EXO- AND ENDOGENOUS FACTORS OF ORGANIC PRODUCTION DEVELOPMENT IN UKRAINE

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Abstract. The article investigates the constraints to the development of organic production in Ukraine. Two blocks of the main constraints that negatively affect the development and implementation of organic production are identified and summarized. Among the exogenous constraints are the full-scale invasion of Ukraine by the aggressor country and the price of organic products on the international market. The endogenous constraints include legal, socio-economic, environmental, logistical factors, as well as the unregulated model of lease relations.

It is determined that Ukraine currently does not have a clearly formed system of certification, standardization and labeling of organic products, but there are a number of regulatory legal acts whose norms create the basis for the development of the organic sector.

The article identifies and analyzes the legal, socio-economic, environmental, and logistical problems that hinder the development of organic production in Ukraine.

It is determined that the existing system of land relations is built on the basis of lease, and the production of organic products under lease is risky, since a short-term lease agreement is economically unprofitable for organic producers, as it is based on the personal economic benefit of the landowner rather than the tenant's interest in a good harvest.
The procedure for determining the suitability of land plots for the production of organic products is identified as another endogenous factor that hinders the development of organic farming in Ukraine.

**Keywords:** land use, land legislation, land relations, land protection, land management, organic products, organic activities, organic farming, certification, organic market operator, transition period, organic period, land degradation, land lease, crop rotation, humus balance.

**Problem statement.** Imperfect regulation of land relations, irrational management decisions regarding land, the current state and use of land resources, including the excess of the permissible level of anthropogenic pressure on land, and a significant level of development of agricultural land in Ukraine do not contribute to the formation of sustainable land use. In particular, this is leading to the proliferation of low-productivity, technologically contaminated land, a decrease in land productivity potential, and in the near future, soil fertility may decline to critically low levels.

Currently, organic production is gaining popularity and Ukraine has a significant potential for the development of organic agricultural production, as the number of certified land plots for organic production is increasing every year, the number of producers of such products is growing, and the volume of domestic and foreign markets is increasing. However, in the context of constant growth of land areas, the selection of land plots and determination of their efficiency, as well as the development of appropriate measures for the appropriate organization of land use, remain problematic for organic farming.

In the context of the war, the development of organic production in Ukraine is not a priority, but this form of farming is being actively implemented. As you know, everything in agriculture starts with the soil, and its productivity potential is crucial. Recognizing the catastrophic consequences of the hostilities, we predict that after the war is over, the total contamination of agricultural land in Ukraine will become global.
According to the National Academy of Agrarian Sciences, even before the full-scale invasion, the level of plowed land in Ukraine was one of the highest in the world - 54%, and in some regions - 70% or more [1]. According to the Food and Agriculture Organization of the United Nations (FAO), the plowed soil in Ukraine is 53.9%. At the same time, the rate of plowed agricultural land is 78.2%, while the average value in the European Union (EU) is 30-35% [1]. The reason for this, in our opinion, is the lack of a land use strategy, non-compliance, and sometimes violation, of norms and standards of agriculture and environmental balance.

The soil ecosystem suffers the most because of the war. Mined regions, shelling craters, landslides, burnt land, and destroyed military equipment in the fields cause long-term environmental degradation.

Today, 30% of Ukraine's territory is a high-risk area for farming. One of the negative factors is soil disturbance. These are mainly direct damages - mechanical deformations, chemical and thermal pollution, and cluttering of the territory [2].

If post-war restoration measures are not implemented, we should expect an increase in the area of land with soils that are flooded, saline, subject to erosion processes, etc. This can undoubtedly lead to devastating consequences in agriculture, soil disturbance, desertification, lack of natural moisture, and the development of wind and water erosion.

