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FOREST LANDS OF UKRAINE: CHALLENGES, LEGISLATIVE REGULATION AND STRATEGIC DIRECTIONS OF DEVELOPMENT

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Abstract. *The article identifies the value of Ukraine's forest lands as a strategic natural resource that performs numerous economic, environmental and social functions. In particular, the need for effective forest land management to preserve the environment and prevent land degradation is emphasized.*

A comprehensive analysis of the current state of forest land use and its key problems in the context of military operations and challenges associated with the war was conducted. The main aspects of forest land use were revealed, taking into account their environmental, economic and social significance for the country. An analysis of the most important instruments of the European Union's forest policy and the possibility of their implementation in Ukraine was carried out.

In the process of studying information on the state of forest lands in Ukraine, their dynamics and the features of their functional use, special attention was paid to forest land management as an important component of the European Union's climate and energy framework until 2030. The article focuses on the need for a comprehensive approach to effective forest land management in Ukraine in achieving the ecological balance of forest protection, ecosystem restoration and their effective use.

The issue of contamination of forest areas with explosives is highlighted, and ways to overcome this problem are considered.

The main regulatory legal acts that regulate land and forest relations are analyzed, in particular the Land and Forest Codes of Ukraine, laws and by-laws that regulate the rights and obligations of management bodies, as well as owners and users of forest lands.

The article identifies the need to supplement the existing regulatory legal framework for forest land management with a strategic direction for overcoming the consequences of war and post-war state development.

Keywords: *forest lands, climate change, functions of forest lands, contamination of forest areas, military operations, post-war restoration, forest policy of the European Union, problems of inefficient forest land management, development strategy, legislative support, forest land management.*

Introduction

Forest lands are an extremely valuable natural resource of Ukraine, which significantly influences the ecological, economic, and social spheres, and plays a crucial role in combating negative environmental phenomena – primarily soil erosion and climate change [15].

Based on this, the functions of forest lands can be defined as a three-component economic-ecological-social system with corresponding interdependent properties within the overall structure of sustainable spatial development of territories (Fig. 1):

- Economic function, related to the use and regeneration of forest land raw material resources;

- Ecological function, which includes the protective, restorative, and safeguarding impact of forest lands on various components of the environment;
- Social function, which determines the ability of forest lands to provide recreational, sanitary-hygienic, cultural-aesthetic, health-promoting, and other services to the population.

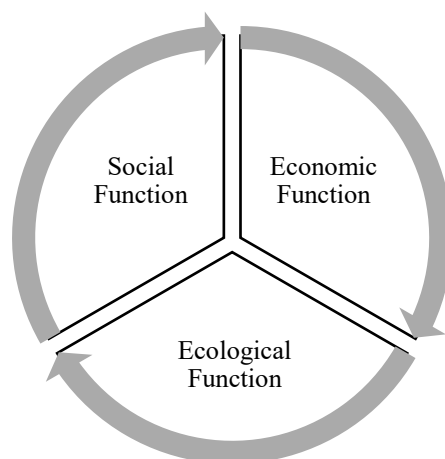


Figure 1. Functions of Forest Lands
in the System of Sustainable Spatial Development of Territories

According to the State Forest Resources Agency of Ukraine, the area of the forest fund in Ukraine amounts to 10.4 million hectares, while the forest cover rate is estimated at 15.9% based on statistical data from 2015–2023. This is in comparison to the clearly defined target set for the year 2020 - 17.0%. This underlines the importance of forest land management, their conservation, and the expansion of forested areas as a strategic direction for the country's economy [16].

When identifying the main problems of effective forest land use in Ukraine, they are viewed through the lens of global climate change, the reduction in productive forest ecosystems, and the impacts of military actions.

Overcoming these challenges is a top priority on the path to effective forest land management in Ukraine.

Literature Review

Forest lands play a significant role in preserving the environment, ensuring sustainable territorial development, and attract scientific interest, as they are a key element in global climate change and desertification.

Stubenrauch, J., Garske, B., Ekardt, F., & Hagemann, K. studied forest governance instruments in the EU and analyzed the most important policy tools of the European Union's forest strategy. They identified the potential benefits of afforestation and reforestation for climate mitigation and achieving climate neutrality. The authors emphasize that only biodiverse and resilient forests can function as long-term carbon sinks [8].

Romppanen S. studied the LULUCF Regulation, which covers forest land management as a critical component of the EU's climate and energy framework for 2030. It provides member states with flexibility in setting reference levels, enabling effective governance and a sustainable, positive climate impact [2].

