

# PROSPECTS AND THREATS FOR DEVELOPING ORGANIC AGRICULTURE: THE EXAMPLE OF AZERBAIJAN

**Shafa Tiflis Aliyev**

Sumgait State University, UNEC Centre for Karabakh Economic Research, Azerbaijan

**Elnura Bunyad Mammadova**

Azerbaijan Cooperation University, Azerbaijan

**Lala Adil Hamidova**

Azerbaijan State University of Economics, Azerbaijan

**Vafa Rashid Dunyamaliyeva**

Azerbaijan State University of Economics, Azerbaijan

**Shahin Nadir Hurshudov**

Ganja State University, Azerbaijan

## ABSTRACT

The article's purpose is to evaluate empirical evidence of the main threats to organic agriculture formation and provide the argumentation of its development prospects in Azerbaijan's current conditions. Questioning of agricultural business owners identified threats and prospects for developing organic agriculture in Azerbaijan. The opportunities and threats for developing organic agriculture are determined and differentiated by groups of entrepreneurs doing business in traditional/organic agriculture. Based on the results of the clustering of the agricultural enterprises depending on the level, the priority of threats, and prospects for development, the strategies for developing organic agriculture in Azerbaijan have been determined: educational strategy of financial accessibility, innovative growth, and infrastructure development.

**Keywords:** Azerbaijan; organic agriculture; prospects; threats; development; traditional agriculture

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## INTRODUCTION

Many scientists studying the prospects for developing organic agriculture proceeded from the view that the basis for its effect is to stimulate the growth of organic production by encouraging

demand for eco-products (Mpanga et al., 2021; Toth et al., 2016). The low popularization of eco-production among farmers and the population seems to be one of the destructive factors of development. On the other hand, organic farming is impossible without introducing the

latest technologies and a comprehensive scientific study of various aspects of the agricultural industry to achieve a balance between productivity and the state of the ecosystem (Canwat & Onakuse, 2022). Since, for example, the yield of organic crops is almost 25% lower than in traditional agriculture. The cost of organic products is higher than conventional agricultural production, etc. (Adamchak, 2022). That is, the advantage of organic agriculture for the ecosystem is balanced by higher production costs, which in turn poses a threat to its development. Especially concerning emerging market countries. Most of which have the most increased environmental pollution and low material support and motivation for developing organic agriculture.

In Azerbaijan, industrial agriculture in current conditions is sharply criticized because biodiversity is suffering in the country, the shortage of clean water is increasing, and the area of erosive soil is expanding (Aliyev, 2018). Despite these egregious threats, scientists are concerned about the significantly lower productivity of organic farming, which requires an even more significant increase in agricultural land for exploitation (Hajiyeva, 2021; Valiyev et al., 2022). This study's scientific priority was identifying destructive factors that hinder the development of organic agriculture in Azerbaijan. Substantiation of effective strategies for developing the industry by arguing complementary aspects contributing to developing organic agricultural products.

## LITERATURE REVIEW

Research activities are characterized by various issues related to developing organic animal husbandry, fisheries, and crop production (Mpanga et al., 2021; Toth et al., 2016).

Animal health and welfare issues in organic pig, poultry, dairy, and meat production systems are priority research areas (Zagata, Uhnak & Hrabák, 2021; Toth et al., 2016). Another vital area of research is the optimization of production and the improvement of economic sustainability. Most scientists agree that the fundamental destructive factor in the development of organic production of agricultural products is low yield and productivity (Thakur et al., 2022). This, in turn, increases the cost of production and reduces the industry's competitiveness. The leveling of this risk in developing organic

agriculture is to introduce innovations: process, institutional, marketing, food, technological and financial. At the same time, the priority of introducing these innovations was not discussed, but the emphasis was placed on their compatibility (Canwat & Onakuse, 2022).

