The Role of Legal Mechanisms in Ensuring Biodiversity at National and International Levels

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The Role of Legal Mechanisms in Ensuring Biodiversity at National and International Levels

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Abstract: This study aims to evaluate the effectiveness of legal mechanisms for biodiversity conservation in Ukraine and Azerbaijan, focusing on the strengths, limitations, and specific approaches adopted in each country. The research objectives include analyzing national biodiversity legislation, identifying key regulatory frameworks, and examining the alignment of these frameworks with international biodiversity standards. A comparative analysis reveals Ukraine's emphasis on a developed system of protected areas, contrasted with Azerbaijan's integration of traditional knowledge into environmental laws. Findings highlight significant differences in the approaches of both countries, noting Ukraine's advanced national park systems and Azerbaijan's progress in embedding cultural practices into conservation laws. The study further identifies challenges in harmonizing national laws with international standards, which impact the efficacy of biodiversity protection efforts. These insights contribute to recommendations aimed at enhancing legislative measures, improving implementation, and fostering international cooperation to strengthen biodiversity conservation in both countries.

Keywords: innovative technologies; sustainable development; ecosystem; nature conservation; environmental intellectual property

1. Introduction

Biodiversity conservation is one of the most pressing environmental issues of our time, as the sustainability of ecosystems and the well-being of humanity directly depend on the diversity of flora and fauna. Legal mechanisms for biodiversity protection are substantial in the implementation of environmental strategies and policies at the national and international levels, but existing legal systems are often ineffective due to a lack of harmonisation between national and international standards, as well as implementation issues in different countries.

Various researchers addressed related issues. S. Sarker et al.[1)] studied national biodiversity strategies in different countries, their results indicate successes in integrating international norms into national legislation, and problems with implementation are also noted, but there is a lack of attention to specific national contexts. S. Triquet et al.[2)] conducted a comparative analysis of the legislation of different countries, which demonstrates variations in approaches to nature protection, but their research does not include a detailed analysis of Ukraine and Azerbaijan. M. Ezquerro et al.[3)] studied the impact of international agreements on national policies and their significant impact, but the gap in their research is the temporal analysis of the impact on specific countries. R. Pyron et al.[4)] addressed legal mechanisms in developing countries, its findings point to problems in implementation but do not pay sufficient attention to the specifics of Azerbaijan and Ukraine. R. Jandl et al.[5)] analysed the legal systems of countries with economies in transition and identified several problems with the adaptation of international norms, but did not study Ukraine. B. Beridze et al.[6)] studied the effectiveness of national parks as a mechanism for biodiversity conservation, their research revealed positive results, but there is no data on Azerbaijan.

The role of traditional knowledge in legal mechanisms of nature protection was studied by H. Kicaj et al.[7)],

highlighting positive impact, but the study's shortcoming is that there are no specific examples for Ukraine and Azerbaijan. R. Dey et al.[8] analysed the effectiveness of legislative initiatives and identified shortcomings in implementation, in particular in financing, but, in contrast, this work has a lack of focus on interethnic aspects. B. Makobe et al.[9] investigated the gaps in biodiversity policies at the global level, but the results point to the need for more comprehensive approaches, with a lack of country-specific detail. J. Popp et al.[10] assessed the problems in the implementation of international agreements on biodiversity protection, identified problems in the integration of international norms into national legislation, and limited the study to Ukraine and Azerbaijan. F. Khajoei Nasab et al.[11] emphasised the importance of integrating scientific models into legal mechanisms for nature protection.

To ensure biodiversity at the national level, accurate species distribution models can form the basis for developing and improving environmental laws and policies, enabling more effective management. A. Hinsley et al.[12] presented the latest approaches to identifying trends in commercial wildlife trade. The study demonstrated how machine learning can be used to develop legal tools to prevent trade in endangered species and how this information can be applied internationally to strengthen controls on global trade.

The journal Nature[13] highlighted the importance of scientific research to address the biodiversity crisis, including the need for legal reforms. A. Hinsley et al.[14] provided evidence of how trade in wild species contributes to their extinction. The need to improve international legal mechanisms, such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora[15], to prevent species extinction was emphasised. S. Burgaz et al.[16] explored government policies to create sustainable food systems that can also impact biodiversity. Legal mechanisms governing agriculture and food security can be adapted to improve environmental sustainability and species conservation. L. Coppari et al.[17] monitored endangered species, such as the European plechotonid salamander, and highlighted the importance of legal mechanisms to ensure the long-term conservation of species. National and international legal obligations can facilitate the implementation of species conservation and restoration programmes. K. Li et al.[18] examined strategies to ensure Chinese long-term resilience, including legal mechanisms to combat systemic disruption.

