UDC 504.05 http://dx.doi.org/10.31548/zemleustriy2022.04.08

ENVIRONMENTAL ASPECTS OF RATIONAL USE AND PROTECTION OF LANDS

N. BAVROVSKA
PhD in Economics,
National University of Bioresources and Nature Management of Ukraine
e-mail: bavrovska_n@nubip.edu.ua
ORCID 0000-0002-2343-3007

Abstract. *The current state of land use in Ukraine is characterized by high agricultural development and a high percentage of plowed land (more than 56%). As of 2022, the state of Ukraine's land resources could be described as cause for concern, as there has been a violation of the ecologically balanced ratio between land categories, a decrease in the area of unique steppe areas, excessive plowing of the area and violation of the natural process of soil formation.*

Protection and rational use of land is one of the most important tasks of society in the process of using natural resources, since food supplies obtained from the use of land make up 98 percent.

The article presents an analysis of the main ecological problems of land use that have arisen as a result of the full-scale war in Ukraine.

The need to solve the problems of rational land use due to the cross-cutting nature of environmental policy and the development of the country based on the European Green Course, taking into account the environmental standards at all levels of policy formation and implementation in the field of environmental protection and rational nature use, through the development and implementation of land management schemes and technical and economic justifications, is substantiated use and protection of lands of administrative-territorial units, territories of communities; automated platforms, information and analytical systems and remote sensing of the Earth; criteria and technologies for monitoring land and land relations, including artificial intelligence algorithms.

Key words: *developed and plowed areas, agricultural land, land protection, mine pollution, dangerous areas.*

Formulation of the problem.

Ukraine has significant strategic advantages due to its natural resources, geographical location and the quality of human resourses, which in general can become the basis for rapid economic growth of the state. The use of natural resources in amounts and methods that ensure sustainable economic development, efficient use of natural resources potential, harmonious interaction of society and natural environment, and economic mechanisms of ecologically

safe nature uses are considered rational nature use.

The main priority areas of rational use of Ukraine's natural resources are [1]: guaranteeing the environmental safety of nuclear facilities and radiation protection of the population and the environment; prevention of pollution of the Black and Azov seas and improvement of their ecological condition; formation of a balanced system of nature use, making industrial technologies more eco-friendly, energy, construction, agriculture; preservation of biological and landscape diversity, reserves and their preservation. Protection and rational use of land is one of the most important tasks of society in the process of using natural resources, since food supplies obtained through the use of land make up 98 percent [2].

Analysis of the latest scientific research and publications

Issues of the study of rational nature management are highlighted in the works of B. M. Danylyshyn, S. I. Doroguntsov [3,4], L. G. Rudenko, M. A. Khvesyk, as well as in the works of D. S. Dobryaka, O.P. Kanasha [7], V.M. Kryvova, A.G. Martyna[5], I.O. Novakovskaya [6], A.M. Thirdly, the issues of rational use of land resources are covered.

The purpose of the study is to substantiate the ecological aspects of the rational use of land resources.

Materials and methods of scientific research.

During the research, the following approaches are used: abstract-logical - to justify the purpose and conclusions; monographic, methods of comparative analysis and scientific generalization.

Research results and discussion.

The rational use of land resources should be based on considering the ecological components (protection and rational use of land and the production of ecologically clean agricultural products) and economic (taking into account the interests of agricultural producers) components.

The state of Ukraine's land resources at the beginning of 2022 could be described as cause for concern, as there had been violation of the ecologically balanced relationship between land categories, a decrease in the area of unique steppe areas, excessive plowing of the territory and violation of the natural process of soil formation.

The percentage of plowed land in Ukraine is one of the world's most significant which from 1961 to 2020 is more than 56%, while in developed European countries it does not exceed 35% according to data (FAO). Ukraine Arable Land: % of Land Area data is updated yearly, from 1992 to 2020. The data reached an all-time high of 57,59 % in 1992 and a record low of 55,99 % in 2007 (Fig. 1).

As of2020, agricultural land as a share of land area in Ukraine was 71.31%. The data is updated annually from December 1961 to 2020 (60 observations), the average rate of plowed agricultural land is 72%. The data reached an all-time high of 72,31 % in 1961 and a record low of 71,30 % in 2020. (Fig. 1).

For comparison, indicators of plowed land and plowed agricultural land in Moldova are 51.7% and 68.8%, in Poland these indicators are 36.7% and 47.24%, in Germany 34.4% and 47.5%, in USA 17.3 % and 44.4 %, in Canada 4.3 % and 6.4 %, respectively.

