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SOCIO-ECONOMIC ASPECTS OF URBAN BIODIVERSITY MANAGEMENT – STATUS AND CHALLENGES IN MONTENEGRO

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Abstract: Urban biodiversity plays a crucial role in maintaining ecological balance, enhancing the quality of life, and supporting sustainable urban development. However, rapid urbanization, economic activities, and inadequate management strategies pose significant challenges to biodiversity conservation in Montenegro's cities. This paper examines the current state of urban biodiversity in Montenegro, analyzing key socio-economic aspects that influence its management. It explores the impact of urban expansion, economic policies, and community engagement on biodiversity preservation, highlighting both the benefits and challenges associated with sustainable governance. Additionally, the paper provides recommendations for improving biodiversity management through institutional reforms, economic incentives, and increased public awareness. By addressing these socio-economic dimensions, the study aims to contribute

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to the development of integrated policies that balance urban growth with environmental sustainability.

Key words: *Urban biodiversity, socio-economic aspects, sustainable development, Montenegro, biodiversity management.*

1. Introduction

Urban biodiversity refers to the variety of living organisms, including flora, fauna, and microorganisms, that inhabit urban and peri-urban areas (Elmqvist et al., 2013). It encompasses green spaces such as parks, gardens, rivers, and urban forests, as well as smaller ecological niches that support wildlife within the built environment. Urban biodiversity plays a crucial role in ecosystem services, including air and water purification, climate regulation, and mental well-being, all of which are essential for sustainable urban living (MEA, 2005).

The conservation of biodiversity within urban settings is increasingly recognized as a key component of sustainable development. Rapid urbanization and infrastructural expansion often lead to habitat fragmentation, loss of native species, and ecological degradation (McDonald, Kareiva, & Forman, 2008). Therefore, integrating biodiversity management into urban planning and governance is essential to maintaining ecological resilience and ensuring long-term socio-economic benefits.

The relationship between socio-economic factors and biodiversity conservation is complex and multifaceted. Economic development, population growth, and land-use changes significantly influence urban biodiversity. Socio-economic variables such as income levels, education, and public awareness determine the extent to which biodiversity-friendly policies and conservation strategies are implemented and supported by local communities (CBD, 2020).

Urban biodiversity contributes directly to economic stability by enhancing ecosystem services that reduce municipal costs associated with flood control, air pollution mitigation, and cooling effects in densely populated areas (Tzoulas et al., 2007). Furthermore, green infrastructure, including urban parks and ecological corridors, has been linked to increased property values, improved public health, and greater recreational opportunities, all of which contribute to a higher quality of life (Fuller & Gaston, 2009).

Montenegro, as a country constitutionally defined as an ecological state (Constitution of Montenegro, 2007), faces particular challenges in balancing urban development and biodiversity conservation. Intensive urbanization, especially in coastal regions, leads to the degradation of natural ecosystems and threatens unique biological diversity (NSSD Montenegro, 2016). In this context, socio-economic factors play a crucial role in shaping conservation policies and integrating ecological standards into urban development.

Montenegro has adopted several national strategic documents to address biodiversity conservation, including the National Strategy for Sustainable Development (NSSD) and the National Biodiversity Strategy and Action Plan

(NBSAP), which align with international commitments (Government of Montenegro, 2016). Furthermore, Montenegro is a signatory to the Convention on Biological Diversity (CBD), a global treaty aimed at conserving biodiversity, ensuring its sustainable use, and promoting fair and equitable sharing of benefits derived from genetic resources (CBD, 1992). These policy frameworks provide a basis for harmonizing urban development with biodiversity protection.

Despite its constitutional commitment to environmental protection, urban biodiversity management in Montenegro remains an underdeveloped and often neglected area. Many strategic documents, including the National Biodiversity Strategy and Action Plan (NBSAP), are outdated or insufficiently implemented, leading to a gap between policy objectives and practical outcomes. Additionally, there is a general lack of public and institutional awareness regarding the socio-economic benefits of biodiversity conservation, which limits efforts to integrate it into urban planning and sustainable development strategies.