Understudy of developing organic agriculture, one can see a pronounced differentiation of scientific approaches in the experience of developed and developing economies (Mpanga et al., 2021; Lehtimäki & Virtanen, 2020; Verburg, Verberne & Negro, 2022; Canwat & Onakuse, 2022). Within the experience of developed countries, the development potential and destructive factors have been investigated regarding expanding developing organic agriculture. The industry is predominantly at the stage of sustainable growth, and in some countries, even at the maturity location (Verburg, Verberne & Negro, 2022). Scientists such as Mpanga et al. (2021) studied the information component of the industry and the dissemination of agricultural knowledge as drivers and barriers to development using the example of the United States. Finland, Lehtimäki, and Virtanen (2020) used the theory of conventions to study the problems of institutionalization as the basis for the economization of organic agriculture. Scientists Verburg, Verberne, and Negro (2022) using the example of the Netherlands, Denmark, and Austria, have investigated organic agriculture (organic dairy farming) as a profitable business and studied strategies for scaling it up.

Scientists in the practice of developing countries have considered such aspects as innovation, profitability, productivity, and so on. But within a specific production process and not in terms of economies of scale within the entire industry.

Other scientists focused on emerging markets, where innovation is a priority for developing organic agriculture but challenging to implement due to the weak capacity of the industry (Canwat & Onakuse, 2022). In developing countries, organic agriculture is in its infancy (except China); most studies have been aimed at studying: the benefits of organic agriculture for the economy, its institutional framework, the possibilities of financing the technological basis of the industry (Canwat & Onakuse, 2022; Toth et al., 2016). Based on the experience of Kenya, Canwat and Onakuse (2022) proved that

agricultural legislative reforms can serve as a driver for developing agriculture. Using Romania as an example, Toth et al. (2016) outlined the importance of the technological basis for developing organic agriculture. They singled out the EU as a targeted source of funding.

Of interest are the studies of Zagata, Uhnak, and Hrabák (2021), Blaće, Čuka, and Šiljković (2020), which analyze the interaction between organic and traditional agriculture in the Czech Republic, Croatia. Scientists concluded the importance of readiness and interest of the society in this sector of the national economy. It necessitates defining sustainable development as the main priority in state programs.

Azerbaijani scientists are also actively exploring the features of the formation of organic farming. Many articles are devoted to intensifying traditional agriculture because the industry is seen as an alternative to the country's energy industry and the basis for the national economy diversification (Hajiyeva, 2021; Gulaliyev et al., 2019). Organic agriculture is only seen as the industry of the future. (Aksoy et al., 2018). But subject to the resolution of the country's strategically essential tasks - reducing energy dependence due to industrial agriculture. And scientists such as Canwat and Onakuse (2022) have studied only the importance of innovation and technology, which are primary in developing organic agriculture.

Based on the preceding, it can be argued that in each country, the complimentary and destructive factors of agricultural development depend on many factors: the level of economic growth, the level of readiness for the development of the industry, the level of development of topics, popularization among the population, the country's orientation towards sustainable development, and so on. Therefore, the experience of developing organic

agriculture in Azerbaijan requires a separate study due to the lack of scientific development on the subject.

## METHODOLOGY

The questionnaire method was used to quantify the prospects and threats for developing organic agriculture in Azerbaijan. The survey was conducted in June-September 2022 among agricultural business owners not related to organic agriculture (group 1) and business owners engaged in organic agriculture (group 2). The respondents represented all economic regions of Azerbaijan. The number of respondents was 1011 people. Respondents were asked to evaluate the prospects and threats for developing organic agriculture in Azerbaijan on a 5-point Likert scale (range from "1" to "5") using the questions in Table 1 (Canwat & Onakuse, 2022; Megits, Neskrodieva & Schuster, 2020; Sun & Li, 2022; Alotaibi et al., 2021; Aksoy et al., 2018; Sahiti et al., 2022). The higher the score, the higher the manifestation of a particular prospect or threat, and vice versa. The survey was conducted face-to-face and remotely. Voluntary participation and anonymity of the results were assumed to ensure the results' representativeness. Representativeness was also confirmed by sample size at a significance level of 0.01 (Taherdoost, 2017).

