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Economic efficiency of organic wheat production

Abstract. *The aim of the study is to determine the economic effect of organic wheat production in comparison with traditional and No-till technologies, which predetermine a change in the nature of consumer preferences in the food market. The article analyzes the advantages and disadvantages of organic wheat in accordance with the cultivation technology (traditional, No till).*

In accordance with the purpose of the study, the following tasks were solved: the advantages of organic products over products grown in the traditional way were formulated; a comparative analysis of costs, yields and prices, profitability for growing traditional and organic spring wheat was carried out, the experience of European organic farmers was analyzed; changes in the composition of price and non-price factors of demand for organic agricultural products were revealed farms, that is, despite the high price of organic wheat, there is a demand from consumers who are ready to buy it.

It is concluded that it is necessary to maintain fair competition in the food market, as well as the availability of information on certification requirements and the quality of organic products to ensure equal access of producers to the market and environmental safety.

Keywords: *organic products, agriculture, wheat, economic efficiency, profitability, traditional technology, No-till.*

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Introduction. Currently, organic agriculture is understood as a form of farming in which there is a conscious minimization or complete rejection of the use of synthetic chemicals used to optimize the growth of plants and living organisms, land cultivation, control of pests, diseases and weeds, as well as genetic engineering, genetically modified organisms, obtaining of ecologically safe for human nutrition agricultural products. On the other hand, compared to traditional agriculture, the method of organic farming production improves soil quality, reduces the rate of biodiversity loss, reduces the environmental impact of greenhouse gas emissions and represents one of the viable alternatives. Organic products are an alternative to traditional ones, which are essentially environmentally friendly products grown taking into account the technological requirements of organic production, which is confirmed by the appropriate labeling. It is a priori characterized by higher quality than traditional products, therefore, it is logical that organic products should be more expensive than traditional ones. Nevertheless, there are cases, especially in countries with a developed market for organic products, when the price of organic products is lower than the traditional one, but only if the efficiency of this organic technology is higher or there are significant subsidies for the production of organic products [1].

The main feature in determining the environmental characteristics of a product is its partial or complete safety for the environment and human health. This is what forms the additional consumer value of organic products in comparison with competitors' goods. According to the World Health Organization (WHO), agriculture affects 75% of our health potential every day through nutrition (50% of a proper and healthy diet and lifestyle, 25% of the environment) [2].

Therefore, one of the most effective tools to solve the tasks set by the doctrine is to provide the population with high-quality, safe and healthy products. Therefore, the development of the organic agriculture market in Kazakhstan is an important government task. The development of a culture of healthy eating of the population can positively affect the development of organic production and promotion of organic products at the state level. If the consumer will be confident in the quality of purchased products, including vegetable products that meet the standards of organic production, which in world practice is guaranteed by a strict system of certification of both products and production, then a large proportion of consumers will make a consumer choice in favor of environmentally friendly products [3].

Material and methods of research. The material for the study served as scientific publications of foreign and domestic scientists devoted to the economic problems of sustainable development of agriculture and its new eco-innovative direction - organic (ecological, biological). Statistical data, materials of international scientific conferences, current publications in the media were used to study organic farming. Basic documents reflecting the position of the government of the Republic of Kazakhstan in relation to organic production, served as laws, presidential messages, state and sectoral programs, regulatory documents of the country. The study of the problems of organic farming methods was conducted using general scientific methods and techniques, such as scientific review and analysis, synthesis of the views and positions of the authors. Structural, calculative-constructive and variant methods were used to justify the proportions between the conventional and organic production.

Discussions and results. Organic agriculture is practiced in 181 countries of the world, occupying 58 million hectares of agricultural land and 2.7 million agricultural producers. According to the report of FIBL&IFOAM, from 2020 to 2022, the amount of land allocated for these purposes in Kazakhstan decreased from 192 thousand hectares to 114,8 thousand hectares, which means the country ranks 29 th in the world, table 1.

