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## ORGANIC AGRICULTURAL PRODUCTION IN THE SYSTEM OF MODERNIZATION OF ENVIRONMENTAL SAFETY

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### ABSTRACT

The article defines the role of organic agricultural production in the system of the agrarian complex. The impact of agriculture on ecology is characterized. It was determined that the greening of agriculture becomes a priority point in the system of modernization of environmental security. The authors present that the latest technologies make it possible to effectively cultivate agricultural land, and the main place among the innovations of agricultural production is occupied by agricultural works, which are provided by automated systems and unmanned equipment. The article highlights environmental problems arising as a result of human economic activity to ensure one's own food security and presents alternative methods of farming. The crucial role of organic production is defined and the main methods of organic agriculture are presented. The authors researched the dynamics of the area of agricultural land used for organic production and operators of organic production. The main environmental criteria of organic agricultural production, projects and programs that provide assistance in the field of organic production, circulation and labeling of organic products are presented.

**KEY WORDS :** Organic production, Ecological safety, Environment, Ecological agriculture, greening.

### INTRODUCTION

The environmental situation in Ukraine at present can be described as a crisis. The crisis was formed over a long period of time due to the neglect of objective laws of development and reproduction of the natural resource complex of Ukraine. A rational solution to this problem is the use of environmental innovations that provide a high level of environmental safety of production, products and services while strengthening the competitive position of production, preservation and reproduction of the environment. In the developed countries of the world it is due to new knowledge and the introduction of innovations in agriculture that a high level of added value is obtained, without disturbing the ecological balance of the environment. Today, the greening of agriculture is becoming a priority problem that can be solved by moving from traditional to organic farming. Based

on the principles of health, ecology, care and justice, organic agriculture provides: modernization of the system of environmentally friendly agricultural activities; increasing the market for environmentally friendly food and raw materials for the food industry; preservation and natural reproduction of fertility of agricultural lands; creation of favorable conditions for environmentally friendly development of rural areas and the social sphere of the village, improving the welfare of peasants; harmonious combination of ecology with the economy (Kaletnik and Lutkovskaya, 2020).

The Earth's population is growing at a breakneck pace and therefore the need for food is increasing. Traditional approaches to growing plants and fattening animals are no longer able to provide environmentally friendly food to the growing population of our planet. Scientists are continuing to work to ensure that these methods not only increase production, increase yields, but also increase human

health benefits.

## BACKGROUND

Today, the environmental sector does not exist as a separate industry. There is an active struggle around the world for the protection of the natural environment. New laws on nature protection, strict environmental standards are being approved, and sewage treatment plants are being built at enterprises. The transformation of the economy leads to the emergence of specialists in all fields dealing with environmental issues (Kaletnik and Lutkovskaya, 2020).

In the environmental sector, the main role is played by the control of environmental changes, the development of waste treatment technologies and the planning of projects and programs based on full-cycle technologies – from product design to its use and recycling or disposal. The latest technologies make it possible to effectively cultivate agricultural land. Leading positions among the innovations of agricultural production are occupied by agricultural works, which are provided by automated systems and unmanned equipment. In the future, farmers will use genetic engineering techniques to increase yields and produce proteins that are good for human health. Organic food has always been popular among the eco-conscious, and is now gaining even more popularity, now occupying about 10% of the food and beverage market (Smigunova and Ilyin, 2020).

## METHODOLOGY

We are accustomed to consider industry and transport to be the main polluters of the environment, but agriculture also has a detrimental effect on the environment. Traditional technologies of agricultural production significantly disturb the natural balance and pollute the environment. Today it is difficult to list all the environmental problems that arise as a result of human economic activity to ensure their own food security, let's name at least some of these problems (Smigunova and Ilyin, 2020):

- Pollution of the environment with waste from livestock farms - soil contamination, air pollution;
- Reduction of species diversity of flora and fauna;
- Depletion, waterlogging, salinization of soils;
- Growing deficit of water resources;

- non-compliance with agronomic standards for the use of fertilizers and plant protection products forms the accumulation of their residues in agricultural products;
- the emergence of genetically modified organisms.