The Fibonacci rule was used to determine the manifestation of prospects and threats for developing organic agriculture in Azerbaijan. We have defined indicative level ranges (Formula 1) and a t-test for adjustment. The adjustment involved searching for contents of levels as close as possible to the results according to the Fibonacci rule, which is statistically significant differences according to the t-criterion.

$$\begin{cases} Low \in [b_{min}; b_{min} + 0.38 \times (b_{max} - b_{min})] \\ Medium \in (b_{min} + 0.38 \times (b_{max} - b_{min}); b_{min} + 0.62 \times (b_{max} - b_{min})] \\ High \in (b_{min} + 0.62 \times (b_{max} - b_{min}); b_{max}] \end{cases} \quad (1)$$

where *Low*, *Medium*, *High* – low, medium, and high levels of prospect/threat;  $b_{min}$  – lowest possible score ( $b_{min}=1$ );  $b_{max}$  – maximum possible score ( $b_{max}=5$ )

We determined the strategies for developing organic agriculture using cluster analysis using Kohonen maps in the program Deductor Academic 5.3. Clustering was performed using

scores for each prospect/threat (Table 1). The normal distribution of these data, and the absence of extreme data, were proved using the Dixon criterion.

## RESULTS

The survey results identified the main prospects and threats to developing organic agriculture in Azerbaijan (Table 1). The calculation of average scores for the

manifestation of opportunities and threats for developing organic agriculture became possible through low coefficients of variation (up to 7%) of scores. The calculation was carried out for each issue differently for agricultural business owners.

**Table 1:** Scoring of prospects and threats for the developing organic agriculture in Azerbaijan

Prospects / Threats	Level ranges			Average score	
	Low	Medium	High	Organic	Traditional
<i>Prospects</i>					
Determination of developing organic agriculture as a priority for developing agriculture	[1; 2.6]	(2.6; 3.5]	(3.5; 5]	2.4	2.1
Support for developing organic agriculture by international organizations	[1; 2.5]	(2.5; 3.5]	(3.5; 5]	2.5	2.1
Availability of natural resources for developing industry	[1; 2.5]	(2.5; 3.4]	(3.4; 5]	2.6	2.6
The international trend towards promoting a healthy lifestyle, growing demand for organic products among the population	[1; 2.6]	(2.6; 3.3]	(3.3; 5]	2.7	2.5
Organic farming contributes to sustainable business development and economic diversification	[1; 2.5]	(2.5; 3.6]	(3.6; 5]	2.9	2.5
<i>Threats</i>					
Insufficient legislative regulation	[1; 2.5]	(2.5; 3.8]	(3.8; 5]	4.5	5.0
Lack of effective quality control of organic products	[1; 2.5]	(2.5; 3.7]	(3.7; 5]	4.8	5.0
Lack of experience in running an organic farming business	[1; 2.5]	(2.5; 3.5]	(3.5; 5]	4.3	5.0
Lack of government financial support	[1; 2.7]	(2.7; 3.4]	(3.4; 5]	3.4	4.0
High international competition in the organic product market	[1; 2.5]	(2.5; 3.6]	(3.6; 5]	3.8	4.5
Lack of demand due to high production costs	[1; 2.6]	(2.6; 3.5]	(3.5; 5]	3.3	3.7
Insufficient innovative business development	[1; 2.5]	(2.5; 3.4]	(3.4; 5]	3.2	3.5
Lack of funding for the scientific development organic agriculture industry	[1; 2.7]	(2.7; 3.4]	(3.4; 5]	3.1	3.5
Low awareness of business owners, managers, and staff about the advantages of organic agriculture	[1; 2.4]	(2.4; 3.5]	(3.5; 5]	2.9	3.6
Lack of necessary production infrastructure (storage, processing plants)	[1; 2.5]	(2.5; 3.4]	(3.4; 5]	3.7	4.1
Lack of stable, established supply chains	[1; 2.6]	(2.6; 3.4]	(3.4; 5]	3.5	4.4

□ - low prospects/threats;  
 □ - high prospects/threats

■ - average prospects/threats;

*Organic* – business entities do organic agriculture; *Traditional* – Business entities do organic agriculture.