For comparison, in Moldova 51.7% and 68.8%, in Poland these indicators

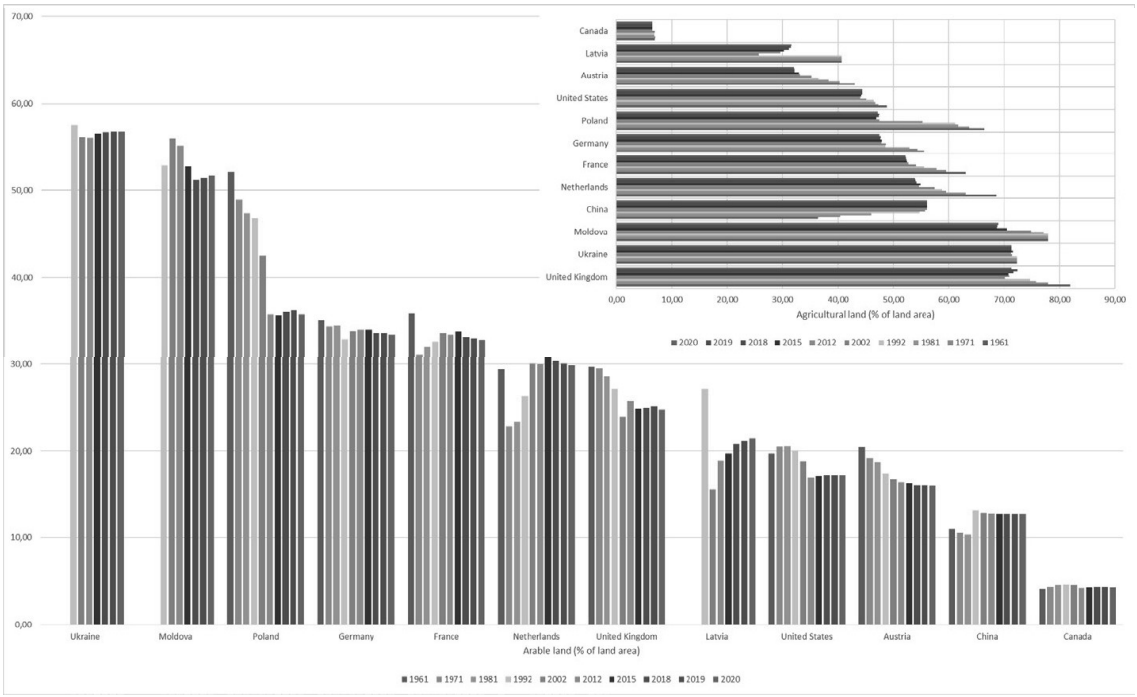

Fig. 1. Data on plowed land in the world from 1961 to 2020

Source: https://data.worldbank.org/indicator/AG.LND.ARBL.ZS?locations=UA

are 36.7% and 47.24%, in Germany: 34.4% and 47.5%, in the USA: 17.3% and 44.4%, in Canada: 4.3% and 6.4%, respectively. As of 2020, data on the plowed UK Arable land (% of land area) of the indicate that it is 24.71% but plowed UK Agricultural Land (% of Land Area) is 71.34% [9].

One of the problems in the field of protection of the environment and natural resources, which negatively affects human health and the sustainability of ecosystems, is the degradation of land resources [10]. The areas of degraded and unproductive lands range from 8 to 10-15 million hectares, of which more than 1.1 million hectares are subject to conservation and 143.4 thousand hectares require reclamation. Annual losses from the main types of soil degradation amount to about UAH 40-50 billion [11]. The most extensive degradation processes are water and wind erosion of soils (about 57% of the country's territory), land flooding (about 12%), acidification (almost 18%), salinization and alkalinization of soils (more than 6%). After signing the UN Convention on Combating Desertification, Ukraine undertook to restore degraded lands and soils by 2030 and strive to achieve a neutral level of land degradation in the world.

Among the ecological problems of land use in Ukraine is a significant level of pollution of land resources: the number and scale of natural and man-made emergencies are increasing. Nearly 23,000 cases of landslides are recorded every year. More than 150,000 hectares of land have been disturbed as a result of mining and other types of activities. The number of underground and surface karst manifestations is about 27,000.

The strategic goals of increasing the level of environmental security envisage reducing the effects and consequences of climate change in Ukraine, ensuring the rational use of natural resources;

the development of organic agriculture, practicing frugal land cultivation with the preservation and increase of soil organic matter [10].

