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**BALANCED USE OF AGRICULTURAL LAND AFFECTED BY WAR
IN UKRAINE AS A PREREQUISITE FOR SUSTAINABLE
DEVELOPMENT**

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Abstract. *The issue of ensuring the sustainable development of humanity is recognized as one of the most urgent problems facing society today. The article is devoted to the generalization of the features of the development of sustainable land use and the definition of the main problems of the sustainable use of agricultural land in Ukraine during the period of European integration, reforms of local self-government in the country, martial law and post-war recovery. The work highlights the main principles and goals of sustainable land use, in accordance with the concept of sustainable development. According to the authors, the practical implementation of the concept of sustainable land use requires determining the priorities of the use of agricultural land, and above all, ecological land. It was noted that the state of land resources in Ukraine was characterized as tense, due to the irrational use of the country's land resource potential, excessive plowing and land degradation. The authors note that organic agriculture has been developing in Ukraine in recent decades, but as a result of full-scale Russian aggression against Ukraine in 2022, the*

issue of organic production in Ukraine took a back seat. The most acute environmental problems are the development of degradation processes on the arable lands of Ukraine, which causes the mining of territories, the formation of craters from shelling, and landslides. Proposed priority areas of development of sustainable land use in Ukraine, which will allow transition to a model of sustainable development

Key words: *sustainable development, balanced land use, goals, indicators, land protection, agricultural land, post-war recovery.*

Problem statement

Land resources, being a strategic resource, play a special role in the economic development of any country. The document of the UN Summit on Sustainable Development "Transforming our world: the 2030 Agenda for Sustainable Development" defines the priorities of modern environmental policy of the entire civilised world [1], which defines 12 goals and 14 indicators for SDG 15 "preserving life on land", including ensuring the rational and balanced use of land resources as one of the priority areas of sustainable development. The environmental component of sustainable development refers to aspects of development that focus on protecting and enhancing the environment while promoting social and economic well-being. It involves adopting practices that balance the needs of the present with the ability of future generations to meet their own needs [2].

Land resources, being an integral part of the ecosystem - a single natural complex formed by living organisms and their habitats, require the concept of sustainable land use and balanced use of land resources [3]. The Law of Ukraine "On Land Management" defines the concept of sustainable land use as "the use of land determined by long-term use of a land plot without changing its intended purpose, deterioration of its quality characteristics and ensuring optimal parameters of environmental and socio-economic functions of the territories" [4]. The main goals of the development of balanced use of land resources are a harmonious combination of economic needs of society with efficient and rational use of land resources.

Analysis of the latest scientific research and publications

Domestic scientists, including B.M. Danylyshyn, S.I. Dorohuntsov, and A.G. Tikhonov, have made a significant contribution to solving problems and substantiating the prospects for sustainable development in Ukraine [5-7]. The theoretical and practical aspects of sustainable land use were studied in the scientific works of M.S. Bogira, O.I. Gutorov, D.S. Dobriak, O.I. Kotykova, A.Y. Sokhnych, V.M. Tretiak and others [8-10]. The study of the works of foreign and domestic scientists proves the relevance of finding a new paradigm of sustainable land use, which is actualised by the aggravation of environmental problems during martial law and post-war recovery.

The purpose of the article is to study the peculiarities of sustainable (balanced) land use development with the identification of the main problems of agricultural land use in Ukraine during the period of European integration, local government reforms in the country, martial law and post-war recovery.

Materials and methods of scientific research

The research was based on official statistics of Ukraine, World Bank data, and UN data. Methods of general analysis, systematisation, abstract and logical and other research methods were used depending on their objectives.

Research results and discussion

Ukraine, thanks to its natural resources, geographical location, quality of human capital and powerful potential of ecosystem, landscape and species diversity, had all the opportunities for rapid economic growth. However, analysing the pre-war state of land resources, it can be noted that in most of Ukraine it was "characterised as tense and sometimes crisis-like, with a tendency to deterioration, which significantly complicated the socio-economic development of Ukraine and its regions and negatively affected the landscape and biological diversity, health and living conditions of the population" [11]. The main reason for this situation is the irrational use of the state's land and resource potential, with a deteriorating quality and decreasing productivity of land, and the lack of a unified state system for land

protection [12]. Issues related to excessive ploughing and soil degradation are a priority, as Ukraine is considered one of the most ploughed countries in the world.