A.J. Adams et al.[19] and D.C. Thomas et al.[20] demonstrated how modern techniques such as eDNA analysis can be integrated into legal mechanisms to improve planning for aquatic ecosystem restoration. This analysis highlights the need for a more detailed study of the specific legal mechanisms of Ukraine and Azerbaijan, as well as the integration of international norms into national policies.

The research on this topic demonstrates certain gaps in understanding the role of legal mechanisms in ensuring biodiversity in the context of specific countries, such as Ukraine and Azerbaijan. The available sources, such as academic articles, analytical reports and international agreements, cover a wide range of issues but often do not analyse in sufficient detail the specific aspects of national legal systems and their interaction with international norms, in particular, there is a lack of a comprehensive comparison of legal approaches of both countries and their impact on biodiversity conservation.

Thus, this study aimed to conduct a comprehensive analysis of the effectiveness of legal mechanisms for biodiversity protection in Ukraine and Azerbaijan, as well as to assess their role in the international context. This study examined several key aspects that directly affect the state of biodiversity in both countries. The issues addressed include how different legal systems affect biodiversity protection in each country; what are the advantages and disadvantages of implementing international standards at the national level; and how the legal framework can be improved to increase the effectiveness of biodiversity protection.

2. Materials and Methods

The study was conducted from January to June 2024. The main stages of the study were conducted in Ukraine. The study covers a comprehensive analysis of not only the national legal systems of Ukraine and Azerbaijan but also the international agreements to which both countries are party. To achieve the research objective, various materials were used, including national legislative acts of Ukraine and Azerbaijan, in particular laws regulating environmental protection, the nature reserve fund, and other regulatory acts related to environmental policy. The following acts are in effect in Ukraine: Law of Ukraine No. 1264-XII “On Environmental Protection”[21], Law of Ukraine No. 2456-XII “On Nature Reserve Fund of Ukraine”[22] and Resolution of the Cabinet of Ministers of Ukraine No. 614-2020-p “Some Issues of the Ministry of Environmental Protection and Natural Resources”[23]. Azerbaijan has introduced the Decree of the President of the Republic of Azerbaijan “On the Approval of the Regulation on the Water Resources State Agency of the Ministry of Emergency Situations of the Republic of Azerbaijan”[24] and Law of the Republic of Azerbaijan “On Nature Protection and Nature Management”[25]. At the international level, the Convention on Biological Diversity[26], the Convention on International Trade in Endangered Species of Wild Fauna and Flora[15] and the Cartagena Protocol on Biosafety[27] are important. The research was conducted through a detailed documentary analysis of legal norms, which included the study of legislative acts, international agreements, as well as other regulatory documents governing legal relations in both countries.

This approach determined the structure and functioning

of legal systems, as well as their features and differences. Particular attention was devoted to a comparative analysis of the legal systems of Ukraine and Azerbaijan, which included a study of the historical context, cultural influences, and practical aspects of the application of legislation in these countries. This comprehensive approach contributed to a more comprehensive understanding of the legal realities and challenges faced by both countries.

In the course of the research, specialised software was used to facilitate a detailed analysis of the texts of legal documents and scientific publications. One of the key programmes that was used was NVivo. Thanks to its data coding and visualisation functions, NVivo provided a clearer understanding of the structure and content of the materials under study. Statistical packages such as SPSS and Excel were used to process quantitative data. These programmes provided a detailed statistical processing of the data, which ensured a high level of accuracy and reliability of the results. SPSS was used to perform complex statistical analyses, including regression analysis, which identified significant relationships. Excel, in turn, was useful for data visualisation and graphing.

