

## THE ORGANIC PRODUCTION IN THE CONTEXT OF IMPROVING THE ECOLOGICAL SAFETY OF PRODUCTION OF THE FOOD INDUSTRY

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**Abstract.** The article presents the data on the relevance of conducting scientific research on the organic production in Ukraine and its role in ensuring environmental safety in the food industry. The analysis of organic agricultural production in the world and Ukraine has been carried out. It is established that in Ukraine there is no state support for the development of the organic sector, however, it occupies leading positions in different groups of cultures in Europe and in the world as a whole. It is substantiated that agricultural lands must meet certain requirements regarding the level of their contamination by harmful substances, heavy metals, radionuclides, etc., for the purpose of conducting organic farming and ensuring environmental safety of the products of the food industry. This suggests that the conversion period for the transition to organic, environmentally safe agricultural production is accompanied by individual risks, which necessitates the solution of the corresponding tasks, which are systematized into complex groups. The conducted analysis of technologies used in the production of organic agricultural products used in the PP "Agroecology" has shown that they are cost-effective, environmentally safe, energy and resource-saving, and are characterized by social orientation. Strategic directions of providing of ecological safety of production of on the food industry basis of long-term development of organic production in Ukraine are offered.

**Key words:** organic production, products, food industry, ecological safety, quality food products, certification.

## ОРГАНІЧНЕ ВИРОБНИЦТВО У КОНТЕКСТІ ЗАБЕЗПЕЧЕННЯ ЕКОЛОГІЧНОЇ БЕЗПЕКИ ПРОДУКЦІЇ ХАРЧОВОЇ ПРОМИСЛОВОСТІ

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**Анотація.** У статті наведено дані щодо актуальності проведення наукових досліджень органічного виробництва в Україні та його роль у забезпеченні екологічної безпеки продукції харчової промисловості. Проведено аналіз органічного виробництва в світі та Україні. Встановлено, що в Україні відсутня державна підтримка розвитку органічного сектору, однак, за окремими групами культур вона займає лідируючі позиції як у Європі, так і у світі в цілому. Обґрунтовано, що для ведення органічного землеробства та забезпечення екологічної безпеки продукції харчової промисловості, сільськогосподарські землі повинні відповідати певним вимогам щодо рівня їх забруднення шкідливими речовинами, важкими металами, радіонуклідами тощо. Це дає підставу стверджувати, що конверсійний період переходу на органічне екологічно безпечне виробництво супроводжується окремими ризиками, що зумовлює необхідність вирішення відповідних задач, які систематизовані в комплексні групи. Проведений аналіз виробництва органічної продукції засвідчив, що вони є економічно ефективними, екологічно безпечними, енерго- та ресурсоощадними і характеризуються соціальною спрямованістю. Запропоновано стратегічні напрями забезпечення екологічної безпеки продукції харчової промисловості на основі довгострокового розвитку органічного виробництва в Україні.

**Ключові слова:** органічне виробництво, продукція, харчова промисловість, екологічна безпека, якісні продукти харчування, сертифікація.



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### Introduction. Formulation of the problem

The level of development of the food industry affects the security of food security and food independence of the country. Recently, however, there has been observed a decline in the quality of foodstuffs, which is due to the deterioration of the ecological state of agricultural land and the decline of soil fertility, an indispensable source of life support for the country and the basis for the well-being of the population. Thus, due to soil erosion, the fertile layer of soil is lost, the

humus content is reduced, the area of acid and saline soils is increased, 38% of the country's arable land is recondensed [1]. Such processes negatively affect the ecological safety of products of the food industry. A greater part of the produced food does not meet world standards. At the same time, organic production in the EU and in the world as a whole is expanding, aimed at improving the health of the population by producing high-quality food, raw materials and other products,

preserving soil fertility and the environment. At the end of the last millennium, the era of global review of the world strategies of development of the food industry has begun and continues to this day. To replace the existing agricultural model “more and cheaper” comes a new model “better and safer” [2].