Lambou F. J., Ngoufo R., Foyet Gankam A. D., & Tchuenga Seutchueng, T. G. analyzed the territory of Cameroon, which has the second-largest forest area in Africa. They determined that the existing forest ecosystem plays a crucial role in climate regulation, carbon sequestration, soil restoration, and the provision of goods and services. The aim of their study was to analyze how changes in forest area affect the existing ecosystem and to evaluate the impacts of REDD+ in forest land management in Ngambe-Tikar [12].

Openko I. A. and Tsvyakh O. M. devoted their work to analyzing the problem of forest fires and the numerous ecological and economic damages they cause. Forest fires receive special attention in the context of sustainable development. The authors note that while fires are not the primary cause of forest cover loss in Ukraine, the area of forest land affected by fire remains significant [13].

Given the current realities - frequent fires caused by explosions and the impact on landscape ecology and atmospheric carbon emissions - a group of scientists (S. V. Zibtsev, J. G. Goldammer, V. V. Myroniuk, O. M. Soshenskyi, R. D. Vasilyshyn, I. L. Budzinskyi, S. V. Sydorenko, O. A. Borsuk, Ye. V. Kalchuk, and I. S. Zibtseva)

conducted research and calculated the fire-affected areas and carbon emissions during the years 2022 and 2023 [5, 6].

The aim of this study is to identify the challenges, the state of legal regulation, and strategic development directions for forest land management in Ukraine.

Materials and Methods

Various materials and research methods were employed in the course of this scientific study to enable a comprehensive analysis of the condition of forest lands, the effectiveness of their legal regulation, and the utilization of their beneficial functions for assessing prospects of sustainable forest land management.

The legal basis of the research includes the current regulatory and legal framework governing land and forest relations, forest land management, and EU directives related to climate change and achieving a zero carbon footprint.

The following methods were used in the scientific study: monographic, abstract-logical, calculation, and analogy methods.

The monographic method was applied to examine the specific features of forest lands, considering natural, economic, and social factors. It involved the analysis of legislative acts on forest land management, management concepts and strategies, the effectiveness of existing measures, as well as issues such as forest contamination by explosive materials and the causes of forest fires.

The abstract-logical method was used to analyze forest land management problems and their impacts on Ukraine's environmental, economic, and social sectors.

The calculation method was employed to study the total area of the forest fund, forest land area, the country's forest cover, and dynamics of area changes, as well as the distribution of the forest fund according to departmental subordination.

Using the analogy method, the study explored challenges and potential solutions. Analogy was applied in comparing two categories of forests (contaminated by radioactive and explosive materials), both of which require specialized monitoring and restoration. The use of international best practices in ecosystem restoration is cited as an example of applying the analogy method to improve forest land management in

Ukraine.

Results and Discussion

Forest lands are among the most valuable natural resources, forming the foundation of ecological balance, biodiversity, and socio-economic development.

“Effective forest management plays a crucial role in preserving the natural environment, preventing soil degradation and climate change” and is receiving increasing attention, as forest lands are a key resource for maintaining ecological equilibrium [9].

According to Article 55 of the Land Code of Ukraine, lands designated for forestry purposes include “lands covered with forest vegetation, as well as lands not covered with forest vegetation, and non-forest lands provided and used for forestry needs” [4].

Similarly, Article 5 of the Forest Code of Ukraine defines forestry-designated lands as:

“Forestry-designated lands include forest lands where forest plots are located, and non-forest lands occupied by agricultural lands, waters and wetlands, structures, communications, low-productivity lands, etc., which have been officially allocated for forestry use” [7].

Upon analyzing the legal definitions of “forestry-designated lands” in both the Land and Forest Codes of Ukraine, a logical conclusion can be drawn: lands not officially designated and used for forestry purposes without clearly defined boundaries in nature are not classified as forest lands. Furthermore, the mere fact of natural afforestation does not automatically reclassify a land plot as forest land [1].

Forest land management requires an integrated approach, including: the adoption of strategic documents, harmonization of current legal norms, official registration and demarcation of forest land areas, ensuring balance among ecological, economic, and social functions, and the implementation of digital monitoring technologies to enhance efficiency and transparency in governance [3].

One of the key components of forest land management is the rational allocation

of Ukraine's forest fund lands by departmental subordination (see Fig. 2), as clearly defined institutional responsibility ensures more effective management and successful achievement of strategic goals at various levels.