Table 1
Indicators of the development of organic agriculture on average over the past three years

Indicators	Area of organic land, ha	The share of organic land from the total share of agricultural land, %	Number of certified manufacturers, units
Australia	35,687,799	9.9	3 906
United States of America	2,326,551	0.6	16 476
Canada	1,417,612	2.4	7 791
Japan	11,992	0.2	7 039
Russia	615,187	0.3	193
Kazakhstan	114,886	0.1	279
Kyrgyzstan	30,259	0.3	1144
Israel	6 287	1	495
Belarus	6 838	0.1	38
Armenia	566	0.03	29

The main factor of reduction is logistics costs during export. The main factor of reduction is the logistical costs of exporting. It is not always profitable for a farmer to sell his products even at a markup of more than 40% to Europe, due to the fact that all this profit will be deposited in the costs of logistics. This is where traders come to the rescue, but they buy below the market price, which is not very good for the farmer. Today in Kazakhstan there are about 60 producers and 7 traders of organic products. In this case, only products that were produced in compliance with the requirements of international or national standards, and which have a certificate obtained from independent certification bodies can be considered organic. Products without a certificate does not have the status of 'organic' [4].

While organic products are becoming more popular in the world, in the domestic market of Kazakhstan the demand for organic products is not growing at the fastest rate. The reason for this is the lack of clear criteria for accreditation, own processing and business interest. International certificate issued to Kazakh farmers, who plan to export their products, is not recognized in our country, and, in fact, it is not organic products. But after all, farmers do not always send all products for export. Sometimes the demand is not the same, or the price does not suit, and then again there is the question of recognition and lack of processing of organic products. Then the farmer is forced to sell his products, grown according to all standards of organic production, as conventional [5].

In Kazakhstan, according to data from a study of the domestic market, most of the areas under the production of organic products are located in Kostanay, North Kazakhstan, Akmola regions.

The main products are designed for export to the EU: wheat, oilcake, oilseeds and soybeans.

According to surveys of agricultural formations, the price premium for organic products, or the so-called "organic premium", on average ranges from 20% to 60%, compared with the market value of traditional products. The exception is oilseed flax, for which the organic premium exceeds 200% and is the main export crop for producers. For the crops under consideration, the actual sizes of the organic premium according to the results of 2021 are taken. Below is a comparative analysis of economic efficiency by crops, table 2 [6].

In order to grow organic wheat, an agricultural producer spends 3325 tenge per 1 centner according to the standard, 3361 tenge according to No-till, while a traditional farmer spends about 6225 tenge.

Table 2
Comparative efficiency of spring wheat production by traditional and organic technology, per 1 ha (on average for three years)

Indicators	Traditional technology		No till		Organic technology		Deviation (+,-)	
	thousand tenge	%	thousand tenge	%	thousand tenge	%	Traditional	No till
Total direct costs per 1 ha	63.5	100	70.6	100	44.9	100	-18.6	-25.7
Salary with accrual	7.4	11.7	7.4	10.5	7.4	16.5	0	0
Seeds, planting material	10.8	17.0	10.8	15.3	10.8	24.1	0	0
CLM (combustive-lubricating materials)	12.9	20.3	9.9	14.0	12.9	28.7	0	3
Mineral fertilizers, pesticides	11.5	18.1	30.4	43.1	0	0.0	-11.5	-30.4
Biopreparations, organic fertilizers	0	0.0	0	0.0	0	0.0	0	0
Herbicides	8.8	1.4	0	0.0	0	0.0	-8.8	0
Current repairs	5	7.9	5	7.1	5	11.1	0	0
Other expenses	7.1	11.2	7.1	10.1	7.1	15.8	0	0
Organic certification, laboratory research	0	0.0	0	0.0	1.7	3.8	1.7	1.7

In organic production, there is a reduction in the costs of excluding the use of synthetic chemical fertilizers, instead of which organic producers use biofertilizers and biologics, in this case, manufacturers had experience using the enzyme preparation Agroflorin based on a strain of fungus and preparations based on *Basillus subtilis*. It is important to note that the choice of drugs and fertilizers, organic producers should coordinate with the certifying company, as there is a requirement for their mandatory certification, table 3.