In organic production the conformity of the organic system of agriculture and products of the food industry with certain standards is ensured, which makes it possible to mark products accordingly and to sell them as organic. The peculiarity of organic production is that the certification by the relevant authorized institutions is subject to production, processing, packaging and storage of products. The absence of own national standards for organic products necessitates the certification by international standards and national standards of other states. Under these conditions, the resulting products are exported mainly to the countries that have been authorized by the appropriate certification bodies. In addition, the development of domestic organic production is complicated by the underdevelopment of the regulatory framework. Organic production allows to realize the concept of balanced development of the food industry at the expense of socio-economic, natural-resource balance and aims at providing society with safe and high-quality food products, as well as maintaining and improving the state of the environment.

Proceeding from this, the issue of the study of the ecological aspects of organic production is important for the formation of an effective strategy of its development, aimed at the production of environmentally safe food products, raising the country's ecological image and competitiveness of agriculture in the domestic and foreign markets.

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#### **Analysis of recent research and publications**

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The issue of production of organic products is not new and its research is paid much attention to on the part of leading scientists. Investigating the ecological and economic problems of the modern economic system, L. Melnyk proposes to consider the ecological safety of food production as “a purposeful process of transformation of the economy, aimed at reducing the integral ecological destructive impact of production processes (environmental pollution and disturbance of natural landscapes) and consumption of resources on the basis of the unit of the aggregate social product” [3]. By developing this doctrine, he points out that “the ecologization of production is carried out through a system of organizational measures, innovative processes, restructuring of the manufacturing sector and consumer demand, technological conversion, rationalization of nature management, transformation of environmental activities implemented at both macro and microeconomic levels” [3].

The preservation of human health is also a key element in the determination of the environmental friendliness of production made by Y.T. Sukhanova. In particular, she notes that ecologization of the food industry is a process of implementing various kinds of solutions (technical, economic, technological, administrative, etc.) that are capable of ensuring the normal reproduction of the production process, the rational use of all resources without exception, environmental protection, while ensuring normal functioning of life for the people. In this sense an important role is given to the nutrition, which is one of the most important factors on which the state of the human body and its ability to work directly depends [4].

I.M. Kobushko in his publications also speaks of “integrated environmental production”, which, in his opinion, is “one of the priority directions of ensuring ecologically balanced development of the economy”, which “provides a complex of ecologically oriented measures in the external and internal environment of the production system and is realized through the environmentalization of the product life cycle”. In connection with this, “integrated ecologization of production” is defined by him as “a continuous process of introduction of new technical, technological, economic, management decisions, which together provide ecological and economic equilibrium” [5]. Thus, we are talking about a fundamentally new system of production, which acquires special importance in the agro-industrial sphere.

An important, and possibly a decisive component of the environmental safety of food production is the environmentalization of land use, which should be understood as the use of land, which provides their natural, resource-saving, renewable nature. Soil conservation is foreseen, negative impact on them, as well as flora and fauna, geological breeds, water sources and other components of the environment are limited [1].

After analyzing the definitions of organic production, which are mostly used in Ukraine and in the world, we consider one of the most comprehensive and systematic formulations proposed by N.A. Berlach, who, suggests to understand under organic production, “a certified management system for production that uses energy and resource-saving technology and is based on the minimum use of mechanical cultivation of soil and synthetic substances, excluding genetically modified organisms from the process of production” [6].

V.I. Artish treats organic production as a model of production of natural products with healing properties, based on the use of biological and agronomic methods of farming in accordance with the established rules in the certain zones [7]. For most scientists, this term refers to agricultural practices with certain restrictions, prohibitions and requirements, namely: the prohibition on the use of synthetic

fertilizers, pesticides, GMOs, the requirement of minimum soil cultivation, etc.

V.A. Chudovska considers organic production as a type of production and economic activity of agricultural producers, aimed at satisfying the public needs and meeting the requirements of environmental safety throughout the life cycle of such products due to the balanced use of natural resources [8].

V. Vovk defines organic production as a practical implementation of the general concept of sustainable development in the industrial sphere, satisfying the needs of the present, while not endangering the needs of future generations [9].

Despite the fact that the concept of organic production has become widespread in various scientific schools, the issues still associated with the definition of its place in ensuring the environmental safety of products in the food industry are still not sufficiently studied.

