Creation of the ecologically safe land use mechanism in the territories that were affected by military actions

*S. Vynohradenko (State Biotechnological University), V. Gurskienė (Vytautas Magnus University), L. Makieieva, N. Mokierova, Y. Kniazev (State Biotechnological University)

SUMMARY

The article considers aspects of improving the theoretical and practical foundations for substantiating the mechanism of environmentally sound land use in the territories affected by military operations. To achieve this goal, the following main tasks were set: to define and substantiate the theoretical foundations of environmentally sound land use, rational use and protection of land; to study the legislative and regulatory framework for rational use and protection of land; to analyse the current state of land use; to substantiate the developed design solutions on the issues of environmental and economic efficiency of land use and to provide proposals for their implementation. A scheme for the formation of environmentally friendly land use in the process of sustainable development of the territory and mechanisms for its management are developed.

Keywords: land management, ecologically safe land use, post-war reconstruction, rational use of land, land fund
Introduction

One of the most time-consuming and promising areas is still the field of land relations. The development of land relations is impossible without a clear and effective apparatus for their regulation. Currently, the priority is to solve the issues of ecologically safe restoration of agricultural territories that have been affected by military aggression, as well as many unresolved land issues, and since the beginning of the Russian invasion, these issues have acquired a broad theoretical perspective and practical focus. In the process of solving them, the issue of ensuring highly efficient and environmentally safe use of land resources is particularly relevant. The solution of which involves the quality restoration of land resources involved in the production process, through the observance of crop rotations, the fertilizers use and methods of biological pests’ destruction, soil cultivation technologies aimed at minimal intervention, reducing soil compaction, and, therefore, obtaining high-quality agricultural products (Shkuratov et al., 2021). Therefore, ecologically safe and effective land use is based not only on achieving the maximum economic effect, but also, first of all, on preserving the ecological balance for the benefit of the country.

The importance of the ecological component in the system of agricultural lands balanced use is becoming more and more relevant every year due to the predominance of the private economic interests of many agricultural producers over the social, socio-ecological needs, and over the past year and a half the situation has become worse as a result of physical destruction fertile soil layer due to the military operations. Ecologically destructive processes in the agricultural use of land resources are also associated with ignoring reproductive processes, the desire to get as much profit as possible from the land, which in the complex can certainly lead to a nationwide ecological crisis (Greschuk, 2018). The primary task of creation the methodology of organizational and economic support of ecologically safe agrarian land use is the definition of the object and subjects. The object is land use, and among the subjects it is worth highlighting the following: landowners, land users, state and local self-government bodies, the public. The subject of the research is a set of theoretical and methodological, scientific and methodical and practical foundations of organizational and economic support of ecologically safe agrarian land holdings and land use (Kupriianchyk, 2020).

Method and Theory

According to A. Tretyak, now is the time to implement a new ecological and economic thinking in Ukraine, which is based on a harmonious combination of agricultural production ecological priorities and economy, that is, the transition of the ecological and economic land use system to the principles of ecologically safe development. Undoubtedly, such a transition will lead to the structural restructuring of the entire agricultural system and will require the implementation of a whole set of measures at the national level, but such ecological and economic efforts will be justified, as they will contribute to increasing the agriculture productivity. Currently, the most widespread systems of ecological agriculture in the world, which are based on the use of purely organic fertilizers, methods of non-chemical control of the spread of weeds, pests, diseases, storage of food products and feed without synthetic additives, rely on advanced technologies, guarantee high quality of food products, economically and effectively use land resources, maintaining the natural balance in agricultural land use (Tretyak et al., 2021, Tretyak et al., 2020).

D. Dobryak notes in his works that: "ecologically safe land use is part of rational land use system, which, in turn, is a system of land and social and production relations, which achieves the optimal ratio between economically expedient and ecologically safe types of land use and ensures economic growth and satisfaction of material and spiritual population needs" (Dobryak et al., 2018). Thus, this interpretation of the concept can be equated with the opinion of I. Osadcha, who claims that sustainable land use is a system of land and social and production relations that achieves the optimal ratio between economically expedient and ecologically safe types of land use, ensures economic growth of material and spiritual population needs (Osadcha, 2009). The modern use of Ukraine's land resources does not meet the requirements of balanced nature management, as the ecologically permissible ratio of arable land, natural fodder lands, and forest plantations is violated, which negatively affects the sustainability of the agrarian landscape. Therefore, we improved the scheme of ecologically safe land use formation, according to which,
ecologically safe land use can and should be formed taking into account all principles and mechanisms in order to achieve the greatest effect from its introduction (fig. 1).

