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SOIL-GEOGRAPHICAL INFORMATION IN THE STATE LAND CADASTRE OF UKRAINE

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Abstract

The article examines current challenges related to the provision of soil-resource information within the land cadastre system of Ukraine. Particular attention is given to the functioning, formation, and use of soil-related information in the State Land Cadastre, especially under the special legal regime of martial law. The study analyses the evolution of the soil-geographical database in Ukraine and assesses the current representation of soil information on the Public Cadastral Map of Ukraine. Key shortcomings of the existing cadastral information system are identified, including data fragmentation, outdated soil information, insufficient integration of digital resources, and limited public accessibility during wartime. Based on the findings, proposals and recommendations are developed to improve the maintenance and modernisation of the State Land Cadastre of Ukraine under

conditions of legal and administrative uncertainty, with particular emphasis on enhancing the rational use and management of agricultural land resources.

Keywords: land cadastre; soil resources; environmental management; land use; soil-geographical information; databases; geographic information systems; land degradation; martial law.

ҐРУНТОВО-ГЕОГРАФІЧНА ІНФОРМАЦІЯ В ДЕРЖАВНОМУ ЗЕМЕЛЬНОМУ КАДАСТРІ УКРАЇНИ

Анотація. У статті висвітлено проблемні питання інформаційного забезпечення земельного кадастру в Україні про ґрунтові ресурси. Схарактеризовані особливості функціонування, формування (наповнення) та використання інформації про ґрунти в системі державного земельного кадастру країни, зокрема під час дії особливого правового режиму воєнного стану. Також розглянуто еволюцію ґрунтово-географічної бази даних в Україні, проаналізовано сучасний стан відображення ґрунтової інформації на Публічній кадастровій карті України, надано пропозиції та рекомендації щодо вирішення деяких нагальних проблем ведення державного земельного кадастру в Україні в умовах невизначеності, пов’язаної з воєнних станом, головно в частині раціоналізації користування землями сільськогосподарського призначення.

Ключові слова: земельний кадастр; ґрунтові ресурси; природокористування; землекористування; ґрунтово-географічна інформація; бази даних; геоінформаційні системи; деградація земель; воєнний стан.

Problem Statement

In the current context of social transformation and the transition to a new order—a post-industrial, information-driven economy—there is increasing attention to the interpretation of accumulated knowledge and data through their digitalisation and visualisation. However, humanity’s fundamental needs for food, clean drinking water, and environmental safety in general remain the foundation of future information-driven social progress. At the same time, natural resources and their rational use remain crucial components of future post-industrial society, as they are essential prerequisites for its sustainable development. Moreover, unregulated and scientifically unsubstantiated anthropogenic pressure on natural resources significantly reduces their productive potential for future use. Given the importance of soil resources in ensuring humanity’s food supply on both global and

regional scales, since more than 95% of food is currently grown on open land [7], the creation of databases on soil resources and the establishment of a system for their sustainable management constitute an extremely important task of public significance.

Since the advent of agriculture, mankind has accumulated knowledge about soil, observing its properties and systematising the information obtained. Over such a long period, a significant amount of data on various soil characteristics has been collected. With the passage of time and the growing demand for soil and geographical information, the volume of these data has constantly increased, which has led to the intensification of soil research and the development of new methods for the analysis and systematisation of information about soil cover. Today, soil is an object of research for specialists in various fields, resulting in the accumulation of diverse information that requires high-quality systematisation and analysis for the effective management of soil resources and preservation of their fertile potential. In this context, the creation and maintenance of an up-to-date information database on the current condition of soils and changes occurring during their use, as well as ensuring free access to these data, are of particular importance.

An analysis of recent publications reveals a widespread trend towards soil degradation, particularly at national and regional levels, which underscores the importance of soil resource conservation [2, 5, 8, 28]. At the same time, modern tools for the digitalisation of social processes highlight the need to improve the existing database on the soils and land resources of the country, its individual regions, and communities. It should be noted that, under martial law, the relevance of working with reliable soil information remains undiminished; however, it faces certain limitations due to the introduction of a special legal regime governing social relations. These circumstances determine the relevance and purpose of this publication.

The aim of the research is to assess the accuracy of the soil-geographical information contained in Ukraine's State Land Cadastre and to improve the land cadastre system with regard to information on the territory's soil and land resources. The object of the study is the soil and land resources of Ukraine. The subject of the study is the analysis of the existing soil-geographical information in the State Land Cadastre of Ukraine and its practical application for environmentally safe land use, particularly under martial law.

Research methodology

In writing this article, traditional general and discipline-specific research methods were used, as well as interdisciplinary approaches within fields relevant to the subject matter, including land management, earth sciences, geography, ecology, and specific areas of environmental, land, and natural resources law.