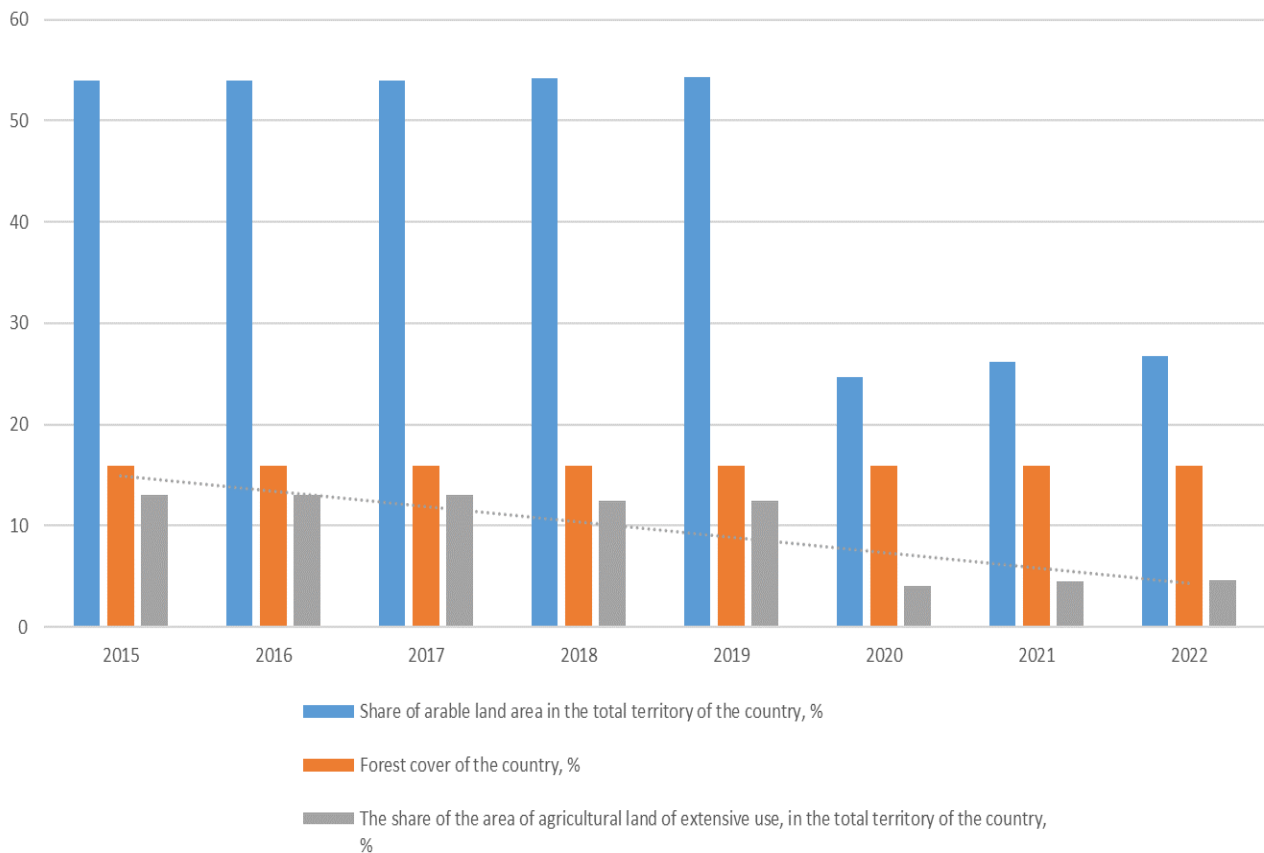


Fig. 1. Dynamics of indicators of arable land and ecologically stabilising lands [13].

The indicators defined under Goal 15[1] are based on the principle of converting arable land into extensive agricultural land (hayfields, pastures). However, it is important to note that Ukraine has a fairly high agricultural land development rate of 56%, of which more than half is ploughed (54% arable land), and forest cover is 15.9% (Fig. 1). The dynamics of the indicators of arable land and ecologically stabilising lands, as well as their shares in the total area of the country's territory, are also negative. Between 2015 and 2019, the area of arable land in Ukraine increased from 32541.3 thousand hectares to 32756 thousand hectares, while the area of agricultural land under extensive use decreased from 7840.5 thousand hectares to 7534.2 thousand hectares. This trend can be characterised primarily by economic factors: first of all, the growth of agricultural business in Ukraine and the need to

improve economic mechanisms to stimulate land protection and soil fertility. From 2020 to 2022, the area of arable land and ecologically stabilising lands (Fig. 1) is presented according to the data entered in the State Land Cadastre [14].

The Sustainable Development Goals [1] cover three main aspects of sustainable development: economic growth, social inclusion and environmental protection. Organic production is related to agriculture and is mentioned in the review in the context of the three goals:

"Goal 2. End hunger, achieve food security, improve nutrition and promote sustainable agriculture.

