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CHALLENGES AND PROBLEMS OF AGRICULTURAL LAND USE CHANGES ACCORDING TO TERRITORIAL PLANNING DOCUMENTS: CASE OF POLAND AND UKRAINE

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ABSTRACT: Soil is a non-renewable natural resource that provides essential ecosystem services for life, playing a crucial role in the environment, economy, and society. In turn, uncontrolled urban development stands out as one of the primary threats to sustainable territorial development and food security. Therefore, ensuring synergy between practical, effective soil protection (especially for high-quality soils) and spatial planning systems is crucial. The main goal of this article is to propose a universal concept that prioritises agricultural land protection in spatial planning systems in Poland and Ukraine. This goal was achieved based on specific objectives: (i) assessment of soil potential; (ii) comparative analysis of legal conditions for agricultural land protection; and (iii) critical comparative analysis of agricultural land protection procedures in spatial planning systems. The proposed concept guarantees the spatial demarcation of land boundaries of particularly valuable agricultural land and their preservation for sustainable use in the future.

KEYWORDS: soil production quality, rational land allocation, soil protection, agricultural land use, land use planning

Introduction

Soil is a living, non-renewable natural resource that provides essential ecosystem services vital for life on Earth (Clunes et al., 2022; European Commission, 2021; 2024). Therefore, it plays a critical role in the environment, economy, and society (Butzer, 2005). Inappropriate agricultural management leads to a decline in soil quality (soil degradation) and, consequently, in food production (Bindraban et al., 2012). The global extent of soil degradation is estimated at between 20% and 40% of the total land area (FAO, 2021). The leading causes of soil degradation include water and wind erosion, compaction, salinisation, nutrient depletion, soil contamination, and sealing (Kraamwinkel et al., 2021; Dragović & Vulević, 2020; Lal, 2015; Blum, 2013). When unfavourable physical, topographic, climatic, and anthropogenic factors combine, soil degradation can be remarkably rapid (Veerman et al., 2020; Poesen, 2018; Amundson, 2015). Therefore, it is essential to implement actions aimed at reversing the trend of soil degradation, in particular through proper soil management from the point of view of land quality, which must take into account all the functions that soils perform (European Commission, 2021; Kopittke et al., 2019; Liu et al., 2024).

The depletion of agricultural land is intrinsically linked to soil degradation, particularly in terms of soil quality. It is a widespread issue affecting regions across the globe (Tran Tuan, 2021; Pozza & Field, 2020). Between 2015 and 2030, it is estimated that about 11% of agricultural land in the EU, over 20 million hectares, will be at high risk of abandonment due to biophysical land suitability, farm structure, agricultural viability, population, and regional specifics. The most significant risk concerns countries such as Romania, France, Spain, Portugal, Cyprus, Poland, Latvia, and Estonia (Perpiña Castillo et al., 2018). However, there are many reasons for the decrease in agricultural land resources. One of them is industrialisation. The demand for new housing (Yasin, 2020; Ribeiro, 2021; Kocur-Bera & Pszenny, 2020; Mazzocchi et al., 2017), industrial, and transport infrastructure (Qiu et al., 2015) is typically the key force behind land acquisition for non-agricultural and non-forest purposes. This trend is mainly driven by population growth and the increasing demand for higher living standards, including larger housing units, more sports facilities, social infrastructure facilities, etc. Many factors can explain the ongoing urban sprawl observed for many years. Many people settle in suburban areas because they can find better quality housing and more living space per capita (European Commission, 2012). Since the mid-1950s, urban areas in the EU have increased by 78%, while the population has grown by only 33% (EEA, 2006). The areas in the EU classified as suburban have the same built-up land as urban areas, but only half are as densely populated (Piorr, 2011). High land prices within city limits encourage the construction of new housing estates on cheaper land surrounding cities, further driving the demand for transport infrastructure. Consequently, various types of demand for land are increasing, especially in and around cities and rural areas (EEA, 2006). Uncontrolled urban development, particularly the construction of low-density housing estates, poses a significant threat to sustainable territorial development in both the EU and Poland (European Commission, 2012). Issues related to transport, loss and fragmentation of open areas significant for the quality of urban life (Cömertler, 2007), loss of areas of natural and economic value, changes in nature and landscape, and environmental pollution are among many consequences of this trend (Bielska & Maciejewska, 2018). The growth of urban areas and their infrastructure that uses the soil as a resource the most, especially productive agricultural soils (Silveira & Dentinho, 2024). Rational allocation of land for development is therefore essential to minimise the negative impacts of sprawling development while ensuring that new development occurs in the most suitable areas (Hailu et al., 2023; Wu et al., 2023; Surya et al., 2020). In response to these challenges, in 2011, the European Commission announced the objective of 'no-net-land take by 2050' to preserve soil, protect biodiversity, and enhance everyone's quality of life. This goal was reaffirmed as part of the European Union Soil Strategy, although it remains non-binding (Energy Cities, 2024).

Spatial planning plays a key role in soil protection, introducing legal mechanisms to limit uncontrolled development at the expense of agricultural land (Zdyb, 2020; Czajka & Kurowska, 2025). Spatial planning aims to minimise spatial conflicts and rationally manage development, thereby designing, modelling, and monitoring smart communities (Yang & Yamagata, 2020). European Union member states are increasingly recognising soil quality as a critical factor in spatial planning, but integration remains inconsistent and incomplete across different countries (Paleari, 2017). The analysis of

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the literature suggests a gradual shift toward more sophisticated soil consideration in land-use and spatial planning decisions (Antoni et al., 2025). Many countries have reformed spatial planning systems to promote more integrated approaches (Nadin et al., 2020). As part of the research work (Fossey et al., 2020), a framework was proposed to make soil ecosystem services more understandable in territorial planning, highlighting the current challenge of translating soil science into governance.

Currently, both in Poland and Ukraine, legislative changes are being introduced to improve spatial planning and to minimise excessive development at the expense of agricultural land. In Poland, the soil structure is diverse, and agricultural land covers approximately 14,461 thousand hectares – 47% of the country's total area (Statistics Poland, 2022). The conversion of agricultural land for non-agricultural purposes, particularly for residential development, is a notable trend, with over 2 thousand ha per year being excluded from production, accounting for 47% of the total land lost to non-agricultural uses (Statistics Poland, 2024). In Ukraine, the total land fund amounts to 61.7 million hectares, of which 17.6 million hectares are agricultural land, including 14.83 million hectares of arable land (National Report, 2022).

Given the threats posed by the declining area of agricultural land in both countries and the still imperfect system of agricultural land protection, a comparison of spatial planning and soil protection systems in Poland and Ukraine has substantial substantive and practical grounds. Both countries face similar challenges, including pressure of urbanisation, the need to protect high-quality soil resources, the transformation of spatial planning systems, and the requirement for coherent spatial management in rural areas. At the same time, they operate in different legal, institutional, and socio-economic conditions, which create excellent conditions for comparative analysis. For Ukraine, the key context is the ongoing land market reform and post-war reconstruction, which will force huge spatial and reclamation decisions. For Poland, it is the modernisation of planning in the light of reforms (including new planning tools), stricter land protection requirements, and varying investment pressures between regions.

There is a lack of in-depth comparative studies on the simultaneous functioning of spatial planning and soil protection systems in Poland and Ukraine. There are national analyses, but comparisons between countries are limited and fragmented. Few studies examine the relationship between planning instruments and the actual effectiveness of soil protection, especially for high-quality soils. Whether legal mechanisms prevent degradation and development remains a poorly understood issue. Few publications consider the perspective of integrated land management, covering planning, protection, and agricultural aspects (land consolidation, reclamation, land use transformation). In practice, however, these processes work together.

Therefore, the primary study aim of this article is to propose a universal concept that prioritises the protection of agricultural land in spatial planning systems in Poland and Ukraine. The main objective will be achieved based on the following specific objectives: (i) assessment of the soil potential of Poland and Ukraine, (ii) comparative analysis of the legal conditions for agricultural land protection in Poland and Ukraine; (iii) a critical comparative analysis of agricultural land protection procedures in spatial planning systems in Poland and Ukraine.

Materials and Methods

The research area encompasses Poland and Ukraine, two neighbouring countries (Figure 1). The study adopted an integrated comparative–spatial–legal approach, combining quantitative and qualitative methods to assess land use changes, soil protection mechanisms, and the efficiency of planning instruments regulating agricultural land conversion.

The study was based on a combination of primary and secondary data, obtained from official institutions and open-access databases. The main sources included:

- Cadastral and land use databases from Statistics Poland and the State Service of Ukraine for Geodesy, Cartography and Cadastre;
- Statistical reports on the area and quality of agricultural land excluded from production in Poland (2003–2023) and Ukraine (2003–2021);
- Soil maps and quality assessments derived from national soil classification systems and agro-ecological zoning databases;

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- Legislative and planning documents defining land protection and conversion procedures, including the Act on the Protection of Agricultural and Forest Land (Poland, 1995) and the Land Code of Ukraine (2001a).

Figure 1. Research area

All data were verified for internal consistency and converted into comparable units, with spatial data harmonised to the national administrative boundaries of 2023.

The research methodology consisted of three stages (Figure 2):

Stage 1. Inventory and classification of agricultural land – A database of agricultural land was identified and categorised using national soil quality classes. In Poland, soils of class I-III were considered high-quality soils, while in Ukraine, soils classified as chernozems of national importance were deemed equivalent. The share of high-quality soils in the total land area was calculated and mapped for both countries.

Stage 2. Comparative analysis of the legal and institutional framework – A structured content analysis of legal acts and planning procedures was conducted to identify differences in institutional mechanisms for land protection. The comparison focused on five dimensions:

a) definition and classification of agricultural land,
b) legal instruments for soil and land protection,
c) decision-making bodies,
d) compensation and financial mechanisms,
e) integration of spatial planning and development systems.