The neglect of urban biodiversity has significant implications for economic and sustainable development. The degradation of natural habitats and green spaces in urban areas reduces ecosystem services, leading to increased costs for air pollution control, flood prevention, and climate adaptation. Moreover, the absence of biodiversity-conscious urban planning results in diminished quality of life, lower property values, and fewer economic opportunities linked to eco-tourism and green infrastructure investment. Addressing these challenges requires a comprehensive approach that aligns biodiversity conservation with Montenegro's broader economic and sustainable development goals, ensuring that urban ecosystems are recognized as vital assets rather than expendable resources.

Urban biodiversity in Montenegro remains a largely undervalued and overlooked area, despite its crucial role in economic and sustainable development. According to the *Montenegro: The Economic Value of Biodiversity and Ecosystem Services* report (Emerton, 2013), the country faces significant gaps in integrating biodiversity valuation into economic planning. While national policies reference the importance of ecosystem services, their economic benefits remain largely unquantified, leading to weak financial and institutional support. The lack of systematic data collection and outdated strategic frameworks hinder efforts to align biodiversity conservation with national development goals. As a result, Montenegro risks missing opportunities for sustainable urban planning, eco-tourism expansion, and green infrastructure investment. Strengthening biodiversity management through updated policies, improved valuation methods, and integration into economic planning would not only enhance environmental resilience but also unlock new economic benefits, particularly in sectors like tourism, agriculture, and energy.

Within Chapter 27, the EU supports decisive measures for climate action, sustainable development, and environmental protection. Its regulations cover issues related to climate change, water and air quality, waste management, nature protection, industrial pollution, chemicals, noise, and civil protection. In the European Commission's 2024 report on Montenegro, it is stated that by

November 2023, Montenegro had made very little progress, implementing only 9 out of 116 activities within this chapter (8%). In the biodiversity segment, it is highlighted that progress has been made in establishing the Natura 2000² network, with approximately 60% of habitats mapped so far. However, further identification and designation of the remaining locations are still required.

This paper aims to analyze the socio-economic aspects of urban biodiversity management in Montenegro, identify key challenges, and propose strategies for sustainable biodiversity governance in urban environments. The specific objectives include: assessing the current state of urban biodiversity in Montenegro; analyzing the impact of socio-economic factors on biodiversity conservation strategies; and identifying policies and practices that can enhance sustainable urban development.

The research is significant as it provides a foundation for developing better-informed urban ecosystem management policies, with a particular focus on aligning economic interests with ecological principles. Given Montenegro's constitutional commitment to being an ecological state, it has the potential to become a regional model for sustainable urban development—provided that biodiversity management strategies are adapted to socio-economic realities and integrated into broader urban planning frameworks. The findings will also contribute to global discussions on urban biodiversity conservation within the framework of the Convention on Biological Diversity (CBD) and the United Nations Sustainable Development Goals (SDGs).

2. Status and trends of urban biodiversity in Montenegro

Montenegro's urban ecosystems are characterized by a unique interplay of natural and anthropogenic elements, including coastal zones, riverine systems, and green spaces such as parks and urban forests. These ecosystems provide critical habitats for native species and deliver essential ecosystem services, including climate regulation, water purification, and recreational opportunities (Elmqvist et al., 2013). However, rapid urbanization, particularly in coastal cities like Podgorica, Budva, and Bar, has led to significant ecological pressures. Key challenges include habitat fragmentation, loss of native species, and the spread of invasive species, which threaten the resilience of urban biodiversity (Government of Montenegro, 2016).

Urban expansion often prioritizes infrastructure development over ecological considerations, resulting in the degradation of natural habitats and green spaces. For instance, the construction of tourism-related infrastructure along Montenegro's coastline has led to the destruction of sensitive ecosystems, such as wetlands and dune systems, which are vital for biodiversity (Emerton, 2013). Additionally, inadequate waste management and pollution further exacerbate the challenges faced by urban ecosystems, undermining their ability to support diverse flora and fauna.

