



ANTHROPOGENIC LANDSCAPES OF UKRAINE AND THEIR RECONSTRUCTION

ANTROPOGENICZNE KRAJOBRAZY UKRAINY I ICH REKONSTRUKCJA

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Abstract

The aim of the research was to analyze the structure of Ukraine's anthropogenic landscape and the directions of its development for the purposes of further reconstruction and rational use. The current state of ten types of anthropogenic landscapes was assessed. In the research based on the maps of natural and contemporary landscapes, use was primarily made of historical and archaeological methods, including historical and genetic sequences. The present landscape of Ukraine can be described as the coexistence of three types of landscapes: natural, natural-anthropogenic and anthropogenic. Anthropogenic landscapes which are definitely dominating nowadays, started to be formed in the late Paleolithic. The classification of ten types of anthropogenic landscapes should be improved and supplemented as the new types of anthropogenic landscapes are created, e.g. garden and park landscapes. Anthropogenic landscapes do not exist in isolation, but interact with one another and with natural landscapes. What is particularly noteworthy is the reconstruction of the anthropogenic landscape of the Forest-Field zone. The restoration of landscapes should begin with the creation of an eco-network. The national ecological network is ineffective because it does not take into account anthropogenic landscape changes. The reconstruction of all types of anthropogenic landscapes must allow for their zonal and regional specificity as well as their cultural importance. The cultural landscape will be the basis of the new structure of the national eco-network and will increase its range.

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Streszczenie

Celem badań przedstawionych w artykule była analiza struktury krajobrazu antropogenicznego Ukrainy oraz kierunków jego rozwoju, co ma umożliwić jego rekonstrukcję, a w konsekwencji racjonalne wykorzystanie. Wyróżniono dziesięć typów krajobrazów antropogenicznych i dokonano oceny aktualnego ich stanu. W badaniach, w których zastosowano głównie metody historyczno-archeologiczne, w tym sekwencji historycznych i genetycznych, oparto się na mapach krajobrazów naturalnych i współczesnych. Krajobraz Ukrainy cechuje się dziś współwystępowaniem krajobrazów naturalnych, przyrodniczo-antropogenicznych i antropogenicznych. Te ostatnie, które kształtowały się od późnego paleolitu, obecnie zdecydowanie dominują. Zdaniem autorów opracowania klasyfikacja dziesięciu typów krajobrazów antropogenicznych wobec dynamiki zachodzących procesów powinna być ulepszana i uzupełniana. Formują się nowe typy krajobrazów, takie np. jak ogrodowo-parkowy. Krajobrazy antropogeniczne nie występują w izolacji, a wchodzą w interakcje między sobą oraz z krajobrazami naturalnymi. Na szczególną uwagę zasługuje rekonstrukcja krajobrazu antropogenicznego strefy leśno-polowej. Autorzy sugerują, że odbudowę krajobrazów należałoby rozpocząć od stworzenia ekosieci. Uznali, że krajowa sieć ekologiczna jest nieefektywna, ponieważ nie uwzględnia antropogenicznych przeobrażeń krajobrazu. W rekonstrukcji wszystkich odmian krajobrazów antropogenicznych trzeba koniecznie brać pod uwagę ich specyfikę strefową i regionalną oraz rangę kulturową. Dopiero wtedy krajobraz kulturowy stanie się podstawą nowej struktury krajowej ekosieci i przyczyni się do zwiększenia jej zasięgu.

Słowa kluczowe: klasyfikacja, krajobraz antropogeniczny, racjonalne wykorzystanie, rekonstrukcja, strefa antropogeniczna, struktura, Ukraina.

INTRODUCTION

Ukraine is one of the oldest settlement regions in Central Europe with an active and diverse economic impact on the environment and natural resources. Mining in this area began in the Palaeolithic (40–35 kya – thousand years ago); more than seven thousand years ago the Neolithic agricultural Bug-Dniester culture was formed. Over the past millennium, natural forest has been destroyed and water resources have been developed (Denysyk, 1998; Denysyk, 2001; Denysyk, Braslavs'ka, 2021). Such a long and often irrational use of natural resources of Ukraine has led to an almost complete change from natural landscapes to anthropogenic ones: in the plains this change constitutes 92–95% of the area, in the mountainous regions of the Carpathians and the Crimean Mountains 67 and 72%, respectively (Marynych, Shyschenko, 2005; Denysyk, 2014; Smoliy, 2018). These changes developed in an irregular pattern, dependent on the needs for cer-

tain natural resources and their importance for economic development at different times.