In preparing this article, the following sources were used: reference and archival materials of the Department of Geography of Ukraine, Soil Science and Land Cadastre, and of the Problem Research Laboratory of Soil Geography and Protection of the Soil Cover of the Chernozem Zone (PNDL-4 ONU); land management schemes of the administrative districts of Odesa Region according to the former territorial division; data from the State Land Cadastre of Ukraine, including the Public Cadastral Map of Ukraine; as well as open data from geospatial databases and soil geoinformation systems of the country.

Main content

The need for high-quality differentiation of soils according to their capacity to perform ecological and productive functions can be traced back to the emergence of agriculture, when humanity accumulated initial knowledge about soil through observation, generalisation, and systematisation of relevant information. Over this extended period, a significant amount of data has been collected regarding the properties and characteristics of various soil types.

Over time, with the growing demand for soil-geographical information, the volume of such data has continuously expanded, while technologies for its collection and processing have improved alongside the development of scientific theoretical and practical approaches to soil classification and use. This has led to the intensification of soil research and the emergence of new methods for analysing and systematising information on soils, soil cover, and their practical application, primarily in agricultural production.

Soil has long been recognised as an interdisciplinary object of study, as it is investigated not only by soil scientists but also by specialists in agrochemistry, agronomy, geography, biology, geology, archaeology, ecology, land management, and other related fields. From this perspective, the accumulated information is highly diverse and requires systematisation and analysis [15].

The analysis of global experience regarding the incorporation of soil information into land cadastre systems may be reduced to two principal categories: cartographic representation, mainly in the form of soil maps within a defined classification system [16, 19, 20, 21], and attribute data, including data banks or databases containing information on soil properties such as organic matter content, aggregate condition, profile depth, erodibility, particle-size distribution, salinity, and others [18, 17, 23].

Existing national web resources containing soil information, such as the USDA Web Soil Survey, may serve as models for the development of global and domestic information systems on soil resources; however, soil systematics and nomenclature must be taken into account. At the same time, in the context of international cooperation, the issue of

harmonising various soil classifications and correlating them with national systems remains highly relevant [26, 27, 4].

The current situation regarding available soil-geographical information in Ukraine is characterised by a dual nature. On the one hand, in accordance with the Law of Ukraine "On the State Land Cadastre" and the current regulatory framework, the State Land Cadastre is defined as "a unified state geoinformation system containing information on lands located within the state border of Ukraine, their designated purpose, restrictions on their use, as well as data on the quantitative and qualitative characteristics of lands, their valuation, the distribution of lands among owners and users, reclamation networks, and components of reclamation networks" [9]. This system includes information on soils within the territories of administrative units, namely:

- information on the qualitative characteristics of land use types;
- information on soil bonitation of administrative-territorial units;
- information on land and soil protection measures;
- information on land and soil protection measures containing data on the thickness of the fertile soil layer (in cases involving reclamation of disturbed lands, removal, and transfer of the fertile soil layer), as well as relevant information on the documents serving as the basis for the implementation of land and soil protection measures within the territory of an administrative-territorial unit [9].

On the other hand, there are fragmented departmental data sources, including the Ukrainian Soil Information Center established at the NSC "O.N. Sokolovsky Institute for Soil Science and Agrochemistry" of the National Academy of Agrarian Sciences of Ukraine [6, 12], as well as various geospatial information platforms (essentially geodatabases) containing data, and less frequently systematic information, on soils and soil cover, including openly accessible resources.

Typically, the maintenance of up-to-date information on soils and soil cover within such resources is carried out only within the framework of project funding and is not sustained over time. This gives rise to another issue—the reliability and objectivity of the soil-related information contained within these resources.

Thus, the optimal approach at present for ensuring the unification, objectivity, and reliability of data should involve centralised database systems or soil information systems supported by state institutions that coordinate and develop the framework for attribute and geospatial information, while all interested stakeholders act as contributors to data input and maintenance.

According to T.S. Yamelynets, the contemporary use of information technologies for soil data processing defines the content of third-generation soil information systems, which consist of three components: (1) geographic information systems for handling geospatial data; (2) relational databases ensuring the functionality and relevance of datasets containing morphological, physical, and physicochemical soil properties; and (3) methods of remote analysis, including the use of the internet, gadgets, mobile devices, etc. [15].

Based on a review of global soil information systems, global systems (GLOSIS (FAO GSP), WoSIS (ISRIC)), regional systems (ESDAC (EU countries)), and national systems (NASIS (USA), CanSIS (Canada), and ASRIS (Australia)) may be distinguished [6, 14, 22, 25]. These may be regarded as a foundation for building a national soil information system with integrated data exchange mechanisms for soil resources. We also propose considering the creation of regional soil information systems (RSoIS), which would be closely integrated into the national infrastructure of freely accessible geospatial soil data and aligned with the data of the Ukrainian Soil Information Center.