Stage 3. Synthesis and Interpretation – Quantitative and qualitative data were combined to identify common challenges, best practices, and potential remedies for improving the effectiveness of agricultural land protection in both countries and to propose a universal concept that prioritises the protection of agricultural land in spatial planning systems in Poland and Ukraine. The results were interpreted considering the EU's 2030 Soil Protection Strategy and the goal of eliminating land taken by the network by 2050.

Only officially published data from verified institutional sources were used. Differences in soil classification systems and terminology between the two countries were normalised by converting all values to percentages of the national territory and grouping soils into three comparable categories (high, medium, and low production quality). The main limitations of the study include:

- differences in data availability and temporal resolution between the two countries;
- partial cadastral coverage and data gaps in Ukraine;
- different definitions of "land exclusion" in national legislation.

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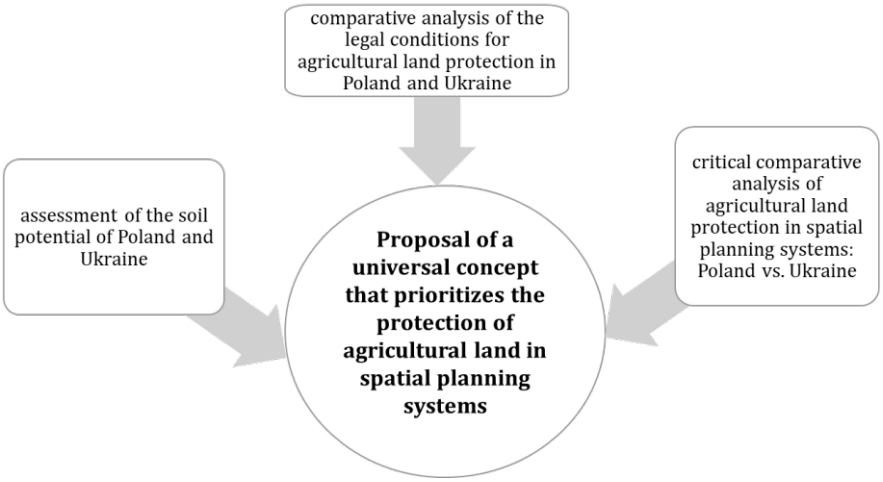

Figure 2. The research methodology diagram

Despite these limitations, the comparative-spatial-legal approach employed provides a solid analytical framework for proposing a universal concept that prioritises the protection of agricultural land in spatial planning systems in Poland and Ukraine.

Results and discussion

Analysis of soil potentials in Poland and Ukraine

Quality of agricultural land in Poland

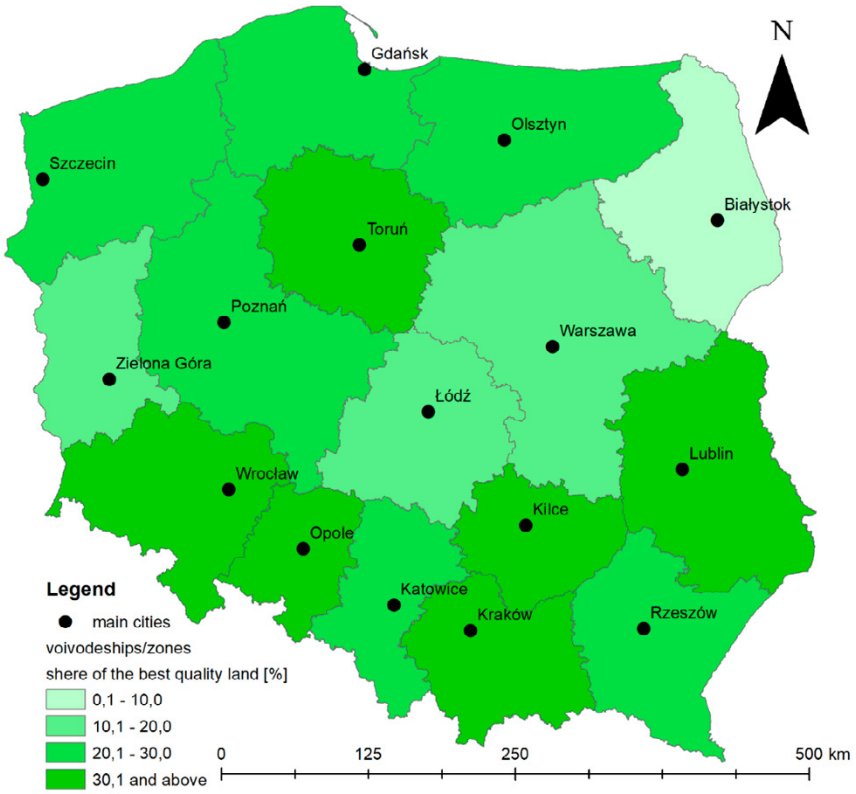

Figure 3. Share of the best quality land in the total area of the voivodeship in Poland

Source: authors' work based on (Statistics Poland, 2005).

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In Poland, the soil quality classes determine the quality of soils in terms of their utility value and are defined in the Regulation of 12 September 2012 on the soil classification of land. All arable land in Poland has been divided into nine quality classes, and grasslands into seven quality classes. The best quality soil types in Poland are primarily chernozems, which constitute only 1% of Poland's area (slightly over 300 thousand hectares) (Statistics Poland, 2020), black earth silt soils, black soils developed from marly clays or dust formations, and brown or lessive soils developed from loess or loess-like formations, from clays, dusty clays or dust formations of aquatic origin. Such soils are classified as quality classes I, II, IIIa, and IIIb on arable land and classes I, II, and III on grasslands. Together, they occupy about 26% of the total area of Poland (about 8 million hectares) (Statistics Poland, 2024). Their percentage share in the total area of the 16 Polish voivodeships is shown in Figure 3.

Quality of agricultural land in Ukraine

Ukraine possesses extensive land resources with substantial natural and resource potential, the value of which continues to grow amid intensifying global challenges. Among the diverse soil types present in Ukraine, chernozems are the most widespread. They are characterised by high natural fertility due to their high humus content. Legal protection of soils is an integral part of land protection. All requirements provided by legislation regarding the rational use and protection of land fully apply to soils. However, soil protection has several peculiarities that are reflected in the legal regulation of its protection and use. These peculiarities are manifested, firstly, in the determination of especially valuable soils by agroecological zones, and secondly, in providing enhanced legal protection for lands covered with valuable types of soils in ecological, economic, agricultural, and social aspects.

In the first case, it concerns the classification of soils compiled according to the materials of the natural-agricultural zoning of the territory of Ukraine (Figure 4), which represents hierarchical taxonomic divisions within the boundaries of natural-agricultural provinces.

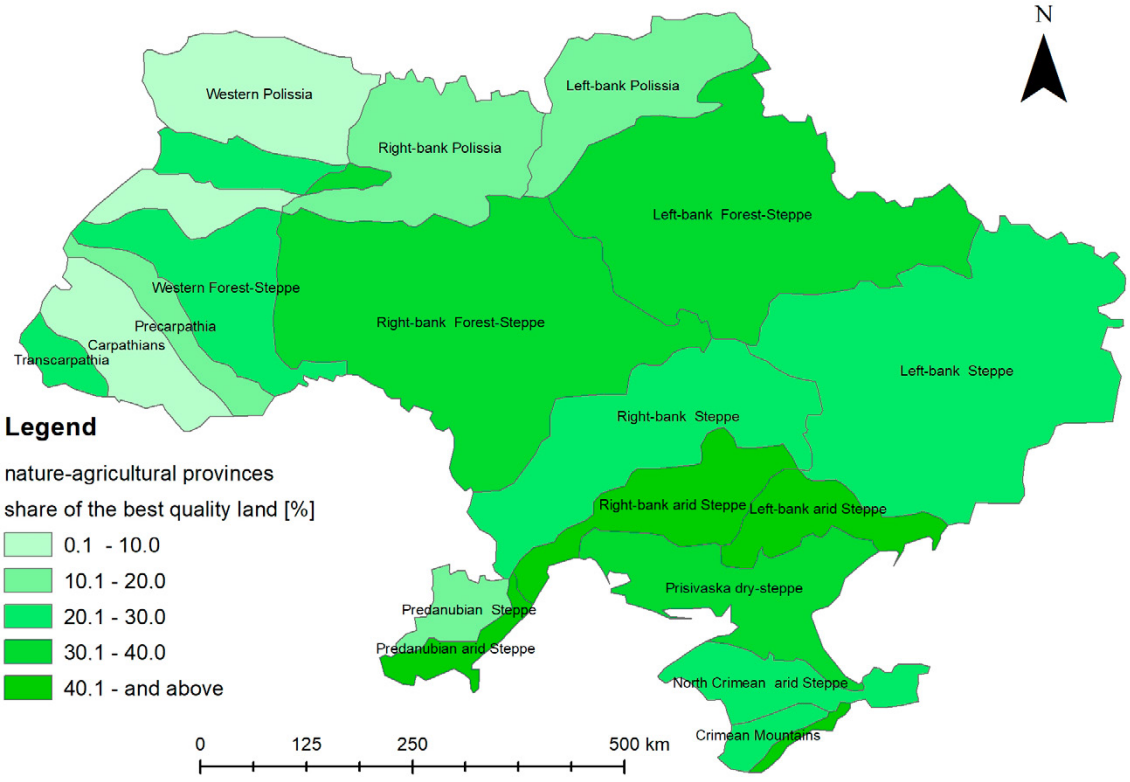

Figure 4. Share of the best quality land in the total area of the zones in Ukraine

Source: authors' work based on (Order, 2003).

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The classification of particularly valuable soils in Ukraine is grounded in data from the natural-agricultural zoning of the country. This classification identifies soil types and assesses their significance within each of Ukraine's provinces (Table 1).

