

THE IMPACT OF LAND USE CHANGES ON THE LANDSCAPE STRUCTURES OF TERRITORIAL COMMUNITIES

Tomas Rozhi

lecturer at the department of geography, geodesy and land management, Pavlo Tychyna Uman state pedagogical university

e-mail: tomas.rozhi.94@gmail.com

ORCID: 0000-0002-6794-9662

Volodymyr Kyryliuk

candidate of agricultural sciences, associate professor at the department of geography, geodesy and land management, Pavlo Tychyna Uman state pedagogical university

e-mail: hidrotechnik@ukr.net

ORCID: 0000-0003-2098-0520

The article discusses the impact of land use changes on the landscape structures of territorial communities. The study of the impact of land use changes on the development of territorial communities is becoming increasingly important against the backdrop of current global challenges and profound changes. Urbanization, intensive agriculture, climate change, and demographic changes have a significant impact on landscapes, requiring territorial communities to adapt and respond strategically. Changes in land use generate significant environmental impacts, such as soil degradation, biodiversity loss and ecosystem disturbance, which affect the quality of life and resilience of local ecosystems. second, changes in landscapes directly affect the socio-economic development of communities, contributing to economic growth and job creation, but can also cause social conflicts and a decline in quality of life. third, an important component is the development of land use management strategies that integrate environmental and social considerations.

Keywords: land management; territorial community; landscapes; decentralization; land use; anthropogenic impact; landscape structures; spatial planning.

ВПЛИВ ЗМІН У ЗЕМЛЕКОРИСТУВАННІ НА ЛАНДШАФТНІ СТРУКТУРИ ТЕРИТОРІАЛЬНИХ ГРОМАД

Томас Рожі

викладач кафедри географії, геодезії та землеустрою, Уманський державний педагогічний університет імені Павла Тичини

e-mail: tomas.rozhi.94@gmail.com

ORCID: 0000-0002-6794-9662

Володимир Кирилюк

канд. с.-г. наук, доцент кафедри географії, геодезії та землеустрою, Уманський державний педагогічний університет імені Павла Тичини

e-mail: hidrotechnik@ukr.net

ORCID: 0000-0003-2098-0520

У статті розглядається вплив змін у землекористуванні на ландшафтні структури територіальних громад. Вивчення впливу змін у землекористуванні на розвиток територіальних громад набуває все більшої актуальності на тлі сучасних глобальних викликів і глибоких змін. Урбанізація, інтенсивне сільське господарство, зміна клімату та демографічні зміни значно впливають на ландшафти, вимагаючи від територіальних громад адаптації та стратегічного реагування. Доведено ряд позицій: по-перше, зміни в землекористуванні спричиняють значний екологічний вплив, такий як деградація ґрунтів, втрата біорізноманіття та порушення екосистем, що впливають на якість життя та стійкість місцевих екосистем; по-друге, зміни в ландшафтах безпосередньо впливають на соціально-економічний розвиток громад, сприяючи економічному зростанню та створенню робочих місць, але можуть також викликати соціальні конфлікти та зниження якості життя. по-третє, важливим компонентом є розробка стратегій управління землекористуванням, які інтегрують екологічні та соціальні аспекти. Це дослідження дозволяє не лише краще зрозуміти наслідки цих процесів, а й сформулювати практичні рекомендації для сталого

розвитку територіальних громад в Україні. Впровадження стратегічного планування територій є ключовим інструментом для підвищення конкурентоспроможності регіонів та ефективного управління територіальним розвитком. Цей підхід дозволяє досягти всебічного соціально-економічного прогресу територій громад, ефективного використання обмежених регіональних ресурсів і стимулює діалог між урядом і громадянським суспільством. Для забезпечення сталого розвитку практик землекористування на рівні територіальних громад необхідно враховувати чотири групи факторів: екологічні, суспільні, економічні та соціальні. Проте всі ці групи факторів тією чи іншою мірою взаємопов'язані, і всі разом утворюють єдиний принцип екологізації земель територіальних громад.

У статті доведено, що впровадження стратегічного планування територій є ключовим інструментом для підвищення конкурентоспроможності регіонів та ефективного управління територіальним розвитком. Цей підхід дозволяє досягти всебічного соціально-економічного прогресу територій громад, ефективного використання обмежених регіональних ресурсів і стимулює діалог між урядом і громадянським суспільством.

Ключові слова: землеустрій; територіальна громада; ландшафти; децентралізація; землекористування; антропогенний вплив; ландшафтні структури; просторове планування.