The research into Ukraine's anthropogenic landscapes began in the 1970s. (Voropay, Kunitsa, 1982; Denysyk, 1998; Romanchuk, 1998; Kazakov, Yarkov, 2007). However, it was the cognition of only certain (residential, industrial, partly agricultural) classes of anthropogenic landscapes within the model (Podillia, Crimea, Transcarpathia) regions. At the turn of the 21st century, the issues related to understanding anthropogenic landscapes (Denysyk, 1998; Romanchuk, 1998; Petlin, 2006; Kovaliov, 2009), approaches to their classification, zoning, etc., began to be singled out. These issues can be traced even in the present discourse (Hrodzysn'kyi, 2005). It is not the presence of human influence on the landscape complex, but its radical reconstruction, the formation of a new typical structure that is the focus in the process of learning about anthropogenic landscapes. Such an approach does not allow considering anthropogenic landscapes as a classification (Hensiruk, Bondar, 1973; Voropay, Kunitsa, 1982) of natural landscapes, which is clearly observed in the works of some geographers in Lviv (Petlin, 2006; Ivanov, 2007; Kruhlov, 2020) and in Kharkiv (Kovaliov, 2009; Baydikov, 2014). In the anthropogenic landscape studies of Ukraine, the opposition to including natural landscapes remains an unresolved problem (Kovaliov, 2009; Maruniak, 2012; Baydikov, 2014; Kruhlov, 2020; Rudenko, Sorokina, 2021), and hence the unfoundedness of the terms "natural-anthropogenic landscape", "natural-anthropogenic process", "natural-anthropogenic nature use", etc. All anthropogenic landscapes without exception are natural. They differ from one another only by their genesis and are a component of natural (natural, natural-anthropogenic, anthropogenic) landscapes (Denysyk, 1998; Romanchuk, 1998; Kazakov, Yarkov, 2007). The incomplete development of general anthropogenic landscape science, the difficulty in providing comprehensive anthropogenic landscape studies, detailed studies of anthropogenic landscapes in only certain regions (Podillia, Kryvbas) in Ukraine and other problems have not yet made it possible to carry out an analysis of the current state of the anthropogenic landscape of Ukraine and to justify the need for its reconstruction. The first attempt to solve two of the above-mentioned issues is presented in the proposed study.

At the beginning of the 21st century, the landscape of Ukraine is a complex combination of three categories of different types and different ages of natural landscapes – natural, natural-anthropogenic and anthropogenic. Natural landscapes, not affected by human activity, have been preserved in 3.2–4.5% of the territory of Ukraine. Natural-anthropogenic landscapes constitute 26–28% and, in the process of their formation, human activity served as a stimulus for their further development. Anthropogenic landscapes are either newly created by people or at least one of their components was completely repurposed. The later dominate 65–67% of the territory of Ukraine. As the main factor of the origin and

further development of natural and anthropogenic landscapes is human, these landscapes are also classified as anthropogenic (Denysyk, 2014).

The current structure of Ukraine's anthropogenic landscape is complex and dynamic, but it needs radical reconstruction. This is especially true of certain types of anthropogenic landscapes that require further rational use and protection.

The purpose of the paper is to analyze the current structure of the anthropogenic landscape of Ukraine, the importance of its development and the current state of ten types of anthropogenic landscapes with the aim of their further reconstruction and rational use.

METHODS

While creating anthropogenic landscape complexes, people mostly strive to "fit" them rationally, and if possible, harmoniously into the natural environment. In the study of anthropogenic landscapes of Ukraine use was made of the *historical and archaeological method* as the anthropogenic formations are younger than the natural ones. A thorough analysis of published and manuscript literary and cartographic sources in the fields of history and archeology was necessary.

Anthropogenic landscapes are characterized by high dynamism. The early (unstable) and mature (stable) stages with well-defined successional changes are clearly distinguished in the development of anthropogenic landscapes. To demonstrate the dynamics and history of the development of anthropogenic landscapes in Ukraine, the *method of historical and genetic sequences* was considered to be appropriate. The maps of natural (restored) and modern (anthropogenic) landscapes with historical-genetic sequences were successfully implemented in the study.