Goal 12: Ensure a transition to sustainable consumption and production patterns.

Goal 15: Protect and restore terrestrial ecosystems and promote their sustainable use, manage forests sustainably, combat desertification, halt and reverse land degradation and halt biodiversity loss."

In developed countries, organic agriculture is quite popular as it has a number of significant benefits for consumers, producers and the environment. Due to its geographical location, proximity to potential international buyers, and widespread fertile black soil, Ukraine also has favourable conditions for organic agriculture.

In Ukraine, from 2011 to 2021, the total area of agricultural land with organic status increased from 270,320 hectares to 422,299 hectares (from 0.65 to 1.02% of the total agricultural land area of Ukraine) (Fig. 2). [15] In 2017, Ukraine was ranked 20th among countries in terms of the area of organic agricultural land, including land in transition. [16] In terms of the area of organic agricultural land in Ukraine, four regions were leading: Odesa (102,238 ha), Kherson (75,866 ha), Dnipro (37,075 ha) and Zhytomyr (31,576 ha). [17]

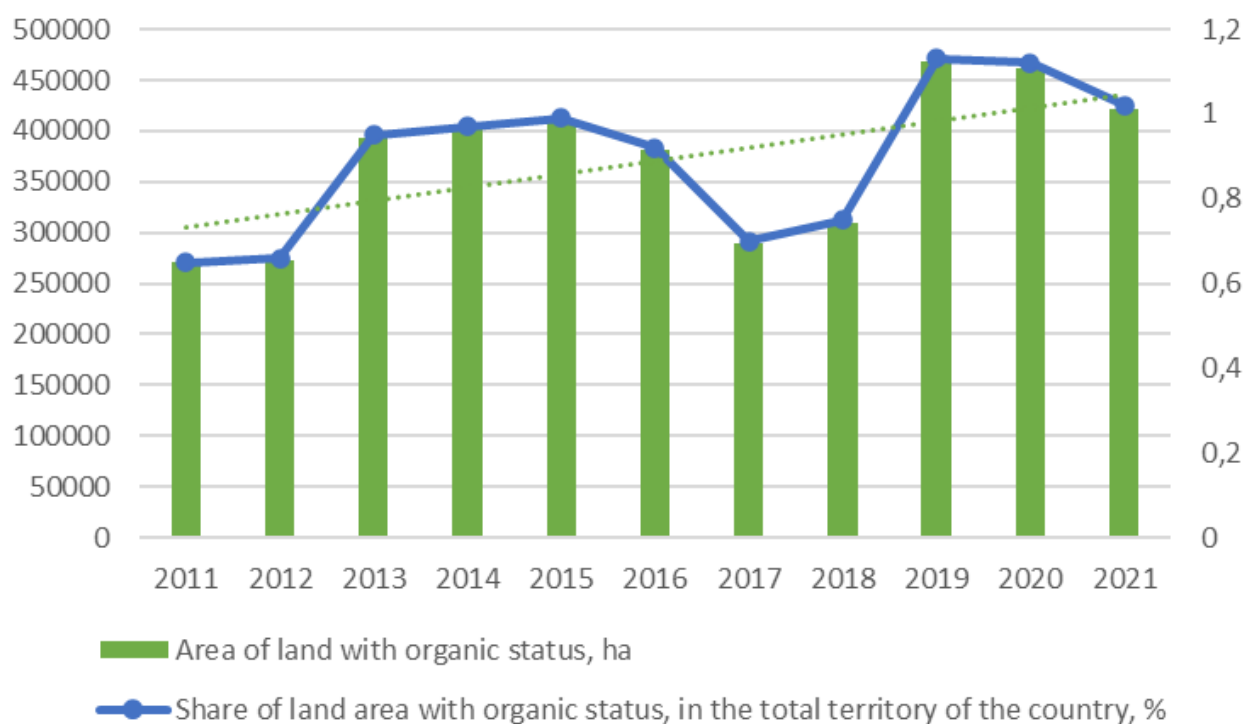


Fig. 2. Dynamics of land area with organic status [15].

Since 2021, Ukraine [18] has defined the principles of organic production and export of organic products, according to which the indicators of the sustainable development strategy are to achieve an indicator of the area of land with organic status of at least 3% of the total area of agricultural land in Ukraine, which is approximately 1.3 million hectares. However, as of 31.12.2022, the total area of agricultural land under organic production amounted to 263,619 hectares (0.6% of the total agricultural land area of Ukraine) [19], as the issue of organic production in Ukraine has faded into the background.