² Natura 2000 is a network of nature protection areas in the territory of the EU.

To summarize, several trends indicate a continued decline in urban biodiversity in Montenegro:

- **Urbanization and Land-Use Change:** The expansion of urban areas, particularly along the Adriatic coast, has led to significant habitat loss and fragmentation, reducing green space availability for wildlife.
- **Pollution and Environmental Degradation:** Air and water pollution from industrial activities, traffic, and waste disposal negatively impact biodiversity and ecosystem services.
- **Climate Change Impacts:** Rising temperatures, altered precipitation patterns, and extreme weather events pose additional stress on urban ecosystems, affecting species composition and ecosystem stability.
- **Limited Policy Implementation:** While Montenegro has adopted various national strategies, their implementation remains weak due to insufficient financial and human resources.

Montenegro has established several policy frameworks aimed at biodiversity conservation, including the National Strategy for Sustainable Development (NSSD) and the National Biodiversity Strategy and Action Plan (NBSAP). These documents align with international commitments, such as the Convention on Biological Diversity (CBD), and emphasize the importance of integrating biodiversity conservation into urban planning (Government of Montenegro, 2016). By adopting the NBSAP, Montenegro reaffirms its strategic commitment to the conservation and sustainable use of biodiversity. The document highlights key issues related to biodiversity protection in the sectors of tourism, spatial planning, and infrastructure, as well as the threats and factors endangering biological diversity. It also defines the vision of Montenegro for 2050, in which functional ecosystems and rich biodiversity serve as the foundation for the sustainable and harmonious development of the country and its inhabitants. However, the implementation of these policies remains inconsistent, with limited enforcement and monitoring mechanisms in place.

One of the key shortcomings of existing policies is their lack of specificity regarding urban biodiversity. While the NBSAP acknowledges the importance of ecosystem services, it does not provide detailed guidelines for managing biodiversity in urban areas. Furthermore, the absence of a comprehensive urban biodiversity action plan limits the effectiveness of conservation efforts. For example, urban green spaces are often underutilized as tools for biodiversity conservation, and their potential to serve as ecological corridors remains largely untapped (Tzoulas et al., 2007).

Urbanization and economic activities, particularly tourism and real estate development, have had profound impacts on Montenegro's urban biodiversity. The rapid growth of coastal cities has led to the conversion of natural habitats into built environments, reducing the availability of resources for native species and disrupting ecological processes (McDonald et al., 2008). For instance, the

construction of hotels and resorts along the Adriatic coast has resulted in the loss of critical habitats for migratory birds and marine species.

Economic activities also contribute to pollution, which further degrades urban ecosystems. For example, untreated wastewater and solid waste from urban areas often find their way into rivers and coastal waters, affecting aquatic biodiversity and reducing the quality of ecosystem services (Emerton, 2013). Additionally, the lack of green infrastructure in urban planning exacerbates the impacts of climate change, such as increased temperatures and flooding, which disproportionately affect urban biodiversity.

Despite these challenges, there are opportunities to mitigate the negative impacts of urbanization through sustainable planning and policy interventions. For example, integrating green infrastructure, such as urban parks, green roofs, and ecological corridors, into urban development plans can enhance biodiversity while providing socio-economic benefits, including improved public health and increased property values (Fuller & Gaston, 2009). Furthermore, raising public awareness about the value of urban biodiversity and promoting community engagement in conservation efforts can help bridge the gap between policy and practice.

Without effective intervention, the decline of urban biodiversity will continue, leading to increased environmental risks, economic costs, and reduced quality of life. Strengthening policy enforcement, increasing investment in green infrastructure, and enhancing public engagement are essential steps toward reversing biodiversity loss and promoting sustainable urban ecosystems in Montenegro.