**The purpose** of the article is to substantiate the essence of organic production in ensuring the ecological safety of products of the food industry, to assess its advantages over the traditional way, to determine the dynamics of the process of ensuring the ecological safety of agriculture, to establish the efficiency of the transition to organic production of the food industry. Proceeding from the stated goal, the following **tasks** are defined: 1) to substantiate the features and advantages of organic production in order to ensure the ecological safety of products of the food industry; 2) to analyze the current state of organic production in Ukraine and in the world; 3) to propose conceptual perspective directions of the development of organic production in the context of ensuring the ecological safety of products of the food industry of Ukraine.

#### Research methods

To achieve the goal put forward in the article, a set of general scientific and special methods of scientific knowledge is used, in particular: abstract-logical (for substantiation of research methodology, theoretical generalizations, formulation of conclusions); dialectical, historical-logical, analysis and synthesis, induction and deduction (to determine the prerequisites for ensuring the ecological safety of products of the food industry through the development of organic production); systematic structural analysis, logical generalization, formal logic and scientific abstraction (to determine the essential characteristic of key concepts, to specify the content of categorical apparatus); statistical-economic (for assessing the current state of ecological safety of agricultural land use and identifying the trends and prospects for the development of organic production); strategic and structural-functional analysis (for elaboration of strategic directions of ensuring environmental safety

on the basis of the efficient functioning of organic food production) [3–5].

#### Results of the research and their discussion

In Ukraine, the production of organic products is at an initial stage of development. The area of land under organic production comprises 0.6% of the total area of agricultural land, there are over 170 “organic” farms. Gradually, the regulatory framework for the regulation of organic production is being formed, the national certification system, market infrastructure, and information support are being developed.

The organic movement was initiated in Switzerland in 1940. Somewhat later (1949) the term “organic-biological farming” appeared. Under it, in the first place, the conditions, techniques and methods of organic production were meant. The active development of the organic movement began in 1973 after the creation of the Swiss Institute of Organic Farming Research (FibL), which is now the largest global research center in the field of organic production [1].

In Ukraine, under the production of organic products (raw materials), it is proposed to understand the production activity of natural or legal persons (including cultivation and processing), whereas during such production it is prohibited to use chemical fertilizers, pesticides, genetically modified organisms (GMOs), preservatives etc., and at all stages of production, the methods, principles and rules for obtaining natural (environmentally friendly) products, as well as the conservation and restoration of natural resources, are applied. This is precisely what the Law of Ukraine “On the Production and Circulation of Organic Agricultural Products and Raw Materials” defines, as the legal, organizational, economic bases of production and circulation of organic agricultural products and raw materials, measures for control and supervision of such activities, and aims at ensuring fair competition and proper functioning of the organic products market, improvement of the main indicators of the state of health of the population, preservation of the natural environment, rational use of soil, sustainable use and restoration of natural resources and the guarantee of consumer confidence in products and raw materials, defined as organic.

The advantages of organic agriculture, according to the United Nations Food and Agriculture Organization (FAO) include: a) long-term environmental sustainability; b) preservation and reproduction of soil fertility; c) rational use of water resources; d) conservation of biodiversity; e) refusal to use genetically modified organisms (GMOs); e) maintaining ecological balance in the food ecological system and its assimilation abilities [2–3].

According to the International Federation of Organic Movement (IFOAM) and the Research Institute of Organic Agriculture (FibL), the areas of lands under organic production in the world are continuously

increasing. Over the past ten years, their size has increased by almost 4 times and by 2015 it amounted to 43.7 million hectares. Statistical information on organic production comes from 172 countries. Every year their

number gradually increases. In Europe, all countries without exception have an organic sector. In Africa, organic production is developing in 70% of countries, in Asia – 79, Latin America – 72% (Table 1) [10–12].