As a result of Russia's full-scale aggression against Ukraine, hundreds of thousands of hectares of arable land were mined and damaged by ammunition explosions, and large areas of agricultural land in eastern and southern Ukraine became contaminated. "As of May 2023, the area of mined fields was 8 million hectares, of which 6 million hectares were in the temporarily occupied territories and 2 million hectares were in the liberated territories. It will take up to 30 years to clear the entire territory of Ukraine" [20]. In Ukraine, more than 5000 thousand hectares of arable land are currently unused.

Table 1: Areas of agricultural land returned to economic use¹

Region	Area of agricultural land, ha			
	Need to be surveyed and demined (20.03.2023)	Surveyed (15.04.2023)	Cleared of VNP (04.09.2023)	Need to be surveyed and demined (01.01.2024)
Dnipropetrovska	2 645	2 645		6600
Donetsk				12800
Zaporizhzhya	1 232	1 232		-
Kyiv	10 410		947	9400
Mykolaivska	85 096		8 417	44000
Sumy	1 760			85
Kharkivska	159 020		49	190000
Kherson	208 438		68 310	248000
Cherkassy	885	885		-
Chernihivska	1 367		95	2000
Total	470853	4762	77818	512885

In order to create a safe environment for the intended use of agricultural land in 2023, 470,853 hectares of land needed to be surveyed and demined, of which 26,8600 hectares were surveyed [21]. The largest area of mined land is in Kherson, Kharkiv, Mykolaiv, and Donetsk regions (Table 1). In 2024, according to the plan of priority survey and, if necessary, more than 512885 hectares of agricultural land are to be cleared and demined [22]. First and foremost, the cause of long-term environmental degradation is mined areas, craters created by shelling, and landslides, which leads to total pollution and degradation of agricultural land.

The main challenges related to the restoration of ecosystems and directions for the development of sustainable land use in Ukraine by 2030 are: the introduction of organic agriculture as an integral part of the national policy of agriculture and rural development; withdrawal of degraded land from circulation with subsequent conservation and restoration of ecosystems, while creating effective legal mechanisms; in order to conserve and further restore natural landscapes, the introduction of state buyouts of war-affected agricultural land.

¹ Compiled based on data from [21,22]

Conclusions

Summarising the above, it should be noted that the concept of sustainable development involves preservation of the environment and all types of resources, providing for a balance of economic, environmental and social vectors of development. The environmental component of sustainable development plays a key role in the process of further use of land resources. The rational use of land resources and soil protection, as well as the development of organic agriculture in a comprehensive manner, will contribute to the integration of environmental and climate aspects into rural development, taking into account Ukrainian realities and compliance with international law on sustainable land use in Ukraine.

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**ЗБАЛАНСОВАНЕ ВИКОРИСТАННЯ
СІЛЬСЬКОГОСПОДАРСЬКИХ ЗЕМЕЛЬ, ЩО ПОСТРАЖДАЛИ
ВНАСЛІДОК БОЙОВИХ ДІЙ В УКРАЇНІ, ЯК ПЕРЕДУМОВА СТАЛОГО
РОЗВИТКУ**

Анотація. Питання забезпечення сталого розвитку людства сьогодні визнається однією з найбільш актуальних проблем, яка стоїть перед суспільством. Стаття присвячена узагальненню особливостей розвитку сталого землекористування та, визначенню основних проблем сталого використання земель сільськогосподарського призначення в Україні в період Євроінтеграції, реформ місцевого самоврядування в країні, воєнного стану та повоєнного відновлення. В роботі виділені основні принципи та цілі збалансованого землекористування відповідно до концепції сталого розвитку. На думку авторів практична реалізація концепції збалансованого землекористування потребує визначення пріоритетів використання сільськогосподарських земель, і перш за все екологічних. Зазначено, що в Україні стан земельних ресурсів характеризувався як напружений, через нераціональне використання земельно-ресурсного потенціалу держави, надмірну розораність та деградацією земель. Автори зазначають, що в останні десятиріччя в Україні розвивалось органічне сільське господарство, однак внаслідок повномасштабної російської агресії проти України у 2022 р. питання органічного виробництва в Україні відійшло на другий план. Найгострішими з екологічних проблем є розвиток деградаційних процесів на орних землях України, що спричиняє замінування

територій, утворення вирв від обстрілів, зсув ґрунту. Запропоновані пріоритетні напрямки розвитку збалансованого землекористування в Україні, які дозволить перейти до моделі сталого розвитку.

Ключові слова: сталий розвиток, збалансоване землекористування, цілі, індикатори, охорона земель, сільськогосподарські землі, повоєнне відновлення.