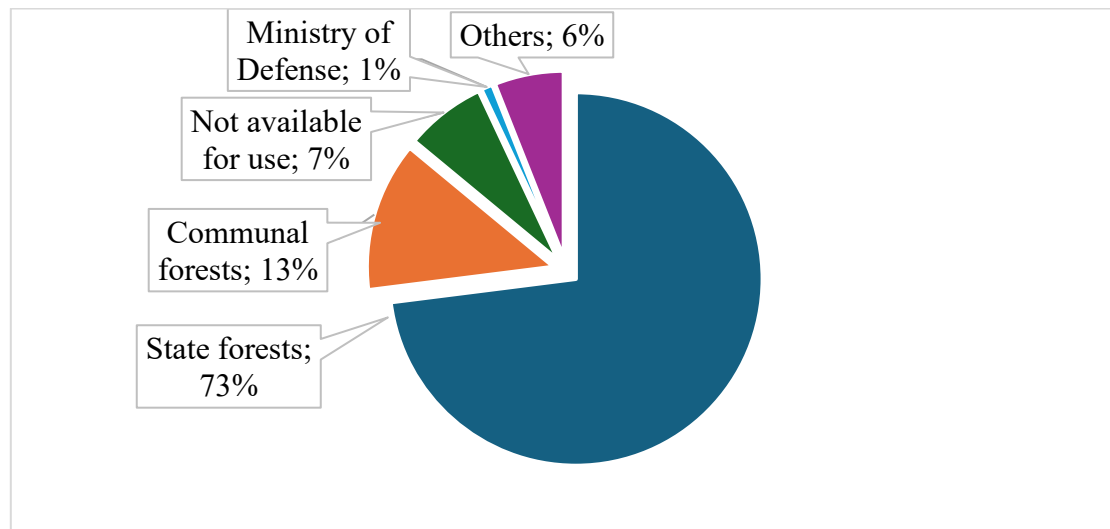


Figure 2. Distribution of the Total Area of Forest Fund Lands in Ukraine by Departmental Subordination, according to the State Forest Resources Agency of Ukraine [3].

In this context, the complexity of forest land management is due to the subordination of existing forest users belonging to different ministries and departments. This creates a multi-departmental structure of forest land management united by common goals, preserving biodiversity and increasing the average forest cover of our country and bringing it closer to the level of European countries (Table 1).

Table 1. Average forest cover of European countries

Country	Forest cover of the territory (%)
Finland	73
Sweden	68
Slovenia	62
Latvia	54
Estonia	52
Greece	50
Spain	37
Ukraine	15,9

Source: Eurostat, FAO, 2022.

As Table 1 shows, Ukraine's forest cover is one of the lowest among European countries. The highest forest cover rates are observed in the Nordic countries, such as Finland and Sweden, where forest land covers the majority of the territory. This is due to the climatic conditions and historical features of forestry development in these regions.

The areas of forest land in different natural zones of Ukraine require individual approaches to management. In each zone, specific climatic, soil and hydrological conditions should be taken into account to determine the optimal methods of forest management.

Therefore, an important task is to preserve existing forest ecosystems, analyze the causes of deforestation and degradation of forest lands (Table 2) and restore them, especially in those regions where the area has been reduced due to economic activity, military operations or natural disasters.

Table 2. Causes of deforestation and forest degradation

	Internal for forest sector	External for forest sector
Direct	• strong impact and illegal logging.	• agricultural expansion; • limited land resources; • settlement expansion; • infrastructure development; • fires; • demand for wood; • demand for wood fuel.
Indirect	• imperfect management component; • weak governance of the forest sector: - weak legal regulation and control; - low level of awareness of stakeholders and their involvement; - corruption; - lack of transparency and accountability; - lack of environmental impact assessment. • lack of demarcation of forest territories; • low awareness; • lack of alternative supply of wood as a source of energy; • lack of effective instruments to stimulate the development of forest	• population growth; • income growth and demand for resources; • increased availability of forest areas; • low crop yields; • migration to forest areas; • military activity; • active agro-industrial development; • lack of information on land use and land documents; • governance: - overlapping/ambiguous jurisdictions; - irrational land tenure; - weak legal governance; - lack of fair and transparent judicial resolution; - systemic administrative violations; - and interdepartmental disputes. • social irresponsibility; • low awareness of the ecological role of forests.

	management; • low efficiency of wood use; • insufficient information on the state of forest resources.	
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Source: Assessment of land use, forest policy and governance in Cambodia.

Modern forest land management methods are aimed at striking a balance between the use of wood in industry and the preservation of forest areas for future generations. After all, the existing forest land management system has a number of problems that have arisen due to its imperfections, outdated management approaches, and inconsistency with modern realities in the country (Fig. 3).