The Concept of the National Target Program for the Use and Protection of Land provides for the achievement of a neutral level of land degradation, to increase the productivity of agricultural land by 40-50% through the rational use of organic and mineral fertilizers [11]. This requires the development of updated scientific and methodical approaches to the use and protection of land, the implementation of land monitoring, the improvement of the regulatory and legal framework taking into account the modern dynamics of socio-economic and ecological conditions in the country, in particular the transformation of land relations in the agrarian sector of the economy (including the formation market circulation of agricultural land plots), accelerated development of digital technologies (in the context of digitization of the country), means of remote sensing of the Earth, global climate changes.

However, as a result of the full-scale war in Ukraine, the environmental problems that existed before the start of the war became much more complicated. The lack of access to territories and objects of environmental management, the loss and destruction of infrastructure, the suspension of control measures during the period of martial law negatively affected the opportunity to fully implement state management in the field of environmental protection and land resources. Agricultural lands especially suffered significant types of damage: mine contamination and direct physical damage (Fig. 2).

Both on the frontline and in occupied (or formerly occupied) territories, agricultural land is at high risk of mine con-

Fig. 2. Potentially dangerous territories of Ukraine that may contain explosive objects as of September 8, 2022.

Source: Developed by a group of experts of the Association of Sappers of Ukraine in accordance with IMAS 08.10 https://www.uda.org.ua/nts-team/

tamination, and there are places affected by active hostilities that are also contaminated by unexploded ordnance. As a result, all agricultural land in active hostilities or occupied by the Russian Federation requires a thorough inspection, and some of these areas require demining to make the land suitable for agriculture again. The cost of surveying lands with a high risk of mine contamination and demining the affected territories is estimated at 436 million US dollars [12].

The second type of damage is physical damage to the fertile soil layer, for example – craters from artillery shelling and missile strikes, soil damage by tank tracks or other military equipment. Such damage in areas of active military operations will require further land restoration, including reclamation and surface leveling. The cost of reclamation of these lands is estimated at 39.6 million US dollars [13]. As of March 20, 2022, the area of damaged soil cover was 6,582.0 hectares, out of 1,655,845.3 hectares of surveyed arable land [13].

Potentially dangerous territories of Ukraine as of September 2022, which are contaminated with explosive objects, amount to about 82,000 km2, which is almost 15% of the total area of the state, thus, the area of damaged land will be larger. [14]

Thus, military operations led to changes in legislation and simplification of the procedure for obtaining land rights, closing the land cadastre. There were problems of mining significant territories of Ukraine, solving the future fate of lands that cannot be quickly inspected and demined, as well as the need to check the quality of agricultural land soils in the territories where active hostilities took place, because the hitting of rockets and projectiles in the fields obviously worsens their quality. contaminates them and can negatively affect the quality, safety and volume of crops that will be grown on these contaminated lands. Also, the post-war development of the territories should take into account the land categories in order to prevent the pollution of the water fund, plowing of floodplains, etc. A balanced model of land use should be implemented even after the war, taking into account the goals of the European Green Course, Ukraine's obligations under international agreements to preserve biodiversity.

Conclusions.

The main principles of the post-war reconstruction of Ukraine should be: 1) comprehensiveness of environmental policy and development of the country based on the principles of the European Green Course; 2) recovery should serve the needs of Ukrainians and contribute to the sustainable development of Ukraine; 3) environmental standards at all levels of policy formation and implementation in the field of environmental protection; 4) compliance with European environmental planning tools in the development of Ukraine; 5) effective functioning and use of target/donor funds for post-war recovery and development of the green economy.

At the same time, it is necessary to solve the problems of rational land use by developing and implementing: plans of land management and technical and economic justifications for the use and protection of lands of administrative-territorial units, territories of communities; automated platforms, information and analytical systems and remote sensing of the Earth; criteria and technologies for monitoring land and land relations, based on artificial intelligence algorithms.