Another issue concerns the objectivity of soil and land valuation. Currently, soil bonitation data in Ukraine are recorded in the State Land Cadastre and are used to determine the economic valuation of agricultural lands (although this type of valuation has been removed from the Land Code of Ukraine), which in turn serves as the basis for monetary valuation. These data were originally calculated based on planning materials from collective and state farms (as of 1988) and have not been updated since, not even partially, let alone at the nationwide level regulated by legal acts. It should be noted that the soil and soil group information, as well as soil bonitation data contained in the State Land Cadastre, are based on materials from large-scale soil surveys conducted in 1957–1961 with subsequent partial adjustments [1]. The technological limitations of analogue maps and the presence of subjectivity in soil mapping and diagnostics are undoubtedly important factors contributing to the inaccuracy and, in many cases, unreliability of this information.

According to Article 194 of the Land Code of Ukraine, the purpose of the State Land Cadastre is to provide the necessary information to public authorities and local self-government bodies, interested enterprises, institutions, organisations, and citizens in order to regulate land relations, ensure the rational use and protection of land, determine land payment rates and land value as part of natural resources, monitor land use and protection, and provide economic and environmental justification for business plans and land management projects [3]. At present, it can be stated that this purpose cannot be fully implemented, as there is no

unified information system for cadastral data and no adequate means of ensuring its reliability, and consequently no effective control over the accuracy of cadastral information.

When considering the problems of maintaining the land cadastre in general, particularly during the period of martial law, one cannot ignore the issue of the lack of up-to-date and reliable soil information on land parcels. Such information forms the basis for data on the qualitative characteristics of land, its valuation, and consequently taxation. The development and implementation of reclamation measures without high-quality soil information on land parcels also raises serious doubts regarding their appropriateness. The issue of updating soil information has always been challenging, but with the introduction of martial law, it has become practically unresolved.

The only publicly accessible official resource containing information on the soil cover of land parcels was the Public Cadastral Map, access to which has been restricted since 24 February 2022, and publication of State Land Cadastre data has been suspended [11]. The lack of public access to such information may have a significantly negative impact on the further development of land relations and create conditions conducive to corruption.

At the same time, greater attention may be given to alternatives to the national State Land Cadastre, for example, maintaining land cadastres within individual territorial communities or agricultural enterprises. Due to the reduced spatial scale compared with the entire country, land quantity and quality records can be maintained more effectively, thereby minimising errors.

It should be noted that effective management of soil and land resources and preservation of their fertility potential require the use of tools that ensure the maintenance of an information database on the current condition of soils and their transformation during use. This implies that free access to such data and its continuous updating are of critical importance.

The existing system of soil-geographical data in Ukraine has undergone a long process of development. Using Odesa Region as an example, it can be observed that attribute information for soil maps was processed during 2007–2009 by the State Enterprise “Odesa Research and Design Institute of Land Management” with methodological support from the Main Department of the State Committee for Land Resources in Odesa Region. In particular, this information is included in land management schemes and feasibility studies for land use and protection of former administrative districts within the territories of village, settlement, and city councils across Odesa Region. During these works, among other tasks, materials from past soil surveys were collected, scanned, georeferenced to the State Coordinate System

of 1963 (SK-63), and vectorised. All digital information was consolidated into unified district-level layers and organised into a structured system of files and directories.

As of the beginning of 2022, two new information layers were published on the Public Cadastral Map of Ukraine [11]: the “Agro-production soil groups” layer (Fig. 1), which contains State Land Cadastre information on the boundaries of agro-production soil groups within and outside populated areas, and the “Natural-agricultural zoning” layer (Fig. 2), which contains data on the boundaries of natural-agricultural regions of Ukraine [13].