Source: Authors' finding

The following are the threats to developing organic agriculture at a high level for both categories of respondents.

Insufficient legislative regulation (4.5 points for business owners of organic agriculture and 5 points for agricultural business owners who don't do organic agriculture). The Law of About environmentally friendly agricultural industry (2008) regulates organic products' production, storage, transportation, and labeling. But this is not enough to ensure effective organic agriculture management in Azerbaijan.

Lack of effective quality control of organic products (4.8 points for the *Organic* group and 5 points for the *Traditional* group). The lack of enterprises operating register in organic agriculture in Azerbaijan, the controlling departments, and the relevant regulations do not allow adequate control of organic products (FAO, 2021; Aksoy et al., 2018).

Lack of experience running an organic agricultural business (4.3 points for the *Organic* group and 5 points for the *Traditional* group).

High international competition in the organic market (3.8 points for the *Organic* group and 4.5 points for the *Traditional* group). All organic products in the Azerbaijani market are imported (FAO, 2020).

The threat of a lack of demand due to the high cost of production compared to traditional agriculture affects differently. Average threat to entrepreneurs in organic agriculture (3.3 points).

High for entrepreneurship in conventional agriculture (3.7 points).

We also have determined less significant threats to developing organic agriculture. Insufficient innovative business development (3.2 points for the *Organic* group and 3.5 points for the *Traditional* group). Organic agriculture in Azerbaijan is a relatively new industry that requires the improvement of production technologies, storage, transportation, and management technologies.

Lack of established supply chains (3.5 points for the *Organic* group and 4.4 points for the *Traditional* group). The non-proliferation of organic agriculture and the lack of stable customers and suppliers lead to additional financial costs, time costs, increased risk of late fulfillment of contract terms, increased costs, and product damage.

The threat of lack of state financial support (3.4 points for the *Organic* group and 4 points for the *Traditional* group), funding scientific development in the industry (3.1 points for the *Organic* group and 3.5 points for the *Traditional* group). In subsidy programs at the national level, priority is given to traditional agriculture. Organic agriculture does not provide government subsidies (FAO, 2020). The creation of organic products requires scientific development aimed at the design or implementation of new technologies, which requires additional funding.

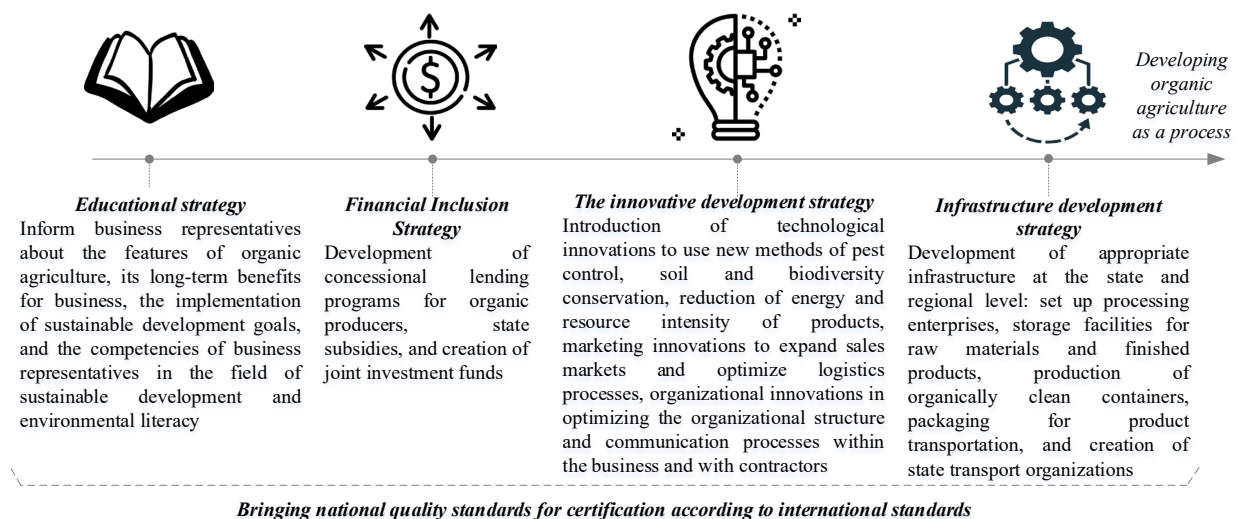
**Table 2:** Clusters of agricultural entrepreneurs in Azerbaijan depending on the level of influence, and priority of threats/prospects for developing organic agriculture