Table 1. List of particularly valuable soil types and their significance within the natural-agricultural provinces of Ukraine

Types and Subtypes of Especially Valuable Soils	Natural-agricultural provinces																	
	Western Polissia	Right-bank Polissia	Left-bank Polissia	Western Forest-Steppe	Right-bank Forest-Steppe	Left-bank Forest-Steppe	Predanubian Steppe	Right-bank Steppe	Left-bank Steppe	Predanubian arid Steppe	Right-bank arid Steppe	Left-bank arid Steppe	North Crimean arid Steppe	Prisivaska dry-steppe	Precarpathia	Carpathians	Transcarpathia	Crimean Mountains	South coast (Crimea)
Sod-podzolic soils	R*	R	R												R		R		
Light grey and grey podzolized soils	R	R	R																
Dark grey podzolized soils	R	R	R	R											R				
Chernozem podzolic	N	R	R	R	R	R									R				
Chernozem typical with light humus	R	R	R																
Chernozem typical with low humus	N	N	N	N	N	N		N	N										
Chernozem typical with moderate humus				N	N	N		N	N										
Chernozem ordinary with low humus							N	N	N	N	N	N							
Chernozem ordinary with moderate humus							N	N	N			N							
Chernozem southern										R	R	R	R	R				R	
Chernozem rubbly	R																	R	
Dark chestnut soils														R					
Meadow chernozem	N	R	R	N	N	R	R	R	N	R	R		R					N	
Lowland peat	R	R	R												R				
Sod soils	R	R	R													R	R		
Sod-brown soils																R	R		
Brown mountain soils																R		R	
Brown soil and foothill chernozem																		R	R

(*N – national significance, R – regional significance.
Source: authors' work based on (Order, 2003).

Table 1 illustrates how especially valuable soils in Ukraine are classified into two categories: soils of national-level significance and regionally significant valuable soils. This approach allows for the inclusion of soils in the first group that exhibit the highest fertility potential across the country, regardless of their geographic location. In other words, their fertility potential is the highest compared to other soils. The second group includes soils that, based on their qualitative indicators, are the most fertile within specific natural-agricultural provinces, but may be significantly less productive than other, more fertile soils in other areas.

The primary objective of designating particularly valuable soils is to ensure they are used exclusively for agricultural purposes, with their allocation for other economic needs strictly prohibited and only permitted in extraordinary cases with approval from the Verkhovna Rada of Ukraine (Kanash, 2011). The legal protection of land in Ukraine also includes the introduction of the category "especially valuable land". According to Article 150 of the Land Code of Ukraine (2001), especially valuable lands include:

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- As a part of agricultural lands: uneroded non-alkali black forest soil; hayfield-black soil non-saline non-alkali loamy soils; dark-gray podsolic soils and podsolic forest and gleyic black-soils; brown mountain-forest and sod-brown deep and medium-deep soils; sod-podsolic loamy soils; brown soils of the Southern coast of Crimea, sod deep soils of the Transcarpathian region;
- Peatlands with a depth of peat of more than one meter and drained regardless of the depth, peatlands are part of wetlands of international importance;
- Lands provided for permanent use to NGO "Massandra" and its constituent enterprises; lands of research fields of scientific institutions and educational establishments;
- Lands of nature reserve and other nature protection purposes, and lands of historical and cultural purposes.

Therefore, the classification of land as especially valuable considers not only the natural qualities of soils, but also their purpose for specific needs. Therefore, lands of experimental fields of research institutions and educational establishments are considered especially valuable, as well as lands of natural reserve funds and lands of historical and cultural significance, which may not always be valuable in terms of soil quality.

Analysis of the legal conditions for the protection of agricultural land in Poland and Ukraine

Polish case studies

In Poland, the protection of agricultural and forest land is governed by the current Act on the Protection of Agricultural and Forest Land (1995). The primary goal of the legislation is to preserve the character of agricultural and forest lands by imposing restrictions on their use by owners, independent possessors, managers or users, perpetual users, and tenants. The restrictions in particular concern their allocation for non-agricultural or non-forest purposes, exclusion from agricultural or forest production, as well as the obligation to prevent the processes of degradation and devastation of agricultural and forest land and damage to agricultural production resulting from non-agricultural or non-forest activities and mass movements of land, reclamation, and development of land for agricultural purposes.

The Act (1995) specifies which lands should be protected, considering, among others, their quality class, type, and soil type. Restrictions on designation for purposes other than agricultural and forestry apply to:

- Agricultural land (mainly arable land and grassland) developed from mineral soils, classified in quality classes I, II, III, IIIa, IIIb, i.e. the best quality;
- All agricultural land of quality classes developed from soils of organic origin, i.e., peat and muck soils;
- And all forest land.

The Act (1995) also refers to special protection of the humus layer of the best quality soils. The legislation stipulates that when land is excluded from production, there may be an obligation to remove and utilise the humus layer to improve the utility value of the land of classes I, II, IIIa, IIIb, III, IVa and IV, as well as peat bogs.

Subsequent amendments to the legal framework regulating land designation for development aim to improve this situation. Under the Act (1995), land designated as wasteland in the land register is prioritised for non-agricultural and non-forest purposes. If wasteland is unavailable, the law mandates the selection of land with the lowest quality and productivity. When building, expanding, or modernising facilities related to industrial activity and other construction facilities, measures are required to minimise adverse effects on the land. The designation of agricultural and forest land for non-agricultural and non-forest purposes is made in the local spatial development plan, prepared in the manner specified in the regulations on spatial planning and development (Act, 2003).

Designation for non-agricultural and non-forest purposes:

- Agricultural land constituting agricultural land of classes I-III – requires the consent of the minister responsible for rural development;
- Forest land owned by the State Treasury – requires the consent of the Minister of Environmental Protection, Natural Resources, and Forestry, or a person authorised by them;
- Other forest land – requires the consent of the voivodeship marshal, expressed after obtaining the opinion of the agricultural chamber.

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Based on the amendment to the Act (2003) in 2023, the designation for non-agricultural and non-forest purposes of agricultural land constituting agricultural land of classes I-III located in the so-called "development supplementation area," which must be specified in the general plan of the commune (Act, 2003), does not require the consent of the minister responsible for rural development. However, it should be emphasised that the change in land development concerns:

1. Large-scale retail facilities;
2. Renewable energy source installations not installed on the building located:

2.1. On agricultural land of classes I–III and forest land;

2.2. On agricultural land of class IV, with an installed electrical capacity of more than 150 kW or used for conducting business activities in the field of electricity generation;

2.3. On land with an installed electrical capacity of more than 1000 kW – is based on a local plan (Act, 2003).

Obtaining consent to exclude agricultural land from production allows the commune to implement a local spatial development plan and exclude the land from production. However, exclusion from production of agricultural land developed from soils of mineral and organic origin, classified as classes I, II, III, IIIa, IIIb, and agricultural land of classes IV, IVa, IVb, V, and VI developed from soils of organic origin and forest land designated for non-agricultural and non-forest purposes may occur after decisions permitting such exclusion have been issued. This decision additionally specifies the obligations related to the exclusion. A person who has obtained a permit to exclude land from production must pay the fee and annual fees. In the case of forest land, there must also be one-time compensation in the event of premature falling of the stand. Such an obligation arises from the date of the actual exclusion of land from production (Act, 1995). A simplified diagram of the procedure for designating land for development is presented in Figure 5.

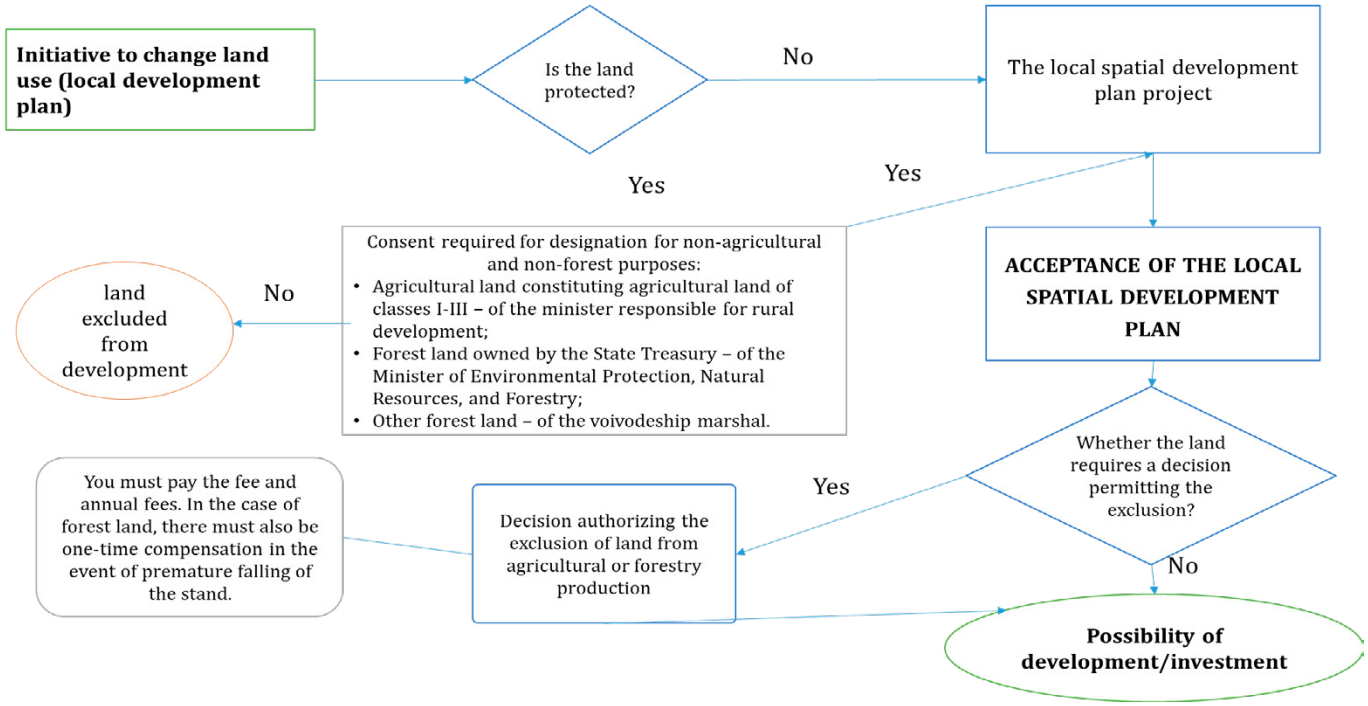

Figure 5. A simplified diagram of the procedure for designating land for development in Poland

In addition, the Environmental Protection Act (2001) establishes principles of environmental protection and regulates the use of natural resources in accordance with the principles of sustainable development. The Act outlines a range of actions, among others, aimed at:

1. Maintaining the best possible condition of the soil by preventing:
- Water and wind erosion;
- A decrease in the content of soil humus;
- Compaction, which means an increase in bulk density and a decrease in soil porosity;
- Salinisation due to the accumulation of soluble salts in the soil;

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Activities causing acidification.