**Table 1– Distribution of countries with the organic sector by continents in 2015**  
(Source: FiBL, IFOAM and SOEL, 2016)

Continent	Number of countries with organic farming	Number of countries on the continent	Share of countries with organic agriculture, %
Africa	39	56	70
Asia	37	47	79
Europe	47	47	100
South America	33	46	72
North America	3	5	60
Australia and Oceania	13	26	50
World in general	172	227	76

In 2007, Ukraine was among the top ten countries in Europe in the area of organic farming, but in 2009, it was squeezed out of this list, by Sweden being ahead of Poland and Greece. By 2015, Spain still holds the leading position in certified organic areas. Ukraine now ranks eleventh in the ranking. One of the key players in the organic products market in Ukraine is the Ukrainian-Swiss project "The development of the organic market in Ukraine". The overall objective of the project is to promote the integration of small and medium-sized enterprises of Ukraine into international trade through certified organic products. The objective of the project is to increase the competitiveness of the Ukrainian organic sector by [13]: improving the quality and increasing the export of organic crops from small and medium-sized enterprises; improvement of quality and increase of turnover in the domestic market of organic dairy products from small and medium enterprises; promoting the brand for regional food products from the Carpathians; development of the segment of commercial services in the organic sector; the formation of a favorable institutional environment for the development of the organic sector.

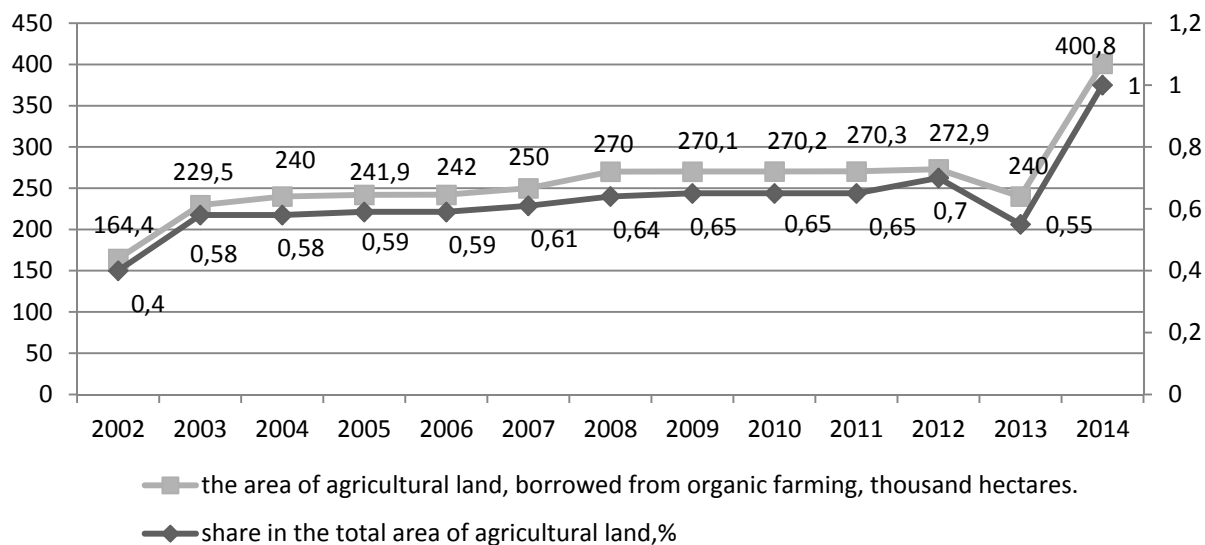
The first Ukrainian certification body, which carries out the inspection and certification of organic production, LLC "Organic standard", was created within the framework of the Ukrainian-Swiss project "The organic certification and development of the organic market in Ukraine". The company works in all regions of Ukraine and conducts organic certification in partnership with the Institute of Agro-Ecological Marketing (IMO, Switzerland). The partners of the company are well-known foreign organic structures and individual members of the organic sector of Ukraine.

LLC "Organic Standard" holds the leading position in the Ukrainian market for the provision of inspection services and certification of organic production. Its activities are carried out in accordance with the basic principles described in the organic standards: health (soil, plants, animals, humans, the environment), ecology (functioning of natural ecological systems and cycles), justice (building trusting relationships, respect for the environment) and care (responsible attitude to the environment, preservation of it for present and future generations) [14].

The inspection of the life cycle of organic products involves the following stages: the production of seed material; the production of crop and livestock products; transportation to the place of processing; processing of agricultural products; storage of raw materials and foodstuffs; transportation to the place of sale; realization.

Every year the area of lands occupied by organic production and the number of certified producers is gradually increasing (Fig. 1). In addition, 59 processing enterprises, 60 importers and 55 exporters of organic raw materials and foodstuffs have been certified in Ukraine.