All these and many other problems and threats have been known for a long time, but to many of us these problems seem to have a tangible impact only in the long run. The intensification of agricultural production has led to environmental pollution, negative changes in ecosystem chains, and deteriorating human health. Working on their own mistakes, humanity is looking for alternative methods of agriculture. To date, the following methods have been developed (Tkachenko, 2018):

- Organic farming;
- Biointensive minifarming;
- Biodynamic agriculture;
- Ecological agriculture;
- EM technologies (effective microorganism technologies);
- Low input sustainable agriculture (LISA);
- Precision farming;
- regenerative agriculture.

The most widespread in the world is the method of modern alternative agriculture, covering the fields of crop and livestock, which was called "organic farming" or "organic production" (Kaletnek *et al.*, 2022).

Organic production is based on the principles of health, ecology, justice and care, uses the principle of biological synergy. The main methods of organic agriculture include:

- refusal to use herbicides, pesticides, fungicides, fertilizers;
- use of biological plant protection products;
- use of animal and vegetable waste as fertilizers;
- application of crop rotation to restore the soil;
- the use of manual labor in the care of crops;
- organization of a closed cycle agriculture-livestock (crop production - fodder, livestock - fertilizers);
- in animal husbandry – grazing, refusal to use synthetic feed additives, hormones, antibiotics.

Along with certain advantages, organic agricultural production has disadvantages (Honcharuk, 2020):

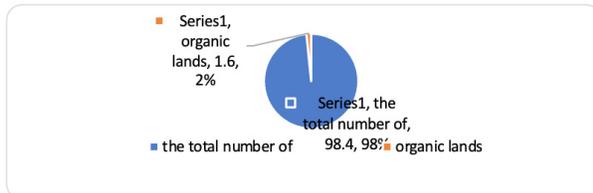
- Low efficiency of biological preparations (green pesticides, biofungicides, bioinsecticides, growth stimulants, microfertilizers, etc.);
- The problem of diseases and pests remains open;

- The production process requires more work and time;
- Organic products are more expensive than traditional ones.

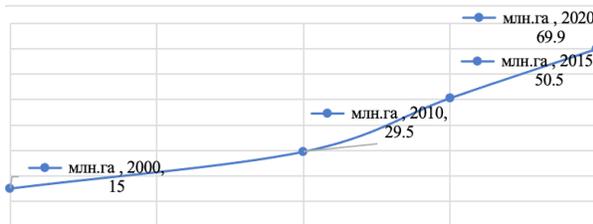
But despite all these shortcomings, organic agriculture is not as detrimental to the environment as traditional agriculture. In addition, the field of organic agriculture continues to develop actively – scientists around the world are working on technology, the process of developing more effective biological products.

**RESULTS**

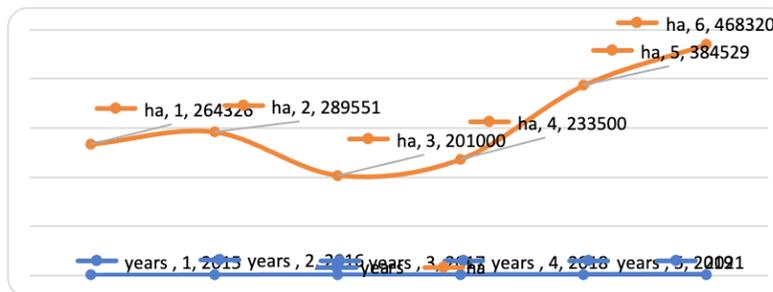
As of 2021, more than 70 million hectares on Earth are used in accordance with the principles of organic production, which is approximately 1,6 % of the total volume of all agricultural land (Electronic Resource).



