0.54 |
| Application of legal instruments for the development of organic agriculture | Legal support for the cultivation of organic crops | 0.61 |
| | Development of standards for the production of agricultural products | 0.66 |
| | Legal supervision of the quality of production of agricultural products | 0.69 |
| Changing consumers' views towards the use of organic foods | Using mass media to spread the culture of consuming organic products | 0.74 |
| | Informing people about the negative effects of non-organic foods | 0.59 |
| | Holding seminars and training workshops in the field of organic food consumption | 0.72 |

who did not. Farmers who participated in extension and educational programs had a better condition in terms of organic agriculture indicators and the difference between the two groups was significant (P< 1%). This result clarifies the path and solution to reduce the difference between these two situations. This result states what extension and educational methods can be used to improve the existing situation. This is a fundamental and important achievement for policy makers and planners.

According to the results obtained from the correlation analysis between the variables, there was a significant (P< 1%) relationship between the level of access to information sources, extension services, social participation, technical knowledge, attitude, income, willingness to creativity and risk oriented with organic farming indicators.This result also explains the convergent variables with organic agriculture indicators, which can be expected to improve the status of organic farming indicators by improving their situation. Based on the results of the research, the factors affecting the development of organic farming dimensions were identified, and attention to them plays an important role in the development of these dimensions. One of the most important of these is development of technical knowledge and empowerment of farmers in the field of organic farming. This can be achieved by using the strategies of participation in organic farming training courses, visiting demonstration farms of organic farming methods and results,





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distribution of organic farming educational bulletins and creating favorable changes in the attitude towards organic farming.

According to the results, the second most effective factor was the government's support for the use of organic farming methods to develop its dimensions. For this purpose, government facilitation support for the cultivation of organic products, financial support for the cultivation of organic products and moral support should be provided by encouraging and persuading farmers to cultivate organic products. For spiritual support, one can use strategies such as appreciating organic farmers as exemplary and superior farmers and awarding them a certificate of appreciation, paying attention to their opinions in decision-making and planning, and using their indigenous knowledge in educational and extension programs. Therefore, this research will have positive implications for the development of organic farming, as it provides research-based information about the real actors in Iran's agricultural systems. The results of this research have implications for the design of future extension and education programs for the development of organic farming in the agricultural sector. It enables planners, policy makers and related ministries to design applied policies and programs that truly reflect the factors affecting the development of organic farming and the skills that need improvement. As theoretical implications, it can be concluded that adoption of organic agriculture by farmers follows a systematic decision-making process. Use of organic agriculture requires educational programs in appropriate social, institutional, and legal contexts. Since the contexts are different according to the region, extension and education programs should be chosen that suit the needs of the target audience, social and cultural structure, and create favorable conditions for the adoption of organic agriculture in a social system. Also, as practical implications, recognition of the role of extension and educational programs in development of organic farming dimensions in vegetable and summer crops cultivation ensures what kind of programs are suitable for the development of organic agriculture according to social systems. The results of this research enable planners, policy makers, and the related ministries to design applied policies and programs that truly reflect the factors affecting the development of organic farming and the skills that need improvement. Other research issues related to similar themes for the research of other scientists are:

Analysis of barriers to farmers' participation in organic farming extension and education programs.

Identifying the sociable context of organic farming.

Designing suitable content for organic farming extension and education.

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# نقش برنامه های ترویجی و آموزشی در توسعه ابعاد کشاورزی ارگانیک در استان لرستان

**جهانبخش بیرانوند، احمدرضا عمانی، آزاده نوراله نوری‌وندی، و محمدرضا اردکانی**

## چکیده

یکی از مهم‌ترین مخاطرات زیست‌محیطی که در سال‌های اخیر چالش‌های زیادی را ایجاد کرده است، توسعه کشاورزی غیر ارگانیک و استفاده بیش از حد از نهاده‌های شیمیایی در بخش کشاورزی است. هدف از این تحقیق بررسی نقش برنامه های ترویجی و آموزشی بر توسعه کشاورزی ارگانیک در کشت سبزی و صیفی در استان لرستان بود. این پژوهش از نظر ماهیت کمی و از نظر هدف کاربردی است. جامعه آماری را کشاورزان سبزی و صیفی در لرستان تشکیل می دادند (۳۵۰۰ نفر). حجم نمونه بر اساس جدول مورگان (۳۸۴ نفر) تعیین شد. به منظور تعیین روایی و پایایی پرسشنامه از پانل خبرگان و ضریب $\Theta$= ۰/۸۵ استفاده شد. بر اساس نتایج، ابعاد کشاورزی ارگانیک بهینه نبود. از بعد اکولوژیکی، بهداشتی، انصافی، مراقبتی، اجتماعی-فرهنگی و تولیدی-اقتصادی بین شرایط فعلی و مطلوب در سطح ۱ درصد تفاوت معناداری وجود داشت. کشاورزانی که در برنامه های کلاس ترویجی و آموزشی، روز مزرعه، نمایشگاه های ترویجی، مدرسه مزرعه کشاورز، سمینارهای علمی و مزارع نمایشی شرکت کردند، از نظر همه جنبه های کشاورزی ارگانیک با کسانی که شرکت نکردند، تفاوت معنی داری در سطح ۱ درصد داشتند. با تحلیل عاملی، مهمترین عوامل موثر بر توسعه ابعاد کشاورزی ارگانیک عبارتند از: (۱) توسعه دانش فنی و توانمندسازی کشاورزان در زمینه کشاورزی ارگانیک، (۲) حمایت دولت از استفاده از روش های کشاورزی ارگانیک و توسعه کشاورزی. ابعاد آن، (۳) استفاده از ابزارهای قانونی برای توسعه کشاورزی ارگانیک و (۴) تغییر دیدگاه مصرف کنندگان نسبت به استفاده از غذاهای ارگانیک.





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