Land use is a way of utilizing land resources for various purposes, such as agriculture, forestry, industry, construction, recreation, etc. Land use determines how land is used, what activities are carried out on it, and what impacts they have on the environment. Changes in land use can have significant consequences for landscapes, affecting their structure and functioning [7].

The impact of land use change on landscapes is a complex and multifaceted process that includes both positive and negative aspects. Intensive agriculture, urbanization and industrialization, reforestation, and recreational land use require careful planning and management to ensure sustainable development of the territories. Studying these processes and their consequences is extremely important for preserving natural capital, improving the quality of life of the population and ensuring the harmonious development of society [12].

The development of territorial land, industry and tourism based on efficient land use can be a powerful stimulus for economic growth. However, improper land use can have the opposite effect. Soil degradation due to intensive farming or land contamination with industrial waste can lead to lower yields and economic losses [1].

Anthropogenic change of natural complexes affects all components of the natural environment and, above all, land. The fundamental way to protect land from unreasonable anthropogenic pressure is to improve technological processes. Along with this, the organization of the territory is of great importance, ensuring high efficiency of land use and environmental sustainability of the territory, which is achieved by taking into account the natural potential and ecological condition of each type of landscape when organizing the use of land in territorial communities. In this regard, the organization of land use should be carried out within the land management system. Since «it is in the process of organizing the territory (land management) that the development and implementation of both organizational, territorial and economic, as well as closely related environmental tasks are carried out through the formation of environmentally sustainable territories» and «no other development, except for land management, allows a comprehensive approach to solving this most important problem» [8]. Therefore, it can be said that the formation of environmentally sustainable territories is carried out in the course of land management, on the basis of schemes and projects, but with further elaboration in farming systems and working projects. In the process of land management, through the formation of a single landscape complex, farming systems are adapted to local conditions. The ultimate goal of organizing the territory on a landscape-ecological basis is to create conditions for the efficient use of land resources of territorial communities and prevent land degradation by creating environmentally sustainable lands to increase productivity and obtain high-quality products. These results can be achieved by solving the following tasks [13]:

- landscape and ecological differentiation of lands in the agricultural landscape on a single taxonomic basis;
- development of principles of justification and methods of preventing the impact of land degradation and pollution at the pre-project and project levels of land management;

- substantiation of sustainability in land management projects;
- optimization of the structure of land;
- improvement of methods of forming land management schemes (projects) taking into account its environmentalization;
- ecological and economic justification of the organization of land use by territorial communities.

Based on the above tasks, when applying the landscape-ecological approach, it is necessary to use the differentiation of the territory with the allocation of zones with the same landscape-ecological conditions to arrange the territory in certain parts of the landscape, to which the system of management, agriculture, environmental protection measures are «tied», up to the formation of ecologically homogeneous areas of territorial communities [16].

One of the key achievements of the decentralization process in Ukraine has been the formation of economically independent territorial communities. These communities have access to the necessary material, land, financial resources and social infrastructure, which allows them to effectively meet the needs of citizens, provide quality social and administrative services, ensure the growth of territories and the optimal use of budget funds.

At the same time, a powerful local government system is being developed that is capable of fulfilling the set tasks. The Law of Ukraine «On Voluntary Amalgamation of Territorial Communities» laid the foundation for a new vector of local government development, encouraging active participation of communities in the process of creating self-sufficient communities, while taking into account the interests of both local and state structures [3].

However, despite decentralization efforts, power in Ukraine continues to be centralized. Local governments, which are the closest link to citizens, should be given more powers and resources to effectively address local issues. The essence of decentralization, which was launched in 2014, is the transfer of authority and funds from the central government to local governments, based on the principles of the European Charter of Local Self-Government.

Key documents aimed at reforming local government and the structure of the territorial organization of power included amendments to the Constitution of Ukraine. These changes included the creation of executive bodies at the level of oblast and rayon councils, optimization of the administrative-territorial structure, and the establishment of territorial communities as basic administrative units. However, due to the lack of support for these changes, the reform is being implemented within the framework of existing legislation through legislative acts, such as amendments to the Budget and Tax Codes, as well as the Laws on Voluntary Amalgamation of Territorial Communities and on Cooperation between them.

Decentralization of power and local government reforms face several serious problems that have not been resolved [10]:

1. Rejection of the proposed amendments to the Constitution concerning the role of regional executive bodies, reorganization of local state administrations and improvement of the administrative-territorial structure, which recognizes amalgamated territorial communities as administrative units, which prevents the formation of a constitutional basis for decentralization.