**Fig. 1.** Share of organic agricultural lands in the total number of agricultural lands in the World,%  
(Source: developed by the authors on the basis of statistical data)



**Fig. 2.** Dynamics of the area of organic lands, million hectares  
(Source: developed by the authors on the basis of statistical data)



**Fig. 3.** Area of agricultural land occupied by organic producers in Ukraine  
(Source: developed by the authors on the basis of statistical data)

In Ukraine, according to the monitoring conducted by the Ministry of Economy, in 2021 the total area of agricultural land with organic status and the status of the transition period amounted to about 468 thousand hectares. At the same time, there were 549 operators of the organic market, of which 419 were agricultural producers [12].

The main types of organic products produced in Ukraine are cereals, fruits and vegetables, meat and meat products, milk and dairy products. The main export products are cereals, oilseeds, berries, mushrooms, nuts, fruits. Ukrainian organic products are mostly bought by EU countries. According to a report by the European Commission in 2021, Ukraine ranked 4th out of 124 countries in terms of imports of organic products to the EU. Thus, in 2021, 2.79 million tons of organic agri-food products were imported into the EU, 7.8% of which were Ukrainian (217.2 thousand tons) (Kaletnik and Shinkovich, 2020).

The largest consumers of domestic organic products are the Netherlands, the United States, Germany, Lithuania, Austria, Great Britain, Poland, Canada, Italy and Switzerland. Ukrainian producers are also exporting to Australia and some Asian countries, including China, Vietnam, India and Japan, as well as making the first deliveries of organic products to the Republic of Korea (Kaletnik and Prishlyak, 2017).

The environmental friendliness of organic production is primarily about preserving human life and health. Organic products do not contain GMOs, trans fats and other toxic compounds. Organic farmers do not use traditional pesticides and fertilizers, and animals grow without the constant use of antibiotics and growth hormones. It is known that if these substances constantly get into the human body, they cause many diseases. Also, when animals and plants grow naturally, the amount of vitamins and antioxidants in foods increases

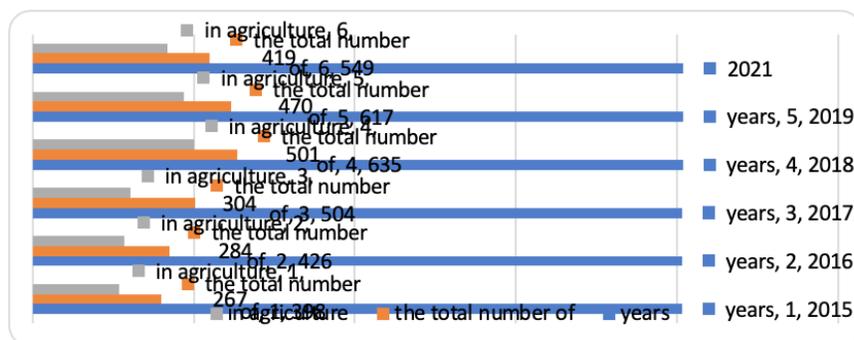


Fig. 4. Number of operators of organic production  
(Source: Developed by the authors on the basis of statistical data)

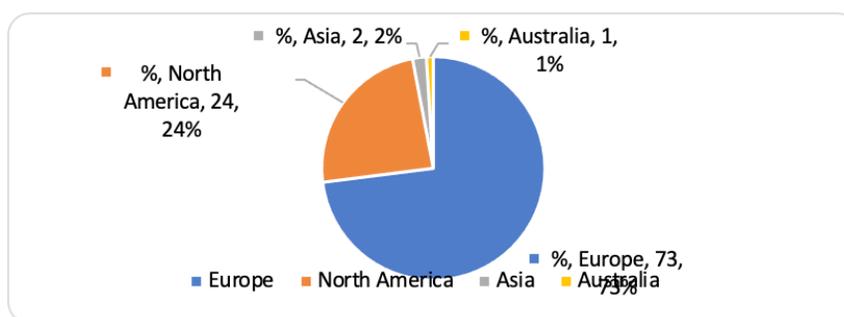


Fig. 5. Exports of organic products from Ukraine,%  
(Source: developed by the authors on the basis of statistical data)

significantly. Therefore, organic production creates not only safe products, but also useful ones [10].

