INVESTIGATION OF AGRICULTURAL LAND MARKET IN UKRAINE

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Abstract. The article presents an analysis of the factors determining the value of land plots in the State Land Cadastre of Ukraine. It has been proven that, given the decline in agricultural production due to military operations in Ukraine, an objective assessment of land can become the basis for the effective functioning of the real estate market. The criteria for the capitalization rate of agricultural land in Ukraine, namely the ratio of net operating income to the sale price of land, are characterized. The article proposes using taxonomic units of natural and agricultural zoning as spatial units of homogeneity of agricultural land. This approach will allow assessing the impact of soil fertility, climate variability, and moisture reserves on land productivity and value. Based on data from the monitoring of land relations by the State Service of Ukraine for Geodesy, Cartography, and Cadastre, the authors calculated and presented a map of the value of agricultural land by natural and agricultural regions of Ukraine. The research materials consist of land cadastre data based on methodological techniques for synthesizing and analyzing individual elements. The research methodology consisted of three stages: 1) studying the spatial variability of transaction costs and rental payments by applying the principles of natural and agricultural zoning; 2) analyzing the regulatory and methodological framework for land valuation within the State Land Cadastre; 3) identification of the most optimal criteria for the functioning of the agricultural land market in Ukraine, despite the challenges caused by the war.

Keywords: cadastre, land evaluation, agricultural land, land plot, land market.

Introduction

The value of agricultural land usually follows the net present value model, where the current value of land is represented by the sum of discounted expected future land income [1]. The study of Mihaela Mihailova [2] provides a detailed overview of price changes in the agricultural land market and land lease in Bulgaria over a ten-year period. It was found that the time, location, and size of the land plot had the greatest impact on the price of land. Maxim Gorgan & Morten Hartvigsen [3] studied in detail the development of agricultural land markets in Eastern Europe and Central Asia and proposed effective land management tools, such as land consolidation and land banks, based on the implementation of relevant land tenure projects of the Food and Agriculture Organization of the United Nations (FAO). In Ukraine, the issue of the formation and valuation of agricultural land parcels has not been sufficiently studied. However, in a study by Mykhaylo Fedorchuk and Andriy Popov [4], the procedures for forming agricultural land blocks were examined in detail as a mechanism for addressing the shortcomings of agricultural land use and ensuring rational use of land.

Korthals Altes WK [5] notes that the increase in farmland prices is due to subsidies and the fact that large farms can pay higher prices than new entrants to agriculture. Large developing farms increase their land holdings mainly through leasing. The increase in land holdings in the province of Saskatchewan (Canada) due to the operation of large farms contributes to the destruction of traditional rural landscapes [6]. Other researchers point to the negative impact of enterprises with large areas of agricultural land on soil conditions. Such consequences include a decrease in soil fertility, pollution of water sources, loss of biodiversity, and drainage of wetlands [7]. The emergence of ultra-large business entities in Ukraine, often with low social and environmental responsibility, leads to depopulation of the countryside and degradation of all its other potentials. To form effective land use, it is necessary to take into account the location of land masses, the relief of the territory, moisture conditions, agroecological suitability of soils for growing specific types of agricultural crops and the consequences of soil degradation [8; 9]. Irrational agricultural use of soils leads to the development of degradation processes, in particular wind erosion [10; 11]. Land quality is recorded in Ukraine's land cadastre according to agricultural soil groups. To effectively monitor and protect land in the cadastre, it is important to take into account the extent of environmentally harmful land degradation processes. Some researchers [12] note that in most developing countries, procedures for monitoring the effectiveness of cadastral systems are virtually nonexistent, as is the case in Ukraine. Continuous and up-to-date information on damage to agricultural

land is important for management decisions. Monitoring war damage reveals its impact on civilians and provides an evidence base for prosecuting war crimes related to food destruction [13].