2. There is no comprehensive approach to addressing the issues of economic development and territorial governance. Decentralization is focused mainly on redistribution of powers, financing of local self-government and provision of public services.

The decentralization process often ignores issues related to the location and development of productive forces, the greening of environmental management, and demographic challenges. In addition, the problems of access to land resources for territorial communities remain unresolved, including shortcomings in the control and distribution of land, as well as the optimization of agricultural landscapes as key aspects of rural management and territorial development. As amalgamated territorial communities (ATCs) are not recognized in the Constitution of Ukraine as subjects of administrative and territorial structure, it is difficult to establish and coordinate their boundaries in accordance with the current legislation [11]. The boundaries of settlements included in ATCs often do not correspond to the officially established ones, as actual development exceeds

the official boundaries. Against the backdrop of reforms of land ownership and other natural resources, there is a need for a clear definition of competencies between the executive and local governments. Such a definition is essential for the effective operation of the state land management system, ensuring the stability of land ownership and coordination of actions of all management bodies.

The territorial community of each village, town or city is a key subject of local self-government, bearing the main functions and powers. Planning for the use and protection of land and other natural resources within the ATC requires the development of new methodological approaches to organize land use and harmonize the interests of communities [15].

To date, the legislative aspects of establishing the boundaries of territorial communities, as well as the development of comprehensive spatial development plans and land management projects for zoning land by their types of use, have not been regulated.

This forms the basis for trading land plots of shareholders, as well as for land management projects that determine land use in the agricultural sector and among farms. These projects are designed to identify opportunities for land use and protection, develop sound recommendations in the context of land relations, organize the efficient use and protection of land, and reorient land to meet the needs of agriculture, forestry and water management, as well as the development of settlements and areas intended for health improvement, recreation, cultural and historical significance and conservation purposes.

The problems of land use formation within territorial communities give rise to numerous conflicts between public and private interests in land, including the lack of mechanisms to regulate these relations and manage land use, as well as an appropriate financial and economic system for the rational use of land. There is also a lack of effective forms of cooperation between local governments and key land users. These problems tend to be exacerbated in the context of agricultural land turnover. The absence of land zoning by type of use in development planning causes problems in the management of land resources within territorial communities.

There is a need to revise the scientific principles of land use planning for amalgamated territorial communities. The Law of Ukraine «On Amendments to Certain Legislative Acts of Ukraine on Land Use Planning», which entered into force on July 24, 2021, aims to conduct comprehensive spatial planning of community territories, which eliminates the need to develop several similar types of urban planning and land management documentation. However, this law contains shortcomings, in particular with regard to land zoning, integration of land management and urban planning documentation, and comprehensive planning of spatial development of land use in communities [4].

The Law establishes criteria for land zoning, classifying it by categories and types of land use, which distinguishes between the concepts of «land» and «territory». There is a need to move from land categories to the European classification system by land use type. This transition will change the approach to regulating land relations, moving from categories of land to types and subtypes of land use, and then to the designated purposes and permitted uses of land within a territorial community. It is necessary to abandon the creation of master plans for settlements such as villages, towns and small cities, replacing them with detailed plans of territories corresponding to certain subtypes of land use. It is important to amend and supplement the legislative acts of Ukraine related to land management of territorial communities, in particular the Land Code of Ukraine [5] and the Law of Ukraine «On Land Management» [6].

Thus, the Law of Ukraine «On Land Management» requires changes to the planning documentation developed to determine the prospects for land use and protection, prepare reasonable proposals in the field of land relations, organize the rational use and protection of land, and redistribute land taking into account the needs of agriculture, water and forestry, development of settlements, health, historical, cultural, recreational areas, nature reserves and other protected areas. Urban planning documentation cannot fully cover land use issues, especially in the agricultural sector, which concerns the creation of environmentally sustainable landscapes, the territorial organization of agricultural and non-agricultural enterprises, and the greening of land use [14].

Territorial communities have already been formed, but their boundaries have not yet been defined and registered in the state land cadastre. Accurately establishing the boundaries of each community is critical to granting them the right to dispose of land resources within their territory, exercising control functions over land use, addressing land payment and greening land use, and allowing communities to effectively exercise their powers within the established boundaries.

There is a problem with the formation of the boundaries of amalgamated territorial communities (ATCs), as the boundaries for village and township councils were formed without accurate measurements, which led to inaccuracies in the definition of areas and boundaries. This also includes reserve lands that are not land plots of collective agricultural enterprises (CAEs) and could not be included in the council boundaries.