Taking into account the practice of organic production in EU member states, such as Germany, we note that the German food and land use system is radically oriented towards sustainable development. One of the steps in this direction is the goal of increasing the share of agricultural land under organic farming from 10 to 30% by 2030. As is well known, the rapid increase in the area under organic crops causes major changes in the food system and land use, including the creation of complex natural systems, reduction of food waste and, possibly, the recovery of nitrogen from wastewater. However, this is only possible if these processes are accompanied by technical advances aimed at increasing crop yields [3].

Research suggests that agricultural land use should be based on farming systems with higher profitability per hectare. Comparing organic and conventional farming
systems, the researchers concluded that organic farming had higher costs, revenues, and profits per hectare than conventional farming. Although both systems had positive financial returns, the average net profit of organic production (per hectare) was 21 times higher than that of conventional farming (per hectare). At the same time, the profitability index of organic farming was 64% higher than that of conventional farming. The organic method also demonstrated higher profitability in terms of the number of direct jobs, income distribution, food for healthy eating, added value to GDP, risks, (bio)diversity of crops, and land area, among other things. In general, it was concluded that organic farming provides higher financial, social, economic, and environmental returns per unit area of land [4].

**Analysis of recent research and publications.** The increasing pace of development of the organic sector has led to a number of articles and publications. Among the latest scientific publications, it is worth noting, first of all, the scientific article by O. S. Dorosh and A. Y. Dorosh, which shows and proves the importance of the development and development of organic land use in the current conditions in Ukraine. In the article, the researchers note that the importance of increasing the pace of development of organic production is due to the use of traditional technologies for growing agricultural products, which significantly worsen the ecological situation in nature, disrupt the natural balance, and impair human health. The author proves the need to reform the legislative sphere, namely, the development of land management projects for the organization of organic land use (land tenure). It is the encouragement of both producers and consumers of organic products that is crucial for the development of this sphere, despite the martial law. The proposed factors for the development of organic production can be implemented to a large extent and logically and consistently implemented [19].

The issue of organizing the territory for organic farming was studied by Y. Dorosh, A. Barvinsky, and D. Melnyk. Based on the results of their research, they emphasized that the current system of legislation is aimed at regulating the technological process of organic production, certification and labeling. However, for the quality production of organic agricultural products, it is necessary, first of all, to
pay attention to the conditions and location of land use, i.e. the organization of the
territory in accordance with the rules and standards of IFOAM. On this basis, they
substantiated that the current organic legislation requires a number of changes,
namely the development and implementation of appropriate land management
projects [20].

Taking into account the achievements of scientists, however, today there is a
need to identify exogenous and endogenous factors for the development of organic
production in Ukraine.

**The purpose of the study.** To analyze and systematize the factors of organic
production development in the current conditions of land relations development.

**Materials and methods of the study.** To implement the relevant tasks, the
relevant research methods were used, namely: scientific and monographic - in a
detailed review and analysis of various scientific articles on the production of organic
products and the problems of its introduction in Ukraine, studying the current state of
organic production and the possibilities of its distribution, analysis of the regulatory
framework for the development of organic farming, relevant periodicals, etc.

**Research results and discussion.** The global community's awareness of the
growing environmental threat posed by intensive farming has prompted the
development of alternative management models that would better meet the vital
needs of society. Organic farming has become such a strategy, and in recent years it
has been providing the growing global market with healthy, certified, safe food. The
term "organic farming" is an agricultural practice that does not use synthetic
pesticides and fertilizers. However, this is a characteristic feature, not a definition, of
this system of agricultural production. This system is based as much as possible on
crop rotation, the use of plant residues, manure and compost, legumes and plant
fertilizers, organic production waste, mineral fertilizers, mechanical tillage and
biological pest control to increase fertility and improve soil structure, provide
effective plant nutrition and control various pests and weeds [5].