The study of Wasilewski A. at all [14] proves the transformational role of the Common Agricultural Policy (CAP) in the stable regulation of the agricultural land market in Eastern Europe. At the same time, the authors also point out the negative aspects of providing subsidies to agricultural producers. The study by Lando E.O. [15], which analyses European land markets, identifies the factors that determine agricultural land value. These include the soil quality, infrastructure provision, economic situation, absence of encumbrances on the land, and access to credit. In countries with favorable credit conditions, land prices are significantly higher, which enables farmers to obtain financing. Climate change can also have a serious impact on farmland values in developing countries such as Bangladesh. Bangladesh is one of the most disaster-affected countries in the world, with natural disasters and climate risks regularly affecting farm productivity and, consequently, the value of agricultural land [16].

The economic valuation of agricultural land is based on the Net Present Value method, which is used to identify the operational production value of land rather than the market value of real estate. As agricultural land use plays a central role in terms of the impact of land use on environmental sustainability, understanding the spatial dynamics of agricultural land cover is crucial [17]. The authors recommend giving priority to balancing direct payments with rural development initiatives to mitigate the disproportionate capitalization of subsidies in land prices. Assessing the impact of climate change on farmland values and farmers' profits is very important. Climate conditions play an important role in determining farmland values across the United States [18]. Long-term projections of climate change suggest an overall loss of farmland values of 2.5-5%, with varying impacts at the state level, ranging from large losses in Florida to significant increases in Virginia [19].

In Ukraine, land zoning plays a crucial role in the valuation of agricultural land. This division of the territory is carried out taking into account natural conditions, biological characteristics of crops, directions of economic development and environmental safety requirements. Different types of natural zoning have been developed considering the territorial differences in natural and economic conditions of Ukraine when using, evaluating and protecting land [20]. Given the great diversity of soil cover, the difficulty of conducting various surveys in modern conditions (conditions of war in the country and subsequent post-war recovery) [21], the normative indicators for the assessment of agricultural land are presented by natural and agricultural districts. The price of agricultural land is calculated from the cost of rent and annual net income, based on a representative crop structure for a given period of time [22]. The value of agricultural land is expressed through the ability of the land to produce agricultural goods and is determined by both objective factors (ability to meet the needs of the crops grown) and subjective factors (technologies of their growing). The price of agricultural land depends on market supply and demand at a given time and can also be determined by calculating the capitalization of land rent.

The purpose of the research was to identify the factors determining the value of agricultural land parcels in the State Land Cadastre of Ukraine and to estimate the capitalization rate across natural-agricultural regions. The empirical basis of the study was a database of agricultural land sale and lease transactions compiled from the monitoring of land relations by the State Service of Ukraine for Geodesy, Cartography, and Cadastre. The dataset covered the period from 1 July 2021 to 29 February 2024, i.e. from the launch of the agricultural land market in Ukraine to the latest date for which a sufficiently complete array of registered transactions was available for analysis.

Materials and methods

The research methodology consisted of three stages: 1) studying the spatial variability of land sale prices and rental payments using the principles of natural-agricultural zoning; 2) analysing the regulatory and methodological framework for land valuation within the State Land Cadastre; 3) calculating and mapping the capitalization rate of agricultural land by natural-agricultural regions of Ukraine. Data aggregation was carried out by assigning each transaction to the corresponding natural-agricultural region according to the location of the land parcel and then calculating average indicators per hectare for each region after excluding erroneous, incomplete, and non-representative observations. The capitalization rate was determined using the extraction method as the ratio of annual rental income to the market sale price of comparable agricultural land parcels:

$$CR_i = \frac{R_i}{P_i} \cdot 100, \quad (1)$$

where CR_i – capitalization rate in region *i;*

R_i – average annual rental payment per 1 ha of agricultural land in region *i;*

P_i – average sale price per 1 ha of comparable agricultural land in region.

Results and discussion

According to many scientific studies, the war in Ukraine has not only caused losses in Ukrainian agriculture but has also posed a threat to global food security [23]. Only coordinated action by government agencies, international organizations, and humanitarian missions can mitigate the extremely negative consequences of the war for local communities. According to FAO [24], assistance to farmers is crucial for stabilizing food systems, protecting livelihoods, and preventing the situation in rural areas from deteriorating. Restoring the economic infrastructure of affected territories will require drastic measures. Among the unpopular decisions are the creation of jobs and infrastructure. Along with this, it is important to develop an effective mechanism for compensating losses, taking into account the voluntary registration of property rights that took place prior to 2013. During the war, the issue of preserving information on Ukrainians' property rights has become particularly relevant, especially non-digitized information (not entered into the State Register of Real Property Rights). When losing property due to war-related destruction, citizens often lose the paper documents for their real estate, and to receive compensation, they must first submit the relevant information by contacting the state registrar or having their property rights recognized in court.