Despite the fact that in Ukraine there is no state support for the development of the organic sector in separate groups of cultures, it has a leading position both in Europe and in the world as a whole. In particular, it owns 32% of the certified world standards for sunflower seeds, 24 – buckwheat, 13 – millet, 10 – barley, 9 – corn and speet, almost 7% - wheat. Gradually, Ukraine is turning into a very powerful producer of organic products and raw materials in Europe. Here, 87% of European areas of organic millet are placed, 37 – sunflower and oilseed flax, 30 – buckwheat, 26 – corn, 12 – barley, 11% – wheat, etc. (Table 2).



**Fig. 1. Agricultural land occupied by organic production in Ukraine**  
(According to the Institute Organic Agriculture FiBLE (2016)).

For organic farming, agricultural lands must meet certain requirements regarding the level of their contamination by harmful substances, heavy metals, radionuclides, etc. Scientists of the NSC “The Institute of Agrochemistry and Soil Science” named after O.N. Sokolovsky of the National Academy of Sciences conducted an examination of the ecological and toxicological state of agricultural lands in Ukraine. As a

result, it has enabled the isolation of areas that are suitable for organic production [15–16]. The conducted scientific investigations have shown the absence of a continuous human-made pollution of the territories. It should be noted that these studies have revealed the availability of land areas with significantly lower content of harmful substances than in Western Europe.

**Table 2 – Ukraine's place in Europe and in the world as for the area of agricultural crops certified in accordance with organic standards in 2015**  
(According to the Institute of Organic Agriculture, FiBLE (2016)).

Culture	Area of lands certified by organic standards, ths ha			Ukraine's share, %	
	Ukraine	Europe	world	in Europe	in the world
Wheat	81.5	711.5	1209.2	11.5	6.7
Barley	103.0	293.6	364.9	11.9	9.6
Buckwheat	5.1	17.3	21.2	29.3	23.9
Corn	32.9	127.2	349.9	25.9	9.4
Millet	5.3	6.1	40.8	87.3	13.0
Rye	9.3	170.5	189.9	5.4	4.9
Spelt	3.0	29.6	35.0	10.2	8.6
Sunflower	40.4	107.6	127.1	37.5	31.8
Soy	4.3	51.1	386.9	8.4	1.1
Oil flax	4.4	12.0	67.5	36.7	6.5
Vegetables	8.0	131.9	290.1	6.1	2.8

However, the availability of suitable for organic production areas is not the only condition for its management. The transition period from traditional (intensive) technologies to organic is a rather lengthy process. Depending on the situation, it can range from 2 to 5 years. The conversion period is accompanied by individual risks, which necessitates the solving of certain tasks, which include: imperfection of the regulatory framework; insufficient development of the domestic system of certification, inspection and control

of the production of organic products; unsatisfactory development of internal infrastructure (markets, associations, centers of organic producers); weak integration with international structures (EU, IFOAM); limited access to foreign markets of organic products; lack of proper state information and education provision (promotion of organic farming technologies, ecological education of the population and producers of food products, advisory support of producers,

specialized trainings for managers and specialists of the branch).

### Approbation of research results Introduction

The largest experience in organic production in Ukraine located in the Poltava region, is Agroecology. It's a agricultural land has been repeatedly certified on the European level for the production of organic products. As of January 1, 2013, there are almost 7.5 thousand hectares of land utilization, of which 6,600 hectares are arable lands. Over the past seven years, the area of agricultural lands has decreased by 169 hectares, as the result of the creation of separate land owners - landlords of farms. In total, 99.3% of all agricultural lands are leased. The size of the rent, in accordance with the lease agreements, is 6.5 cents of grain per 1 ha of the rented area. The vulnerability of agricultural lands is quite high – 88.9%. The share of hayfields and pastures is 11%, perennial plantations – 0.1% [11,14].

Based on the above data, the impression is that such a structure of agricultural lands has negative environmental characteristics. However, attention should be paid to the fact that in the structure of arable land the crops of solid cover are prevailing – annual and perennial grasses, grains and leguminous plants. Such a set of crops contributes to the processes of reproduction of soil fertility, as well as protects the soil from water and wind erosion, which are widespread for the region. On the sloping lands (in the structure of land use of the enterprise their share is about 30%) perennial grasses forage or winter grain are grown. After harvesting of grain peeling, stubble is not produced, which increases the resistance of soil to erosion.