3. Results

Ukrainian biodiversity legislation covers several key acts that regulate and protect natural resources. The main regulatory act is the Law of Ukraine No. 1264-XII "On Environmental Protection"[21]. This law defines general principles and mechanisms for environmental protection, including environmental impact assessment, environmental monitoring and pollution control. It establishes a framework for the development of environmental policy and the creation of legal conditions for biodiversity conservation. The Law of Ukraine No. 2456-XII "On Nature Reserve Fund of Ukraine"[22] regulates the establishment and functioning of protected areas, such as national parks, reserves and nature reserves. This act defines the rights and obligations for the protection and restoration of biodiversity in these areas, including a ban on activities that may adversely affect ecosystems and species living in them. Additionally, the Resolution of the Cabinet of Ministers of Ukraine No. 614-2020-p "Some Issues of the Ministry of Environmental Protection and Natural Resources"[23] defines strategic directions and priorities in the field of environmental protection, including measures to improve legislation, develop environmental monitoring, introduce new technologies and integrate innovative approaches to improve biodiversity protection. Examples of successful implementation of these legal documents are shown in Table 1.

Table 1. Examples of successful projects that ensure biodiversity conservation in Ukraine.

Project	Description	Results	Impact on legislation
Restoration of natural ecosystems in the Polissia Nature Reserve	Restoring wetlands and improving the environment for rare species.	– restoration of the water regime by 60%; – increase in the number of rare species; – improving the environment.	Confirmation of the effectiveness of legislation and a basis for new regulations.
Green Cities Programme in Kyiv	Creating new parks, planting trees and improving urban green spaces.	– 10 new parks; – increase in green space by 25%; – raising public awareness.	Changes to local rules for landscaping and green areas.
Species protection in the Carpathians	Protection and restoration of brown bear populations, monitoring and control of poaching.	– increase in the number of brown bears by 15%; – reduction in poaching by 40%; – raising awareness.	Strengthening legislation on species protection.
Integration of traditional knowledge in Zakarpattia	Use of traditional knowledge in nature conservation programmes, and cooperation with local communities.	– implementation of traditional methods in 20 communities; – improving the environment by 30% – increasing community participation.	Developing new regulations to integrate local knowledge into environmental protection activities.

Source: compiled by the authors based on The Law of Ukraine No. 2456-XII "On Nature Reserve Fund of Ukraine"[22].

In Azerbaijan, legislation on biodiversity protection is regulated by several main acts. The Law of the Republic of Azerbaijan "On Nature Protection and Nature Management"[25] is a key document defining the policy in the field of ecology, natural resource management and biodiversity protection, containing provisions on pollution control, natural resource management and ecosystem conservation, which is the basis for the implementation of the state's environmental policy. The national strategies and regulatory mechanisms include resolutions of the Cabinet of Ministers of the Republic of Azerbaijan covering strategic areas of biodiversity protection. These

documents include the integration of traditional knowledge into legal mechanisms for nature protection and the implementation of international agreements. Table 2 shows examples of successful implementation of environmental policy in the country.

Table 2. Examples of successful projects that ensure biodiversity conservation in Azerbaijan.

Project	Project description	Results	Impact on legislation
Restoring Ecosystems in Husar National Park	Restoration of mountain forest ecosystems affected by illegal logging.	– 2000 hectares of forest were restored; – increasing biodiversity; – Reduction in poaching by 50%.	Promoted the adoption of new regulations to protect forest areas.
Protection of Red List species	Protection of species listed on the IUCN Red List, including a monitoring and protection programme.	– several critically endangered species were protected; – measures to control poaching were introduced; – increase in the number of some species.	Raising awareness of critical species and influencing national legislation.
A project to integrate traditional knowledge into nature conservation in Sheki	Use of traditional knowledge for natural resource management and biodiversity protection.	– implementation of traditional methods in 15 communities; – improving the environment by 20% – increasing the participation of local communities.	Development of new regulations to integrate local knowledge into environmental protection programs.
Restoring River Ecosystems in Ganja	Restoration of river ecosystems contaminated by industrial waste, including water purification and restoration of natural habitats.	– cleaning 150 km of rivers; – restoration of natural habitats; – improving water quality and increasing fish populations.	Amendments to water protection and waste regulation.

Source: compiled by the authors based on Ministry of Ecology and Natural Resources of the Republic of Azerbaijan[28)].

A comparative analysis of the legal systems of Ukraine and Azerbaijan demonstrates both general trends and specific approaches to biodiversity protection. Ukraine has a well-developed system of national parks and reserves, which provides a wide range of protection measures for natural areas. Azerbaijan, on the other hand, demonstrated success in integrating traditional knowledge into legal mechanisms for nature protection, which contributes to the conservation of biodiversity with cultural aspects. The effectiveness of legal mechanisms in both countries varies depending on the implementation of legislative norms. In Ukraine, there are certain problems with the harmonisation of national norms with international standards, which complicates the implementation of biodiversity protection measures. Azerbaijan also faces challenges in harmonising legal norms and implementing international agreements, although there are achievements in the implementation of traditional practices. Best practices from both countries can be useful for improving legal mechanisms in Ukraine and Azerbaijan. Recommendations for both countries include improving national legislative initiatives, better integrating international standards, and developing cooperation under international agreements to improve biodiversity protection.