3. Socio-economic aspects of urban biodiversity management

The economic development of every country largely depends on biodiversity and ecosystem services, which provide the foundation for stable economic growth and the sustainable use of natural resources. Many developing countries do not adopt a sustainable approach and, in this context, rely on the exploitation of natural wealth, often failing to adequately assess its long-term ecological and economic value.

In light of modern environmental challenges, the conservation and sustainable management of ecosystems are essential for poverty reduction and improving the quality of life. The regulation and protection of ecological systems, along with their integration into development policies, contribute to socio-economic progress and enhance resilience to climate change. At the global level, regulators aim to prevent ecological disasters through various measures and to direct the activities of individuals and institutions towards promoting environmental awareness and preserving primary biodiversity.

This is particularly relevant because biodiversity plays a vital role in various economic sectors, including agriculture, fisheries, forestry, and tourism. These

sectors not only generate economic revenues but also ensure ecological stability and the long-term sustainability of resources.

As previously highlighted, Montenegro, with its rich natural landscapes and diverse ecosystems, attracts a large number of tourists. National parks, protected areas, and coastal ecosystems are key attractions that contribute to the economy through tourism revenue. However, unregulated development in this sector can lead to habitat degradation, pollution, and excessive resource exploitation. Sustainable tourism requires the implementation of strategies that balance economic growth with biodiversity protection.

Agriculture is a key pillar of food security and a significant economic factor, particularly in rural areas. Sustainable agriculture involves food production with minimal environmental impact while preserving natural resources and biodiversity. Montenegro, especially its northern region, has significant potential for the development of sustainable agriculture, including the preservation of fertile soil and the reduction of pesticide use.

The Ministry of Agriculture, Forestry, and Water Management³ implements various support measures aimed at improving organic production and expanding it to a larger scale. However, challenges such as rural depopulation, limited access to modern technologies, and insufficient investment in sustainable production remain obstacles to the further development of this sector in Montenegro.

Forests represent an invaluable natural resource, providing a wide range of ecological and economic benefits. They play a crucial role in protecting water resources, mitigating climate change effects, controlling erosion, storing carbon dioxide, and preserving biodiversity. In addition to their ecological significance, forestry in Montenegro also has an important economic role. However, its long-term sustainability is threatened by excessive logging, illegal exploitation, and the degradation of forest ecosystems.

Aware of these challenges, the Government of Montenegro has adopted the Forestry Development Strategy (2024–2028), which, through its Action Plan, defines concrete measures to ensure the sustainable management of forest resources. The application of modern and sustainable forestry practices, including reducing deforestation and enhancing afforestation, is essential for preserving natural wealth and improving environmental quality.

The marine and freshwater ecosystems are vital sources of food and income for local communities. Sustainable fisheries management is crucial to preventing overfishing and the degradation of aquatic ecosystems. In Montenegro, fishing and fish processing are significant economic activities, but it is necessary to ensure the rational use of resources through regulatory measures such as quotas and the protection of spawning grounds.

Globally, fisheries subsidies amount to between \$15 and \$35 billion annually, with a dual impact—while some forms of support promote sustainable sector

³ <https://www.gov.me/clanak/organska-proizvodnja>

management, many subsidies contribute to overfishing and the depletion of fish stocks.⁴

Beyond its general ecological importance, biodiversity plays a particularly significant role in urban areas. Given the fast pace of life and high population density, preserving and enhancing urban biodiversity can greatly contribute to improving quality of life, strengthening ecological stability, and fostering socio-economic development. Green spaces, urban forests, and ecosystem services provided by biodiversity are key factors in reducing stress, improving microclimatic conditions, and enhancing urban resilience to environmental challenges.

Ecosystem services of urban biodiversity include: air and water purification, temperature and microclimate regulation, increased resilience to climate change, and reduction of cities' ecological footprint.

However, the unequal distribution of green spaces can lead to social and environmental inequality. Studies show that wealthier urban areas have greater biological diversity and better-maintained ecosystems, while poorer city districts often have fewer green spaces and lower environmental quality.⁵ In Montenegro, unsustainable urban development, pollution, and habitat degradation pose challenges to the preservation of urban biodiversity.