Organic production is constantly improving, and producers are trying to reduce the harmful effects of their farms on nature. To do this, farmers maintain and restore soil fertility, care for the welfare and free growth of animals, do not use chemical compounds that could contaminate water bodies. Traditional agriculture causes huge emissions of greenhouse gases such as nitrogen oxides, methane and carbon dioxide, which exacerbates climate change on the planet. Organic farms produce much less greenhouse gases. According to IFOAM (International Federation of Organic Agriculture), with a full transition to organic farming by 2030, it is possible to compensate for 20% of greenhouse gas emissions caused by agriculture. And this is a huge contribution to the fight to preserve the climate [17].

In the Western world, income from organic farms is growing steadily. Prices for organic products are higher than for ordinary ones, and consumers are willing to pay more for quality and naturalness. And this is just the beginning. Currently, not all Ukrainians know about the benefits of organic products, but with the growing awareness - the demand will grow. Creating economic benefits for

farmers is an important part of organic farming development programs in Europe and Ukraine. European programs plan to implement the idea of «organic on everyone's table» by 2030, and are funded accordingly.

To date, Ukraine has adopted many laws and strategies that provide for the modernization of the system of organic agriculture in terms of sustainable development. These are, in particular, the Energy Strategy for the period up to 2035, the Strategy of State Environmental Policy of Ukraine for the period up to 2030, the Low-Carbon Development Strategy, the Energy Efficiency and Renewable Energy Action Plan, the National Plan for Reducing Pollutant Emissions from Large Combustion Plants, the Law on Principles monitoring, reporting and verification of greenhouse gas emissions and others. All these documents stipulate that our state must implement many important projects to preserve the environment (Kaletnik and Lutkovska, 2020).

In addition to state programs, international programs are being implemented. The Ministry of Economy of Ukraine cooperates with international projects aimed at the development of organic production, in particular with:

- Swiss-Ukrainian program «Development of trade

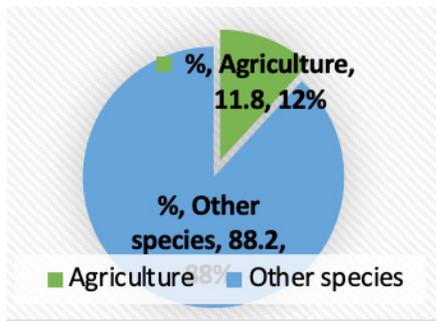


Fig. 6. Greenhouse gas emissions in Ukraine in 2021, % (Source: developed by the authors on the basis of statistical data)

with higher added value in the organic and dairy sectors of Ukraine» (QFTP), funded by Switzerland and implemented by the Research Institute of Organic Agriculture (FiBL, Switzerland) in partnership with SAFOSO AG (Switzerland).

- Project «German-Ukrainian cooperation in the field of organic agriculture».
- Organic Trade for Development in Eastern Europe (OT4D).
- USAID Agricultural and Rural Development Program (AGRO).

These projects and programs provide expert assistance in developing the regulatory framework and implementing legislation in the field of organic production, circulation and labeling of organic products (Law of Ukraine).

## CONCLUSION

Greening of agricultural production is closely linked to innovation and should be considered as an integral part of its development with the introduction at the state level of environmental and economic management of the industry. An important direction in the implementation of environmental innovations is organic farming. Proof of economic, environmental and social benefits of organic agriculture is many years of experience in the production of organic products in agricultural enterprises of leading foreign countries. Positive economic manifestations of organic agricultural production are the dynamics of increasing the profitability of products, reducing dependence on external sources and increasing competitiveness. Undoubted environmental consequences are the reduction of man-made impact on soils, reduction of

natural water pollution, conservation and restoration of biodiversity in agricultural landscapes and ensuring the ecological balance of the environment. Along with the obvious importance of providing the population with quality food, among the social consequences of organic farming should be noted the strengthening of ethical and natural human behavior in the ecosystem, rural development, increasing employment and welfare in rural areas and more.

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