2. Minimising the degree and mitigating the effects of soil sealing by:
- Limiting the area of soil covered by development to the necessary minimum;
- Preserving or creating biologically active soil surfaces capable of mitigating the degrading effects of built-up areas and environmental pollution.

The legal protection of agricultural land in Poland is defined as qualitative and quantitative, as it takes into account the area of these lands and their quality, particularly the condition of the soil.

Ukrainian case studies

In Ukraine, although there is no formal spatial delineation for especially valuable land, a mechanism exists to assess the suitability of arable land through the development of land management schemes and the technical and economic justifications for land use and protection within administrative-territorial units. This is land management documentation aims to optimize land allocation across categories according to development prospects. It involves assessing whether the current land use aligns with its designated purpose, identifying land suitable for agricultural and other uses, and justifying the allocation of land for non-agricultural purposes (Law of Ukraine, 2003). In accordance with the approved 'Methodological recommendations for the development of land management schemes and technical and economic justifications for the use and protection of lands in administrative-territorial units,' the allocation of three ecological-technological groups of arable-suitable lands is provided (Order, *2013):*

- Group I – Slightly degraded soils on plateaus and slopes up to 3°, which, when necessary, are used for the placement of grain-fallow-row crop rotations and the cultivation of crops using intensive technologies;
- Group II – Slopes of 3–5° with slightly and moderately degraded soils, which are managed using biological farming principles for the cultivation of solid-seeded crops and perennial grasses, i.e., grain-grass or grass-grain crop rotations;
- Group III – Slopes from 5° to 7°.

The process of creating land management schemes and determining the agro-ecological suitability of soils for growing agricultural crops relies on data from natural-agricultural land zoning. The smallest taxonomic unit of zoning is the natural-agricultural region, which is characterised by the similarity of the main genetic properties of soils, a specific soil cover structure, a combination of climatic, hydrological, and geomorphological conditions, and factors that affect soil productivity and their effective use (Kanash and Osypchuk, 2006). Soil classification in Ukraine for agricultural suitability involves creating direct suitability scales for specific soils for the cultivation of major agricultural crops in certain areas. For this purpose, arable lands are divided into five classes for the cultivation of zoned crops – winter wheat and rye, barley, oats, sugar beets, potatoes, and flax (Rozumny, 1996).

Class I (most suitable) comprises arable land that supports crop cultivation without any limitations. The indicators that characterise the soil, its placement, and topography in terms of crop requirements are optimal, while the yield and profitability or efficiency of cultivation are the highest. Class II (moderately suitable) includes arable lands that have moderate to high nutrient supply. The topography, soils, and other conditions generally meet the crop requirements, but some factors reduce soil fertility. Crop yields and cultivation efficiency are somewhat lower than in Class I; however, with a high level of agronomy and fertiliser supply, they can reach the levels of Class I. Class III (limited suitability) includes arable lands with moderate to low nutrient availability. The soil cover, topography, and other conditions are characterised by some negative factors, the elimination of which for crop cultivation requires additional expenses for agronomic, reclamation, and other measures. Class IV (poorly suitable soils) comprises arable lands where the soil cover has significant negative characteristics (severe erosion, deflation). However, after reclamation, they may become suitable for growing crops. Class V (unsuitable lands) includes arable lands that are unsuitable for crops, where the improvement efforts are either unfeasible or impractical due to technological, environmental, and economic reasons (Dobryak et al., 2007).

However, in the past 30 years, due to insufficient funding, land management schemes have been developed very rarely. Some of them mainly dealt with issues of land inventory, adjusting the bound-

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aries of land plots, and identifying areas for conservation rather than evaluating the agricultural suitability of arable land.

The current land legislation of Ukraine generally defines specific types of land and land plots that are under special legal protection. At the same time, this list is intended to limit the use of especially valuable lands for purposes that could diminish their social and natural value. However, it primarily serves to enhance the organisational and managerial level of decision-making related to decisions about withdrawing or changing the designated use of land plots (Yevsyukov, 2015).

Since July 24, 2021, the land designation procedure in Ukraine has undergone significant changes following the enactment of the Law of Ukraine dated June 17, 2020, No. 711-IX "On Amending Certain Legislative Acts of Ukraine Regarding Land Use Planning" (Law of Ukraine, 2020). In particular, the obligation to develop, adopt, and submit the following documents has been abolished:

- Land survey project for land plot allocation, as well as any other land survey documentation (except for cases of forming land plots from state and municipal lands not formed into land plots);
- Decisions of executive authorities and local councils (except for decisions on establishing and changing the purpose of land plots, the disposal of which is carried out by such authorities).
- Also, the list of cases requiring approval for changes in the land plot's designated purpose has been reduced. Now, approval will only take place if the land plot:
- In use under the rights of permanent use, lease, emphyteusis, superficies, or mortgage – with the land user, mortgage holder;
- Belongs to defence lands – with the Ministry of Defense of Ukraine or the state authority that directs military formations, under the management of which the military unit, institution, military educational institution, enterprise, and organisation using defense lands on the right of permanent use;

Belongs to state and communal property of the nature reserve fund and other nature conservation purposes, historical-cultural, forestry purposes, and due to a change in its purpose, are withdrawn from the composition of such categories, as well as changes in the purpose of peatlands with a peat depth of more than one meter and drained regardless of depth, peatlands as part of wetlands of international importance – with the Cabinet of Ministers of Ukraine.

Under the new procedure, changes in the designated use of land plots will only be permitted if the respective type of functional zoning of the territory is outlined in the approved comprehensive plan of spatial development of the territorial community or the master plan of the settlement. In particular, for agricultural territories, 12 types of functional zoning of the territory are envisaged, with specified predominant (main) and ancillary types of land use. These types include: areas under plowing and furrowing, reclaimed territories, unreclaim territories, areas under perennial plantings, areas under orchards, areas under plantations, areas under nurseries, areas for mowing and livestock grazing, areas for mowing, areas for livestock grazing, areas for locating agricultural buildings and yards.

The Land Code of Ukraine also allows the change of land use from agricultural to non-agricultural purposes outside the scope of functional zoning in the following cases (Land Code of Ukraine, 2001):

- Conservation of degraded and low-productive, technogenically polluted lands;
- Allocation of land plots to the natural reserve fund and other nature conservation purposes;
- Allocation of land plots for forestry purposes;
- Change of the type of land use within the category of agricultural land.
- An exception is their allocation as land plots for gardening, and a change of land use for beneficial protective forest strips.
- The change of the designated purpose use of particularly valuable lands and forest land plots for purposes not related to forestry is allowed only in the following cases:
- Placement of objects of national importance, roads, power lines, and electronic communication networks, pipelines, drainage and irrigation canals, geodetic points, housing, objects of social and cultural purpose, objects related to the extraction of minerals, oil and gas wells, and production facilities associated with their operation;
- Placement of industrial objects on particularly valuable agricultural lands;
- Alienation of land plots for public needs or on grounds of societal necessity, inclusion of particularly valuable agricultural lands, peatlands into lands of the natural reserve fund and other nature conservation purposes, historical-cultural purposes, and forestry purposes.

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Critical comparative analysis of agricultural land protection in spatial planning systems: Poland vs. Ukraine

Soil protection is a key component of Poland's spatial planning system, and its importance is consistently growing in the context of sustainable spatial management. Soils with the highest production value – particularly those in soil quality classes I–III – are treated as a strategic resource, requiring special attention at both the national and provincial policy levels. National planning documents, such as the National Spatial Development Policy, emphasise the need to preserve agricultural production space and reduce urbanisation pressure on land with high agricultural suitability. Soil protection is addressed in the context of rationalising development processes, counteracting sprawl, and promoting a compact model of urban development.

The importance of high-quality soils is equally strongly emphasised in regional spatial development plans. These documents identify key areas for agricultural production and define a spatial policy framework designed to protect soils from excessive transformation and infrastructural interference. Voivodeships indicate, among other things, the need to limit the location of new investment areas on high-quality soils, favouring settlement development on lands of lower agricultural value. At the same time, the need to protect soils from degradation, erosion, and the loss of their environmental and retention functions is emphasised.

The Polish planning system operates based on a multi-level mechanism, in which soil protection serves as a criterion for spatial decisions. National and provincial documents define strategic goals and constraints, while local plans and conditional studies translate these principles into operational terms. Ultimately, soil protection is not merely a legal requirement arising from the Act on the Protection of Agricultural and Forest Land, but an integral element of rational spatial management, serving to preserve the long-term production and ecological potential of rural areas.