The importance of the formation and establishment of boundaries includes [5; 14]:

- accurate land records and statistical reporting on land owners and land users, as well as types of land use;
- land management within amalgamated territorial communities (ATCs);
- ensuring efficient and rational use of natural resources;
- increasing the number of land taxation objects on the territory of ATCs;
- regulation of land relations and land use administration.

The absence of established boundaries on the ground does not allow territorial communities to effectively manage land resources under the jurisdiction of local governments, leaving these bodies distanced from land issues.

In order to form a rational system of land ownership and land use, create ecologically balanced landscapes, organize territories for agricultural and non-agricultural enterprises, scientifically substantiate possible redistribution of land, green land use and land protection in cities, towns and villages, it is necessary to develop a comprehensive plan for the spatial development of the community territory. When developing such comprehensive plans, taking into account foreign experience, it is economically and environmentally preferable to develop plans for the development of land use in the territories of ATCs through zoning of land by their categories and types of use. The following requirements must be met [2, 12]:

- 1) Creation of safe and healthy conditions for living and working of the population;
- 2) Avoiding imbalances in the structure and dynamics of the population, increasing land ownership among the general population;
- 3) Provision of land plots for education, sports, leisure and recreation, in particular for families, youth, elderly citizens and persons with disabilities;
- 4) Protection of valuable natural resources, landscapes, biodiversity, historical and cultural heritage, as well as the formation of architectural, artistic and recreational landscapes in cities and villages;
- 5) Preservation and development of land use for churches and religious institutions;
- 6) Use of renewable energy sources, preservation of nature and rural areas, ensuring ecological balance, protection of water resources, soils, lands with mineral deposits, and climate;
- 7) Expansion of the agricultural, forestry, and water sectors, development of transport and municipal services, such as water supply and waste management, support for small and medium-sized businesses, protection and conservation of land and other natural resources, and creation of new jobs;
- 8) Ensuring the country's security, development of the energy system;
- 9) Development of national and regional transportation corridors and infrastructure;
- 10) Implementation of other measures taken by territorial communities for the efficient use of land.

Land use planning in rural areas is carried out through land management measures. However, there are unresolved legislative issues related to the establishment of boundaries, creation of land management schemes and projects for the common land space of amalgamated territorial communities, village, town and city councils, as well as for the formation of agricultural land. This hinders the introduction of landscape organization of territories and is one of the main obstacles to the development of local self-government.

To create an effective land use system and form environmentally sustainable landscapes, it is necessary to develop appropriate methods. Land management, based on land management documentation, ensures measures for the rational use and protection of land, organization of territories, taking into account their intended purpose, restrictions on use and the rights of others (land easements). It also contributes to the preservation and improvement of soil fertility, which leads to an increase in the value of land plots and an increase in the budget revenues of the ATC [14].

To improve the financial condition of territorial communities, it is important to implement appropriate land management measures, such as determining the boundaries of ATCs and land management of territories, which will increase the value of land plots and increase budget revenues from land fees. Comprehensive plans for the spatial development of territorial communities are developed to determine the use and protection of land and natural resources in accordance with their suitability, resource potential and market conditions. The interests of the state, territorial communities, citizens and legal entities are taken into account. The comprehensive plan for the spatial development of the territorial community provides for the following measures [15]:

- 1) analysis of the resource potential of land, assessment of the environmental sustainability of their use, as well as identification of key areas for improving the redistribution and rational management of land resources
- 2) development of recommendations for optimizing the composition of land and its use, classification of land by its suitability for use, improvement and reclamation of land, justification of its redistribution for health, recreational and other purposes;
- 3) expansion of zones of nature protection and nature reserve areas, recreational, health and historical and cultural areas, creation of ecological networks at the local level;
- 4) establishing and clarifying the regimes of use of various territories, including those with special restrictions on their use;
- 5) clarifying the boundaries of settlements and identifying reserve land for their further expansion.

A comprehensive plan for the spatial development of a territorial community contains [8, 20]:

- 1) justification of the future development and optimal location of agricultural enterprises, farms, non-agricultural enterprises, as well as engineering, social and production infrastructure, based on the suitability and value of land and natural resources;
- 2) development of measures to organize anti-erosion activities, protect land from erosion, flooding, waterlogging, various types of pollution, and improve natural landscapes;
- 3) determination of capital investment and resource requirements for the implementation of the planned measures, development of financial proposals and implementation of measures in accordance with the land management plan;
- 4) analysis of environmental, economic, and social impacts arising from changes in land use and design decisions;
- 5) involvement of topographic and geodetic works necessary for detailed planning of territories;
- 6) consideration of documentation that complies with the provisions of the Land Code of Ukraine;
- 7) detailed description of land use, identification of owners and users;
- 8) lists of existing restrictions on the use of land and indications of land plots subject to such restrictions;
- 9) a schematic representation of the distribution of land by category, owner and user, showing existing encumbrances.