The *areographic method* proved to be productive for a small-scale examination of Ukraine's anthropogenic landscapes. Its essence is to reflect on the map the habitats (in the form of continuous areas of distribution or icons) of the main types or subtypes of anthropogenic landscapes. The specifics of the site and the availability of the necessary literature as well as field materials of anthropogenic landscape research were important in choosing the method of mapping the area. In addition to the above, use was made of the methods of other sciences, which contributed to the knowledge of the corresponding types of anthropogenic landscapes. For instance, in the process of studying agricultural landscapes, application of the methods used in soil science, agrophitocenology, were relevant.

RESULTS

The development of Ukraine’s anthropogenic landscape

Diverse and active development of natural resources of Ukraine has led to the landscape diversity of anthropogenic complexes, the development of which can be divided into three stages: origin, formation and functioning as anthropogenic (Table 1). The following taxonomic structures can be identified within the classification of anthropogenic landscapes of Ukraine (Fig. 1):

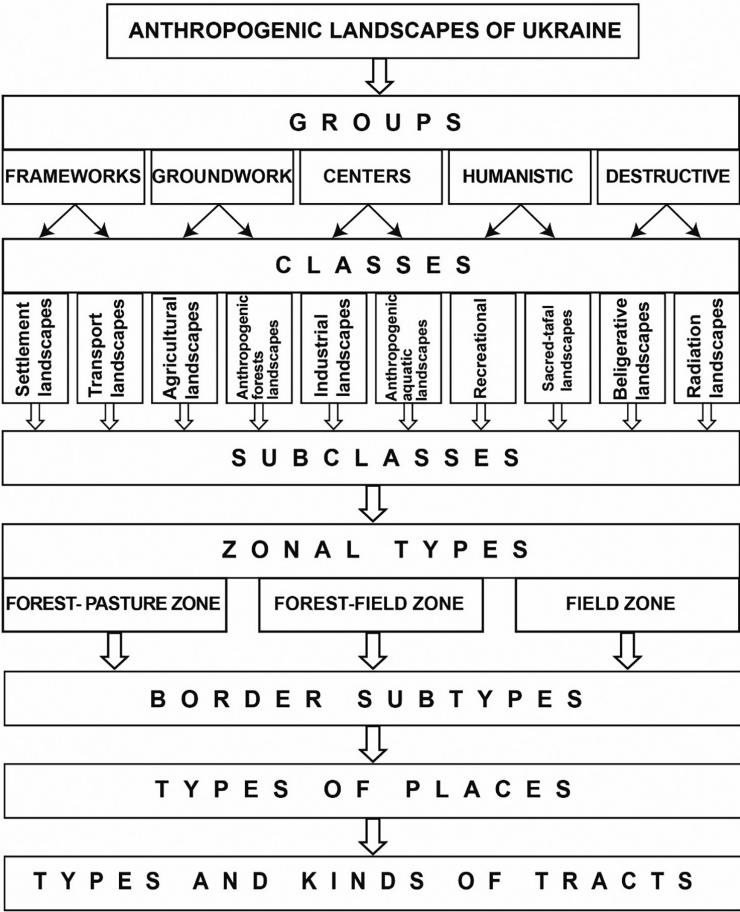


Fig. 1. General classification of anthropogenic landscapes of the plains of Ukraine supplemented with the detailed classifications of each type of anthropogenic landscapes (types of tracts are determined by belonging to the appropriate landform and soil type, species – by vegetation)

Source: Denysyk (1998), Denysyk (2014), Denysyk, Braslavs’ka (2021).

Table 1. Development stages of Ukraine’s anthropogenic landscapes

No	Classes of anthropogenic landscapes	Subclasses of anthropogenic landscapes	Origin	Formation	Beginning of functioning as anthropogenic
1	Residential	rural landscapes	40–35 kya	4–3 myr BC	End of first millennium BC –beginning of first millennium AD
		town landscapes	6–9 mya	11th c. – early 13th c.	14th–15th c.
		urban landscapes	12th c. – early 14th c.	16th–18th c.	18th–19th c.
2	Road (transport)	road landscapes	6th–5th c. BC	9th–17th c.	18th–20th c.
		automobile road landscapes	18th c.	18th–19th c.	20th c.
		railway landscapes	Second half of 19th c.	End of 19th c. – first half of 20th c.	20th c.
3	Agricultural	field landscapes	7–4 myr BC	4–3 myr BC	End of first millennium BC –beginning of first millennium AD
		meadow-pasture landscapes	4–3 myr BC	End of first millennium BC – beginning of first millennium AD	Beginning of first millennium AD
		garden landscapes	9th–13th c.	16th–18th c.	19th c.
		conditionally-natural forest landscapes	4–3 myr BC	First millennium AD	15th–16th c.
4	Anthropogenic forests	secondary (derivatives) forest landscapes	First millennium BC	15th–16th c.	18th–20th c.
		silvicultural landscapes	14th–18th c.	First half of 19th c.	Second half of 19th–20th c.
		industrial landscapes	5th c. BC	9th–13th c.	19th–20th c.
5	Industrial landscapes	mining-industrial landscapes	40–35 myr BC	9th–12th c.	Second half of 19th c.