In Ukraine, the spatial planning system also includes measures for protecting agricultural land and assessing its suitability, but these procedures are far less detailed and consistently applied than in Poland. At the regional and local levels, soil-related issues appear mainly in descriptive form within Regional Spatial Planning Schemes, which address land-use structure, valuable agricultural areas, degraded lands, and spatial conflicts, while detailed land-suitability assessments are usually performed only in optional district-level land management schemes. After territorial reform, local Comprehensive Plans for spatial development gained importance, combining planning and land management functions and incorporating analyses of agro-production soil groups as well as identifying degraded and low-productivity lands. However, unlike in Poland, it does not systematically classify soils by suitability classes. It provides a simplified classification of soils, which is not based on formal suitability classes, including:

- High: well-supplied with nutrients, optimal soil pH, favourable water-air and thermal regimes for plant growth.
- Medium: sufficient nutrient and moisture availability; the main limiting factor is leaching of humus horizons.
- Low: poor nutrient supply, unsatisfactory soil pH, water-air, and thermal regimes; pronounced negative properties and high leaching of topsoil.

Such an approach, in our assessment, poses significant risks to the preservation of highly valuable soils and their continued agricultural use.

Based on the analysis of spatial planning systems in Poland and Ukraine, a comparative table was prepared highlighting the inclusion (or absence) of soil suitability considerations at each planning level (Table 2).

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Table 2. Comparative analysis of soil suitability integration in spatial planning systems in Poland and Ukraine

Planning Level	Poland	Ukraine
National	Strategic documents emphasize protection of high-class soils (I–III); general guidelines only, no binding decisions.	National documents provide general directions for soil protection; limited influence on actual planning decisions.
Regional	Voivodeship Spatial Development Plan identifies valuable soils and restricts development; strategic soil analysis.	Regional Planning Scheme considers land-use structure, degraded and agricultural areas; no detailed soil classification.
Local	General plan of the commune analyze soil classes; I–III soils strictly protected; ministerial approval required; real development restrictions.	Comprehensive Plan of Spatial Development uses soil maps and suitability; analyses less detailed, weaker restrictions.
Sub-local	Master plans legally determines land use; maintains agricultural function or allows development.	Detailed Spatial Plans can change land use but must comply with Integrated Plan; limited influence of soil analyses.

The compensation mechanism for excluding agricultural land from production is a crucial element of Poland's soil protection system, serving both regulatory and preventive purposes. Pursuant to the Act on the Protection of Agricultural and Forest Land, these fees are equivalent in nature – they aim to compensate for the loss of productive value of soils, particularly those with the highest soil quality ratings (classes I–III). Compensation includes both a one-time fee for the permanent change of land use and annual fees payable over ten years, calculated proportionally to the area of land actually excluded from production. The system's financial structure is designed to limit excessive investment pressure on agricultural areas with high production potential and to discourage unjustified urbanisation economically. Funds obtained from these exclusions are allocated to environmental protection funds and district budgets, where they are used for activities related to reclamation, improving soil quality, and mitigating soil degradation. The compensation system, therefore, serves a dual function: on the one hand, it enforces the rationalisation of spatial decisions by internalising the environmental costs of investments, and on the other, it supports the financing of projects aimed at preserving soil resources. As a result, it constitutes an essential tool for spatial and environmental policy, thereby strengthening the long-term protection of agricultural production space.

However, in practice, there are cases of attempts to lower the soil quality class from classes IIIa–IIIb to IVa to avoid the rigours of protecting the best agricultural land. Changing the classification to IVa significantly reduces these burdens, creating the temptation to manipulate soil quality assessments. However, literature and case law (Woźniak-Waszak & Sobecki, 2024) indicate that such actions lead to distortions of the actual production potential of soils and violate the principles of rational spatial management. Assessment of soil quality is a process based on natural criteria; the instrumental use of these criteria undermines the credibility of the classification and can lead to the permanent degradation of the best soils through their allocation to non-agricultural purposes. For this reason, greater control over soil classification procedures is required, including strengthening the supervision of administrative bodies and introducing tools to detect and verify unjustified changes in soil quality classification.

However, despite Ukraine's significant land resources and the inherent value of highly productive lands, the current state of their use raises serious concerns. The approval of materials for the placement of facilities on plots of particularly valuable land owned by the state or community, accompanied by a change in their designated use, requires agreement with the Verkhovna Rada of Ukraine. While this adds procedural complexity to the allocation of such plots, it does not effectively protect them from withdrawal and does not establish sufficient restrictions for interested parties.

One common mechanism of corruption involves the preparation of fictitious conclusions by officials regarding soil surveys, falsely claiming that particularly valuable lands are not actually valuable to benefit certain parties. Subsequently, these land plots are transferred to private ownership. Such illegal changes in land use contribute to the erosion of effective land management, the loss of valuable land assets, reduced budget revenues, and the deterioration of the investment climate (Table 3).

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Table 3. Strategic consequences of illegal changes to the designated purpose of especially valuable lands

Risk	Sources of Risk	Corrupt Actions	Strategic Consequences
Illegal change of the designated use of essentially valuable land	1. Imperfections in regulatory frameworks 2. Individual dishonesty	1. Official forgery 2. Acceptance of a proposal, promise, or receipt of improper benefits by a public official 3. Abuse of power or official position	1. Decreased management efficiency in the field of land relations 2. Loss of valuable land assets 3. Reduced budget revenues 4. Deterioration of the investment climate

Another important aspect is that changing the designated use of agricultural and forestry lands previously required landowners to compensate for losses in agricultural and forestry production. However, following the legislative amendments adopted on October 19, 2022, which aimed to improve land protection legislation, the legal basis for compensating losses in agricultural production was abolished (Law of Ukraine, 2022). Based on an analysis of compensation for agricultural land use in Poland and Ukraine, a comparative table was developed (Table 4).

Table 4. Comparative analysis of agricultural land compensation mechanisms in Poland and Ukraine

Aspect	Poland	Ukraine
Compulsory compensation	Mandatory for all cases of conversion from agricultural to non-agricultural use, based on land productivity and market value.	Cancelled for most cases; retained only for forestry lands.
Link to soil quality / productivity	Direct link to soil quality classes (I–III) and productivity; higher-class soils have stricter protection and higher compensation.	No systematic link; simplified classification of high-value agricultural land not based on formal soil suitability classes.
Transparency and oversight	High; decisions require formal administrative procedures, public disclosure, and integration across planning levels.	Limited; decisions require formal administrative procedures, high risk of corruption through falsified soil assessments and approvals.
Impact on land preservation	Strong; compensation and strict regulation incentivize preservation of high-value agricultural land.	Weak; free-of-charge conversion encourages withdrawal of valuable agricultural land.

Proposal of a universal concept that prioritises the protection of agricultural land in spatial planning systems in Poland and Ukraine

The conversion of agricultural land for non-agricultural purposes is an inevitable trend in developing countries, driven by factors like population growth, demand for new housing, industrial and transport infrastructure, and business locations (Bołtryk, 2020). This results mainly from the growing population and the expectation of a higher quality and standard of living (Azadi et al., 2011) (larger housing units, more sports facilities, social infrastructure facilities, etc.).

The authors propose that in the spatial planning process, before decisions are made to exclude a given land from production, detailed analyses should be carried out regarding the assessment of natural and economic conditions in accordance with the scheme presented in Figure 6.

Before developing planning documents, data should be collected, particularly on soil conditions, land use, and demographic projections. It is essential to assess the quality and reliability of soil data. Then, based on the collected data, a qualitative and quantitative assessment of agricultural land required for agricultural production should be made, and the area needed for investment sites should be determined. Determining the area that can be reused through reclamation or revitalisation is also crucial. A reliable analysis of reliable data regarding the quality and agricultural suitability of soils, land development and demographic predictions will allow for the identification of areas that can be repurposed through reclamation or revitalisation. This approach will be in line with the objective of 'no-net-land by 2050' (Energy Cities, 2024). The assessment process should be conducted at every planning level, starting at the regional level. Differences in the assessment process will involve the use of data of varying levels of detail, depending on the level for which it is being prepared. Nevertheless, this approach will ensure the protection of agricultural land at the regional level, while at the

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local level, areas/surfaces of agricultural land protected from exclusion from production will be precisely defined.

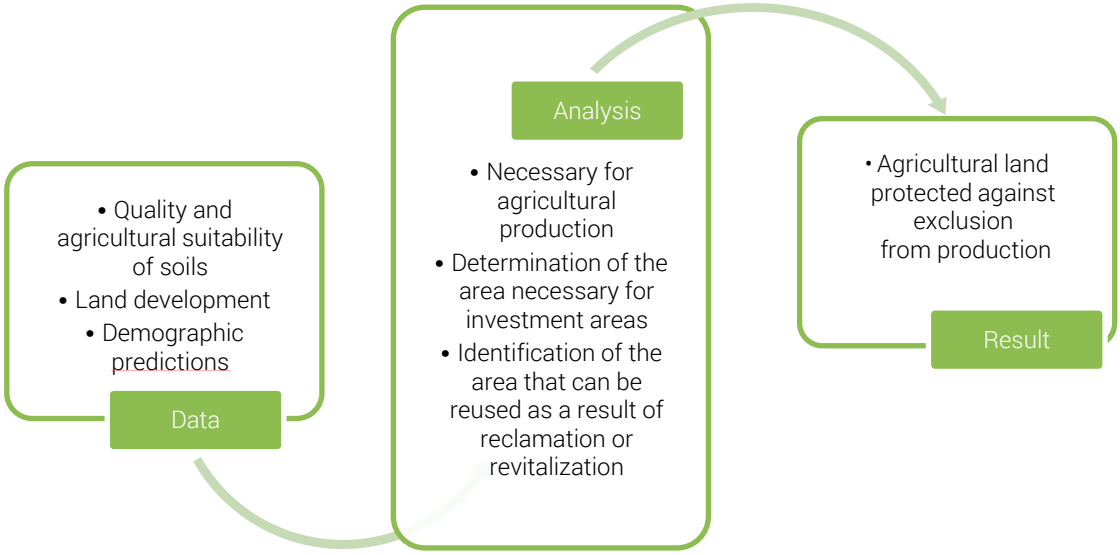


Figure 6. A scheme for assessing natural and economic conditions to ensure the protection of agricultural land from being withdrawn from production

In turn, regional-level activities made it possible to define functional and spatial zones aligned with the assumptions of the development of the technical infrastructure network, including roads, to designate the range and identify priority areas for the development of agriculture. At the local level, this approach facilitates rational designation of planning zones, enabling the accurate determination of land use, the location of public purpose investments, and the specification of development methods and conditions, as illustrated in Figure 7.