In Ukraine, income capitalization rates have historically been among the key indicators used to value agricultural land. In addition, when valuation of agricultural land is conducted, soil quality indicators are taken into account through soil bonitet scores. The capitalization rate is defined as the ratio of net income to the market sales price of comparable land parcels without improvements, based on an analysis of market data regarding the ratio of rent to sales price. Since a moratorium on the sale of agricultural land was in effect in Ukraine until 2021, the number of such land plots was insufficient for a competitive real estate market. The adoption of the Law of Ukraine No. 340-IX of December 5, 2019, "On Amendments to Certain Legislative Acts of Ukraine Regarding Countering Raiding" marked a significant step toward the registration of property rights to land plots and the determination of land plot fees. These changes have facilitated the accumulation of a substantial dataset over the past four years regarding the sale prices of agricultural land plots under purchase and sale agreements, as well as the amounts of rent for agricultural land.

Based on data from the State Service of Ukraine for Geodesy, Cartography, and Cadastre monitoring of land relations, we calculated and presented a map of the value of agricultural land by natural-agricultural regions of Ukraine (Fig. 1). The homogeneity of land use and soil cover is reflected in the division into natural-agricultural regions, which are characterized by similar soil properties, a combination of climatic, hydrological, and geomorphological conditions, as well as factors that fundamentally influence land productivity and the efficiency of agricultural production.

According to official statistics from the State Service of Ukraine for Geodesy, Cartography, and Cadastre (as of March 2024), approximately 283,200 land sale agreements were concluded. The highest number of land sale agreements in the pre-war period was recorded in the Kharkiv, Kherson, and Sumy regions. However, the war led to migration of business to the central and western regions of Ukraine. As a result, the highest numbers of transactions were recorded in the Khmelnytskyi (1,623) and Vinnytsia (1,341) regions. Across Ukraine as a whole, the value of agricultural land increased by 8.3% in 2023. As of March 2024, the average cost per hectare of sold land was 913,96 US dollars. The lowest average prices were observed in the regions most affected by occupation or military operations, particularly in the Kherson, Zaporizhzhia, and Donetsk regions. The highest prices for land plots were recorded in Lviv, Ivano-Frankivsk, and Kyiv regions.

The market for renting privately owned agricultural land is very active and has changed significantly in Ukraine following the launch of the agricultural land sales market. As of July 1, 2021, the average rental rate for land intended for commercial agricultural production and for private farms rose from approximately 57.55-59.86 USD per ha to 69.07 USD per ha [25]. The free transfer of state-

owned land into private ownership, as well as restitution, carried out in the 20th century in post-socialist countries, has led to the continued prevalence of land rent.