To protect urban biodiversity, it is necessary to implement integrated urban planning policies, improve legal frameworks and protection mechanisms, and encourage active citizen and community participation in managing natural resources. As one of Europe's ecological states, Montenegro possesses exceptionally rich flora and fauna, with over 3,250 recorded plant species, making it one of the most biodiverse countries in the region. Its natural habitats, ranging from high mountain areas to coastal ecosystems, provide a home for numerous endemic and protected species.

However, the key challenges in biodiversity protection in Montenegro include the inadequate implementation of environmental laws and regulations, increasing pressure from urbanization and infrastructure projects, the negative impact of climate change on ecosystems, and a lack of financial resources for the conservation and restoration of endangered areas, all of which will be further discussed in the following sections.

3.1. Economic benefits and costs of biodiversity conservation

A key challenge in financing biodiversity conservation in Montenegro is ensuring long-term revenue sources and actively involving the private sector through market-based incentives. Mechanisms such as payments for ecosystem services,

⁴ Convention on Biological Diversity. (2010) Biodiversity, Development and Poverty Alleviation: Recognizing the Role of Biodiversity for Human Well-being. pg. 29

⁵ Leong, M., Dunn, R. R., & Trautwein, M. D. (2018). Biodiversity and socioeconomics in the city: a review of the luxury effect. *Biology Letters*, 14(5), 20180082, pg. 2. <http://dx.doi.org/10.1098/rsbl.2018.0082>

sustainable certifications, and green bonds can help secure the financial sustainability of natural resource protection. Investments in biodiversity not only contribute to ecological stability but also open new economic opportunities and strengthen the country's sustainable development.

A systematic assessment of the economic value of biodiversity and ecosystem services has not yet been conducted for Montenegro. In recent years, some studies have evaluated the value of ecosystems and services related to the Tara River⁶ and protected areas⁷. Additionally, the Environmental Protection Agency⁸ has conducted numerous studies on protected areas, analyzing the socio-economic impact of conservation measures. However, a comprehensive and systematized overview is still lacking. The most significant attempt at a national biodiversity and ecosystem services assessment in Montenegro was presented in the 2013 report by the Ministry of Sustainable Development and Tourism⁹. The study estimated that the total value of ecosystem services in Montenegro for 2011 was €982 million, distributed as follows:¹⁰

- Provisioning services (e.g., timber biomass, livestock fodder) – €169 million (17%)
- Regulation and maintenance services (e.g., soil fertility, pollination, coastal protection) – €276 million (28%)
- Cultural services (e.g., landscape and nature-based recreation) – €537 million (55%)

However, public funding for biodiversity protection in Montenegro remains low. For example, in 2015, the annual budget for managing protected areas was only €2 million (€1,800 per km²), which is insufficient for effective ecosystem conservation and enhancement. Increasing investments in natural capital would require a larger public funding commitment but would also bring long-term economic benefits.

According to available analyses, between 2011 and 2020, as much as 77% of the benefits derived from biodiversity and ecosystem services came from the direct added value in the agriculture, livestock, fisheries, and forestry sectors, while the remaining 23% consisted of avoided costs related to hydropower protection, water supply, settlement, and infrastructure development.

⁶ Freyhof, J., Weiss, S., Adrović, A., Čaleta, M., Duplić, A., Hrašovec, B., ... & Zabrc, D. (2015). The huchen (*Hucho hucho*) in the Balkan region: distribution and future impacts by hydropower development. In "12. Hrvatski biološki kongres s međunarodnim sudjelovanjem", pg. 15-16.

⁷ Emerton, L. (2011). The economic value of protected areas in Montenegro. UNDP Montenegro, Podgorica

⁸ <https://epa.org.me/>

⁹ Government of Montenegro. (2015). National biodiversity strategy with an action plan for the period 2016-2020. Podgorica.

¹⁰ Emerton, L. (2013). *Montenegro: The economic value of biodiversity and ecosystem services*. UNDP/GEF.