No	Classes of anthropogenic landscapes	Subclasses of anthropogenic landscapes	Origin	Formation	Beginning of functioning as anthropogenic
6	Anthropogenic aquatic landscapes	pond landscapes	Beginning of first millennium AD	14th–15th c.	15th c.
		channel landscapes	1st c. AD	9th–16th c.	Second half of 20th c.
		reservoir landscapes	15th–16th c.	End of 19th c.	Second half of 20th c.
7	Recreational	therapeutic landscapes	Second half 19th c.–early 20th c.	1950s–1980s	Late 20th – early 21st c.
		wellness and recreation landscapes	Late 19th – early 20th c.	1950s–1970s	Late 20th c.
		sports and cognitive landscapes	1960s–1980s	1980s–early 1990s	Early 21st c.
8	Sacred-tafal	tafal landscapes	40–35 kya	4th–3rd c. BC	First millennium BC
		sacred landscapes	4th–3rd c. BC	First millennium BC	9th–12th c. AD
		sacred-tafal landscapes	7th–9th c. AD	9th–12th c. AD	15th–18th c.
9	Defensive	defensive landscapes	9th–8th c. BC	8th–5th c. BC	14th c.
		defensive landscapes and ditches	Second – beginning of first millennium BC	7th–5th c. BC	17th–18th c.
		fortified settlement	7th–4th c. BC	8th–12th c. AD	14th–15th c.
		mixed military fortifications	16th–18th c.	Second half of 18th–19th c.	Early 20th c.
10	Radiation	landfill landscapes	End of 1940s–1960s	1950s–1970s	Second half of 20th c.
		industrial landscapes	1960s–1970s	1960s–1980s	Second half of 20th c.
		Chernobyl landscapes	1970s–1980s	1980s–1990s	Late 20th c. – early 21st c.

Sources: Romanchuk (1998), Hrodzyns'kyi (2005, 2019), Kazakov, Yarkov (2007), Stepanchuk et al. (2012). The specified colors in the columns of types and subtypes are most frequently used in the process of mapping these landscapes.

kya – thousand years ago; mya – million years ago; myr – million years; c. – century.

- *category* of anthropogenic landscapes based on their importance in human life and spatial distribution (groups, classes, subclasses);
- *type* of anthropogenic landscapes—established by a type of economic activity;
- *subtypes* of anthropogenic landscapes—separated depending on the method of management.

The classification of anthropogenic landscapes of the plains of Ukraine is discussed in details in other monographs (Denysyk, 1998; Denysyk, 2001; Volovyk, 2021) and educational publications (Denysyk, 2014).

Classes of anthropogenic landscapes

The “*framework*” of anthropogenic landscapes of any region, as well as Ukraine in general, is formed by residential and road landscapes. With their appearance, there begins an active process of anthropogenization of natural landscapes and development of anthropogenic landscapes. People and technology concentrated in residential and road landscapes stimulate further formation and functioning of all other classes of anthropogenic landscapes. Residential and road landscapes are the oldest in the structure of Ukraine’s modern anthropogenic landscape. They started to be formed in the Upper Paleolithic (40–35 kya). The development of historical features of residential and road landscapes, their diversity, structure, current state, further ways of reconstruction and development are discussed in details in other publications (Voropay, Kunitsa, 1982; Denysyk, 1998; Denysyk, Braslavs’ka, 2021). In the early 1930s, *residential landscapes* in Ukraine occupied 8–12% of the territory, *road landscapes* – 0.8–1.2% (Voropay, Kunitsa, 1982; Denysyk, 1998; Smoliy, 2018). The pace of their reconstruction and development in the area were significantly increasing compared to other types of anthropogenic landscapes. The trend would continue after the end of the war in Ukraine.