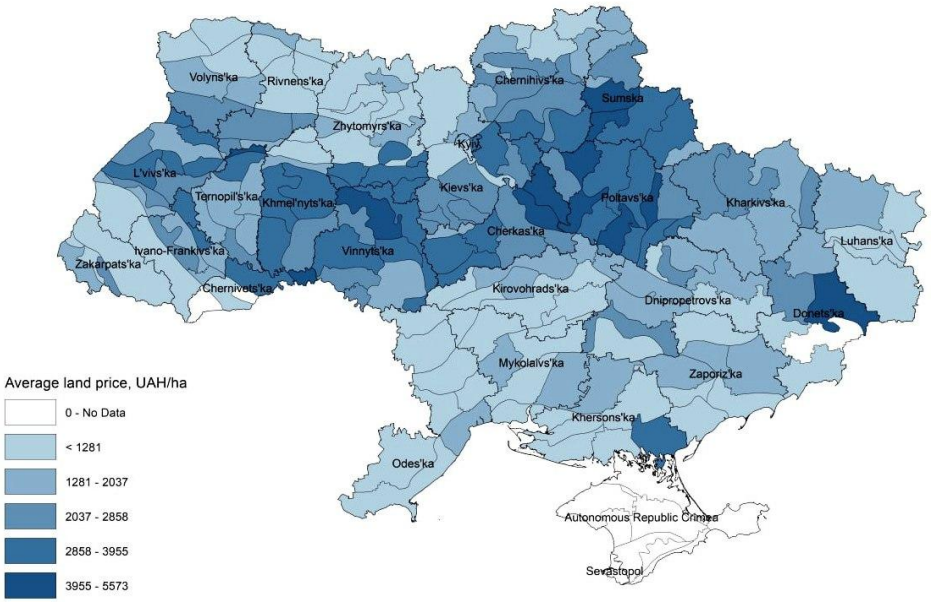

Fig. 1. **Price of agricultural lands (UAH/ha) across natural-agricultural regions of Ukraine**: calculations based on land relations monitoring data of the State Service of Ukraine for Geodesy, Cartography and Cadastre (2024)

The reason for this phenomenon is the reluctance of landowners to sell their plots, either because of low expected prices or because they view the plots as a source of future long-term income [26]. Natural and climatic conditions, along with soil conditions for crop cultivation, are a major factor influencing land productivity. That is why it is so important to take into account the natural and agricultural zones of the territory when evaluating agricultural land. Unfortunately, however, in Ukraine, the consequences of the war remain the decisive factors influencing land lease and sale prices. Based on a database of transactions involving the lease and sale of agricultural land plots in Ukraine, a capitalization rate was determined (Fig. 2).

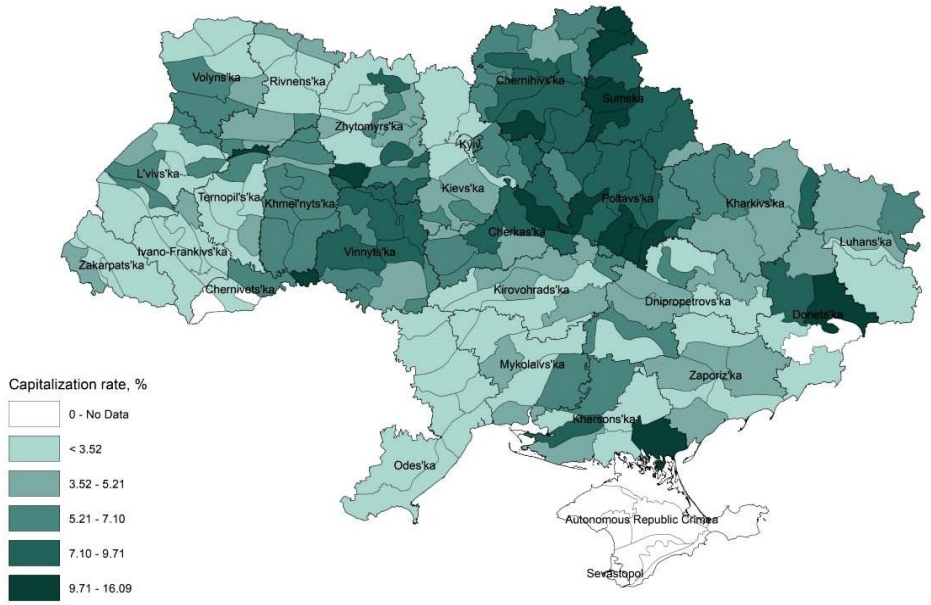

Fig. 2. **Capitalization rate for agricultural lands across natural-agricultural regions of Ukraine, in percentage**: calculations based on land relations monitoring data of the State Service of Ukraine for Geodesy, Cartography and Cadastre (2024)

The highest values of the agricultural land capitalization rate are observed in the northeastern part of Ukraine (the natural and agricultural regions of Chernihiv, Sumy, Kharkiv, and Poltava Oblasts). It is precisely these territories that are particularly at risk due to the security situation. Therefore, in Ukraine, traditional factors influencing agricultural productivity (such as soil fertility, climatic conditions, crop-growing zones, and agricultural product markets) rank second, while territorial security and environmental conditions currently take precedence. Such regional differences in capitalization rates are critically important for potential investors in agricultural land.