Figure 1. Structural and logical scheme of ecologically safe agricultural land use

Special attention should be focused on the implementation of sustainable development of land use by comprehensively solving the problems of ensuring the rational land use. One of the important components of their solution is the optimization of land use with the simultaneous compilation of large-scale cartographic materials of territories with complex relief and the integration of environmentally safe design solutions on them (Koshkalda et al., 2022). The formation of a new philosophy and methodology of sustainable land use in Ukraine opens up the possibility of applying its results not only for effective land relations regulation, but also for the organization of protection and rational use of land, definition and justification of economic and organizational-economic measures system to restore their productivity.

Figure 2. Components of the mechanism formation of rational and ecologically safe land use

Ukraine has the highest integrated indicator of negative anthropogenic loads on almost its entire territory among European countries, the ecological situation and quality of the environment are characterized as acutely critical
and unfavorable from the point of view of the human health interests. Hence the logical conclusion: it is necessary to fundamentally rebuild the nature and structure of land use in Ukraine, primarily agrarian, to change the directions and structure of agriculture taking into account ecological and economic criteria and to transfer the national production complex to a model of sustainable development and functioning. Implementation of ecologically safe land use is a long-term process. The mechanism of ecologically safe land use is an organic component of the nature use economic mechanism. Thus, a number of measures must be coordinated with other economic mechanisms and natural processes implemented in a single economic system of management. The mechanism offered by us has six components, which, in turn, are implemented through certain influence levers (fig. 2).

**Results**

The main tool for achieving ecologically safe land use is the organization of the land use territory, which should provide the most appropriate organizational, territorial and production conditions for the rational development of the economy, the most productive use of all land, the introduction of correct crop rotations, the creation of a strong and stable fodder base for animal husbandry, the effective use of agricultural machinery, obtaining high and stable yields with the lowest costs of labour and funds per unit of production. When studying the issue of the organization of the territory of land use, the company "Zlagoda" LLC of the Oskilsk OTG of the Izyum district of the Kharkiv region was chosen, where we offered design solutions for the rational territory organization. Therefore, at the time of the project development for the organization of the enterprise territory under investigation, there were 2449.76 hectares of land within its borders, the largest area of which is occupied by agricultural land - 2028.71 (98.24%), including arable land – 1,818.35 (88.05 %). On the territory of "Zlagoda" LLC, some lands belong to moderately and severely eroded lands, therefore it is advisable to design a soil-protective crop rotation, which will consist of 7 fields, in which crops will be grown that will prevent soil erosion and help meet the farm's need for fodder. To determine the rational area of fodder rotation, the company calculated the need for fodder for farm animals.

The designed composition of land and crop rotation should ensure obtaining the maximum amount of plant products with the lowest labour costs, while simultaneously increasing soil fertility. When drawing up the scheme of agricultural crops rotation in crop rotations, the biological features of each crop, their placement according to the best predecessors, as well as the structure of sown areas were taken into account. Analysing the results of natural fodder land management, it can be noted that on the territory of "Zlagoda" LLC, a four-plot pasture rotation for one group with a total area of 133.48 hectares and one four-plot hay rotation with an area of 67.72 hectares was organized. The corresponding design decisions are shown on fig. 3.

![Figure 3](image-url)
Conclusions

Ecologically safe land use is part of the rational land use system, which, in turn, is a system of land and social and industrial relations, which achieves the optimal ratio between economically expedient and ecologically safe types of land use and ensures economic growth and satisfaction of the population needs. A scheme for the formation of ecologically safe land use in the process of territory sustainable development and the mechanisms of its management has been developed.

The analysis of the current legislation of Ukraine in the context of the state ecological development was carried out. When justifying the ecological efficiency of project decisions regarding the introduction of crop rotations, the coefficient of erosion danger was calculated and the balance of humus was calculated according to crop rotations. Field crop rotation turned out to be the most erosively dangerous, its coefficient of erosion danger was 0.67, for soil protective crop rotation it was 0.27, so it is erosion safe. We revealed the essence of the organic farming application on the example of the agricultural enterprise “Zlagoda” LLC, in the system of ecologically safe land use.

References


Shkuratov O., Chudovska V., Kushniruk T., Sotnikova I., Sotnikov D. Methodology of the environmental efficiency assessment of spatial organization of rural areas. E3S Web of Conferences, 2021, 255. DOI: 10.1051/e3sconf/202125501005

Dobriak, D.S., Shkuratov, O.I., Yevsiukov, T.O., Skliar, Yu.L. (2018). Naukovi osnovy ekoloho-ekonomichnoho vyvchennia zemelnykh resursiv. Zbalansovane pryrodokorystuvannia, 3, 106–112. URL: https://repo.snau.edu.ua/bitstream/123456789/7415/1/%d0%9d%d0%b0%d1%83%d0%ba%d0%be%d0%b2%d1%96%20%d0%be%d1%81%d0%bd%d0%be%d0%b2%d0%b8.pdf (In Ukrainian).