Organic production in Ukraine began to develop in the early 2000s. Since then,
Ukraine has been considered one of the main suppliers of organic products to the EU.
In recent years, Ukraine has confidently held a position in the top 5 largest producers of organic products to the EU. In 2020, Ukraine ranked fourth in the world in terms of imports of organic products to the EU with a share of 7.8% among 123 countries, and exported 217,210 tons of organic products to the EU in 2020. Key products: corn, soybeans, wheat, sunflower oil, cake, rapeseed, sunflower seeds, berries, blueberries (frozen), and millet. For many years, Ukraine has been a reliable producer of organic products and has maintained its leading position during the COVID-19 pandemic, which significantly disrupted supply chains. The pandemic has shown that the demand for organic products in the EU will continue to grow as more and more consumers choose a healthy lifestyle and quality food [5].

When thinking about the benefits of organic foods over conventionally produced foods, we should note the health benefits of organic foods, which are the absence of chemical pesticides and other harmful substances that can cause serious health problems, including cancer, birth defects and reproductive disorders. Higher concentrations of vitamins, minerals, and antioxidants mean that eating organic foods can help strengthen the immune system and protect against disease. Because they contain fewer harmful substances, such as pesticides and GMOs, these foods can help reduce the risk of allergies and other health problems. Some studies also confirm that organic foods have lower levels of nitrates, which are considered carcinogenic [6]. In addition, organic foods often have a higher nutritional value, which contributes to a balanced diet, providing the body with all the necessary nutrients. [6]. More advantages of organic agriculture are shown in Table 1.

**Table 1 - Advantages of organic farming**

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Environmental impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced use of chemical pesticides and fertilizers that pollute soil and water</td>
<td>Using natural pest control methods and biological fertilizers that are less harmful to the environment.</td>
</tr>
<tr>
<td>Conserving biodiversity and maintaining healthy ecosystems</td>
<td>The cultivation of diverse crops and the use of mixed cultivation methods contribute to the formation of healthy ecosystems and the maintenance of biological diversity.</td>
</tr>
<tr>
<td>Restore soil fertility and reduce erosion</td>
<td>The use of organic farming methods,</td>
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such as composting and green fertilizers, helps to increase fertility and improve soil structure.

<table>
<thead>
<tr>
<th>Reducing water use and ensuring sustainable agriculture</th>
<th>The use of drip irrigation and mulching methods helps to reduce water loss through evaporation and provides a stable water supply for plants.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reducing greenhouse gas emissions</td>
<td>Organic land use can help reduce greenhouse gas emissions, as it typically requires less fossil fuel use for fertilizer and pesticide production.</td>
</tr>
<tr>
<td>Promoting the local economy and social development</td>
<td>Organic farms can become centers of educational and training opportunities for the local population, promoting sustainable agriculture among the region's residents.</td>
</tr>
</tbody>
</table>

*Source: developed by the author using the source [6].

Organic production in Ukraine is characterized by the following. According to the Ministry of Agrarian Policy and Food of Ukraine, as of December 31, 2021, the total area of land used for organic production and in the transition period amounted to 422,299 hectares, which is 1% of the total agricultural land in Ukraine, while as of 2018, the total area of agricultural land (organic and transition period) was 381,173 hectares. The area of agricultural land with organic status as of 2021 amounted to 370,110 hectares, and in 2018 - 289,551 hectares. The total number of operators in 2021 was 528, including 418 agricultural producers, and in 2018 - 426 people (organic and transition). As we can see, organic products are increasingly fascinating Ukrainians [2, 7].

However, despite the positive changes in the development of organic production in Ukraine, there are a number of negative constraints that hinder its development in the context of land relations reform, which we have grouped by their origin.

Thus, the exogenous and endogenous factors shown in Fig. 1, exogenous and endogenous factors in the context of land relations development hinder the development of organic production at any level. Some of the factors are described in more detail below.
A particularly relevant exogenous constraint at the moment is Russia's full-scale invasion of Ukraine. The ecosystem is suffering the most because of the war. Minefields, landslides, shelling craters, scorched land, and destroyed military equipment cause long-term environmental degradation. Today, 30% of Ukraine's territory is a high risk zone for agriculture. This exogenous factor is characterized by soil disturbance. This is primarily direct damage, such as mechanical deformation, thermal and chemical pollution, and surface contamination.