It should be noted that the company has high quality potential of soils. The main soils are typical deep-black chernozems. They contain about 5% of humus, the reserves of which in a meter thickness make 420 t/ha. The soils are close to the neutral reaction of the soil solution. In an arable layer, the pH of the salt is 6,4. The degree of saturation by the basics reaches 95%. The high level of humus content in soils, its saturation with bases of calcium and magnesium provides the water-physical properties favorable for the growth and development of plants. This resulted in a rather high permeability and moisture content, and, as a result, the ability to accumulate sufficient supplies of productive moisture. In some periods, its reserves in the meter layer of soil reach 180 mm.

The most characteristic for the enterprise is the application of soil protection technologies, in particular, soil cultivation without rotation of the chute (multifaceted and minimal, uncultivated tilling at a depth of 10–12 cm), mulching of the soil surface with post-dredging remnants, application of wide-reaching heavy cultivators, wide-reaching heavy disk harrows, annular-spur

rollers, direct sowing machines and modernized grain sowing machines.

The system of farming in the enterprise is based on the rational use of the natural potential of soils and is aimed at preserving and reproducing their fertility by replenishing nutrients by introducing manure and enrichment of soils with nitrogen by growing nitrogen fixing plants and siderates. The varieties and species of plants are selected taking into account the climatic conditions and the state of soils and, directly, the fields themselves. Of the 7.5 thousand hectares of agricultural land, about 25% is occupied by sideral pairs, 7% – perennial grasses. In the long run, the share of steam is planned to bring up to 30%. In addition to the planned sedentary vapors, there are so-called “unscheduled”, which are formed in cases of damage to agricultural crops by illness or pests. Under such conditions, the green mass is moved and plunged in the ground, using it as a siderate. The use of pure vapor is not practiced in the enterprise.

Organic fertilizers use humus, non-market part of the harvest (straw of cereals and legumes, crushed sunflower stems, corn, etc.), as well as post-harvest cedar siderates. Much attention is paid to adjusting the structure of land and modeling the optimal crop structure. The share of the grain wedge in the area of arable land is 35%. Under technical crops, about 5% are employed. The group of grains and legumes is represented by winter wheat, spring barley, oats, buckwheat and corn.

Wheat, cultivated according to organic standards, is in high demand in Europe and North America. However, in Ukraine, the demand for it is still quite low and it grows slowly. The technology of wheat cultivation, which corresponds to the status of “organic”, requires the introduction of the most recent achievements of agrarian science. In particular, the problem of combating weeds, which is complicated by the standards of organic production, is difficult in the technological sense, remains important and needs necessary solution. Particular importance in combating weeds in the “organic” production belongs to agrotechnical measures and the observance of scientifically grounded crop rotation. The maintenance and reproduction of soil fertility requires the introduction of organic fertilizers, which in the “Agroecology” PE is successfully combined with sideration and the use of by-products of plant growing and post-dormancy remains. Considering that winter wheat is quite demanding for nitrogen, phosphorus, potassium and trace elements, the specialists of the farm use nitrogen-fixing and phosphorus-binding bacteria through the proper selection of precursors. It accordingly affects the indicators of economic efficiency of its cultivation.

For an objective assessment of the determination of the efficiency of organic production of cereals in PE “Agroecology” a comparison of its indicators with other enterprises in the district and region was carried out. It was established that the yield of grain and leguminous crops in PE “Agroecology” for the period of study was lower by 25 and 32%, respectively, in comparison with the district and regional indicators. Significantly lower

was the price of sales of one centner of products – 145.5 UAH. As a result, the profit per hectare of sown area was lower, compared with the district indicator by 5.1 times, with the region – by 2.9 times. However, the level of profitability exceeded twice the regional indicator. This is explained by the fact that, due to the energy and resource-saving technologies introduced at PE “Agroecology”, production costs per unit of the area are almost two times lower than in the rest of the enterprises (Table 3).