For thousands of years, *agricultural* and *forest* anthropogenic landscapes have been, are and will be the background landscapes in Ukraine. Ukraine is a kind of model region for these types of anthropogenic landscapes. From the 1990s, however, their area was gradually declining, but since the early 21st century agricultural and forest anthropogenic landscapes have dominated the structure of Ukraine’s anthropogenic landscapes. They comprise 62–65% and 14–15% of Ukraine’s territory, respectively (Denysyk, Kans’kyi, 2011). In the future, the structure of the agricultural landscape will not change significantly. However, the area of its components, in particular field landscapes, will decrease by 28–30%; meadow and pasture crops will grow by 3–4% and garden meadows by 6–7%. The need to reduce the area of field landscapes is justified by their irrational use, further development within the field landscapes of residential, industrial and road landscapes, as well as the transformation of some areas with degraded soils into meadows-pastures and garden landscapes. The changes in the agricultural

landscape of Ukraine have been observed since the beginning of the 21st century. The significant increase in the area of garden landscapes is due to the occupation of the Crimean Peninsula in 2014, where these landscapes were widespread and highly productive.

The history of economic development, and in fact predatory destruction of natural forest landscapes of Ukraine, as well as the formation of modern forest anthropogenic landscapes are examined in numerous publications, including two monographs: general (Hensiruk, Bondar, 1973) and regional (Denysyk, Kans'kyi, 2011). As an example, before the active (early first millennium AD) economic development of Podillia, forest landscapes occupied 72–75% of its territory, at the beginning of the 21st century – 12.8%, and they continue to decline. Modern forest landscapes of Ukraine in comparison with Europe is shown in Table 2.

Table 2. Forest landscapes of Europe and Ukraine at the beginning of the 21st century

Region	Total area, thousands ha	Forest area, thousands ha	Forest cover, %	Forest area per 1 inhabitant, ha
All of Europe	2,260,128	933,326	41.3	1.3
Northern Europe	112,329	52,538	46.8	2.8
Western Europe	245,569	59,479	24.2	0.2
Eastern Europe	1,902,230	821,309	43.2	2.4
Ukraine	60,350	9,400	15.6	0.2

Source: Tkach (2012), with the authors' changes, concerning the areas of forests and forest cover of Ukraine (2021).

In the structure of Ukraine's forest anthropogenic landscape, conditionally-natural forest landscapes occupy 7–8% of its area, secondary or derivative forest landscapes – 28–39%, silvicultural landscapes – 58–62%.

Separate “*focal*” landscapes in the structure of anthropogenic landscape are formed by *industrial* and *aquatic* anthropogenic landscapes. Such landscapes are technogenic in origin but their spatial location, functioning and significance in the structure of the anthropogenic landscape of Ukraine differs considerably from the frame and background anthropogenic landscapes. Focal anthropogenic landscapes occupy small areas compared to frame and background ones. In some cases, they form industrial (Donbas, Kryvbas, Lviv-Volyn Basin, Industrial Dnipro) or aqua (Dnipro basin, part of the Dnister) areas. Focal anthropogenic landscapes often shape the corresponding ecological situation of corresponding areas.

Industrial landscapes are located around large industrial enterprises (Industrial Dnipro), especially in the old industrial (Donbas) area. Mining landscapes are most pronounced in Kryvbas. The total area occupied by quarries there

is 33.34 km², dumps – 60.0 km², tailings – 52.74 km², subsidence zones above the mine area – 34.71 km². The depths of iron ore quarries are close to 500 m, the height of dumps and dams – up to 120–140 m, the depth of mines – 1400–1500 m (Paliyenko, 2005).

In the 20th century, aquatic anthropogenic landscapes became an integral feature of Ukraine's anthropogenic landscape. They are represented by a system of reservoirs, ponds and canals, as well as derivative aquatic anthropogenic landscape complexes that have been formed in abandoned quarries, cavities of underground workings, settling tanks, etc. The current number and area of reservoirs and ponds in Ukraine are presented in Tables 3 and 4. Reservoirs completely regulate the Dnipro's flow, partly the Dnister and the Pivdennyi Buh; ponds regulate medium and small rivers of Ukraine.