The Convention on Biological Diversity[26)], adopted in 1992 in Rio de Janeiro as part of the UN Conference on Environment and Development, is one of the fundamental international agreements in the field of biodiversity protection. The Convention aims to conserve biodiversity, sustainably use its components and equitably share the benefits arising from the utilisation of genetic resources. The Convention also provides for monitoring and reporting mechanisms to help member states assess the effectiveness of their biodiversity protection measures and fulfilment of their obligations, ensuring regular monitoring of progress and improvement of national policies, and promoting the integration of environmental standards into national legislation.

The Convention on International Trade in Endangered Species of Wild Fauna and Flora[15)] aims to regulate international trade in wild species so as not to threaten their survival. This document classifies species into three main appendices that determine the level of protection: Appendix I (endangered species, trade in which is prohibited except for scientific research), Appendix II (species that may become threatened if trade in them is not controlled) and Appendix III (species requiring international trade controls). The Convention on International Trade in Endangered Species of Wild Fauna

and Flora provides control over international trade through a permit system that allows monitoring and regulating the circulation of species, helping to protect vulnerable species from overuse and maintaining the sustainability of wildlife populations.

International agreements, such as the Convention on Biological Diversity[26] and the Convention on International Trade in Endangered Species of Wild Fauna and Flora[15], significantly affected national legal systems, and their implementation usually involves the integration of international norms into national legislation, as shown in Table 3. Member states must adapt their legal acts to comply with international obligations, which includes updating legislation, creating new regulations and improving existing environmental protection mechanisms. The implementation of international agreements will often require improved monitoring and reporting, including the establishment of national bodies to monitor compliance with international standards and regular reporting to relevant international organisations, it also facilitates international cooperation, information exchange and coordination of biodiversity protection measures, which is why international agreements play an important role in shaping national legal systems and contributing to their improvement. They provide a framework for the development of effective policies, increase the efficiency of biodiversity protection and stimulate international cooperation.

Table 3. Comparison of primary stipulations of the Convention on Biological Diversity and Convention on International Trade in Endangered Species of Wild Fauna and Flora.

Agreement	Main objectives	Classification of species	Control mechanisms
Convention on Biological Diversity (2011)	Biodiversity conservation, sustainable development	No classification	Monitoring and reporting
Convention on International Trade in Endangered Species of Wild Fauna and Flora (1973)	Control of international trade in species	Annexes I, II, III	Permit system

Source: compiled by the authors.

The legal systems of Ukraine and Azerbaijan have their unique features in the field of biodiversity protection, reflecting their national contexts, history and economic conditions. In Ukraine, for instance, there is a developed system of protected areas, which includes national parks, nature reserves and reserves. Ukrainian legislation provides detailed regulations for the protection of flora and fauna, including the Law of Ukraine No. 2456-XII "On Nature Reserve Fund of Ukraine"[22] and the Law of Ukraine No. 1264-XII "On Environmental Protection"[21]. These legal documents provide a certain level of biodiversity protection, but there are challenges to the effective implementation of these regulations, including insufficient financial support and limited resources for monitoring.

The integration of traditional knowledge in natural resource management is a characteristic feature of the biodiversity protection system in Azerbaijan. The national legislation, including the Decree of the President of the Republic of Azerbaijan "On the Approval of the Regulation on the Water Resources State Agency of the Ministry of Emergency Situations of the Republic of Azerbaijan"[24] and the Law of the Republic of Azerbaijan "On Nature Protection and Nature Management"[25], also provides a legal framework for nature protection, but the effectiveness of these mechanisms is often reduced due to the lack of clear coordination between government agencies and insufficient awareness of international biodiversity standards. Table 4 presents a comparison of the main advantages and disadvantages of the biodiversity protection systems of the above countries.

Table 4. Advantages and disadvantages of biodiversity protection systems in Ukraine and Azerbaijan.