A comprehensive plan for the spatial development of the territory of a territorial community combines land management and urban planning at the local level and has the following characteristics:

- 1) Establishing interconnections in the development of settlements, defining and revising boundaries within communities;

- 2) Ensuring a reasonable redistribution of land to form a single spatial context that can influence changes in the administrative-territorial division at the district level and promote integrated community development;
- 3) Development of the economy and land use system based on the interconnection between local and regional levels, in order to optimize production in each individual community;
- 4) The organization of agricultural and non-agricultural land use should contribute to an increase in the number of jobs, growth of community budget revenues and solution of social problems.

One of the fundamental planning documents for capitalizing land, natural and human resources, as well as for filling local budgets, is the local community development program.

The program aims to identify opportunities for land use and protection, develop recommendations on land relations, ensure efficient use and protection of land resources, and distribute and redistribute land taking into account the needs of agricultural, forest and water areas, as well as areas with special functions, such as health, recreational, historical and cultural, nature reserve and other protected areas.

To ensure the efficient use of land resources of amalgamated territorial communities and village councils, as well as the rational use of funds aimed at improving land relations and land protection, it is necessary to develop programs for the use and protection of land and other resources within these communities [9].

Improvement of the financial situation in the newly created amalgamated territorial communities depends on budget revenues from land payments. Land management is the main mechanism for planning land use in rural areas, as it allows to establish the boundaries and organize the territories of the united territorial communities, and these measures, as well as land improvement, will increase their value and, accordingly, local budget revenues.

There are numerous problems in the agricultural land turnover sector. In particular, there is no land bank institution that would help farmers, small and medium-sized agricultural enterprises by purchasing land and providing loans. The land mortgage market is a key part of the land market. For example, in the United States, the agricultural land market is 90% based on easements. In Ukraine, among agricultural land uses, easements are almost not developed, which leads to losses due to their absence [11].

Agricultural land turnover and its components require local solutions. Land use planning plays an important role in this process. It is necessary to develop land zoning by categories and types of use, as well as land management plans for agricultural enterprises, setting restrictions on their use. Land turnover cannot exist in isolation, so territorial communities must administer and regulate this process.

Thus, we can see that strategic measures for planning and managing land use of territorial communities are based on a triad of main dimensions: social, economic, and environmental. The development of land use of territorial communities means a harmonious merger of these aspects in the process of improving the quality of life through the use of optimal strategies in these three areas at the level of community life support. In the current environment, when regional development is facing numerous crises, there is a critical need to reassess the economic approaches of our time and their significance for future generations. Integration of social, economic and environmental aspects of sustainable development at the level of territorial communities involves coordinated actions in various areas, promoting economic growth, achieving social goals without jeopardizing limited land resources. Effective integration of these dimensions requires the implementation of targeted measures and specific actions within the framework of sustainable development. The sustainability of territorial communities is defined as a process that aims to improve the quality of human life within the global ecological environment. This concept encourages society to take sustainable measures: understanding the interrelationships between the economy, society and the natural environment, living within the land's capacity to support life, and equitable distribution of resources and opportunities between current and future generations.

Further research into the impact of land use changes on the landscape structures of territorial communities has prospects for development in several interrelated aspects:

- development of interactive GIS models for predicting landscape transformation under different scenarios of land use and spatial development of communities;
- an in-depth analysis of anthropogenic factors that determine the spatial restructuring of landscape structures, taking into account demographic, economic, and environmental indicators;
- assessment of ecosystem services of territorial communities, taking into account changes in the structure of land use and the development of recommendations for their conservation and restoration;
- testing of environmental and landscape planning methods within the framework of integrated community spatial development plans;
- monitoring of degradation processes and development of a system for preventing negative changes in landscape structures through land use regulation;
- researching the cultural and recreational potential of landscapes, the transformation of which can affect the social attractiveness of territories and the quality of life of the population;
- development of integrated approaches to land management at the local level that would combine environmental, socio-economic, and spatial objectives.