Taking into account the high level of anthropogenization of the territory of Ukraine, its significant in-

dustrial potential, the relatively high density of population (80-150 people per 1 km<sup>2</sup>), the largest in Europe employment of the population in agricultural production (18% of the working-age population), a significant degree of land erosion (58% of all agricultural land), the highest in Europe level of tilling (79%), low forest cover and a number of other objective factors, it is necessary to provide the state support for the development of the environmental management of agricultural land fellowship. At the same time, the central place should be given to organic production.

**Table 3 – Efficiency of the technology of grain and legume production in PE "Agroecology" in comparison with district and regional indicators (2014)**

Indicator	PE “Agroecology”	Shishatsky district	Poltava region
Yield, c / ha	30.6	40.8	44.8
Gathered area, ha	2326	23107	695486
Gross tax, ths. Tons	71287	942279	31153704
Expenditures per 1 hectare of crops, UAH	2810.8	5119.8	5011.9
Production cost of 1 centner made products, UAH	91.7	125.6	111.9
Total cost, thousand UAH	2987	129079	5194142
Production cost of 1 centner of sold products, UAH	111.2	121.1	135.8
Sales price 1 centner, UAH	145.5	165.2	156.9
Income (revenue) from sales, ths. UAH	3908	176144	6001764
Profit for 1 hectare, UAH	396.0	2036.8	1161.2
Profitability,%	30.8	36.5	15.5

In the long run, organic production will promote the harmonization of economic, environmental and social goals in the production of food products. The public profits from its introduction include, in particular, the following: independence from industrial chemicals, reduction of energy intensity of producing food products; minimizing the negative impact on the environment through the prevention of soils degradation (erosion, increased acidity, salinity), preservation and reproduction of their natural fertility; the stabilization of the number of jobs in rural areas, the emergence of new promising jobs for the development of small family farms; availability of environmental food products. In regard to the carried out analysis, it can be asserted that organic production is a fundamental precondition for the implementation of the basic provisions of the concept of sustainable rural development [17–18].

The priority direction of the current policy of development of the food industry, in the context of Ukraine's integration into the European economic space, should be the goal-oriented transition to a self-reproducing, ecologically balanced model of development based on economic efficiency, social stability and environmental safety. This necessitates the development of strategic activities that will respond to the physical and economic interpretation of the effectiveness of the activity and will be directed towards radical improvement of the methods and ways of production of the food industry.

The mechanism of implementation of the strategy of ensuring the ecological safety of the products of the food industry should be based on the system of national, sectoral and regional programs aimed at introducing into agricultural practice and the practice of food enterprises energy and resource-saving technologies, technical means, qualitatively new methods and ways of organization of production, the latest scientific achievements on the rational use of natural resources, their conservation, reproduction and maintenance of the dynamic equilibrium of ecosystems. Special attention should be paid to the development of markets of environmentally safe goods and services, including the organic products market, biological products of plant protection, microbial biopreparations, etc. [19–20].

The strategic objectives of the ecological safety of products of the food industry should be as follows: the satisfaction of the full needs of the population in environmentally safe food products; achievement of the rational use of agricultural lands, improvement of their ecological status; prevention of ecological destructive influence of economic activity on the ecological status of rural territories, soils, the environment and guaranteeing safe environment for people's life and health [21–22].

The key indicators for the development of organic production in the context of ensuring the ecological safety of food products in Ukraine are: increasing the share of agricultural lands certified in accordance with organic standards – up to 5% against 0.9% in

2015; the increase in the number of certified organic producers of food products engaged in the production of milk, vegetables, fruits and medicinal plants not less than three times; introduction of compulsory statistical reporting for certified producers of organic products; creation of scientific and information centers on organic production at higher educational institutions – up to 22, against 7 in 2015; preparation of highly qualified specialists in the field of ecologically safe land use and organic food production by introducing a separate discipline by institutions of higher education [16,18,23].

The globalization of the world economy necessitates a structural adjustment of the domestic food industry in order to increase its competitiveness. Ukraine mainly positions itself as a state oriented to the export of certified organic standards of agricultural raw materials. In this regard, the issue of increasing the export of ready-made high-quality organic food products is of particular relevance. The strategy for the further development of the organic segment should meet both the needs of the domestic market and increase the export potential of the state in the context of ensuring the ecological safety of the products of the food industry of the country. This, in its turn, necessitates the systematic coordination of structural, investment, fiscal, foreign-economic, tax and customs policies, by subordinating their tasks of resource saving, import substitution, diversification of sources of supply and effective structural adjustment of the economy as a defining condition for improving the structure and increasing the efficiency of foreign trade.