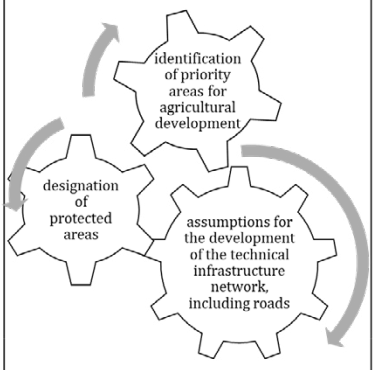
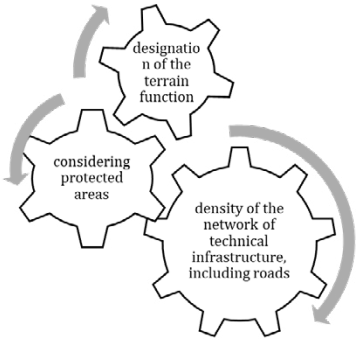
level	regional	local	local
proposed solutions	 indications for functional and spatial zones	 separation of planning zones	determining the intended use of the area, the location of public purpose investments and determining the methods of development and development conditions of the area
planning documents	planning schemes of the territory of the region	comprehensive spatial development plans of the territory of the territorial community	master plans of settlements, detailed territory plans

Figure 7. Activities in developing planning documents and land use decisions at different planning levels

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This figure illustrates the sequence of activities involved in preparing spatial planning documents across regional, local, and sub-local levels. At the regional level, planning focuses on identifying protected areas, determining assumptions for technical infrastructure development, and defining priority zones for agricultural development, which together provide indications for functional and spatial zoning and support land-use decisions related to the identification of valuable soils and development restrictions. At the local level, these regional guidelines are further detailed through consideration of protected areas, analysis of infrastructure density, and designation of terrain functions, resulting in the separation of planning zones and land-use decisions aimed at the protection or sustainable development of agricultural land. At the sub-local level, the process culminates in determining the intended land use, the placement of public-purpose investments, and the conditions for land development, guiding decisions on whether agricultural land should be preserved, developed, or excluded from agricultural use.

In Poland, regional differences (voivodeships) are observed in the share of land excluded from production, which is confirmed by research (Prus, 2016; Marks-Bielska & Witkowska-Dąbrowska, 2021). Several factors contribute to these regional differences, widely discussed in the literature (Viana et al., 2021; van der Krabben et al., 2023; Bogusz et al., 2024). However, continued research to minimise the exclusion of the best-quality land from production seems reasonable. The factors driving the exclusion of agricultural land from production are complex. The final report of the EPSON project emphasised, among other things, that suburbanization is a significant problem in Poland, especially in larger urban areas. Moreover, the land development control system is not functioning properly, and there is a lack of critical mass in urban size and population, dispersed settlements and poor accessibility (ESPON, 2024). Low coverage of local spatial development plans contributes to worsening "spatial chaos' (Rogatka et al., 2023). As Evers et al. (2024) emphasise, attempts to adopt flexible European planning systems have not been fully successful in Poland. which in practice resulted in the Polish system being labelled 'misunderstood performative' (Berisha et al., 2021), later softened to the term 'performative misunderstanding' (Berisha et al., 2023). It is, therefore, difficult to disagree with the statement that the misunderstood performative systems result from the fact that the public authority, committed to assigning spatial development rights on a case-by-case basis, is often overwhelmed by the prevailing socio-economic dynamics and ends up accepting most of the requests of private stakeholders, therefore renouncing effective public control (Berisha et al., 2024). As shown by the analysis of legal acts regulating the process of allocating land for development in Poland, subsequent amendments to these documents aim to improve the situation. The focus should be on strategic planning at higher regional levels. Greater public control should also be assigned at the level of individual investments or other land-use changes (Dombi, 2021; Siu et al., 2023). For lands which are too small and fragmented to be designated as protected areas, a practical solution is to link the market price of land more closely to its quality class. This would assign a greater weight to the "land quality class" attribute during valuation. Higher price of agricultural land with the best quality classes and higher fees for their conversion to non-agricultural purposes will become a more significant barrier for future investors (Buśko & Szafrańska, 2018).

Conclusions

The analysis of spatial planning systems in Poland and Ukraine demonstrates significant differences in the integration of soil suitability and the protection of agricultural land. In Poland, soil quality and agricultural value are systematically incorporated at all levels of planning. At the national level, strategic documents emphasise the protection of high-class soils (I–III) as resources of particular social and economic importance. Regional plans provide more detailed, spatially explicit assessments, identifying areas of high agricultural value and establishing rules to prevent urban expansion into productive land. At the local level, municipal planning instruments, such as the general plan of the commune and master plans, include detailed analyses of soil classes, impose binding restrictions, and require administrative approval for changes in land use, ensuring the protection of the most valuable agricultural lands.

In contrast, the Ukrainian system, while also addressing agricultural land protection and soil suitability, lacks the level of detail and regulatory enforcement present in Poland. National strategic doc-

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uments provide general guidance but do not establish binding rules for soil protection. Regional planning schemes consider land-use structures and areas of high agricultural value in a largely descriptive manner, while detailed assessments of soil suitability are optional and are carried out primarily within land management schemes – not within spatial planning documentation – at the district level. At the local level, Comprehensive plan for spatial development of the territorial community includes simplified classifications of soils and identifies degraded or low-productivity lands, but they do not systematically use formal soil suitability classes, leaving highly valuable soils more vulnerable to non-agricultural conversion.

A comparison of the Ukrainian and Polish experiences reveals significant differences in approaches to agricultural land protection and compensation for its withdrawal. In Ukraine, following the legislative changes of 2022, compensation for losses in agricultural production was abolished in most cases, except for forestry lands. This leaves the procedure for converting agricultural land to non-agricultural use free of charge and increases the risk of corrupt practices.

In contrast, in Poland, mandatory compensation for land withdrawal is linked to soil productivity and market value, creating an economic incentive to preserve high-quality agricultural land. The integration of soil assessment at national, regional, and local levels ensures transparency, oversight, and planned management, reducing the risk of corruption. The Polish spatial planning system combines strategic and operational approaches, allowing for a balance between urbanisation and infrastructure development needs and the protection of valuable agricultural resources.

The research findings underscore the importance of reinstating compensation for losses in agricultural production in Ukraine. This approach previously ensured compensation to society for the negative socio-economic and environmental consequences associated with the reclassification of especially valuable agricultural lands into other categories, as well as in cases where land use was restricted or land quality declined. Such lands, considered national assets, require special state protection.

Meanwhile, Poland introduced legal changes in 2023 to implement a comprehensive approach to spatial planning at the local level. This is another step towards rational spatial planning and the protection of the best agricultural land.

The institutional framework for managing especially valuable lands in Ukraine falls short of aligning with market-driven land relations and spatial planning practices. This framework is fragmented, as it does not create obligations to consider the qualitative characteristics of soils when developing planning documentation at both the regional and local levels. Consequently, it facilitates abuses in land relations, manipulation of especially valuable lands, and conditions for their inefficient use. As a result, the ecological and economic suitability of such lands for growing major agricultural crops is neglected, and their land use is unjustifiably changed for non-agricultural activities.

Therefore, it is crucial to establish a special protective regime for especially valuable lands, not only when they are withdrawn from agricultural production, but also when their designated land use is changed. Both in Poland and in Ukraine, this can be achieved by developing land management documentation at the regional and local levels. This would allow for the spatial delineation of their boundaries and their preservation for sustainable agricultural use in the future.

In conclusion, despite the differences in the countries covered by the research, the overarching goal of protecting the highest quality soils is equally essential and has global significance. Integrating and updating data, particularly those related to soil conditions, is a significant challenge in research. Furthermore, further research in this area should incorporate and verify legal regulations and spatial planning tools to assess their actual impact on land protection.

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Conceptualisation, A.B. and R.K.; methodology, A.B., R.K.; software, A.B; validation, K.S-M, R.K., A.B. and N.S.; formal analysis, A.B.; investigation, K.S-M.; resources, A.B., R.K; data curation, A.B., R.K; writing – original draft preparation, A.B., R.K.; writing – review and editing, N.S.; visualization, A.B.; supervision, K.S-M.; project administration, N.S.; funding acquisition, K.S-M.

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References

Act from 3 February 1995. Act on the Protection of Agricultural and Forest Lands. Journal of Laws No. 16, item 82. https://isap.sejm.gov.pl/isap.nsf/DocDetails.xsp?id=WDU19950160078 (in Polish).

Act from 27 April 2001. Environmental Protection Law. Journal of Laws No. 62, item 627. https://isap.sejm.gov.pl/isap.nsf/DocDetails.xsp?id=WDU20010620627 (in Polish).

Act from 27 March 2003. Act on Spatial Planning and Development. Journal of Laws No. 80, item 717, as amended. https://isap.sejm.gov.pl/isap.nsf/DocDetails.xsp?id=WDU20030800717 (in Polish).