Conclusions

The agricultural land market in Ukraine remains active despite the ongoing hostilities. An increase in the number of transactions involving the sale and purchase of agricultural land has been observed in the relatively safer western regions of Ukraine. However, the southern regions are more favourable for crop cultivation. High capitalization rates in regions affected by the war indicate the need for coordinated policy decisions to mitigate risks, strengthen infrastructure, and facilitate rural development.

Author contributions

The contribution of each author. Conceptualization, Andrii Martyn, Oleksandr Shevchenko, Olha Tykhenko; methodology, Oleksandr Shevchenko and Ruslan Tykhenko; formal analysis, Olha Tykhenko and Andrii Martyn; investigation, Olha Tykhenko, Andrii Martyn, Ruslan Tykhenko and Ivan Openko; writing – original draft preparation, Olha Tykhenko and Ruslan Tykhenko; writing – review and editing, Andrii Martyn and Ivan Openko; visualization, Oleksandr Shevchenko, Andrii Synieutskyi and Ruslan Tykhenko; project administration, Olha Tykhenko; funding acquisition, Ivan Openko. All authors have read and agreed to the published version of the manuscript.

References

[1] Ciaian P., Baldoni E., Kancs D., Drabik D. The capitalization of agricultural subsidies into land prices. Annual Review of Resource Economics, 13, 2021, pp. 17-38. DOI: 10.1146/annurev-resource-102020-100625

[2] Mihailova M. Relationship between rent prices and agricultural land prices. Bulgarian Journal of Agricultural Science, 28 (No 1), 2022, pp. 26–35.

[3] Gorgan M., Hartvigsen M. Development of agricultural land markets in countries in Eastern Europe and Central Asia. Land Use Policy, 120, 2022, 106257. DOI: 10.1016/j.landusepol.2022.106257

[4] Fedorchuk M., Popov A., Fedorchuk V. Addressing the spatial shortcomings of agricultural land use: Legal aspects and obstacles. Studia Iuridica Lublinensia, 33, 2024, pp. 57–72. DOI: 10.17951/sil.2024.33.4.57-72

[5] Korthals Altes W.K. Access to land: markets, policies and initiatives. Sustainability, 15(6), 2023, 5097. DOI: 10.3390/su15065097

[6] Magnan A., Davidson M., Desmarais A.A. They call it progress, but we don't see it as progress: farm consolidation and land concentration in Saskatchewan, Canada. Agriculture and Human Values, 40, 2023, pp. 277–290. DOI:10.1007/s10460-022-10353-y

[7] Rasva M, Jürgenson E. Agricultural land concentration in Estonia and its containment possibilities. Land, 11(12), 2022, 2270. DOI: doi.org/10.3390/land11122270

[8] Бурлака Н., Панько В. Екологічні наслідки деградації ґрунту та інноваційні шляхи її подолання. (Ecologi consequences of soil degradation and innovative ways of its subsidy). Agrosvit, 7, 2020, pp. 80-86. DOI: 10.32702/2306-6792.2020.7.80 (In Ukrainian).

[9] Новаковський Л., Євсюков Т., Новаковська І. Управління землекористуванням: проблеми охорони основного національного багатства (Land use management: problems of protection of basic national wealth). Land management, cadastre and land monitoring, 1, 2022, pp. 4-17. DOI: 10.31548/zemleustriy2022.01.01 (In Ukrainian).

[10] Pikovska O. Changes in anti-deflation resistance of chernozem typical under different tillage and fertilizers. Plant and Soil Science, 12 (1), 2021, pp. 86-93. DOI: 10.31548/agr2021.01.0086

[11] Tonkha O., Menshov O., Sychevskyy S., Pikovska O., Balaev A. Geospatial and magnetic assessment of soil and relief of the farming lands at the Forest-Steppe zone of Ukraine. Geoinformatics, May 2021, pp. 1-6. DOI: 10.3997/2214-4609.20215521108