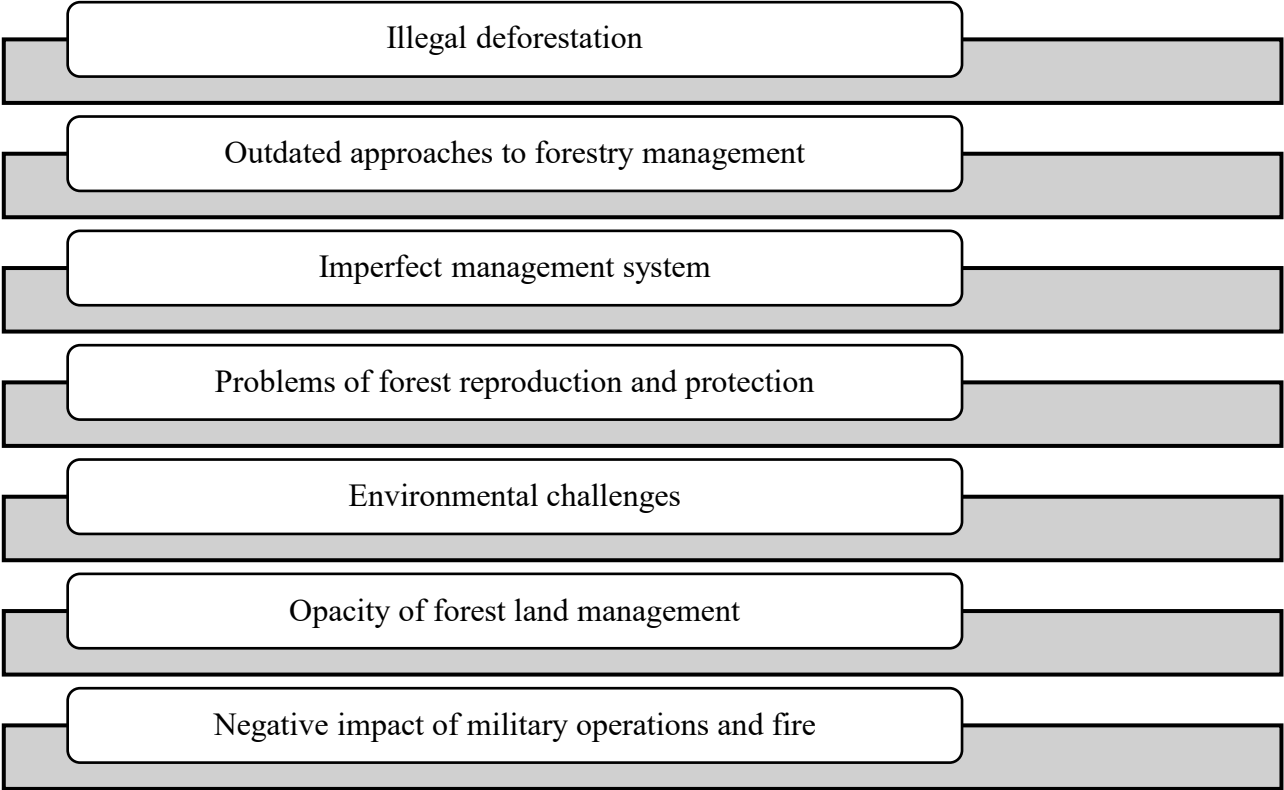


Figure 3. Key problems of ineffective forest land management

Forest lands of Ukraine are an integral part of the comprehensive European Green Deal aimed at achieving climate neutrality by 2050. They support biodiversity, contribute to the restoration of degraded areas, ensure sustainable development of rural areas and absorb carbon dioxide, reducing overall greenhouse gas emissions [17].

Given that a significant part of Ukraine's forests is of ecological importance, it is important to develop a green economy focused on the formation of ecosystem services that forests provide by purifying the air, absorbing surface runoff, and protecting soils from erosion processes, which indicates an increase in the importance of effective

forest land management.

Forest restoration is of great importance for ecology and biodiversity. From the analysis of data from the State Statistics Service of Ukraine, it is possible to observe a stable growth in the area of forest lands in the period 2010-2022, where this indicator is 22.2%. Reforestation and afforestation show 33% positive dynamics, contributing to the increase in the total area of forest land. In particular, in 2022, the area of restored forests significantly exceeded the indicators of previous years, which indicates the effectiveness of measures to restore forest areas and sustainable management of forest lands. These trends are important for maintaining the ecological balance and reducing greenhouse gas emissions, which is in line with the objectives of the European Green Deal. Therefore, their restoration is critical to ensuring the sustainability of natural ecosystems and maintaining sustainable relationships in the surrounding natural environment [28].

Another important part of reforestation work is the creation of artificial forests, especially in post-war reconstruction. Such forests can help to quickly restore forest areas, ensure ecological stability and support biodiversity. However, they require constant monitoring and care to ensure their sustainability and long-term environmental and economic benefits.

According to the State Agency of Forest Resources of Ukraine, the area of artificial forests in Ukraine is about 1.7 million hectares. Reforestation work is carried out annually on an area of more than 50 thousand hectares. Their important role in the ecological and economic stability of the country should be determined due to the increase in wood, as well as the possibility of recreational and tourist use of these territories [29].