Table 3
Comparative efficiency of spring wheat production by traditional and organic technology, per 1 ha
(on average for three years)

Indicators	unit of measurement	Traditional technology	No till	Organic technology	Deviation (+,-)	
					No till	Traditional
Yield	c/ha	11.2	15.6	13.5	-2.1	2.3
Standard per 1 centner	thousand tenge	5.670	4.526	4.052	-0.474	-1.618
Selling price for 1 centner	thousand tenge	8.7	8.7	8.7	0	0
profit	thousand tenge	3.03	4.17	4.65	0.47	1.62
Profitability	%	53.4	92.2	114.7	22.5	61.3
Organic Award	0%			0%		

Rejection of mineral fertilizers, herbicides and pesticides is accompanied by a decrease in yields by 0.7 c/ha. To control weeds, farmers use various agronomic techniques, for example, mulching, fallows, mechanical processing, which eventually affects the costs. At the same time, organic farmers have costs associated with the involvement of additional labor, organic certification and quality control of products [7].

According to the Union of Organic Producers, the total volume of organic wheat exports in Kazakhstan in 2021-2022 decreased by 5 times compared to 2019.

Organic producers carry out laboratory analyses of products in the countries of the European Union, as in Kazakhstan, according to them, there are no necessary laboratories with international accreditation capable of doing the entire necessary range of analyses required for organic products. For example, about 500 indicators are studied for the glyphosate group in the EU, while in the laboratories of Kazakhstan no more than 10 [8].

Thus, the total direct costs for the production of organic wheat are 1% less in comparison with the traditional wheat production technology, and as a result of a comparative analysis of the production of organic wheat and traditional, it was revealed that the economic efficiency of 1 ha of organic wheat is 16%. This is achieved not at the expense of an organic premium, but by improving the quality of products. For example, grain had the following quality indicators: gluten -36; nature – 800; protein 18. According to the results of the survey of the heads of the surveyed farms, they could not receive an organic premium, as they could not sell products for export and sold them as traditional on the domestic market [9].

The reasons for the decline in exports may be different: lower demand in importing countries, weak marketing, increased competition, etc. To identify these causes, a separate study is required [10].

It is important to note that the demand for solid varieties of organic wheat remained unchanged, with the export of which the organic premium varied from 20 to 50%. At the same time, the level of profitability was higher compared to No-till and traditional wheat by 22.5% - 61%.

Consider the situation of producers who are in a transition period from traditional to organic production. As a rule, this period lasts from 1 to 3 years, depending on the history of the use of chemical synthetic substances in the fields. During this period, the producer cannot sell his products with an organic premium, since there is practically no market for transitional wheat, so let's assume that it will be sold as traditional without an organic premium. Despite this, the economic efficiency of organic wheat remains 14-16% higher [11].

This analysis showed that even during the transition and/or with a decrease in yield, the profit of an organic producer remains higher than the traditional one, since it does not make high costs for mineral fertilizers and pesticides.

Conclusion. It was revealed that the profitability of growing all the upset crops using organic technology is higher than with traditional technology:

- the profitability of organic wheat is 61% higher than the traditional one without taking into account the organic premium;

- the profitability of organic wheat is 22.5% higher than No-till wheat with an organic premium of 20% to 50%;

Thus, as the results of the study showed, the economic efficiency of organic production is higher than traditional, due to the reduction of direct costs, as well as the organic premium that can be obtained when exporting to international markets. Also, it should be noted that organic producers have a strong opinion that the No-till technology necessarily includes the use of chemical vapors in crop rotation and therefore this technology is incompatible with organic production.

However, the experience of European organic farmers demonstrates the fallacy of this opinion and requires study on the possibility of implementation in Kazakhstan.

The study also analyzed the transition period during which products are sold as traditional, if there is no market for "transitional" products, and the situation of declining yields due to a number of reasons. Even under these unfavorable circumstances, the organic producer suffers a minimum of losses compared to the traditional one, since the maximum costs go to chemicals.

Therefore, organic production can be considered profitable/profitable, therefore, more cost-effective. As soon as the domestic market of organic products begins to develop in the country, it will be much easier, simpler and more profitable for producers to produce organic products for their own market.