For example, mechanical deformation is a violation of the soil structure during the transportation of military equipment, construction of defensive structures, movement of troops, and the formation of craters from bombing. Soils are compacted, their structure changes, they become contaminated with heavy metals, soil fauna and vegetation die, and this causes additional disruption of the soil biocenosis.

As for chemical impacts, the problem of soil contamination with heavy metals and their compounds requires special attention, as it can lead to the migration of these substances into the vegetative mass of plants. Pollutant emissions have a direct impact on the environment and affect human health and well-being. There are negative health consequences associated with cardiovascular, neurological, metabolic, and oncological diseases. The impact on the health of children living in the territories of military operations is particularly critical.

The physical impact of war is characterized by changes in the physical characteristics of the soil as a result of the use of military equipment and weapons. This includes vibration, radioactive and thermal impact.

According to the data of the State Enterprise "Office for Entrepreneurship and Export Development", presented during the online conference "Export of Organic Products in War", as of June 2022, 1/5 of organic land is under occupation (Kherson and Zaporizhzhia regions). About 30% of organic enterprises have suspended their activities, but 70% continue to operate. About 32% of enterprises producing organic products are partially operating, and only 7% have no changes in their work, 15% of
producers donate their products to support the Ukrainian army and shelters. Some of the producers sell their products at a nominal cost [7].

The issue of organic production development is also taken into account within the framework of the global Sustainable Development Goals (SDGs), which are a universal call to action and were adopted by all UN member states in 2015 as part of the 2030 Agenda for Sustainable Development. Presidential Decree No. 722/2019 "On the Sustainable Development Goals of Ukraine for the period up to 2030" supports the global SDGs by 2030 and the results of their adaptation taking into account the specifics of Ukraine's development in order to ensure the national interests of Ukraine in the sustainable development of the economy, civil society and the state to achieve an increase in the standard of living and quality of life of the population, and to respect the constitutional rights and freedoms of man and citizen. In this regard, taking into account the dynamics of indicator 15.3.4 Area under organic production, SDG 15 Protect and restore terrestrial ecosystems, we can see a downward trend in the area of land under organic production as a result of military actions in Ukraine (Table 2).

**Table 2 - Area of land under organic production, thousand hectares**

<table>
<thead>
<tr>
<th>Year</th>
<th>Area, thousand hectares</th>
</tr>
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<tbody>
<tr>
<td>2015</td>
<td>410,6</td>
</tr>
<tr>
<td>2016</td>
<td>381,2</td>
</tr>
<tr>
<td>2017</td>
<td>289,0</td>
</tr>
<tr>
<td>2018</td>
<td>309,1</td>
</tr>
<tr>
<td>2019</td>
<td>468,0</td>
</tr>
<tr>
<td>2020</td>
<td>462,0</td>
</tr>
<tr>
<td>2021</td>
<td>422,3</td>
</tr>
<tr>
<td>2022</td>
<td>263,6</td>
</tr>
</tbody>
</table>

* Source: [8].

The legal constraint endogenous factor includes the unregulated regulatory framework, as the Law of Ukraine "On the Production and Circulation of Organic
Agricultural Products" [9], adopted in 2013, does not meet the requirements of European legislation in the field of circulation, organic production and labeling of organic products [9]. As part of the improvement of the regulatory framework for the development of organic production, the Law of Ukraine "On Basic Principles and Requirements for Organic Production, Circulation and Labeling of Organic Products" No. 2496-VII was adopted, which entered into force on August 2, 2019 [10]. However, even after the adoption of this law, certification of organic producers is carried out in accordance with standards equivalent to EU regulations. This is due to the absence of Ukraine's own organic standard, so labeling products with the yellow and blue EU logo is not possible [10].

On December 25, 2015, the Ministry of Agrarian Policy and Food of Ukraine approved the organic logo (Fig. 1).

![State logo for organic products](image)

Figure 1 - State logo for organic products

* Source: [11].