Another promising direction is the development of natural forestry, which reflects a progressive form of forest policy aimed at preserving the forest ecosystem and supporting its sustainability. This approach is consistent with modern European standards and meets the needs of a society that seeks to consider forests not only as a source of wood, but also as an important part of the ecosystem.

Analyzing the environmental challenges of forest land management and

biodiversity conservation, it is worth mentioning the Emerald Network, created to implement the provisions of the Bern Convention on the Conservation of European Wild Flora and Fauna and Natural Habitats, of which Ukraine has been a member since 1996. The Emerald Network in Ukraine already includes 377 protected areas, which makes up 13.4% of its area, including the areas of the nature reserve fund of Ukraine, which makes up 6.82% of the total area of the country and has a doubling dynamic by 2030. This plays an important role in absorbing CO₂ emissions, contributing to reducing the greenhouse effect and combating climate change. These aspects are critically important for ensuring sustainable forest land management and achieving ecological balance [30]. Problems with forest land management, in essence, are associated with insufficient coordination between management bodies, lack of effective long-term planning and insufficient control. Therefore, effective management of forest lands in Ukraine requires an integrated approach that combines the protection of natural forests, the restoration of ecosystems, as well as the effective use of forest resources, the preservation of biodiversity and ensuring ecological balance.

A derivative of one of the main problems is: large-scale illegal logging, which causes significant damage to ecosystems and the country's economy and reveals the problem of ineffective control and monitoring by state authorities. As can be seen from the analysis of the Forest Guard reports [18], the lack of clearly established boundaries of forest lands makes effective management and protection impossible. This leads to the impossibility of identifying violations and violators, which contributes to the increase in illegal logging and other offenses on these lands. The materials of the Report determine the need to carry out work on demarcating the boundaries of forest and nature conservation areas, as well as fixing them in nature to ensure proper control and protection of these lands in Ukraine. That is, the absence of boundaries of permanent forest users does not make it possible to identify the violation and the violator, and the damage caused to the forest, in the event that the persons guilty of causing such damage are not identified, must be compensated by the local government body, as determined by part two of Article 107 of the Law of Ukraine “On Amendments to Certain Legislative Acts of Ukraine on Forest Conservation” No.

2321-IX of 06/20/2022 [19]. This problem has become so widespread and acute that it has attracted the attention of law enforcement agencies, in particular the prosecutor's office, but its solution lies in carrying out work to establish the boundaries of forest and nature conservation areas and consolidate them in nature.

The problem of forest regeneration and protection is the insufficient restoration of forest stands after felling, the use of low-quality planting material, and a high level of forest damage by pests and diseases. At the same time, processes of self-afforestation of lands are taking place in Ukraine, which contributes to the natural restoration of ecosystems, the preservation of biodiversity, the improvement of soil quality, helps to reduce erosion and restore degraded lands, which is important for ecological stability and the fight against climate change. However, the lack of clearly established boundaries for such lands and their legal status complicates their effective management.

Environmental factors include climate change, which negatively affects the growth area and condition of forests, an increase in the number of forest fires and, as a result, air and water pollution as a result of deforestation. Organizational and economic factors include limited information on the volume of deforestation during wartime and the sale of wood, and the lack of effective public control.

Given the presence of forests growing in radiation-contaminated areas, in particular in the Chernobyl Radiation and Ecological Biosphere Reserve, it is important to continue monitoring and scientific research to assess the degree of radiation contamination of forest areas, analyze indicators for the possibility of safe use of existing forest resources and the restoration of their productive properties.

The war in Ukraine has caused significant environmental problems. According to the FOREST EUROPE report, the area of forest lands affected by military actions has increased significantly, and the main environmental problems of forest lands include: destruction of forests as a result of military actions; contamination of forest lands with explosives; forest fires.

Of particular importance is the restoration of forest areas affected by military operations in Ukraine, which require significant efforts and resources to clear them of

hazardous objects. Forests affected by military operations often contain dangerous remnants, such as mines and unexploded ordnance, which makes the demining process complex and lengthy.

Post-war restoration of the territory includes several stages, among which demining is one of the most important. First, settlements are demined, then agricultural lands, and only then do they proceed to demining forests. This means that forests often remain dangerous for a long time after the end of military operations and the deoccupation of territories.

Since the beginning of the full-scale invasion in Ukraine, about 3 million hectares of forests have been affected, which is almost a third of the country's forest fund. According to the State Agency of Forest Resources of Ukraine, almost 900 hectares of forests have been completely destroyed. The total damage caused to the forest fund is estimated at 60 billion dollars [31].

According to the authors, the problem of post-war forest restoration consists of several key aspects [14].