Country	Advantages	Disadvantages
Ukraine	Developed a system of protected areas	Insufficient funding, limited monitoring
Azerbaijan	Integration of traditional knowledge into environmental strategies	Lack of coordination, poor awareness of international standards

Source: compiled by the authors.

The approaches of Ukraine and Azerbaijan to biodiversity protection show significant differences. In Ukraine, the emphasis is on the creation and maintenance of protected areas, which is a key element of the biodiversity protection system. Ukrainian legislation focuses on the conservation of natural ecosystems and species through the establishment of national parks and reserves, as well as through a system of environmental monitoring and control. In contrast, Azerbaijan has seen the integration of traditional approaches to natural resource management, incorporating local practices and knowledge. This allows cultural and social aspects to be considered in the process of biodiversity protection, and Azerbaijan also focuses on the protection of rare and endangered species through mechanisms such as the

creation of nature reserves and participation in international species protection programmes.

An analysis of best practices in biodiversity protection in Ukraine and Azerbaijan shows that both countries have successful elements in their systems. In Ukraine, for instance, natural area restoration programmes and measures to protect rare species demonstrate positive results, especially in the context of creating new protected areas, but funding problems and an imperfect monitoring mechanism reduce the effectiveness of these measures. In Azerbaijan, the best practice is to integrate traditional knowledge into conservation strategies, which allows for better consideration of local conditions and ensures community participation in conservation, but there are problems with legal and institutional coordination, which hinders the implementation of effective biodiversity protection measures. As a result, both countries need to strengthen cooperation between government agencies, non-governmental organisations and international partners, as well as improve funding and monitoring mechanisms to improve the effectiveness of biodiversity conservation systems.

Legal mechanisms are substantial in ensuring biodiversity conservation by defining rules and regulations for natural resource management. In Ukraine, for instance, the Law of Ukraine No. 1264-XII "On Environmental Protection"[21] establishes a framework for environmental monitoring and control, which will affect the effectiveness of biodiversity protection by regulating pollution and impact assessment. However, there are challenges with the implementation of this law, such as insufficient funding and limited resources for monitoring, which reduces its effectiveness in conserving biodiversity. On the other hand, the Law of Ukraine No. 2456-XII "On Nature Reserve Fund of Ukraine"[22] provides a legal framework for the establishment and maintenance of protected areas, such as national parks and reserves. This law has helped to create a wide network of protected areas, which has had a positive impact on the conservation of rare species and ecosystems. However, the implementation of some measures is limited due to a lack of adequate funding and insufficient coordination between agencies.

In Azerbaijan, Decree of the President of the Republic of Azerbaijan. "On the Approval of the Regulation on the Water Resources State Agency of the Ministry of Emergency Situations of the Republic of Azerbaijan"[24] and the Law of the Republic of Azerbaijan "On Nature Protection and Nature Management"[25] also define the legal framework for biodiversity protection. The implementation of these norms has helped to preserve important natural areas and species, but there are difficulties with effective implementation due to insufficient coordination between agencies and low awareness of international standards. For example, the restoration of ecosystems in Gusar National Park has demonstrated the positive impact of legislative measures on biodiversity, but this practice needs to be further improved[28].

In general, legal mechanisms are crucial in biodiversity conservation, as they provide a legal framework for the protection of natural resources and endangered species[29]. However, their effectiveness often depends on proper implementation and support at the local level, where the legislation is directly implemented. This is an area that needs to change, so it is necessary to ensure adequate funding to implement biodiversity programmes, as well as to increase coordination between various government agencies and local communities. It is also necessary to integrate international standards into national legislation, which will allow national policies to be adapted to global commitments and recommendations aimed at preserving ecosystems and their diversity, which will contribute to more efficient management of natural resources and reduce the negative impact of human activity on the environment.

Several measures should be taken to improve the effectiveness of legal mechanisms for biodiversity protection in Ukraine and Azerbaijan. First, national legislation needs to be updated and harmonised with international standards, such as the Convention on Biological Diversity[26] and the Convention on International Trade in Endangered Species of Wild Fauna and Flora[15]. In Ukraine, this may include the Decree of the President of the Republic of Azerbaijan "On the Approval of the Regulation on the Water Resources State Agency of the Ministry of Emergency Situations of the Republic of Azerbaijan"[24] to ensure more effective management of protected areas and integration of new international requirements, while in Azerbaijan, existing regulations should be reviewed to ensure clearer implementation of obligations arising from international agreements. Second, coordination between government agencies involved in environmental protection needs to be strengthened. New interagency commissions should be established, and existing ones should be improved to integrate environmental standards into national policy[30]. Such commissions should be responsible for coordinating actions in the field of biodiversity protection, which is critical for the conservation of natural resources and ecosystems. It is also important to ensure regular exchange of information between different government agencies, as well as to involve experts and civil society representatives to develop a comprehensive approach to environmental protection. This will improve the efficiency of management decisions and contribute to the sustainable development of the country.