Clusters	Level of Threats/Prospects	Priority Threats
Cluster 1	High threats, low prospects for developing organic agriculture	Legislative lack of regulation and effective quality control of organic products, and lack of experience in running an organic agricultural business
Cluster 2	Medium threat, low and medium perspective	Legislative lack of regulation and effective quality control of organic products, and experience in running an organic agricultural business, lack of funding
Cluster 3	Medium threats, low and medium perspective	Legislative lack of regulation and effective quality control of organic products, and experience in running an organic agricultural business, low innovative business development
Cluster 4	Medium threats, low and medium opportunities	Legislative lack of regulation and effective quality control of organic products, experience running an organic agricultural business, lack of appropriate production infrastructure, stable, established supply chains.

Source: Authors' finding

Lack of appropriate production infrastructure (storage facilities, processing plants) (3.7 points for the *Organic* group and 4.1 points for the *Traditional* group). Organic agriculture puts forward strict requirements for equipment, facilities, and materials in which it is stored and transported and products are produced. Such equipment, structures, and materials should not contain prohibited substances. Therefore, organic agriculture requires a unique environmentally friendly production infrastructure. Strategies for developing organic agriculture in Azerbaijan have been determined based on cluster analysis results (Table 2).

Using the clustering results, 4 clusters of enterprises in the agricultural sector in Azerbaijan were identified depending on the level of influence, a priority of threats, and prospects for developing organic agriculture (Fig. 1). The values of clustering errors confirmed the statistical significance of the clustering results. It does not exceed 5%, and the percentage of recognized objects - is lower than 95%. For the training sample, the maximum clustering error was 0.0194; for the test sample, it was 0.0132. The percentage of recognized objects for the training sample is 97.5%, and for the test sample, 98.1%.



**Figure 1:** Strategies for developing organic agriculture in Azerbaijan

Source: Authors' finding

## DISCUSSION AND CONCLUSION

The empirical results showed that today's business in Azerbaijan is focused only on the development of traditional agriculture. The main threats to developing organic agriculture are the imperfection of legislative regulation, lack of effective control, lack of experience in producing organic products, and state support. These destructive factors are natural for emerging markets, according to such studies as Canwat and Onakuse (2022), Sun and Li (2022), and Alotaibi et al. (2021), and are inherent in an industry that is in its infancy. But it should be noted that according to the interviews, an almost absolute disinterest and misunderstanding of the prospects for developing the organic industry is determined. And this is typical even for those businessmen who partially implement

approaches and technologies based on the greening of production. Differences in the average score of the answers to questions about the prospects for developing organic agriculture in Azerbaijan, exhibited by business owners who produce organic products, and those who do not, are confirmed by the *t*-test. That is, it can be argued that the critical threat to the formation and development of organic farms in Azerbaijan today is: information asymmetry between all market participants and the lack of popularization of ecological production of agricultural products among the population, underestimation of the organic agriculture benefits. As shown by previous studies by Canwat and Onakuse (2022), these threats are inherent in the more advanced stage of agricultural development in developing countries.

The identified features of the threats to developing organic agriculture in Azerbaijan can be explained by the fact that, at the moment, the national economy's priority is the economy's diversification. Due to the high economic importance of traditional agriculture as an alternative to the energy complex, the emphasis is on achieving a significant increase in the industry's added value in the shortest time. And because of the capital intensity of organic production of agricultural products, the business does not see the prospects for its development. In our opinion, based on the results obtained, this seems to be an erroneous strategy. The projects for developing organic agriculture are more attractive for foreign investment, unlike traditional agriculture (Verburg, Verberne & Negro, 2022). For example, today, there is support in Azerbaijan for developing organic agriculture from international organizations. The project "GCP/AZE/006/TUR. Developing organic farming and building up institutional development in Azerbaijan", USAID "Smart Farm." The United States Agency is implementing educational projects for International Development (USAID), the German Agency for International Cooperation (GIZ), the Non-Profit Organization for Assistance to Developing Countries (COSPE), the Swedish International Development Cooperation Agency (SIDA), the Turkish Cooperation and Coordination Agency (TIKA), United Nations Development Program (UNDP) and others (FAO, 2020).