[12] Popov A., Kolodiy P., Zadorogniy Y. An evaluation framework of the current cadastral system in Ukraine – A case study. Acta Scientiarum Polonorum Administratio Locorum, 22(4), 2023, pp. 537–560. DOI: 10.31648/aspal.9044
[13] Kussul N., Drozd S., Yailymova H., Shelestov A., Lemoine G., Deininger K. Assessing damage to agricultural fields from military actions in Ukraine: An integrated approach using statistical indicators and machine learning. International Journal of Applied Earth Observation and Geoinformation, 125, 2023, 103562. DOI: 10.1016/j.jag.2023.103562
[14] Wasilewski A., Gospodarowicz M., Wasilewska A. Agricultural land price dynamics in Europe: convergence, divergence, and policy impacts across EU member states. Sustainability, 16, 2024, 10982. DOI: 10.3390/su162410982
[15] Ландо Є.О., Андреєва І.Г., Трегуб О.В., Степанцова О.Є. Дослідження досвіду формування ринку сільськогосподарських земель в інших країнах (A study of the development of agricultural land markets in other countries). Український журнал будівництва та архітектури, 3, 2024. pp.130-134 (In Ukrainian).
[16] Ustaoglu E., Perpiña Castillo C., Jacobs-Crisioni C., Lavalle. C. Economic evaluation of agricultural land to assess land use changes. Land Use Policy, 56, 2016, pp. 125-146. DOI: 10.1016/j.landusepol.2016.04.020
[17] Ashraf, A., Dinar A. Impact of short-run weather fluctuations on farmland sales and values. Journal of ASFMRA, 2020, pp. 137-147. [online] [31.03.2012]. Available at: https://www.jstor.org/stable/27033933
[18] Quaye F., Nadolnyak D., Hartarska V. Climate change impacts on farmland values in the southeast United States. Sustainability, 10(10), 2018, 3426. DOI: 10.3390/su10103426
[19] Shakhawat Hossain Md., Arshad M., Qian L., Kachele H., Khan I., Din Il Islam Md., Golam Mahboob M. Climate change impacts on farmland value in Bangladesh. Ecological Indicators, 112, 2020, 106181. DOI: 10.1016/j.ecolind.2020.106181
[20] Resolution of the Cabinet of Ministers of Ukraine "On approval of the Procedure for implementing natural-agricultural, ecological-economic, anti-erosion and other types of land zoning". No 681, May 26, 2004. [online] [03.03.2026]. Available at: https://zakon.rada.gov.ua/laws/show/681-2004-%D0%BF?lang = en#Text
[21] Tykhenko O., Martyn A., Tykhenko R., et al. Impact of comparative assessment of soil quality on determining the value of agricultural land (Ukraine). Ecological Engineering & Environmental Technology, 25(4), 2024, pp. 252-261. DOI: 10.12912/27197050/183900
[22] Alda T., Doko A., Kopali A., Musabelliu B., Veselaj E., Malltezi J. Sulçe S. Comparative analysis of the agriculture land price assessment in Albania. Asian Journal of Agricultural Extension, Economics & Sociology, 20 (3), 2017, pp. 1-12. DOI: 10.9734/AJAEES/2017/37275
[23] Frolenkova N., et al. Estimating the cost of drained lands by using them in variable conditions. Handbook of Research on Improving the Natural and Ecological Conditions of the Polesie Zone, edited by A. Rokochinskiy, et al. IGI Global, 2023, pp. 359-371. DOI: 10.4018/978-1-6684-8248-3.ch022
[24] FAO. 2026. Ukraine: Food security and agricultural livelihoods assessment, July 2025. Kyiv. DOI: 10.4060/cd8710en
[25] Kvartiuk, V., Martyn, A. Agricultural land lease market in Ukraine: prices and monitoring issues. Agricultural policy report. German-Ukrainian Agricultural Policy Dialogue (APD). Kyiv, August 2023. 22 p. [online] [21.02.2026]. Available at: https://www.apd-ukraine.de/fileadmin/user_upload/followup_3_eng_fin.pdf
[26] Boranek M., Pixova K., Calta J., Sklenicka P. Capitalization of direct payments and agricultural land rental prices in the Czech Republic. Land Use Policy, 165, 2026, 108000. [online] [21.02.2026]. Available at: https://www.sciencedirect.com/science/article/pii/S0264837726000840