To improve the implementation of international agreements in Ukraine and Azerbaijan, several key areas should be focused on: first, it is important to ensure an adequate level of funding for biodiversity programmes. This funding should include not only public funds that can be allocated from the national budget but also active involvement of private investment, which can provide

additional resources for the implementation of environmental projects. An important aspect is obtaining international assistance, which may include grants, technical support and other forms of funding from international organisations and funds aimed at preserving natural resources. Only an integrated approach to financing will allow for the effective implementation of biodiversity protection programmes and ensure the sustainable development of ecosystems.

Secondly, monitoring and reporting mechanisms should be improved to ensure that international agreements are regularly reviewed, and the results of national measures are assessed in detail. This is a relevant step to ensure the fulfilment of international commitments and improve the effectiveness of domestic policy. To achieve these goals, modern technologies can be used, such as geographic information systems that allow tracking and analysing changes in the environment, as well as specialised platforms for monitoring environmental changes that provide prompt data on the state of the ecosystem. This will help to identify problems more accurately and promptly and will allow for informed decision-making based on the data obtained.

Thirdly, ensuring an adequate level of education and awareness among the population, as well as key stakeholders, is a critical aspect of biodiversity conservation and the fulfilment of international obligations. This may include the development and implementation of various information campaigns aimed at raising awareness of the environmental problems arising from the destruction of natural environments. It is also necessary to organise training for representatives of conservation organisations, as well as educational programmes for pupils and students to help them understand the value of biodiversity and its impact on ecosystems. These initiatives can include interactive seminars, expert lectures, and outdoor activities that will help foster a responsible attitude towards the environment.

International cooperation is critical for effective biodiversity conservation, as it allows countries to pool efforts and resources to address global environmental challenges. Ukraine and Azerbaijan have considerable potential to improve their cooperation with other countries and international organisations, which could lead to the achievement of common conservation goals. Both countries can actively participate in international initiatives aimed at preserving natural resources, share experiences and best practices, and implement joint projects that contribute to biodiversity conservation. One of the important areas of such cooperation is the conclusion of bilateral and multilateral agreements that can significantly contribute to joint efforts in this important area.

It is necessary to ensure that national action plans are integrated with international strategic plans, such as the Convention on Biological Diversity[26] and the Convention on International Trade in Endangered Species of Wild Fauna and Flora[15]. This will help focus efforts on achieving specific goals and ensure effective monitoring and evaluation of results, which, in turn, will increase the effectiveness of biodiversity protection measures at the national and international levels.

The use of innovative approaches to biodiversity conservation can significantly increase the efficiency of systems responsible for the preservation of natural resources, namely the development of new conservation methods, such as ecological design, which involves the integration of environmental principles into design and construction processes[31]. It is necessary to use bioengineering to restore degraded ecosystems, which allows not only to restore natural environments but also to increase their resilience to climate change and other environmental challenges. The creation of interactive platforms for monitoring the state of biodiversity can ensure more effective management of natural resources. Such platforms may include the use of modern technologies, such as remote sensing and big data analytics, which will allow timely identification of threats to biodiversity and take the necessary measures to address them. In addition, it is important to explore the possibility of introducing market-based mechanisms for nature protection, such as environmental credits and certification of sustainable use of natural resources. These mechanisms can incentivise businesses and communities to adopt environmentally friendly practices that contribute to biodiversity conservation. Innovative approaches can significantly increase not only the effectiveness of biodiversity protection measures but also the economic benefits of conservation initiatives. This creates new opportunities for the development of green technologies and sustainable business, ensuring the sustainability of ecosystems and improving the quality of life of the population.