Consequently, further development of organic production in Ukraine requires: changes and additions to the regulatory framework, development of the State Target Program for the Development of Organic Production in Ukraine; creation of a national certification body; introduction of national accreditation of certification companies operating in the domestic market; development and approval of standards for organic agriculture, as much as possible consistent with world requirements; introduction of compulsory statistical reporting for certified producers of organic food products; the increase of awareness and ecological consciousness of the population about organic products; promotion of organic products by highlighting their benefits in the media, holding thematic seminars and conferences, as well as through the network of existing advisory services; involvement of state authorities and local self-government bodies, environmental associations and organizations,

scientists, consumers in the process of forming the market of organic products in Ukraine; conducting marketing research on potential export markets for Ukrainian organic products and developing the domestic market for organic food; improvement of market mechanisms of regulation of production and circulation of organic food products and raw materials; providing training for specialists in the field of ecologically safe land use and organic food products.

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### Conclusions

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1) In Ukraine, the production of organic products is at an initial stage of development. The area of land under organic production is 0.6% of the total area of agricultural land, there are over 170 “organic” farms. Gradually, the regulatory framework for regulating organic production is being formed, the national certification system, market infrastructure, and information support are developing. The eco-socio-economic advantage of organic production is simultaneous achievement of the increase of productivity of agriculture, improvement of the quality of ecosystem services and preservation of the health of contemporary and future generations, which fully meets the requirements of the concept of sustainable (balanced) development.

2) The largest experience of conducting organic agriculture in Ukraine is PE “Agroecology”. The analysis of the production of organic agricultural products (both crop and livestock production) used in PE “Agroecology” has shown that they are cost-effective, environmentally friendly, energy and resource-saving, and are characterized by social orientation.

3) In the long term, organic production will contribute to the harmonization of economic, environmental and social objectives for ensuring the ecological safety of products in the food industry. The public benefits from its introduction include the following: independence from industrial chemicals, reduction of energy intensity of agricultural production; minimizing the negative impact on the environment through the prevention of soil degradation (erosion, increased acidity, salinity), conservation and reproduction of their natural fertility. In view of the analysis, it can be stated that organic production of food products is a fundamental precondition for the implementation of the basic provisions of the concept of environmental safety.

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## ОРГАНИЧЕСКОЕ ПРОИЗВОДСТВО В КОНТЕКСТЕ ОБЕСПЕЧЕНИЯ ЭКОЛОГИЧЕСКОЙ БЕЗОПАСНОСТИ ПРОДУКЦИИ ПИЩЕВОЙ ПРОМЫШЛЕННОСТИ

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**Аннотация.** В статье приведены данные об актуальности проведения научных исследований органического производства в Украине и его роль в обеспечении экологической безопасности продукции пищевой промышленности. Проведенный анализ органического сельскохозяйственного производства в мире и Украине. Установлено, что в Украине отсутствует государственная поддержка развития органического сектора, однако, по отдельным группам культур она занимает лидирующие позиции как в Европе, так и в мире в целом. Обосновано, что для ведения органического земледелия и обеспечения экологической безопасности, сельскохозяйственные земли должны отвечать определенным требованиям по уровню их загрязнения вредными веществами, тяжелыми металлами, радионуклидами и тому подобное. Это дает основание утверждать, что конверсионный период перехода на органическое экологически безопасное производство сопровождается отдельными рисками, предопределяет необходимость решения соответствующих задач, которые систематизированы в комплексные группы. Проведенный анализ технологий производства органической продукции показал, что они являются экономически эффективными, экологически безопасными, энерго- и ресурсосберегающими и характеризуются социальной направленностью. Предложенные стратегические направления обеспечения экологической безопасности продукции пищевой промышленности на основе долгосрочного развития органического производства в Украине.

**Ключевые слова:** органическое производство, продукция, пищевая промышленность, экологическая безопасность, качественные продукты питания, сертификация.

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