Table 3. The largest reservoirs of Ukraine's rivers

Reservoir	River	Area of water mirror, km ²	Reservoir volume, km ³	Water runoff volume, km ³
Kremenchuk	Dnipro	2,250	13.52	47.8
Kakhovka	Dnipro	2,150	18.18	52.2
Kyiv	Dnipro	992	3.73	33.1
Kaniv	Dnipro	581	2.50	43.9
Kamianske	Dnipro	567	2.46	52.0
Dnipro	Dnipro	410	3.32	52.2
Dnister	Dnister	142	3.0	8.7

Source: Smoliy (2018).

Table 4. Presence of ponds within the river basin in Ukraine's territory

Name of river basin area	Amount	Area of water mirror, hectares	Ponds volume, million m ³
Vistula river	1,456	4,810	58.0
Danube river	1,989	10,422	113.5
Dnister river	5,500	23,336	282.8
Pivdennyi Buh river	9,877	56,400	645.5
Dnipro river	24,043	153,278	2,087.4
Don river	2,679	14,183	295.9
Rivers near the Black Sea	57	5,755	85.7
Rivers near the Sea of Azov	1,336	8,109	182.9
Crimea rivers	1,994	12,816	217.7
Total	494,444	289,109	3,969.4

Source: Smoliy (2018).

Humanistic anthropogenic landscapes are represented in Ukraine by *recreational* and *sacred-tafal* (from the Greek *taphe*—burial, grave) landscapes. Their spatial distribution across Ukraine and their importance differ significantly. Recreational landscapes are formed in the areas of recreation and active tourism, occupy large space, create and determine the structure of the landscape of certain territories of Ukraine like Arabatska Strilka, parts of the Black and Azov seas or areas of the southern coast of Crimea.

Sacred-tafal landscapes do not require detailed characterization. Since the 1990s their area in Ukraine has increased significantly. This is due to the active reconstruction and development of religious buildings and the design of their territories. During this period, the population of Ukraine decreased significantly (from 52 to 42 million people) because of economic issues, the pandemic, and the war. The area of tafal landscapes has almost doubled. It should be noted that in Ukraine, recreational and sacred-tafal landscapes among anthropogenic ones are the most consistent with the concept of “cultural landscapes”. In most cases, such landscapes do not need to be protected by special laws—people themselves take care of their condition.

In the structure of Ukraine’s anthropogenic landscape, both *destructive* landscapes—*beligerative* landscapes (from the Latin “*beligero*”—to wage war) and *radiation* landscapes deserve special attention. Over the past centuries, the territory of Ukraine has been repeatedly affected by various military conflicts. In the 20th century, the country experienced the events of two world wars. The overall result was not only significant human and material losses, but also damaged landscapes. To this day numerous and unique landscape complexes of military origin can be found in Ukraine, including fortified settlements, defensive ramparts and ditches, mounds, trenches, explosion funnels, bunkers, dugouts as well as fortified lines that stretch for tens of kilometers. The active formation of deliberative landscapes continued throughout Ukraine at the beginning of the 21st century, especially in its eastern and southern regions. The diversity of beligerative landscapes has increased so much that it is possible to classify them now (Fig. 2).

In the publications of the 1990s and the first decade of the 21st century, the authors of this article optimistically called beligerative landscapes “landscapes without future” (Denysyk, 2001; Denysyk, Antoniuk, 2017); however, many wars (Georgia, Syria, Ukraine, and others) came in the early 21st century. The formation of the modern beligerative landscape that takes up to 20% of Ukraine goes hand in hand with deaths of many people. This is one of the specific features which distinguishes its formation from other anthropogenic landscapes.

Ukraine is one of the countries in which three subtypes, namely industrial, Chernobyl and landfill, were formed in radiation landscapes. Owing to the fact that uranium ore was mined in the Kirovohrad region, processed and enriched in former Dnipropetrovsk (now the Dnipro region), they began to be formed in