Amundson, R., Berhe, A. A., Hopmans, J. W., Olson, C., Sztein, A. E., & Sparks, D. L. (2015). Soil and human security in the 21st century. Science, 348(6235), 1261071. https://doi.org/10.1126/science.1261071

Antoni, J.-P., Sinsin, T., Agbossou, I., Vuidel, G., & Patault, E. (2025). Are soil conservation and "No Net Land Take" suitable for urban development? Modeling and assessment in two French cases. City and Environment Interactions, 28, 100243. https://doi.org/10.1016/j.cacint.2025.100243

Azadi, H., Ho, P., & Hasfiati, L. (2011). Agricultural land conversion drivers: A comparison between less developed, developing, and developed countries. Land Degradation & Development, 22(5), 596–604. https://doi.org/10.1002/ldr.1037

Berisha, E., Cotella, G., Janin Rivolin, U., & Solly, A. (2021). Spatial governance and planning systems in the public control of spatial development: A European typology. European Planning Studies, 29(1), 181–200. https://doi.org/10.1080/09654313.2020.1726295

Berisha, E., Cotella, G., Janin Rivolin, U., & Solly, A. (2023). Spatial governance and planning systems vis-à-vis land consumption in Europe. European Planning Studies, 32(3), 553–568. https://doi.org/10.1080/09654313.2023.2207605

Berisha, E., Cotella, G., & Solly, A. (2024). The invisible hand of the EU: Europeanisation of spatial planning in two non-EU countries. Regional Science Policy & Practice, 17, 100168. https://doi.org/10.1016/j.rspp.2024.100168

Bielska, A., & Maciejewska, A. (2018). Problems of obtaining land for investment purposes in rural areas. Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu, 504, 9–20. https://doi.org/10.15611/pn.2018.504.01 (in Polish).

Bindraban, P. S., van der Velde, M., Ye, L., van den Berg, M., Materechera, S., Kiba, D. I., Tamene, L., Ragnarsdóttir, K. V., Jongschaap, R., Hoogmoed, M., Hoogmoed, W., van Beek, C., & van Lynden, G. (2012). Assessing the impact of soil degradation on food production. Current Opinion in Environmental Sustainability, 4(5), 478–488. https://doi.org/10.1016/j.cosust.2012.09.015

Blum, W. E. H. (2013). Soil and land resources for agricultural production: General trends and future scenarios – A worldwide perspective. International Soil and Water Conservation Research, 1(3), 1–14. https://doi.org/10.1016/S2095-6339(15)30026-5

Bogusz, H., Winnicki, S., & Wójcik, P. (2024). What factors contribute to uneven suburbanisation? Predicting the number of migrants from Warsaw to its suburbs with machine learning. The Annals of Regional Science, 72(4), 1353–1382. https://doi.org/10.1007/s00168-023-01245-y

Bołtryk, P. (2020). Conversion of agricultural land into non-agricultural land in Poland. Economics and Environment, 72(1), 17. https://www.ekonomiaisrodowisko.pl/journal/article/view/44

Buśko, M., & Szafrańska, B. (2018). Analysis of changes in land use patterns pursuant to the conversion of agricultural land to non-agricultural use in the context of the sustainable development of the Małopolska region. Sustainability, 10(1), 136. https://doi.org/10.3390/su10010136

Butzer, K. W. (2005). Environmental history in the Mediterranean world: Cross-disciplinary investigation of cause-and-effect for degradation and soil erosion. Journal of Archaeological Science, 32(12), 1773–1800. https://doi.org/10.1016/j.jas.2005.06.001

Clunes, J., Valle, S., Dörner, J., Martínez, O., Pinochet, D., Zúñiga, F., & Blum, W. E. H. (2022). Soil fragility: A concept to ensure a sustainable use of soils. Ecological Indicators, 139, 108969. https://doi.org/10.1016/j.ecolind.2022.108969

Cömertler, S. (2007). Rola terenów otwartych w podnoszeniu atrakcyjności i jakości życia miejskiego. Czasopismo Techniczne. Architektura, 1-A/2007. https://repozytorium.biblos.pk.edu.pl/redo/resources/34574/file/suwFiles/ComertlerS_RolaTerenow.pdf (in Polish).

Czajka, A., & Kurowska, K. (2025). An evaluation of the effectiveness of legal instruments for the protection of agricultural land in Poland. Rocznik Ochrona Środowiska, 27, 541–552. https://doi.org/10.54740/ros.2025.044

Dobryak, D. S., Kanash, O. P., Babmindra, D. I., & Rozumnyi, I. A. (2007). *Classification of agricultural lands as a scientific prerequisite for their environmentally safe use*. Urozhai.

Dombi, M. (2021). Types of planning systems and effects on construction material volumes: An explanatory analysis in Europe. Land Use Policy, 109, 105682. https://doi.org/10.1016/j.landusepol.2021.105682

Dragović, N., & Vulević, T. (2020). Soil degradation processes, causes, and assessment approaches. In W. Leal Filho, A. Azul, L. Brandli, A. Lange Salvia, & T. Wall (Eds.), *Life on land (Encyclopedia of the UN Sustainable Development Goals)* (pp. 1-12). Springer. https://doi.org/10.1007/978-3-319-71065-5_86-1

EEA. (2006). *Urban sprawl in Europe: The ignored challenge (EEA Report No. 10/2006).* https://www.eea.europa.eu/publications/eea_report_2006_10

Energy Cities. (2024). *Are EU countries following the "No-Net-Land Take in 2050" recommendation?* https://energy-cities.eu/are-eu-countries-following-the-no-net-land-take-in-2050-recommendation/

ESPON. (2018). *COMPASS – Comparative analysis of territorial governance and spatial planning systems in Europe (Final Report).* https://archive.espon.eu/sites/default/files/attachments/1.%20COMPASS_Final_Report.pdf

European Commission. (2012). *Guidelines on best practice to limit, mitigate and compensate soil sealing.* Publications Office of the European Union.

European Commission. (2021). *EU Soil Strategy for 2030 – Reaping the benefits of healthy soils for people, food, nature and climate (COM/2021/699 final).* https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021DC0699

European Commission. (2024). *Sustainable use of key natural resources.* https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/sustainable-use-key-natural-resources_en

Evers, D., Katurić, I., & van der Wouden, R. (2024). Urbanization interventions: Strategies, plans, and policies. In D. Evers, I. Katurić, & R. van der Wouden (Eds.), *Urbanization in Europe: Past developments and pathways to a sustainable future* (pp. 53–85). Springer. https://doi.org/10.1007/978-3-031-62261-8_3

FAO. (2021). *The state of the world's land and water resources for food and agriculture: Systems at breaking point (Synthesis report).* https://doi.org/10.4060/cb7654en

Fossey, M., Angers, D., Bustany, C., Cudennec, C., Durand, P., Gascuel-Odoux, C., Jaffrezic, A., Pérès, G., Besse, C., & Walter, C. (2020). A Framework to Consider Soil Ecosystem Services in Territorial Planning. Front. Environ. Sci. 8(28). https://doi.org/10.3389/fenvs.2020.00028

Hailu, T., Assefa, E., & Zeleke, T. (2023). Land use planning implementation and its effect on the ecosystem in Addis Ababa, Ethiopia. Environmental Challenges, 13, 100798. https://doi.org/10.1016/j.envc.2023.100798

Kanash, O. P., & Osypchuk, S. O. (2006). Natural and agricultural zoning of Ukraine: Identification of natural-agricultural zones and mountainous regions. Land Management and Cadastre, (2), 50–68.

Kanash, O. P. (2011). Returning to the issue of particularly valuable lands. Land Management and Cadastre, (1), 53–59.

Kocur-Bera, K., & Pszenny, A. (2020). Conversion of agricultural land for urbanization purposes: A case study of the suburbs of the capital of Warmia and Mazury, Poland. Remote Sensing, 12(14), 2325. https://doi.org/10.3390/rs12142325

Kopittke, P. M., Menzies, N. W., Wang, P., McKenna, B. A., & Lombi, E. (2019). Soil and the intensification of agriculture for global food security. Environment International, 132, 105078. https://doi.org/10.1016/j.envint.2019.105078

Kraamwinkel, C. T., Beaulieu, A., Dias, T., & Howison, R. A. (2021). Planetary limits to soil degradation. Communications Earth & Environment, 2(1), 249. https://doi.org/10.1038/s43247-021-00323-3

Krellenberg, K., Welz, J., & Reyes-Päcke, S. (2014). Urban green areas and their potential for social interaction – A case study of a socio-economically mixed neighbourhood in Santiago de Chile. Habitat International, 44, 11–21. https://doi.org/10.1016/j.habitatint.2014.04.004

Lal, R. (2015). Restoring soil quality to mitigate soil degradation. Sustainability, 7(5), 5875–5895. https://doi.org/10.3390/su7055875

Land Code of Ukraine, Law No. 2768-III. (2001). https://zakon.rada.gov.ua/laws/show/2768-14#Text

Liu, K., Cheng, P., Zhang, A., Qin, S., & Zhang, X. (2024). Beyond environmental sustainability: Low-carbon land use policies can contribute to the realization of comprehensive sustainable development. Sustainable Development, 33(1), 1315-1332. https://doi.org/10.1002/sd.3180

Marks-Bielska, R., & Witkowska-Dąbrowska, M. (2021). Evaluation of changes in exclusion of arable land from agricultural production in Poland in the context of guidelines of the Strategy for Responsible Development. European Research Studies Journal, 24(Special Issue 3), 351–364. https://doi.org/10.35808/ersj/2433

Mazzocchi, C., Corsi, S., & Sali, G. (2017). Agricultural land consumption in periurban areas: A methodological approach for risk assessment using artificial neural networks and spatial correlation in Northern Italy. Applied Spatial Analysis and Policy, 10(1), 3–20. https://doi.org/10.1007/s12061-015-9168-9

Nadin, V., Stead, D., Dąbrowski, M., & Fernandez-Maldonado, A. M. (2020). Integrated, adaptive and participatory spatial planning: Trends across Europe. Regional Studies, 55(5), 791–803. https://doi.org/10.1080/00343404.2020.1817363

Ministry of Environmental Protection and Natural Resources of Ukraine. (2022). *National Report on the State of the Environment in Ukraine in 2021.* https://mepr.gov.ua/wp-content/uploads/2023/01/Natsdopovid-2021-n.pdf (in Ukrainian).