For the development of the organic industry in the Republic of Kazakhstan, it is necessary to carry out a whole range of measures. The main task of the Government in the coming years will be the process of harmonization of national standards with the standards of exporting countries. One of the drivers of this process will be the accreditation of the Kazakh certification body in the exporting country. This will reduce the cost of certification for our farmer, which entails a reduction in the cost of Kazakh organic products, and consequently, an increase in its competitiveness in the Western market. All these events will mark the beginning of the growth of interest from the business side in the production of organic products.

Since the organic market in the country is not developed today, the possibility of entering international markets should be considered, not forgetting to take into account the associated costs. In conclusion, it should be noted that the organic form of production has an impact on environmental and social factors, which may be the subject of further research.

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Органикалық бидай өндірісінің экономикалық тиімділігі

Аңдатпа. Мақалада органикалық ауыл шаруашылығын дамытудың өзекті тенденцияларын зерттеуге арналған. Зерттеудің мақсаты – дәстүрлі және no till технологияларымен салыстырғанда органикалық бидай өндірісінің экономикалық әсерін анықтау, бұл азық-түлік нарығындағы тұтынушылық қалаулардың өзгеруін алдын-ала анықтайды. Мақалада өңдеу технологиясына (дәстүрлі, no till) сәйкес органикалық бидайдың артықшылықтары мен кемшіліктері талданады.

Мақсатқа сәйкес зерттеу барысында мынадай міндеттер шешілді: органикалық өнімнің дәстүрлі тәсілмен өсірілген өнімнен артықшылығы тұжырымдалды; дәстүрлі және органикалық жаздық бидайды өсіруге жұмсалатын шығындарға, өнімділік пен бағаларға, рентабельділікке салыстырмалы талдау жүргізілді, еуропалық органикалық фермерлердің тәжірибесі талданды; Органикалық ауыл шаруашылығы өнімдеріне сұраныстың баға және баға емес факторларының құрамындағы өзгерістер анықталды шаруашылықтар, яғни органикалық бидайдың жоғары бағасына қарамастан, оны сатып алуға дайын тұтынушылардың сұранысы бар.

Азық-түлік тауарлары нарығында адал бәсекелестікті сақтау қажеттілігі, сондай-ақ өндірушілердің нарыққа және экологиялық қауіпсіздікке тең қолжетімділігін қамтамасыз ету үшін сертификаттау талаптары мен органикалық өнімнің сапасы туралы ақпараттың қолжетімділігі туралы қорытынды жасалды.

Түйін сөздер: органикалық өнімдер, ауыл шаруашылығы, бидай, экономикалық тиімділік, рентабельділік, дәстүрлі технология, No till.

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Экономическая оценка эффективности органического производства пшеницы

Аннотация. Статья посвящена изучению актуальных трендов развития органического сельского хозяйства. Целью исследования выступает определение экономического эффекта органического производства пшеницы в сравнении с технологиями традиционной и No till, которые определяют изменение характера потребительских предпочтений на рынке продовольственных товаров. В статье проанализированы преимущества и недостатки органической пшеницы в соответствии с технологией возделывания (традиционной, No till).

В соответствии с целью в ходе исследования решены следующие задачи: сформулированы преимущества органической продукции над продукцией, выращенной традиционным способом; проведен сравнительный анализ затрат, урожайности и цен, рентабельности на выращивание традиционной и органической яровой пшеницы в сравнении; проанализирован опыт европейских фермеров-органиков; выявлены изменения в составе ценовых и неценовых факторов спроса на продукцию органического сельского хозяйства, то есть несмотря на высокую цену органической пшеницы, есть спрос потребителей готовых ее приобрести.

Сделан вывод о необходимости поддержания добросовестной конкуренции на рынке продовольственных товаров, а также доступности информации о сертификационных требованиях и качестве органической продукции для обеспечения равного доступа производителей на рынок и экологической безопасности.

Ключевые слова: органическая продукция, сельское хозяйство, пшеница, экономическая эффективность, рентабельность, традиционная технология, No till.

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