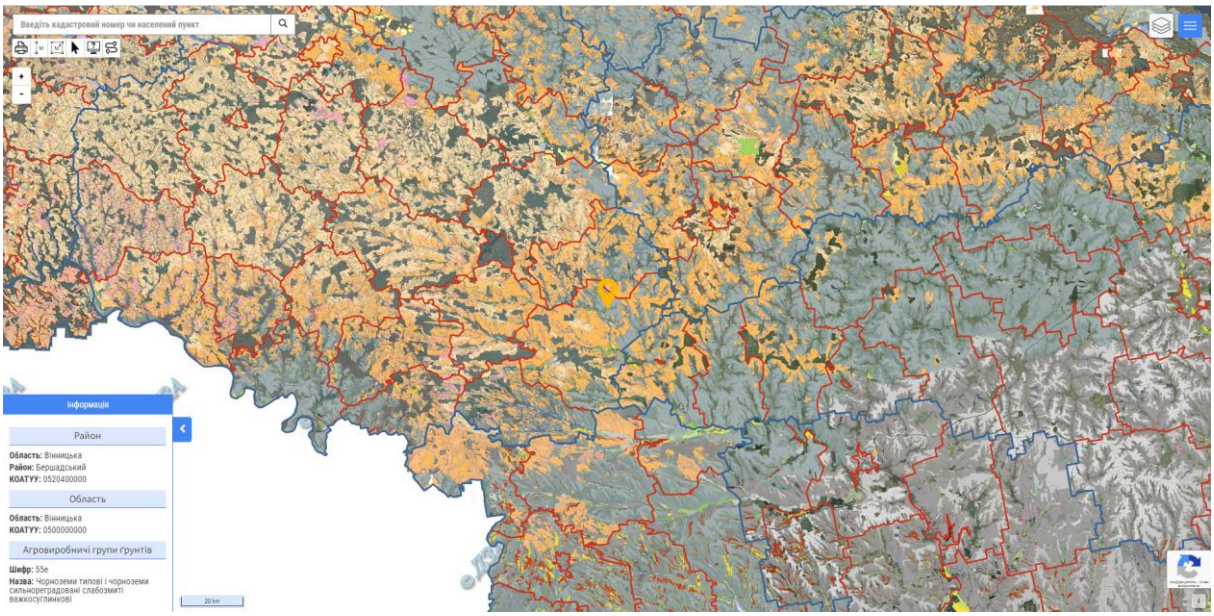

Fig. 1. “Agro-production soil groups” layer on the Public Cadastral Map of Ukraine (Government Portal, 2025).

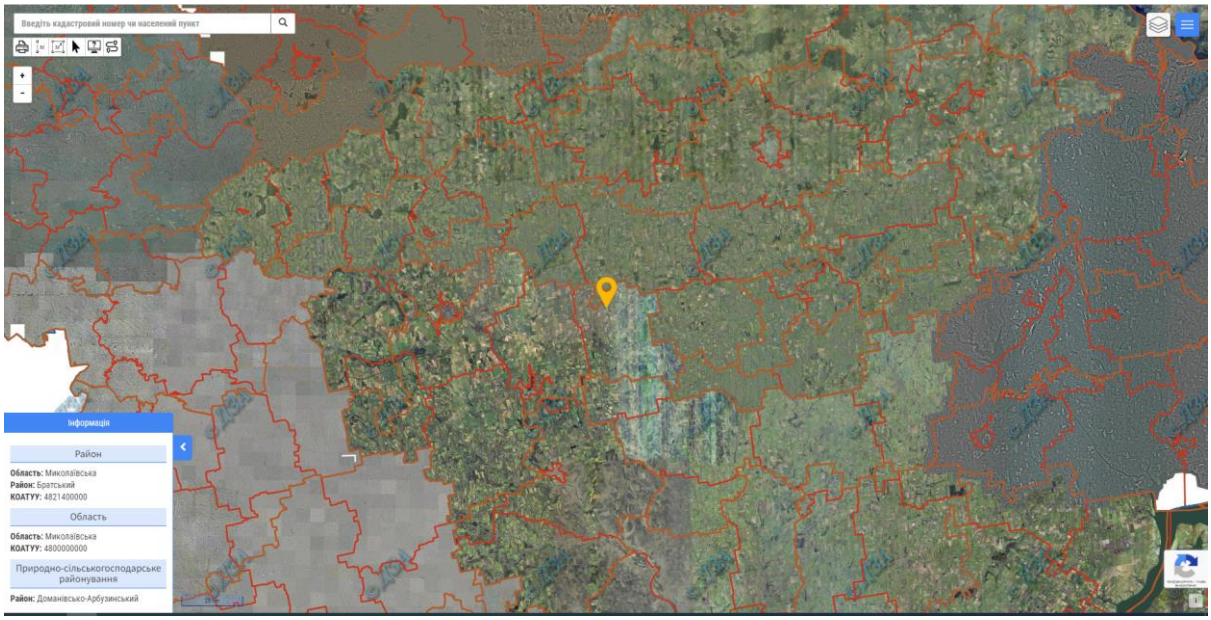

Fig. 2. “Natural-agricultural zoning” layer on the Public Cadastral Map of Ukraine (Government Portal, 2025).

The creation of such a unified geoinformation system, with its subsequent integration into the state online resource of the Public Cadastral Map, undoubtedly constitutes a significant step towards the development and digitalisation of soil science. However, each stage in the development of the modern soil-geographical database has been accompanied by certain challenges. This process began with the digitisation of outdated information that had previously existed only in paper form. Each successive stage of this work has cumulatively introduced inaccuracies, which, in turn, have led to inconsistencies between soil-geographical information and actual soil properties. Table 1 presents a summary of the existing soil-geographical information contained in the State Land Cadastre of Ukraine.

To ensure soil protection and rational use, up-to-date information on soils is required. This imposes specific requirements on such information. First and foremost, it must adequately reflect the actual state of affairs. It is also essential that information be timely, understandable to the user, and relevant to their needs at a given moment. Thus, information should possess such characteristics as reliability, completeness, timeliness, usefulness, and clarity. This general principle should be fully applied to soil information as well.

Despite the significant volume of accumulated data in the field of digitalisation of soil-geographical information and its public accessibility, a number of pressing issues remain that require urgent resolution in order to ensure the effective use of these data within the State Land Cadastre of Ukraine.

One of the key problems is the fragmentation and mutual incompatibility of data obtained during different periods and by different institutions. Soil survey methodologies, classification systems, and levels of detail may differ significantly, which complicates the integration, consolidation, and comparative analysis of soil-geographical information. This leads to fragmentation of the accumulated data and reduces their value for informed management decision-making.