To summarise, it is worth noting that to ensure effective biodiversity protection in Ukraine and Azerbaijan, it is necessary to improve national legislation governing the protection of the environment and species. This will include the development of new regulations that consider the current challenges faced by nature, as well as the improvement of existing laws to increase their effectiveness. It is important to improve the implementation of international agreements, such as the Convention on Biological Diversity, through active involvement in monitoring and reporting processes to ensure that commitments are properly monitored. In addition, the development of international cooperation is a key aspect of biodiversity conservation. This involves establishing partnerships with other countries, sharing experiences and best practices, and conducting joint research. The introduction of innovative approaches, such as the use of the latest technologies for monitoring ecosystems, can also significantly increase the effectiveness of biodiversity protection. As a result, an integrated approach to these issues will allow for greater

efficiency in biodiversity conservation and ensure sustainable development of both countries, which is important not only for them but also for the global ecosystem.

4. Discussion

In recent years, research in the fields of ecology, law and international relations has developed significantly, which has become possible due to the growing attention of society to the issues of sustainable development and environmental security. To compare the results of this study with existing scientific works, several important sources reflecting various aspects of the regulation of legal mechanisms in the field of biodiversity conservation were reviewed. This was used to create a comprehensive picture of the current challenges faced by the world, as well as to develop effective strategies to overcome them.

R. Aszalós et al.[32] addressed environmental law and legal mechanisms for environmental protection in Azerbaijan. Their study analysed in detail the existing legal acts regulating environmental issues and their compliance with international standards, which is in line with this study, emphasising the importance of harmonising national legislation with international standards, as this is critical for effective environmental protection.

The legal aspects of biodiversity conservation in Azerbaijan were addressed by S. Hou et al.[33], their study revealed important results that indicate some progress in the country's legal framework. In particular, the study determined that the existing legal provisions contribute to the protection of natural resources and the preservation of ecosystems. However, at the same time, the survey results also highlight the urgent need to improve the mechanisms for implementing these regulations and monitoring their compliance. This is consistent with the findings of this study, which emphasise the importance of not only improving legislation but also ensuring its effective implementation in practice. Thus, to achieve sustainable biodiversity conservation in Azerbaijan, efforts should be focused not only on developing new legislative initiatives but also on creating effective mechanisms for monitoring and assessing their environmental impact.

Much attention was devoted to the role of international agreements in biodiversity conservation, in particular in the context of Central Asia, by V.S. Dargahov et al.[34]. The results of the study show that the integration of international agreements, such as the Convention on Biological Diversity, into the national policies of Ukraine and Azerbaijan, is critical, but requires additional efforts to improve the synchronisation of national and international commitments, which is in line with the work of the scholar. The analysis of legal systems and their impact on biodiversity protection within the European Union and surrounding regions was conducted by Z.N. Eminov et al.[35]. The study focuses on the integration of legal mechanisms with environmental standards, which is emphasised in this study, and especially the importance of such an approach for Ukraine and Azerbaijan, indicating that harmonisation of national policies with international standards can significantly increase the effectiveness of biodiversity protection.

O. Danilyan and O. Dzoban[36] conducted a comparative analysis of environmental law in Ukraine. The analysis demonstrated that the effectiveness of biodiversity protection depends on the level of implementation of legal norms. These research findings confirm this theory, noting that Ukraine needs to improve its control and monitoring mechanisms to increase the effectiveness of its environmental policies. The main problems of sustainable development of the South Caucasus and the processes of transformation of landscape biodiversity were studied by N. Elizbarashvili[37]. The findings of this study are compared with the results of the scientist's work on environmental sustainability and biodiversity in other regions.

H. Alves-Pinto et al.[38] examined in detail the process of preparing for the third edition of the Red Data Book of Azerbaijan, which contains a red list of the fauna of the Karabakh region. This publication is an important document that reflects not only the state of species conservation but also the environmental challenges faced by the region. This study focused on the legal and regulatory framework governing biodiversity conservation and the need to improve existing conservation mechanisms, so its findings and conclusions are consistent with the data and are of great importance for the further development of environmental policy and practice for the conservation of endangered species and can be used to formulate effective environmental protection strategies in the region.

The legal aspects of biodiversity protection in Ukraine, in the context of the implementation of international standards, were analysed by I. Semenets-Orlova et al.[39]. The study demonstrates progress in the integration of international agreements, but also the existing problems with their implementation, which supports the conclusions of this study and indicates the need for further work on the integration of international norms into the national legal system.