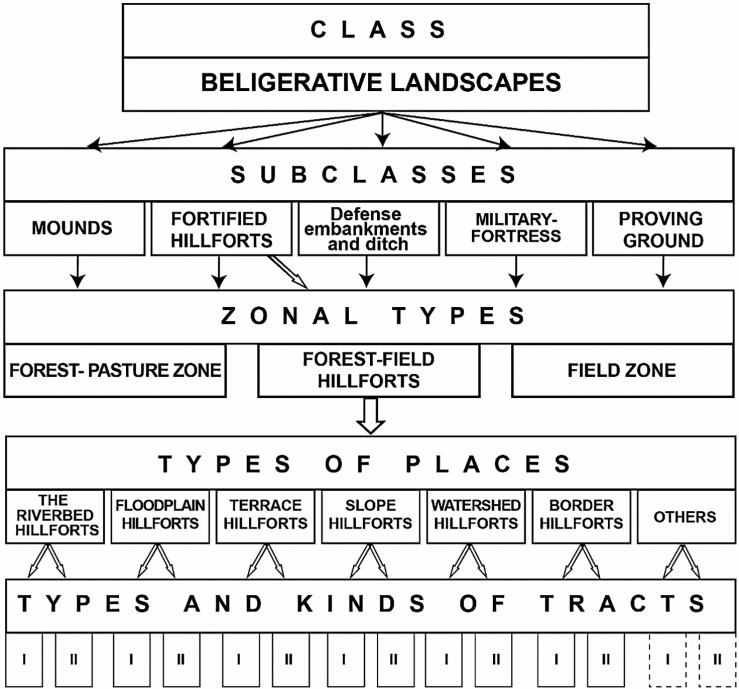


Fig. 2. Taxonomic system of typological structures of beligerative landscapes (a type of tract is determined by the structure and lithological composition of rocks of defensive elements of a settlement, a kind – by vegetation)
Source: Denysyk, Antoniuk (2017).

the 1940s and 1950s and continue functioning nowadays. Radiation landscapes are discussed in detail in another monograph (Denysyk, Kozyns’ka, 2015). The Chernobyl subtype of radiation landscapes has been extensively studied and characterized in research literature. The explosion of two nuclear charges in the coal mines of Donbass in the 1950s led to the formation of the surface of the landfill of radiation landscapes. No further nuclear tests were performed, but radiation landscape complexes remained.

Anthropogenic landscape zones

The long-lasting multifaceted development of natural conditions and resources of Ukraine has led to a radical transformation of its natural landscape into an anthropogenic one. As a result, the formation and functioning anthropogenic regional structures, such as zones, subzones, regions, and areas presented in Fig. 3, are being developed. Their detailed description requires a separate publication.

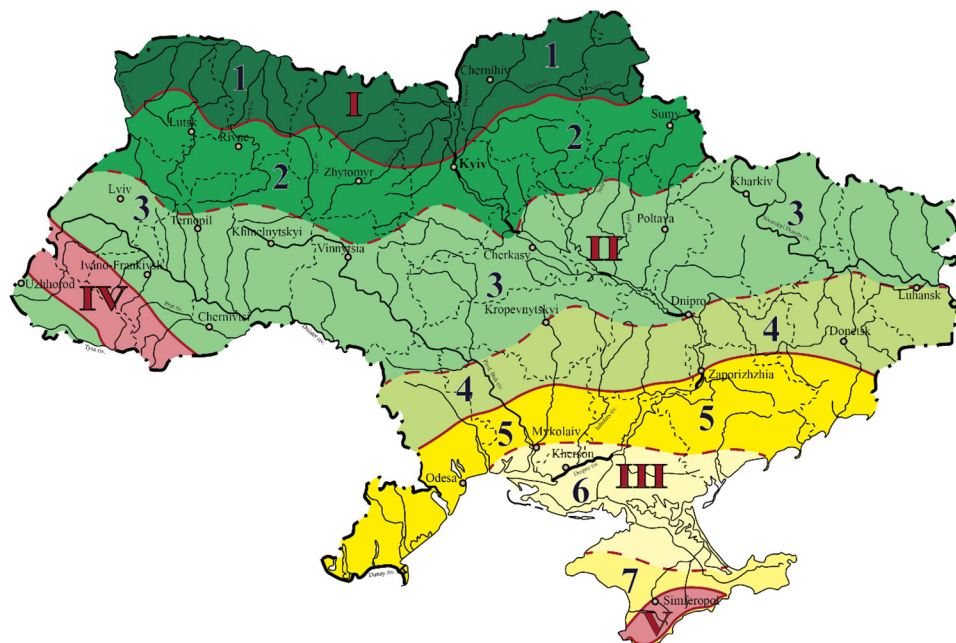


Fig. 3. Zones and subzones of anthropogenic landscapes in Ukraine

I – Forest-Pasture zone. Subzones: 1 – South

II – Forest-Field zone. Subzones: 2 – North, 3 – Central (typical), 4 – South

III – Field zone. Subzones: 5 – North, 6 – Central, 7 – South

IV, V – Mountain areas of anthropogenic landscapes of the Carpathians and the Crimean Mountains The division into regions of anthropogenic landscapes in the Carpathian and the Crimean Mountains has not yet been developed.