Particular attention should be paid to the quality and reliability of digitised information currently represented in the State Land Cadastre. The process of converting paper-based materials into digital format is accompanied by inevitable data loss and distortion. Scanning errors, inaccuracies in georeferencing to coordinate systems, and imperfections in the vectorisation process result in inaccuracies in the representation of soil boundary contours and attribute data. This reduces trust in the information and complicates its use for cadastral, governmental, and regional purposes.

Table 1 – Soil-geographical information in the State Land Cadastre of Ukraine

Existing digital information (general)	**Existing digital soil-geographical information**	**Land accounting data**	**Existing paper-based information**
State (national) level			
All layers of the Public Cadastral Map*	Public Cadastral Map layers: Soils; Agro-production soil groups; Natural-agricultural zoning.	- Records under Forms 2 and 6-zem (in fact, not maintained since 2017); - State Land Cadastre registers; - State Register of Property Rights to Immovable Property.	Cartographic materials, attribute information, databases.
Regional (region) and territorial community level			
- Public Cadastral Map layers (all*); - Archival materials from completed works (soil surveys of previous years, land management schemes, land allocation projects for ownership or use, etc.); - Paid or free online resources.	- Public Cadastral Map layers: Soils; - Agro-production soil groups; Natural-agricultural zoning; - Agrochemical passporting data included in project documentation or available separately.	- State Land Cadastre registers; - State Register of Property Rights to Immovable Property; - Independent accounting by executive bodies of territorial communities.	- Agrochemical passporting data included in project documentation or available separately; - Archival materials from completed works (soil surveys of previous years, land management schemes, land allocation projects for ownership or use, etc.).
Local level (at the level of individual enterprises)			
- Public Cadastral Map layers (all*); - Paid or free online resources.	- Public Cadastral Map layers: Soils; - Agro-production soil groups; - Natural-agricultural zoning; - Agrochemical passporting data conducted for internal (own) use.	- State Land Cadastre registers; - State Register of Property Rights to Immovable Property; - Independent accounting.	Self-created maps for internal use.

*Note: Public Cadastral Map layers (all as of 2021):

- Orthophoto plans; - Overview map; - Overview map; - Map at scale 1:100,000; - Orthophoto plans (Kyiv city); - Unregistered territories; - Cadastral division; - Archived land parcels; - Land use restrictions; - Disposal of agricultural lands; - State land supervision; - Administrative-territorial units; - Soils; - Agro-production soil groups; - Natural-agricultural zoning; - Boundaries of territorial communities; - Nature conservation fund.	- Lands requiring conservation; - Wetlands of international importance; - State border of Ukraine; - Information on land share allocation; - Parcels with geometric errors; - Location of Administrative Service Centres; - Regional centres; - Indicative coastal protection zone; - Forests; - Emerald Network; - Geonadra (special permits); - Mineral deposits; - Oil and gas wells; - Protection zones of gas transmission system; - Ukrenergo facilities; - Oblenergo facilities.

Another important issue is the relevance and completeness of the available information on soil cover. Soil processes are dynamic; soil properties are not constant and continuously change under the influence of natural and anthropogenic factors. Outdated data fail to reflect the current state of the soil cover, which leads to erroneous subsequent calculations, including taxation values, estimated fertility assessments, erosion resistance indicators, and other important land characteristics. In addition, the existing information may be insufficient for certain territories or may lack the level of detail required to address specific tasks in land management, urban planning, or agricultural production.

Furthermore, there is the issue of integrating soil-geographical information with other data contained in the State Land Cadastre and other information systems. Effective land resource management requires comprehensive analysis of diverse information, including data on land ownership, land use designation, usage restrictions, agrochemical indicators, and other related data. The lack of proper integration complicates, and in some cases entirely prevents, such analysis and the adoption of well-informed management decisions.

At the legislative level, there is also an insufficient regulatory and legal framework governing soil protection. The Decree of the President of Ukraine dated 23 March 2021 No. 111/2021 enacted the decision of the National Security and Defence Council of Ukraine "On Challenges and Threats to Ukraine's National Security in the Environmental Sphere and Priority Measures to Neutralise Them," which, among other provisions, envisaged the submission to the Verkhovna Rada of draft laws on soil conservation and fertility protection [10]. Given the circumstances of wartime, this necessary legislative initiative has not yet been implemented.

To address the identified problems and improve the efficiency of using soil-geographical information in the State Land Cadastre of Ukraine, a comprehensive set of measures is required, including:

- unification of methodological approaches to soil surveys, soil classification, and soil mapping;
- development and implementation of unified standards and requirements for the quality of soil-geographical information;
- conducting modern soil surveys using advanced technologies such as remote sensing, GPS positioning, and subsequent processing with geoinformation tools in order to obtain up-to-date and high-precision information on soil cover;
- creation and continuous updating of a nationwide soil-geographical database with open and unrestricted access for all interested users;

- ensuring compatibility of data with other information systems (urban planning cadastre, other sectoral cadastres, etc.);
- quality control and verification of existing digitised soil-geographical information in order to identify and eliminate inaccuracies and errors;
- development and implementation of effective mechanisms for the exchange of soil-geographical information among state authorities, research institutions, and other stakeholders;
- improvement of qualifications of specialists in the fields of soil science, land cadastre, and geoinformation technologies.