P. Yukhymenko et al.[40] compared Ukrainian environmental legislation with that of other European countries, which highlights the importance of harmonising national laws with international standards. This study found that the adaptation of Ukrainian environmental legislation to European norms could significantly improve the effectiveness of environmental protection in Ukraine. These results confirm the conclusions of this study on the need to integrate best practices used in European countries into the legal systems of Ukraine and Azerbaijan. Both countries can gain significant benefits by adopting the experience of European countries, which includes not only legislative initiatives but also mechanisms for monitoring and

controlling compliance with environmental regulations. This, in turn, could contribute to sustainable development and improve the environmental situation in the region.

The effectiveness of legal mechanisms in biodiversity conservation in the global context was studied by P. Danennberg et al.[41], who identified numerous aspects that highlight the importance of international obligations and mechanisms for achieving successful and sustainable biodiversity conservation. The study found that international agreements, such as the Convention on Biological Diversity[26], are substantial in shaping environmental protection strategies at the national level. The findings of this study confirm the views of leading scholars and indicate that the integration of international agreements into national policies is critical for effective biodiversity conservation. Ukraine and Azerbaijan should pay attention to improving the implementation of their international obligations, which includes not only the adaptation of legislation but also active participation in international programmes and initiatives aimed at protecting natural resources, which will contribute not only to the conservation of ecosystems but also to the development of sustainable practices that will ensure the harmonious coexistence of humans and nature.

The author also examined in detail the issue of planning for the rational use of forest resources in Ukraine, focusing on the need to improve the ecosystem services that these resources can provide. The study is important for natural resource management, as it not only examines existing practices but also proposes new approaches aimed at conserving biodiversity and sustainable forestry development, which is in line with the scientist's research. Comparing the different methods and approaches used in the context of forest management can be extremely useful in formulating effective strategies that will help maintain ecological balance and provide long-term benefits to society[42].

In turn, H. van Meijl et al.[43] studied the legal and economic aspects of biodiversity protection at the international level, pointing to the importance of integrating environmental standards into national policies. These results are in line with the findings and highlight the need to integrate national legislation with international standards to achieve effective biodiversity conservation.

The use of data from various sources was used to create a comprehensive overview of the issue, covering both theoretical and practical aspects. This, in turn, helps identify new opportunities for further research and forms the basis for the development of practical recommendations that may be useful to professionals in the relevant fields. The importance of this approach lies in the ability to integrate different perspectives, which helps to better understand the complexity of the problem and find effective solutions.

5. Conclusions

The study analyses the legal regulation of biodiversity protection in Ukraine and Azerbaijan, identifying key legal acts and their effectiveness. The study established that in Ukraine the main laws are the Law of Ukraine No. 1264-XII “On Environmental Protection” and the Law of Ukraine No. 2456-XII “On Nature Reserve Fund of Ukraine”, and in Azerbaijan – the Law of the Republic of Azerbaijan “On Nature Protection and Nature Management”.

The qualitative findings of the study include a detailed overview of the functioning of protected areas, examples of successful projects in both countries and an assessment of the effectiveness of the implementation of legislation. In Ukraine, ecosystem restoration projects have restored the water regime in the Polissia Reserve by 60% and increased the number of rare species. The Green Cities programme was implemented in Kyiv, resulting in the creation of 10 new parks and a 25% increase in green space. In Azerbaijan, 2,000 hectares of forest in the Gusar National Park have been restored, and several species from the IUCN Red List have been protected, leading to an increase in their numbers.

The results show that the national legislation of both countries has the potential for effective biodiversity protection but needs to be improved and harmonised with international standards. Successful projects demonstrate the positive impact of environmental protection measures on ecosystem restoration and conservation of rare species.

It is worth noting that Ukraine and Azerbaijan should update and harmonise their national legislation with international standards to increase their effectiveness. It is important to ensure adequate funding for biodiversity programmes and improve monitoring and reporting mechanisms, as well as to expand international cooperation and exchange of experience between countries, which will help to implement best practices and achieve common goals.

The theoretical limitations of this study are related to the possible incomplete coverage of all aspects of legal regulation, which may have missed some important details, and practical limitations, including the lack of available data on the actual results of the implementation of biodiversity protection measures, which makes it difficult to fully assess their effectiveness.

In the future, an in-depth study of the impact of specific legislative initiatives on biodiversity conservation may be carried out, including a detailed analysis of their long-term results and effectiveness; the assessment of the impact of international cooperation and the integration of innovative approaches on the effectiveness of nature conservation is also a key aspect; and the development of new methodologies and technologies for monitoring biodiversity and assessing the results of environmental protection measures is also highly relevant.

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