First, part of the forest areas is now dangerous for people to stay due to the presence of mines, unexploded shells and other ammunition. This poses a threat to the life and health of both the civilian population and the specialists working there.

Second, contamination with explosive objects harms the ecosystem. Forests, which are home to many species of animals and plants, are under threat. Explosions can destroy flora and fauna, as well as cause fires, which further aggravates the disease.

Third, the problem affects economic activity. Forestry, timber harvesting, mushroom and berry picking, as well as the tourism industry are experiencing serious losses, the latter many areas remain dangerous.

Thus, forest contamination by explosive objects is a multifaceted problem that has both humanitarian and environmental and economic dimensions. Its solution requires an integrated approach: demining the territory, environmental monitoring and information work among settlements [6].

Forest fires in Ukraine are a serious environmental problem, especially in conditions of active military operations. In 2022, 70% of the area of all fires was

registered in a 25-kilometer buffer zone. The area of fires on forest lands in 2023 covers 51 thousand hectares, and the main causes of fires are hostilities, shelling and mining of forest lands. “Forest fires most often occur in the following regions:

- occupied areas of Kherson region: 8.2 thousand hectares of forests were affected, large forest fires - 8.1 thousand hectares;
- partially occupied territory of Mykolaiv region: 2.3 thousand hectares affected, 2.2 thousand hectares covered by large forest fires;
- partially occupied territory of Kharkiv region: 1.2 thousand hectares affected, 1.1 thousand hectares covered by large forest fires;
- deoccupied territories of Kyiv region: 2.3 thousand hectares affected, 2.1 thousand hectares covered by large forest fires” [22].

Climate change significantly affects the absorption of greenhouse gases by forest lands. Forests play an important role in absorbing carbon dioxide (CO₂), which helps reduce the greenhouse effect. According to the Ministry of Environmental Protection and Natural Resources of Ukraine [21], in 2020, forest lands in Ukraine absorbed 42.5 million tons of CO₂, which is 5.2% more than in 2015. However, CO₂ emissions from forest fires in 2020 amounted to 1.8 million tons, which is 12.5% more than in 2015 and offsets the effect of forest lands in combating climate change and desertification processes. The data presented emphasize the importance of effective management of forest lands to reduce greenhouse gas emissions and increase their absorption. According to the Resolution of the Cabinet of Ministers of Ukraine No. 303 of 2007, “allocation of land plots for afforestation contributes to an increase in the area of forest plantations, which is critical for reducing greenhouse gas emissions and improving the ecological state of the country,” therefore, the allocation of plots for afforestation is an important step for increasing the area of forest lands and maintaining ecological stability.

However, an important condition for achieving these goals is scientifically based, rational use of forest lands, which not only meets economic interests, but also takes into account environmental requirements, contributing to the sustainable development of forestry in Ukraine [7].

To ensure rational and effective management of forest lands in Ukraine, forest relations issues and regulation at the legislative level, it is necessary to create a legal framework for the functioning of forestry. According to Article 3 of the Forest Code of Ukraine, forest relations, in addition to the above-mentioned collection, are regulated by a number of basic documents, including: the Constitution of Ukraine, the Law of Ukraine “On Environmental Protection”, the Resolution of the Cabinet of Ministers of Ukraine “On Approval of the State Strategy for Forest Management of Ukraine until 2035”, the Pan-European Strategy for the Conservation of Biological and Landscape Biodiversity, the Framework Convention on the Protection and Sustainable Development of the Carpathians, the Strategy for Low-Carbon Development of Ukraine until 2050, the Concept for the Implementation of State Policy in the Field of Climate Change for the Period up to 2030, the National Action Plan for Renewable Energy for the Period up to 2030, as well as other legislative acts that establish legal norms and strategic directions of development in the field of ecology and forest land management (Table 3).

Table 3. Concepts, state strategies and programs related to forest land management

Title of the strategic document	About forest lands	Features of measures/tools/mechanisms
State Forest Management Strategy of Ukraine until 2035	Creating the necessary infrastructure for forest land management, a balanced legal system and ensuring transparency in forestry. Active involvement of public and private entities, international organizations and the use of modern technologies for monitoring and protecting forest resources.	The State Forest Management Strategy of Ukraine until 2035 aims to address key issues such as the balance between the ecological, economic and social functions of forests, inadequate forest land management, financial difficulties, environmental problems and overcoming the consequences of war. The strategy envisages reforming state administration, restoring forest areas after military operations and creating a single electronic database on forest lands.
Pan-European Strategy for the Conservation of Biological and Landscape Diversity	Development and implementation of an action plan for the introduction of aspects of biological and landscape diversity with the	It is determined that aspects of biological and landscape diversity will be integrated, as appropriate, into the relevant economic and social sectors. In particular, agriculture, marine fisheries, forestry and tourism are