The implementation of these measures will contribute to improving the quality and relevance of soil-geographical information in the State Land Cadastre of Ukraine, which, in turn, will ensure the adoption of well-founded decisions in the field of natural resource management, soil protection, and sustainable agricultural development. Further development and enhancement of the soil-geographical component of the land cadastre constitute an important step towards the efficient and rational use of Ukraine's land resources.

Conclusions

Modern soil science in Ukraine has undergone a long evolution from simple observations to a complex interdisciplinary scientific field. The accumulation of a significant volume of soil-related information and the growing need for the transformation of soil-geographical data have necessitated the evolution of research organisation approaches and the development of methods for their analysis and systematisation. An important intermediate step in this direction has been the creation and dissemination of soil-geographical information through the Public Cadastral Map of Ukraine.

However, the process of digitalisation and integration of soil data is accompanied by a number of challenges, including data fragmentation and incompatibility, insufficient quality of digitised information, its obsolescence and limited completeness, as well as problems related to integration with other information systems and inadequate legislative regulation.

The effective use of soil-geographical information in the State Land Cadastre of Ukraine requires a comprehensive approach, including methodological unification, conducting surveys using modern technologies such as remote sensing, creation of a nationwide open-access database, quality control of existing data, establishment of information exchange mechanisms, and professional development of specialists, particularly under conditions of martial law.

It is proposed to consider the creation of regional soil information systems (RSoIS), which would be closely integrated into the national infrastructure of freely accessible geospatial soil data and aligned with the data of the Ukrainian Soil Information Center.

Addressing these issues will contribute to improving the quality and relevance of soil-geographical information, which is critically important for informed decision-making in the field of soil and land resource management, soil protection, and sustainable agricultural development in Ukraine. Further development of the soil-geographical component of the State Land Cadastre of Ukraine constitutes a prerequisite for the efficient, rational, and sustainable use of the country's most valuable natural resource.

СПИСОК ВИКОРИСТАНИХ ДЖЕРЕЛ

1. Алєксєєнко А.П., Буяновський А.О. Проблеми ведення земельного кадастру в період воєнного стану. Збірник матеріалів ІІІ наукової конференції студентів, аспірантів і молодих науковців «Горизонти ґрунтознавства» (м. Львів, 17 травня 2024 року). Вип. 4. Львів, 2024. С. 5-11.
2. Балюк С.А., Медвєдєв В.В., Тараріко О.Г., Греков В.О., Балаєв А.Д. Національна доповідь "Про стан родючості ґрунтів України" 2010. 112 с.
3. Земельний кодекс України: Закон України від 25.10.2001 року № 2768-ІІІ. *Відомості Верховної Ради України.* 2001. Дата оновлення: 12.09.2025. URL: https://zakon.rada.gov.ua/laws/show/2768-14/ed20250912#Text (дата звернення 22.10.2025)
4. Іванюк Г.С. Класифікація і діагностика ґрунтів: монографія. Львів: ЛНУ імені Івана Франка. 2017. 334 с.
5. Красєха Є.Н., Біланчин Я.М. та ін. Чорноземи масивів зрошення Одещини: монографія. Одеса: ОНУ імені І.І. Мечникова, 2016. 194 с.
6. Лебедь В.В. Досвід найвідоміших ґрунтових інформаційних систем світу. Аналітичний огляд. Агрохімія і ґрунтознавство. Міжвід. тем. наук. збірник. 2023. Вип. 94. Харків: ННЦ "ІҐА ім. О.Н. Соколовського". С. 54-61. URL: https://doi.org/10.31073/acss94-06
7. Паньків З.П. Ґрунтові ресурси: значення та функції. Вісник Одеського національного університету. Серія: Географічні та геологічні науки. 2015. Т. 20, Вип. 2. С. 84-95.
8. Позняк С.П. Чорнозем у наукових дослідженнях і пам'яті народів світу. Укр. геогр. журнал, 2016 (2). С. 26-31. URL: https://doi.org/10.15407/ugz2016.02.026

9. Про державний земельний кадастр: Закон України від 7 липня 2011 року № 3613-VI. Дата оновлення: 08.08.2025. URL: https://zakon.rada.gov.ua/laws/show/3613-17#Text (дата звернення 20.10.2025)

10. Про рішення Ради національної безпеки і оборони України від 23 березня 2021 року "Про виклики і загрози національній безпеці України в екологічній сфері та першочергові заходи щодо їх нейтралізації": Указ Президента України від 23.03.2021 року № 111/2021. URL: https://zakon.rada.gov.ua/laws/show/111/2021#n5 (дата звернення 18.10.2025)