Thus, Law No. 2496-VII was adopted, but due to imperfections, lack of regulations and state standards, it is impossible to use the state logo for labeling Ukrainian organic products, which is why Ukrainian organic entrepreneurs use the Euroleaf label, which is applied to the label (Fig. 2) [12].
The legal problems also include the lack of state financial support and imperfect institutional support for organic production, which are especially noticeable during the transition period, as the most difficult and costly period, since funds are spent not only on certification of organic products, but also on preparing land for organic production, and purchasing organic seeds in accordance with standards. Additional costs are also incurred for the foreign inspector's flight and accommodation [13].

Considering the socio-economic constraint of the endogenous factor of development of organic production, it should be noted that the biggest problem is the price of organic products for consumers. Thus, in accordance with Article 8 of the Law of Ukraine "On the State Budget of Ukraine for 2024", the minimum wage in Ukraine as of January 1, 2024 is UAH 7,100, and the minimum subsistence level is on average UAH 2,920 for all population groups, in this situation, everyone has to pay for utilities, buy clothes and hygiene items, and therefore meet their social and cultural needs, and therefore there is almost nothing left for food, not to mention products of organic origin [14].

Another endogenous constraint to the development of organic production is that organic products are expensive due to the predominantly manual labor involved in growing them: since chemicals cannot be used to control pests, people often have to collect and shake off these pests themselves, pull weeds, weed, weed, hoe, and water, which is very labor intensive.
One of the endogenous deterrents is also the annual certification process, as you need to pay for the certification itself, buy organic seeds, and pay for the flight costs of a foreign inspector (when certified according to European standards).

Another endogenous constraint to the development of organic production is the fact that most organic producers are innovatively passive, since in order to switch from conventional to organic production, it is necessary to retrain staff, change the technology of growing products, and transform attitudes, skills, and desires [15].

Considering the environmental factors that are endogenously constraining and affect the development of organic production in Ukraine, it should be noted that agriculture can be compared to an open-air "workshop", and even minimal changes in weather or climate have an immediate impact on the harvest through the impact on the growth and progress of crops, as well as on the efficiency of fertilizer use, which contributes to the spread of pests and diseases.

The world is currently experiencing global warming, with summer months becoming hotter and winters becoming less cold and milder. According to research conducted by the German-Ukrainian Agricultural Policy Dialogue (APD), over the past 13 years, absolute maximum temperatures have been exceeding by 1-4°C throughout Ukraine(Fig.3).
The availability of high-quality and appropriate inputs is the key to success and high yields. The main components of the material and technical base are the selection of crops and varieties for organic production and their rotation in the crop rotation. Other components of the material and technical base include the availability of appropriate machinery for soil preparation, crop care, weed control, and harvesting.

Another endogenous factor that is an obstacle to the development of organic farming is that the model of lease relations, which is currently most common in Ukraine, is more focused on the personal economic benefit of the landowner than on the tenant's interest in achieving a good harvest. Consequently, there is a serious problem in concluding lease agreements for land plots where organic production is planned. This is due to the fact that, according to paragraph 3 of Article 27 of the Law of Ukraine "On Basic Principles and Requirements for Organic Production, Circulation and Labeling of Organic Products", the certification process begins from
the moment the certification agreement is signed between the certification body and the person intending to engage in organic production. At this time, the transition period begins, which is the phase of transition from the production of non-organic products to the production of organic products. During this period, the operator must comply with all legal requirements related to organic production, circulation and labeling of these products. The duration of the transition period may vary depending on the field of organic production, for example, for annual crops it cannot be less than 24 months before the start of sowing, for perennial crops it cannot be less than 36 months. In addition, the farmer must cover the transportation costs of the foreign inspector, as well as the inspection and certification itself, and, if necessary, additional analyzes that the certification body will prescribe, since payment for the services of certification bodies is made on a contractual basis [18].