References

1. Postanova Kabinetu Ministriv Ukrayiny № 188/98-VR vid 05.03.1998 r. «On the main directions of the state policy of Ukraine in the field of environmental protection, use of natural resources and provision of environmental safety». Available at: https://zakon.rada.gov.ua/laws/show/188/98-%D0%B2%D1%80#o767 (Accessed 1 Nov. 2022)
2. Zakon Ukrayiny № 2697-VIII vid 28.02.2019 r. « On the Basic principles (strategy) of the state environmental policy of Ukraine for the period until 2030». Available at: https://zakon.rada.gov.ua/laws/show/2697-19#Text (Accessed 1 Nov. 2022)
3. Danylyshyn B. M., Dorohuntsov S. I., Mishchenko V. S., Koval Ya. V., Novorotov O. S., Palamarchuk M. M. (1999) Natural resource potential of sustainable development of Ukraine/ textbook. P. 716
4. Dorohuntsov S.I., Khvesyk M.A., Horbach L.M., Pastushenko P.P. (2006) Eco-environment and modernity. T.1. Natural environment in the modern dimension. textbook. P. 424
5. Martyn A.H.? Shevchenko O.V. (2014) Problems of agricultural land protection in the conditions of completion of the land reform. Land management, cadastre and land monitoring. № 1-2. 48–56
6. Velichko V.A., Martin A.G., Novakovskaya I.O. (2020) Soil monitoring of Ukraine - problems of land management, soil science and scientific support. Bulletin of Agricultural Science. 7/808. 5-16. (DOI:https://doi.org/10.31073/agrovisnyk 202007-01)
7. Kanash O.P. (2013) Soils are the leading component of land resources. Land management and cadastre. № 2. 48-56
8. Bavrovska N.M., Boryshkevych O.V. (2016) Problems of use and protection of agricultural land in modern conditions. Land management and cadastre. № 1-2. 53-61.
9. FAO. 2022. The State of the World's Land and Water Resources for Food and Agriculture – Systems at breaking point. Main report. Rome. (DOI: https://doi.org/10.4060/cb9910en)
10. Rozporiadzhennia Kabinetu Ministriv Ukrainy № 1363-r vid 20.10.2021 r. «On the approval of the Strategy of ecological security and adaptation to climate change for the period until 2030». Available at: https://zakon.rada.gov.ua/laws/show/1363-2021-%D1%80#Text (Accessed 1 Nov. 2022)
11. Postanova Kabinetu Ministriv Ukrayiny № 70-r vid 19.01. 2022 r. «On the approval of the Concept of the National target program of land use and protection». Available at: https://zakon.rada.gov.ua/laws/show/70-2022-%D1%80#Text (Accessed 1 Nov. 2022)
12. Overview of damages and losses in agriculture. Available at: https://kse.ua/ua/oglyad-zbitkiv-ta-vtrat-v-apk/ (Accessed 1 Nov. 2022)
13. Overview of war damage in the agriculture of Ukraine." Indirect damage assessment. Available at: https://minagro.gov.ua/storage/app/sites/1/uploaded-files/Damages_report_issue1_ua.pdf (Accessed 1 Nov. 2022)
14. Planning for environmental restoration: Analytical note. (2022) Available at: http://epl.org.ua/wp-content/uploads/2022/06/FIN_Planuvannya-vidnovlennya-dovkillya.pdf (Accessed 1 Nov. 2022)

Бавровська Н.М.

ЕКОЛОГІЧНІ АСПЕКТИ РАЦІОНАЛЬНОГО ВИКОРИСТАННЯ ТА ОХОРОНИ ЗЕМЕЛЬ

LAND MANAGEMENT, CADASTRE AND LAND MONITORING 4'22: 82-88.
http://dx.doi.org/10.31548/zemleustriy2022.04.08

Анотація. *Сучасний стан землекористування в Україні характеризується високою сільськогосподарською освоєністю та розораністю земель (понад 54%). Станом на 2022*

рік стан земельних ресурсів України можна було охарактеризувати таким, що викликає занепокоєність, оскільки відбулося порушення екологічно збалансованого співвідношення між категоріями земель, зменшення території унікальних степових ділянок, надмірна розораність території та порушення природного процесу ґрунтоутворення. Охорона та раціональне використання земель є одним із найголовніших завдань суспільства в процесі використання природних ресурсів, оскільки продукти харчування, одержані за рахунок використання землі, становлять 98 відсотків.

В статті представлено аналіз основних екологічних проблем, які виникли внаслідок повномасштабної війни в Україні. Обґрунтовано необхідність вирішення проблем раціонального землекористування за рахунок наскрізності екологічної політики та розвитку країни на засадах Європейського зеленого курсу з врахуванням екологічних стандартів на всіх рівнях формування і реалізації політики у сфері охорони довкілля та раціонального природокористування, шляхом розроблення та впровадження: схем землеустрою та техніко-економічних обґрунтувань використання та охорони земель адміністративно-територіальних одиниць, територій громад; автоматизованих платформ, інформаційно-аналітичних систем та дистанційного зондування Землі; критеріїв і технологій для здійснення моніторингу земель та земельних відносин, у тому числі на основі алгоритмів штучного інтелекту.

Ключові слова: *освоєність і розораність території, сільськогосподарські землі, охорона земель, мінне забруднення, небезпечні території.*