11. Публічна кадастрова карта України. URL: https://map.land.gov.ua (дата звернення 15.10.2025)

12. Український ґрунтовий інформаційний центр. URL: https://issar.com.ua/ukra%D1%97nskij-%D2%91runtovij-informaczijnij-czentr-u%D2%91icz (дата звернення 15.10.2025)

13. Урядовий портал: На Публічній кадастровій карті додано нові шари – «Агровиробничі групи ґрунтів» та «Природно-сільськогосподарське районування». URL: https://land.gov.ua/na-publichnii-kadastrovii-karti-dodano-novi-shary-ahrovyrobnychi-hrupy-%D2%91runtiv-ta-pryrodno-silskohospodarske-raionuvannia/ (дата звернення 30.09.2025)

14. Ямелинець Т. С. Аналіз сучасних ґрунтових інформаційних систем і баз даних ґрунтів країн світу. Вісник Одеського національного університету. Серія: Географічні та геологічні науки. 2020. Т. 25, Вип. 2(37). С. 128–139. URL: https://doi.org/10.18524/2303-9914.2020.2(37).216566

15. Ямелинець Т. Інформаційне ґрунтознавство: монографія. Львів: ЛНУ ім. Івана Франка, 2022. 352 с.

16. Ackerson, K.T., D.L., Gallup, J.D., Rourke, A.J., Vessel. 1968. Soils of the world: Probable occurrence of orders and suborders (map scale ca. 1: 88,000,000). U.S. Dep. Agric., Soil Conserv. Serv. In: Buckman, H.O., Brady, N.C. The nature and properties of soils. 7th ed. 653 pp. Macmillan Co., NY.

17. e-SOTER. URL: https://www.isric.org/projects/e-soter (дата звернення 07.10.2025)

18. EuDASM. European Digital Archive of Soil Maps. URL: https://isric.org/projects/eudasm-european-digital-archive-soil-maps (дата звернення 07.10.2025)

19. FAO. 1995. Digital Soil Map of the World and Derived Soil Properties (Version 3.5). FAO, Rome, Italy.

20. FAO-EC-ISRIC, 2003. World Soil Resources Map. URL: ftp://ftp.fao.org/agl/agll/faomwsr/wsavcl.jpg. (дата звернення 05.10.2025)

21. GlobalSoilMap.Net. URL: https://www.isric.org/projects/globalsoilmapnet. (дата звернення 07.10.2025)

22. Soil Information System. ISIS. URL: isis.isric.nl (дата звернення 07.10.2025)

23. The Copernicus Land Monitoring Service. URL: https://land.copernicus.eu/pan-european/corine-land-cover (дата звернення 07.10.2025)

24. USDA Web Soil Survey. URL: https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm (дата звернення 07.10.2025)

25. WoSIS. URL: https://isric.org/explore/wosis/ (дата звернення 07.10.2025)

26. WRB. World Reference Base for Soil Resources. Rome: IUSS, ISRIC, FAO, 2014. 133 p.

27. WRB. World Reference Base for Soil Resources.2022. International soil classification system for naming soils and creating legends for soil maps. 4th edition. 2022. International Union of Soil Sciences (IUSS), Vienna, Austria. IUSS Working Group WRB.

28. Yaroslav Bilanchyn, Oksana Tsurkan, Mykola Tortyk, Volodymyr Medinets, Andriy Buyanovskiy, Inna Soltys, Sergiy Medinets. Post-irrigation state of Black Soils in South-Western Ukraine. In: Dent D., Boincean B. (eds). Regenerative Agriculture. Springer, Cham. 2021. PP. 303-309. URL: https://doi.org/10.1007/978-3-030-72224-1_27

REFERENCES

1. Alieksieienko A.P., Buianovskyi A.O. Problems of maintaining a land cadastre during martial law. Collection of materials of the III scientific conference of students, postgraduates and young scientists "Horizons of soil science" (Lviv, May 17, 2024). Issue 4. Lviv, 2024. Pp. 5-11. [in Ukrainian].

2. Baliuk S.A., Medviediev V.V., Tarariko O.H., Hrekov V.O., Balaiev A.D. (Editorial board) National report "On the state of soil fertility of Ukraine" 2010. P 112. [in Ukrainian].

3. Land Code of Ukraine: Law of Ukraine dated 25.10.2001 No. 2768-III. Bulletin of the Verkhovna Rada of Ukraine. 2001. Update date: 12.09.2025. URL: https://zakon.rada.gov.ua/laws/show/2768-14/ed20250912#Text (access date 22.10.2025)

4. Ivaniuk H.S. Classification and diagnostics of soils: monograph. Lviv: Ivan Franko National University of Lviv. 2017. 334 p. P334. [in Ukrainian].

5. Krasiekha Y.N., Bilanchyn Y.M. at al. (Eds) Chernozems of irrigation areas of Odessa region: monograph. Odesa: ONU imeni I.I. Mechnykova, 2016. P 194. [in Ukrainian].