	development of an ecological network into forest management and taking into account the use of forest products and their restoration.	expected to recognise the need to conserve biological and landscape diversity as their primary concern and to actively seek to maintain and enhance the quality of nature and landscapes. Forestry: implement strategic principles in forest management more effectively, to increase the capacity of local tree species to regenerate, to zone naturally developing forest areas, and to align afforestation policies with environmental and landscape conservation policies, as well as rationalize the use of fertilizers and pesticides. Defense: integrate biodiversity and landscape diversity objectives into the defense sector in order to avoid the negative impact of military activities on areas of high natural value and to prevent or reduce this impact on landscapes, and to promote the introduction of rational land use.
Framework Convention on the Protection and Sustainable Development of the Carpathians	Integrated planning and management of land and water resources.	The Parties shall apply the integrated land management approach, as defined in Chapter 10 of Agenda 21, by developing and implementing appropriate instruments, such as integrated management plans, relating to the areas covered by this Convention.
Low-carbon development strategy of Ukraine until 2050	The importance of forest lands for increasing carbon sequestration through afforestation (reforestation) and other measures is identified, which is part of Ukraine's strategy to achieve the goals of the Paris Agreement and transition to a low-carbon economy.	Describes a set of tools to achieve low-carbon development in Ukraine, including reforestation, increasing energy efficiency, increasing the share of renewable energy sources, improving waste management, and developing organic agriculture, which contributes to reducing greenhouse gas emissions and transitioning to an environmentally sustainable economy.
Concept for the implementation of state policy in the field of climate change for the period until 2030	Politically, economically and scientifically sound decisions on climate change must be made for all sectors of the economy, including energy, industry, agro-	Increase the absorption of greenhouse gases through measures in forestry and land use.

	industrial complex, transport, water, forestry and housing and communal services, land use, as well as health protection, preservation and restoration of ecosystems.	
National Renewable Energy Action Plan for the period up to 2030	In addition to the available woody biomass, a promising renewable source for thermal energy production is energy plants, which are grown on low-yield lands and can be resistant to drought conditions and require less or no use of chemical plant protection products.	The cultivation of energy crops should not displace traditional cultivation of agricultural crops and lead to the transformation of forests, wetlands, peatlands, etc., in particular into agricultural land, which negatively affects the environment and increases greenhouse gas emissions. The production of biofuels, biomass and other relevant agricultural raw materials for energy production should not interfere with the goals of environmental protection, the preservation of nature-protected areas and objects, valuable ecosystems, biota species, etc. In Ukraine, there are more than 500 thousand hectares of land that require conservation. As of the beginning of 2024, only 6.5 thousand hectares of low-productive land were used for energy crops.

Source: Prepared on the basis of [10, 23, 24, 25, 26, 27].

In general, the existing concepts, state strategies and programs related to forest land management are an ambitious and comprehensive action plan aimed at solving not only economic but also environmental challenges. They provide a balance between the need for raw material use of forest areas and preserving the ecological stability of forest ecosystems. The system of existing concepts and state strategies has the potential to improve forest land management, preserve natural resources and strengthen the role of forest areas in combating climate change, however, their implementation requires significant financial resources and effective coordination between state, local authorities and the public.

In this context, special attention is paid to modern forest land management models, which are not only aimed at preserving and restoring forests, but also ensure their rational exploitation taking into account new challenges. Such models are

considered as the basis of a platform for systemic interactions between the forest-resource and market development cycles. They contribute to the effective functioning of the economic system, providing analytical support for management decisions, development, implementation and gradual improvement of a single development strategy. Such models contribute to positive transformations in the structures and relationships of systems, eliminating factors that lead to a decline in the state of forest resources and ecosystems, as well as losing their usefulness and value for current and future generations.

The structure of the model of balanced use of forest lands involves the implementation of a comprehensive system of protection and reproduction of natural resources on their areas [11]. Such models include three main verticals of quality management:

- political, legal/regulatory and institutional frameworks;
- planning and decision-making processes;
- implementation, execution and compliance.

The concept of the vertical of quality management defines the following six principles that are intertwined and relate to the quality of forest land management:

- accountability - people and institutions must be responsible for their actions;
- effectiveness - forest land management mechanisms should achieve the objectives they aim to achieve;
- efficiency - forest land management should operate with minimal input of resources;
- equity - the value of forest land should be objective;
- participation - all interested people should be able to be consulted or participate in making key decisions concerning forest resources;
- transparency - information about forest land and how it is managed should be available to all [20].