RECONSTRUCTION

The results of the economic development of natural resources and the current state of Ukraine's anthropogenic landscape show that at all stages of its historical progress, the material needs of people were ahead of their wisdom and resulted in hazardous circumstances. A Podillian, like a Bukovinian, a Slobozhanets or Polishchuk, is a product of the landscape and is associated with its traditional (indigenous) conditions. The current structure of Ukraine's anthropogenic landscape is irrational, and its productivity is constantly declining (Denysyk, 1998; Denysyk, 2001). Its modern management clearly does not meet reasonable standards (Tab. 5).

You may disagree with the authors on the presented standards. Obviously, they will be different for various regions and countries. For countries with favorable natural conditions, such as Ukraine, higher standards are necessary and achievable (Tab. 5).

Table 5. The ratio of the main types of land use (landscape) in the ideal (according to C.A. Doxiadis) and the modern territory of Ukraine

No	Types of land use	Ideal norms (in % of land)	Modern (in % of land)	Rational (in % of land)
1	Complete preservation of landscape (without any economic use)	40	0,9	20–22
2	Maximum preservation of landscape (permissible movement of people without setting up camp)	17	1,9–2,5	8–9
3	Preservation of landscape with temporary stay of vacationers (vacationers)	18	2–3	10–12
4	Preservation of landscape with permanent population	7–8	3–5	7–9
5	Urbanized areas	5–8	8–12	8–10
6	Agricultural and industrial areas	6–9	78–82	42–46

Sources: Hensiruk, Bondar (1973), Marynych et al. (1985), Vakuliuk, Samoplavs'kyi (1998), Rudenko (2007), Baydikov (2014), Smoliy (2018), Petlin, Mischenko (2021).

CONCLUSIONS

The modern landscape of Ukraine is a complex combination of natural, natural-anthropogenic and anthropogenic landscapes. The last two categories are anthropogenic in origin. In Ukraine, they began to be formed in the Late Palaeolithic – 35–40 thousand years ago. In the period of Trypillia (4th–3rd millennium BC) anthropogenic landscapes became widespread, but their share in the structure of Ukraine's natural landscape was comparatively small. Between the 7th and 12th centuries there was a transition from the natural to anthropogenic landscape, and since the 17th century the share of the latter has been constantly growing. At the beginning of the 21st century, anthropogenic landscapes in the plains of Ukraine occupy 92–95%, and in some regions of Ukraine (Prykarpattia, Middle Pobuzhia, Middle Dnipro, Donbas) up to 98% of the territory, nature reserves – 3.5–4.0%, undried swamps – 0.8–1.0%, steep slopes that cannot be used – 0.7–1.5% (Denysyk, 1998; Denysyk, 2001; Rudenko, 2007).

The historical and landscape analysis of the formation and the functioning, diversity, specificity, and modern structure of Ukraine's anthropogenic landscapes makes it possible to classify them. The classification is not limited to the ten types. Improvements and additions are possible. In particular, the sacred-tafal landscapes can be divided into two types, namely sacred and tafal. A new type of anthropogenic landscapes can be added to this group, that is garden and park type. The classification of beligerative landscapes also needs to be improved because of

the war in Ukraine. No type of anthropogenic landscapes functions in isolation; they interact with one another and with natural landscapes. The modern landscape of Ukraine is a complex unity of all types of landscapes the reconstruction of which requires careful attention.

Special emphasis should be put to the reconstruction of the anthropogenic landscape of the Forest-Field zone. The main human and economic potential of Ukraine is concentrated there. It is also the most extensively studied modern anthropogenic landscape of the country (Denysyk, 2001). The history of formation of all types of anthropogenic landscapes is described in the original series of monographs entitled "Anthropogenic landscapes of Podillia" (2005–2020). Podillia was chosen as model of a Forest-Field zone.

The reconstruction needs to start with the creation of a real eco-network. The modern national ecological network is inefficient as it does not take into account the anthropogenic changes in the landscape. The reconstruction of all types of anthropogenic landscapes needs to include their zonal and regional specificity as it will make it possible to upgrade Ukraine's anthropogenic landscape to the rank of cultural. The experience of Western European countries demonstrated that the cultural landscape will lay the foundation for an advanced national eco-network structure and will increase its range.

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