On the other hand, organic agricultural products are in great demand in developed countries. The international trend towards promoting a healthy lifestyle, respect for the environment, and a green economy create a solid foundation for a steady increase in demand for organic products. For 2022-2030 the global organic food and beverage market is projected to grow by 13% annually (Grand View Research, 2022). This, in turn, can significantly increase the non-energy export potential of Azerbaijan.

Based on the study results, practical strategies for leveling threats to developing organic agriculture by groups of clusters depending on the level of threats are substantiated.

Cluster 1 - business entities for which organic agriculture is associated with threats assessed at a high level. Benefits for this cluster are rated as low. This cluster is represented exclusively by

business entities unrelated to organic products. Therefore, a pessimistic assessment of the prospects and the need for developing organic agriculture is associated with a misleading idea about this agriculture sector. The cluster development is based on an educational strategy, the essence of which is to inform business representatives about the features of organic agriculture, its long-term benefits for business, the performance of the SDGs, and the development of competencies of business representatives in the field of sustainable development, and environmental literacy. The strategy involves raising awareness, which does not solve the objective problems associated with legislative regulation, financing, etc. The educational strategy is the initial strategy on the evolutionary path of organic agriculture development and short-term, the implementation of which leads to a transition to other development strategies.

Cluster 2 - business entities, the features for which are the funding problem. Prospects for developing organic agriculture are assessed at a low and medium level. Here proper is the strategy of financial inclusion, which is implemented through developing concessional lending programs for organic producers, state subsidies, and the creation of joint investment funds.

For cluster 3, a low level of innovative business development is determined to be elected among the priority threats to growth, legislative unsettledness, lack of effective quality control of organic products, and lack of experience running an organic agricultural business. To minimize these threats are technological innovations, new pest control methods, soil conservation and biodiversity, and reducing product energy and resource intensity. Marketing innovations contribute to the expansion of sales markets and the optimization of logistics processes. Organizational innovations can optimize the organizational structure of business entities and communication processes within the business and with contractors.

For cluster 4, the threats to developing organic agriculture are assessed at an average level, with low and medium prospects. It is essential to create the appropriate infrastructure: the construction of processing enterprises, storage facilities for raw materials and finished products, the production of containers, packaging for



transporting products, and the creation of state transport organizations.

The scientific results of this study were based on a sample of respondents doing business in Azerbaijan. Therefore, we cannot extend good patterns to the practice of other countries or industries. Also, this study did not consider such aspects as opposition or subordination of organic and traditional agriculture. Given the identified threats and prospects in our future studies, we will consider these aspects.

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## ABOUT THE AUTHORS

Shafa Tiflis Aliyev, e-mail:

[shafaaliyev@gmail.com](mailto:shafaaliyev@gmail.com)

**Shafa Tiflis Aliyev**, Sumgait State University, and UNEC Centre for Karabakh Economic Research, Azerbaijan, Doctor of Economic Sciences, Professor.

**Elnura Bunyad Mammadova**, Azerbaijan Cooperation University, Azerbaijan, Ph.D. in Economics, Associate Professor.

**Lala Adil Hamidova**, Azerbaijan State University of Economics, Azerbaijan, Ph.D. in Economics, Associate Professor.

**Vafa Rashid Dunyamaliyeva**, Azerbaijan State University of Economics, Azerbaijan, Ph.D. in Economics, Associate Professor.

**Shahin Nadir Hurshudov**, Ganja State University, Azerbaijan, Ph.D. in Economics, Associate Professor.