In summary, the main proposals for forest land management should be highlighted, which are aimed at ensuring sustainable development of forest lands and maintaining ecological balance in the biosphere:

- restoration of forest lands by planting local tree species to restore forest cover under the influence of military actions and improve the condition of degraded lands;
- creation of forest plantations that provide a wide range of products and services that contribute to the spatial development of territorial communities;
- ensuring a balance between meeting immediate human needs and maintaining the ability of the forest biosphere to generate ecological services in the long term;
- improving the quality of restoration and rehabilitation of forest lands to reduce vulnerability to climate change and other natural challenges.

Conclusions. Ukraine faces a multi-layered crisis in forest land management, encompassing illegal logging, outdated approaches, weak governance, and environmental challenges. One of the most acute factors is large-scale illegal logging, which is made possible by the lack of clearly defined forest land boundaries, weak control, and low transparency in accounting. These violations undermine the principles of sustainable management enshrined in the EU Forest Strategy, which calls for the integration of a conservation approach, digitalization of cadastres, and rigorous monitoring.

The current forest management system is based on outdated approaches that do not meet the environmental, social, and climate challenges of the 21st century. Forest lands continue to be viewed primarily as a source of wood, rather than as multifunctional ecosystems capable of providing air purification, water conservation, and climate regulation services. Existing management strategies do not fully reflect, and sometimes contradict, the European Biodiversity Strategy for 2030 and the EU Green Deal, which aim to cover at least 30% of Europe's territory, including forest lands, with protection.

The problems of forest land restoration and protection remain critical. Despite the positive dynamics: an increase in forest land area by 22.2% from 2010 to 2022 and active restoration programs (over 50,000 ha per year), which have ensured a 33% increase, the quality of reforestation often remains unsatisfactory. Artificial forests,

covering 1.7 million ha, require long-term supervision, and self-afforestation processes require legal regulation. Without an integrated approach that takes into account scientific methods and European approaches to forest land management, it is impossible to ensure their sustainable use.

A separate threat is posed by environmental challenges caused by military operations and large-scale forest fires. About 3 million hectares of forest land have been affected by the ongoing military operations in Ukraine, of which 900 hectares have been completely destroyed. In 2023, the area of forest fires amounted to 51 thousand hectares, a significant part of which fell on mined territories. According to the information provided, in 2020, forests absorbed 42.5 million tons of CO₂, but due to the increase in the frequency of fires, emissions reached 1.8 million tons of CO₂, which partially offsets the climate function of forest lands. The restoration of these territories should be based on integration into the Emerald Network, which already covers 13.4% of the territory in Ukraine, and the use of the EU's experience in adapting to climate change, which focuses on restoring natural processes and minimizing human impact.

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ЛІСОВІ ЗЕМЛІ УКРАЇНИ: ВИКЛИКИ, ЗАКОНОДАВЧЕ РЕГУЛЮВАННЯ ТА СТРАТЕГІЧНІ НАПРЯМИ РОЗВИТКУ

***Анотація.** У статті визначено цінність лісових земель України як стратегічного природного ресурсу, які виконують численні економічні, екологічні та соціальні функції. Зокрема, підкреслено необхідність ефективного управління лісовими землями для збереження навколишнього природного середовища та запобігання деградації земель.*

Проведено всебічний аналіз сучасного стану використання лісових земель та їх ключових проблем в умовах воєнних дій та викликів, пов'язаних із війною. Розкрито основні аспекти використання лісових земель, враховуючи їх екологічне, економічне та соціальне значення для країни. Було здійснено аналіз найважливіших інструментів лісової політики Європейського Союзу та можливість їх впровадження в Україні.

У процесі дослідження інформації про стан лісових земель в Україні, їх динаміку та особливості їх функціонального використання особливу увагу було приділено управлінню лісовими землями, як важливого компонента кліматично-енергетичних рамок Європейського Союзу до 2030 року. У статті акцентовано увагу на необхідності комплексного підходу до ефективного управління лісовими землями в Україні при досягненні екологічного балансу охорони лісів, відновленні екосистем та їх ефективному використанні.

Висвітлено проблематику забруднення лісових площ вибухонебезпечними речовинами, та розглянуто шляхи подолання цієї проблеми.

Проаналізовано основні нормативно-правові акти, які регулюють земельні і лісові відносини, зокрема Земельний і Лісовий кодекси України, закони та

підзаконні акти, що регулюють права та обов'язки органів управління, а також власників і користувачів лісових земель.

У статті визначено необхідність доповнення існуючої нормативно правової бази управління лісовими землями стратегічним напрямом подолання наслідків війни і повоєнної розбудови держави.

Ключові слова: *лісові землі, кліматичні зміни, функції лісових земель, забруднення лісових площ, воєнні дії, повоєнне відновлення, лісова політика Європейського Союзу, проблеми неефективного управління лісовими землями, стратегія розвитку, законодавче забезпечення, управління лісовими землями.*