6. Lebed V.V. Experience of the most famous soil information systems in the world. Analytical review. Agrochemistry and soil science. Interdepartmental thematic scientific collection. 2023. Issue 94. Kharkiv: NNC "IGA named after O.N. Sokolovsky". P. 54-61. URL: https://doi.org/10.31073/acss94-06 [in Ukrainian].

7. Pankiv Z.P. Soil resources: meaning and functions. Bulletin of the Odessa National University. Series: Geographical and geological sciences. 2015. Vol. 20, Issue 2. Pp. 84-95. [in Ukrainian].

8. Pozniak S.P. Chernozem in scientific research and memory of the peoples of the world. Ukrainian Geographical Journal, 2016 (2). P. 26.31. URL: https://doi.org/10.15407/ugz2016.02.026 [in Ukrainian].

9. On the State Land Cadastre: Law of Ukraine No. 3613-VI of July 7, 2011. Update date: 08.08.2025. URL: https://zakon.rada.gov.ua/laws/show/3613-17#Text (access date 20.10.2025)

10. On the decision of the National Security and Defense Council of Ukraine dated March 23, 2021 "On challenges and threats to the national security of Ukraine in the environmental sphere and priority measures to neutralize them": Decree of the President of Ukraine dated March 23, 2021 No. 111/2021. URL: https://zakon.rada.gov.ua/laws/show/111/2021#n5 (date of access 18.10.2025)

11. Public cadastral map of Ukraine. URL: https://map.land.gov.ua (date of access 15.10.2025)

12. Ukrainian Soil Information Center. URL: https://issar.com.ua/ukra%D1%97nskij-%D2%91runtovij-informaczijnij-czentr-u%D2%91icz (date of access 15.10.2025)

13. Government portal: New layers have been added to the Public Cadastral Map – "Agro-Production Groups of Soils" and "Natural and Agricultural Zoning". URL: https://land.gov.ua/na-publichnii-kadastrovii-karti-dodano-novi-shary-ahrovyrobnychi-hrupy-%D2%91runtiv-ta-pryrodno-silskohospodarske-raionuvannia/ (access date 30.09.2025)

14. Yamelynets T. S. Analysis of modern soil information systems and soil databases of countries around the world. Bulletin of the Odessa National University. Series:

Geographical and geological sciences. 2020. Vol. 25, Issue 2(37). pp. 128–139. URL: https://doi.org/10.18524/2303-9914.2020.2(37).216566 [in Ukrainian].

15. Yamelynets T. Information Soil Science: Monograph. Lviv: Ivan Franko National University of Lviv, 2022. 352 p. [in Ukrainian].

16. Ackerson, K.T., D.L., Gallup, J.D., Rourke, A.J., Vessel. 1968. Soils of the world: Probable occurrence of orders and suborders (map scale ca. 1: 88,000,000). U.S. Dep. Agric., Soil Conserv. Serv. In: Buckman, H.O., Brady, N.C. The nature and properties of soils. 7th ed. 653 pp. Macmillan Co., NY. [in English]

17. e-SOTER. URL: https://www.isric.org/projects/e-soter (access date 07.10.2025)

18. EuDASM. European Digital Archive of Soil Maps. URL: https://isric.org/projects/eudasm-european-digital-archive-soil-maps (access date 07.10.2025)

19. FAO. 1995. Digital Soil Map of the World and Derived Soil Properties (Version 3.5). FAO, Rome, Italy.

20. FAO-EC-ISRIC, 2003. World Soil Resources Map. URL: ftp://ftp.fao.org/agl/agll/faomwsr/wsavcl.jpg (access date 05.10.2025)

21. GlobalSoilMap.Net. URL: https://www.isric.org/projects/globalsoilmapnet. (access date 07.10.2025)

22. Soil Information System. ISIS. URL: isis.isric.nl (access date 07.10.2025)

23. The Copernicus Land Monitoring Service. URL: https://land.copernicus.eu/pan-european/corine-land-cover (access date 07.10.2025)

24. USDA Web Soil Survey. URL: https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm (access date 07.10.2025)

25. WoSIS. URL: https://isric.org/explore/wosis/ (access date 07.10.2025)

26. WRB. World Reference Base for Soil Resources. Rome: IUSS, ISRIC, FAO, 2014. 133 p.

27. WRB. World Reference Base for Soil Resources.2022. International soil classification system for naming soils and creating legends for soil maps. 4th edition. 2022. International Union of Soil Sciences (IUSS), Vienna, Austria. IUSS Working Group WRB.

28. Yaroslav Bilanchyn, Oksana Tsurkan, Mykola Tortyk, Volodymyr Medinets, Andriy Buyanovskiy, Inna Soltys, Sergiy Medinets. Post-irrigation state of Black Soils in South-Western Ukraine. In: Dent D., Boincean B. (eds). Regenerative Agriculture. Springer, Cham. 2021. P. 303-309. URL: https://doi.org/10.1007/978-3-030-72224-1_27 [in English]