**Conclusions.** Organic production in Ukraine and the world is being implemented at a rapid pace, the demand for exports and imports of organic products is growing, and consumers are increasingly aware of the importance and benefits of organic products.

We divide the factors that influence and constrain the development of organic production in Ukraine into two groups: endogenous and exogenous. The endogenous constraints include legal (unregulated legal framework, lack of state financial support and imperfect institutional support for organic production), socio-economic (price of organic products for consumers, lack of awareness of the benefits of organic products, low wages and subsistence level, innovative passivity of producers), environmental (global warming and climate change), material and technical, unregulated model of lease relations. Exogenous factors include the price of organic products on the international market, as well as Russia's full-scale invasion of Ukraine.

Legal endogenous factors include the lack of a regulatory framework, the absence of a system of certification, standardization and labeling of organic products, as well as a lack of financial support from the state and shortcomings in the institutional support of organic production, especially during the transition period.
The internal socio-economic factors that hinder the development of organic production in Ukraine include high prices for organic products, lack of effective demand, passivity in the implementation of innovations by organic producers, as well as limited awareness of producers about the benefits of organic products compared to non-organic ones.

In determining the environmental factors that affect the development of organic production, this group of factors includes global warming, which leads to a decrease in crop yields, an increase in the number of pests and the spread of various plant diseases.

Among the material and technical constraints, we include the inconsistency of the technology of growing crops and varieties adopted at the enterprise with the agricultural technology of growing organic products, as well as the lack of appropriate machinery for soil preparation, crop care, weed control, and harvesting.

The study of the factors hindering the development of organic production in Ukraine found that there is currently no well-established system of certification, standardization and labeling of organic products in Ukraine. Therefore, it is necessary to improve the existing or create a new regulatory framework that will regulate the production of organic products at any administrative and managerial level. Without a proper regulatory framework and financial support, in particular, state support, the development of organic production will not reach the level of the EU countries [12].

We consider the production of organic products to be an important factor in the country's welfare, because the production of high-quality food will improve the health of the nation, and a healthy nation is the key to a successful future.

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ЕКЗО- ТА ЕНДОГЕННІ ФАКТОРИ РОЗВИТКУ ОРГАНІЧНОГО ВИРОБНИЦТВА В УКРАЇНІ

Анотація. У статті досліджено стримуючі фактори розвитку органічного виробництва в Україні. Визначено та узагальнено два блоки основних стримуючих факторів, які негативно впливають на розвиток і впровадження органічного виробництва. Серед екзогенних стримуючих факторів виділено повномасштабне вторгнення країни-агресора в Україну, а також ціну органічної продукції на міжнародному ринку. До ендогенних стримуючих факторів віднесено правові, суспільно-економічні, екологічні, матеріально-технічні фактори, а також неврегульованість моделі орендних відносин.

Визначено, що в Україні на даний момент немає чітко сформованої системи сертифікації, стандартизації і маркування органічної продукції, однак існує низка нормативно-правових актів, норми яких створюють підґрунтя для розвитку органічної сфери.

Виділено та проаналізовано правові, суспільно-економічні, екологічні і матеріально-технічні проблеми, які стримують розвиток виробництва органічної продукції в Україні.

Визначено, що існуюча система земельних відносин побудована на основі оренди, а виробництво органічної продукції в умовах оренди є ризикованим, оскільки короткостроковий договір оренди – економічно невигідний для
виробників органіки, адже грунтується на особистій економічній вигоді власника земельної ділянки, ніж зацікавленості орендаря у гарному врожаї.

Ще одним ендогенним фактором, який стримує розвиток органічного землеробства в Україні, визначено процедуру встановлення придатності земельних ділянок для виробництва органічної продукції.

Ключові слова: землекористування, земельне законодавство, земельні відносини, охорона земель, землеустрій, органічна продукція, органічна діяльність, органічне землеробство, сертифікація, оператор органічного ринку, перехідний період, органічний період, деградація земель, оренда земель, ротація сівозмін, баланс гумусу.