On Land Management, Law of Ukraine No. 858-IV. (2003). https://zakon.rada.gov.ua/laws/show/858-15#Text (in Ukrainian).

On the Approval of the List of Especially Valuable Soil Groups, Order of Ukraine No. 245. (2003). https://zakon.rada.gov.ua/laws/show/z0979-03#Text (in Ukrainian).

On the Approval of Methodological Recommendations..., Order of Ukraine No. 395. (2013). https://zakon.rada.gov.ua/rada/show/v0395821-13#Text (in Ukrainian).

On Amending Certain Legislative Acts..., Law of Ukraine No. 711-IX. (2020). https://zakon.rada.gov.ua/laws/show/711-20#Text (in Ukrainian).

On Amendments to Some Legislative Acts..., Law of Ukraine No. 2698-20. (2022). https://zakon.rada.gov.ua/laws/show/2698-20#Text (in Ukrainian).

Paleari, S. (2017). Is the European Union protecting soil? A critical analysis of Community environmental policy and law. Land Use Policy, 63, 163–173. https://doi.org/10.1016/j.landusepol.2017.02.007

Perpiña Castillo, C., Kavalov, B., Diogo, V., Jacobs-Crisioni, C., e Silva, F., & Lavalle, C. (2018). *Agricultural land abandonment in the EU within 2015-2030 (JRC Research Reports)*. Joint Research Centre.

Piorr, A., Ravetz, J., & Tosics, I. (2011). *Peri-urbanisation in Europe: Towards a European policy to sustain urban-rural futures*. University of Copenhagen.

Poesen, J. (2018). Soil erosion in the Anthropocene: Research needs. Earth Surface Processes and Landforms, 43(1), 64–84. https://doi.org/10.1002/esp.4250

Pozza, L. E., & Field, D. J. (2020). The science of soil security and food security. Soil Security, 1, 100002. https://doi.org/10.1016/j.soisec.2020.100002

Prus, B. (2016). Exclusion of lands from agricultural production and urban pressure – Case study. Geomatics, Landmanagement and Landscape, 4, 169–182. https://doi.org/10.15576/GLL/2016.4.169

Qiu, F., Laliberté, L., Swallow, B., & Jeffrey, S. (2015). Impacts of fragmentation and neighbor influences on farmland conversion: A case study of the Edmonton-Calgary Corridor, Canada. Land Use Policy, 48, 482–494. https://doi.org/10.1016/j.landusepol.2015.06.024

Regulation on the Soil Classification of Land (Journal of Laws 2012, item 1246). https://isap.sejm.gov.pl/isap.nsf/download.xsp/WDU20120001246/O/D20121246.pdf (in Polish).

Ribeiro, F. L. (2021). Unplanned urban development: A neglected global threat. Current Urban Studies, 9(3), 434–444. https://doi.org/10.4236/cus.2021.93027

Rogatka, K., Kowalski, M., & Starczewski, T. (2023). Less important space? Spatial planning in small towns in Poland. Land Use Policy, 130, 106674. https://doi.org/10.1016/j.landusepol.2023.106674

Rozumny, I. A. (1996). *Ecological and economic study and environmentally safe use of agricultural land: Scientific-methodological and practical aspects.* Institute of Land Management of UANAS.

Siu, W. Y., Li, M., & Caplan, A. J. (2023). Unintended effects of preferential tax assessment on farmland protection: Evidence from Utah's Farmland Assessment Act. Journal of the Agricultural and Applied Economics Association, 2(4), 737–752. https://doi.org/10.1002/jaa2.88

Silveira, P., & Dentinho, T. P. (2024). *Spatial interaction models with land use: A tool for interdisciplinary analysis and integrated territorial policy.* Springer. https://doi.org/10.1007/978-3-031-55008-9

Statistics Poland. (2005). *Ochrona środowiska 2005*. https://stat.gov.pl/obszary-tematyczne/srodowisko-energia/srodowisko/ochrona-srodowiska-2005-r,1,1.html?contrast=black-white (in Polish).

Statistics Poland. (2018). *Ochrona środowiska 2018: Informacje i opracowania statystyczne.* https://stat.gov.pl/obszary-tematyczne/srodowisko-energia/srodowisko/ochrona-srodowiska-2018,1,19.html (in Polish).

Statistics Poland. (2020). *Ochrona środowiska 2020: Informacje i opracowania statystyczne.* https://stat.gov.pl/obszary-tematyczne/srodowisko-energia/srodowisko/ochrona-srodowiska-2020,1,21.html (in Polish).

Statistics Poland. (2022). *Ochrona środowiska 2022: Informacje i opracowania statystyczne*. https://stat.gov.pl/obszary-tematyczne/srodowisko-energia/srodowisko/ochrona-srodowiska-2022,1,23.html (in Polish).

Statistics Poland. (2024). *Bank Danych Lokalnych*. https://bdl.stat.gov.pl/ (in Polish).

Surya, B., Ahmad, D. N. A., Sakti, H. H., & Sahban, H. (2020). Land use change, spatial interaction, and sustainable development in the metropolitan urban areas, South Sulawesi Province, Indonesia. Land, 9(3), 95. https://doi.org/10.3390/land9030095

Tran Tuan, N. (2021). Shrinking agricultural land and changing livelihoods after land acquisition in Vietnam. Bulletin of Geography. Socio-economic Series, 53, 17–32. https://doi.org/10.2478/bog-2021-0020

van der Krabben, E., Tiwari, P., & Shukla, J. (2023). A review of land development strategies for urban development: Technical function and rationales. Town Planning Review, 94(2), 125–148. https://doi.org/10.3828/tpr.2021.52

Viana, C. M., Santos, M., Freire, D., Abrantes, P., & Rocha, J. (2021). Evaluation of the factors explaining the use of agricultural land: A machine learning and model-agnostic approach. Ecological Indicators, 131, 108200. https://doi.org/10.1016/j.ecolind.2021.108200

Veerman, C., Pinto Correia, T., & Bastioli, C. (2020). *Caring for soil is caring for life: Ensure 75% of soils are healthy by 2030 for healthy food, people, nature and climate (Report of the Mission Board for Soil Health and Food).* Publications Office of the European Union. https://doi.org/10.2777/821504

Woźniak-Waszak, S., & Sobecki, T. (2024). Potrzebne zmiany w prawie geodezyjnym i kartograficznym. Wykonywanie gleboznawczej klasyfikacji gruntów. Kontrola Państwowa, 1. https://www.nik.gov.pl/kontrola-panstwowa/01/wykonywanie-gleboznawczej-klasyfikacji-gruntow-potrzebne-zmiany-w-prawie-geodezyjnym-i-kartograficznym.html (in Polish).

Wu, Y., Ao, J., & Ren, Y. (2023). Allocation of land factors in China looking forward to 2035: Planning and market. International Journal of Environmental Research and Public Health, 20(4), 3424. https://doi.org/10.3390/ijerph20043424

Yang, P. P. J., & Yamagata, Y. (2020). Urban systems design: Shaping smart cities by integrating urban design and systems science. In Y. Yamagata & P. P. J. Yang (Eds.), *Urban systems design* (pp. 1–22). Elsevier. https://doi.org/10.1016/B978-0-12-816055-8.00001-4

Yasin, M. (2020). Is urban sprawl a threat to sustainable development? A review of characteristics and consequences. Malaysian Journal of Society and Space, 16(4), 56–68. https://doi.org/10.17576/geo-2020-1604-05

Yevsyukov, T. O. (2015). *Classification and eco-friendly use of especially valuable lands.* Liga-Press.

Zdyb, M. (2020). Spatial planning as an instrument of influencing the protection of natural resources and real estate management. Studia Iuridica Lublinensia, 29(1), 229–242. https://doi.org/10.17951/sil.2020.29.1.229-242

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PROBLEMY I WYZWANIA ZMIAN UŻYTKOWANIA GRUNTÓW ROLNYCH W ŚWIETLE DOKUMENTÓW PLANOWANIA PRZESTRZENNEGO: STUDIUM PRZYPADKU POLSKI I UKRAINY

STRESZCZENIE: Gleba jest nieodnawialnym zasobem naturalnym, który zapewnia niezbędne usługi ekosystemowe dla życia, odgrywając kluczową rolę w środowisku, gospodarce i społeczeństwie. Z kolei niekontrolowany rozwój obszarów miejskich stanowi jedno z głównych zagrożeń dla zrównoważonego rozwoju terytorialnego i bezpieczeństwa żywnościowego. Dlatego zapewnienie synergii między praktyczną, skuteczną ochroną gleb (zwłaszcza gleb wysokiej jakości) a systemami planowania przestrzennego jest kluczowe. Głównym celem niniejszego artykułu jest zaproponowanie uniwersalnej koncepcji, która priorytetowo traktuje ochronę gruntów rolnych w systemach planowania przestrzennego w Polsce i na Ukrainie. Cel ten został osiągnięty w oparciu o zrealizowane cele szczegółowe: (i) ocena potencjału glebowego; (ii) analiza porównawcza uwarunkowań prawnych ochrony gruntów rolnych (iii) krytyczna analiza porównawcza procedur ochrony gruntów rolnych w systemach planowania przestrzennego. Proponowana koncepcja gwarantuje przestrzenne wytyczenie granic szczególnie cennych gruntów rolnych i ich zachowanie dla zrównoważonego użytkowania w przyszłości.

SŁOWA KLUCZOWE: jakość gleb, racjonalny podział gruntów, ochrona gleb, użytkowanie gruntów rolniczych, planowanie użytkowania gruntów

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