Expanding such research will contribute to the formation of a modern scientific and methodological framework for sound management of territorial development and preservation of the natural environment in the context of decentralization.

References

1. Aktualni napriamky rozvytku kartohrafii v Ukraini. L. H. Rudenko (Ed.). (2019). Kyiv: In-t heohrafii NAN Ukrainy [in Ukrainian].
2. Bezlatnya, L. O. (2023). Kulturni landshafty Serednoho Pobuzhzhia: monohrafiia. Vinnytsia: TOV «TVORY» [in Ukrainian].
3. Vasylieva, O. I., Vasylieva, N. V. (2018). Kontseptualni zasady staloho rozvytku terytorialnykh hromad. *Investytsii: praktyka ta dosvid*, 8, 74–78. [in Ukrainian].
4. Vidbudova dlia rozvytku: zarubizhnyi dosvid ta ukraïnski perspektyvy: mizhnarodna kolektyvna monohrafiia. V. V. Nebrat (Ed.). (2023). Kyiv: DU «In-t ekon. ta prohnozuv. NAN Ukrainy». [in Ukrainian].
5. Zemelnyi kodeks Ukrainy: Zakon Ukrainy vid 25.10.2001 № 2768-III. (2002). *Vidomosti Verkhovnoi Rady Ukrainy (VVR)*, 3–4, art. 27 [in Ukrainian].
6. Pro Zemleustrii : Zakon Ukrainy vid 31.12.2023 № 858-IV. (2003). *Vidomosti Verkhovnoi Rady Ukrainy (VVR)*, 36, art. 282 [in Ukrainian].
7. Khvesyuk, M. A., Holian, V. A. (2006). Instytutsionalne zabezpechennia zemlekorystuvannia: teoriia i praktyka. Kyiv: NAN Ukrainy [in Ukrainian].
8. Denysuk, H. I. (1998). Antropohenni landshafty Pravoberezhnoi Ukrainy. Vinnytsia: Arbat [in Ukrainian].
9. Denysuk, H. I. (2011). Pryrodnycha heohrafiia Podillia: tutorial. Vinnytsia: EkoBiznesTsentr [in Ukrainian].
10. Pylypiv, N. I., Piatnychuk, I. D., Solohub, S. I. (2021). Rol stratehii sotsialno-ekonomichnoho rozvytku OTH v konteksti zminy pidkhodiv do rehionalnoho rozvytku v Ukraini. *Rozvytok terytorialnykh hromad: proceedings of the international scientific-practical conference*. Mykolaiv: MNAU, 54–55 [in Ukrainian].
11. Rozhi, T. A. (2023). Vrakhuвання landshaftnoi struktury terytorii hromad dlia ratsionalnoho pryrodokorystuvannia. *Landshaftoznavstvo: nauko- teoretychnyi zhurnal*, issue 4, 2, 85–91 [in Ukrainian].
12. Semyhulina, I., Yaroshenko, I., Krasnonosova, O., Kozryieva, O. (2022). Prohamno-proektnyi pidkhid do publichnogo upravlinnia prostorovym rozvytkom obiednanykh terytorialnykh hromad za yikh vydamy. *Finansovo-kredytna diialnist: proiulemy teorii ta praktyky*, Vol. 6, 47, 352–364 [in Ukrainian].
13. Tkachuk, A., Tretiak, Yu. (2022). Pro vidnovlennia ta rehionalnyi rozvytok pislia viiny. *Instytut hromadianskoho suspilstva*. URL: <https://www.csi.org.ua/news/pro-vidnovlennya-ta-regionalnyj-rozvytok-pislya-vijny/> [in Ukrainian].
14. Kharchenko, T. O., Hasiuk, R. Y. (2022). Otsinka rezultatyvnosti stratehichnoho planuvannia yak skladovoi orhanizatsiinoho mekhanizmu derzhavnogo rehuliuвання rozvytku terytorialnykh hromad. *Dniprovskyi naukovyi chasopys publichnogo upravlinnia, psyholohii, prava*, issue 4, 67–72 [in Ukrainian].
15. Khokhuliak, O. (2023). Rol stratehichnoho planuvannia v systemi zabezpechennia staloho rozvytku terytorialnykh hromad. *Naukovyi visnyk Polissia*, issue 2, 25, 124–136 [in Ukrainian].
16. Woo, K. S., Worboys, G. (2019). Geological monitoring in protected areas. *International Journal of Geoheritage and Parks*, issue 7, 4, 218–225. DOI: <https://doi.org/10.1016/j.ijgeop.2019.12.004>