The cumulative economic gains from implementing the revised National Biodiversity Strategy and Action Plan (NBSAP) were estimated at €150 million by 2014, €328 million by 2017, and €541 million by 2020. These figures highlight that investments in natural resource protection yield substantial financial returns and enhance the economy's resilience to environmental and climate challenges. Additionally, estimates suggest that for every €1 invested in biodiversity conservation, Montenegro can generate up to €29 in economic benefits through ecotourism and ecosystem services, demonstrating a high return on investment in this sector.¹¹

The economic value of biodiversity in Montenegro is best understood through its impacts on ecotourism, public health, and climate and air quality regulation. Urban areas that integrate green spaces and preserved natural resources attract nature-focused tourists, boosting the economy through increased spending on accommodation, food, and services. The presence of parks and green spaces improves both physical and mental well-being, reducing healthcare costs and increasing productivity. Green areas help mitigate the urban heat island effect and improve air quality, reducing economic losses associated with pollution-related health issues. On the other hand, the costs of maintaining biodiversity primarily involve the upkeep and management of urban green spaces, requiring funding for planting, irrigation, maintenance, and the protection of plant and animal species. Additionally, land dedicated to green areas could be used for more profitable purposes, such as residential or commercial development, which represents a potential economic loss for investors.

3.2. Role of institutions, local communities, and the private sector

The conservation of biodiversity and sustainable management of natural resources require synergy and coordinated collaboration between governmental institutions, local communities, and the private sector. National and local authorities play a key role in creating and implementing legal regulations and nature protection strategies, while communities and the private sector contribute through practical initiatives and investments in sustainable development.

In Montenegro, biodiversity protection is regulated through the actions of the Ministry of Ecology, Spatial Planning, and Urbanism, which enacts laws and strategies for nature conservation, and the Environmental Protection Agency, which monitors ecosystem conditions and implements protection measures. National strategies, such as the National Sustainable Development Strategy until 2030 (NSOR) and the National Biodiversity Management Strategy (NSUB), aim to integrate biodiversity conservation principles into sectoral policies, including agriculture, tourism, and energy.

Furthermore, adopting a legal framework that encourages sustainable resource use, pollution control, and protection of natural habitats is crucial for long-term

¹¹ Government of Montenegro. (2015). National biodiversity strategy with an action plan for the period 2016-2020. Podgorica.

ecological stability. The Government of Montenegro also relies on international organizations, such as UNDP, the World Bank, and the European Union, which provide financial and technical support through various biodiversity protection projects.

Local communities, especially those dependent on natural resources, possess valuable traditional knowledge and practices that can contribute to ecosystem conservation. Their inclusion in decision-making and natural resource management increases the effectiveness of protective measures. For example, models of joint forest management and compensation through Payments for Ecosystem Services (PES) allow communities to economically benefit from nature conservation.

However, one of the key limitations for local communities in Montenegro is the lack of financial capacities, which often leads to dependence on state and international donations. Therefore, it is important to strengthen local ecological funds, where they exist, and encourage the development of economically sustainable initiatives such as ecotourism and organic farming.

The private sector can play a crucial role in biodiversity protection through sustainable business practices, ecological innovations, and funding nature conservation projects. For instance, ecotourism, based on the conservation of natural landscapes and ecosystems, can significantly contribute to local economies while simultaneously protecting natural resources.

In Montenegro, the potential of the private sector in this area is still not fully realized. Many companies still do not integrate ecological standards into their operations, while investments in green infrastructure and renewable energy sources are limited. Encouraging the private sector to adopt socially responsible business practices through tax incentives and subsidies could significantly increase their contribution to biodiversity conservation.

One key aspect is also the inclusion of green spaces in urban planning, where companies and investors could contribute to the development of sustainable residential and business zones, thus increasing the attractiveness of real estate and improving microclimatic conditions in cities.

Despite existing strategies and laws, coordination between different stakeholders in Montenegro still poses a challenge. It is necessary to strengthen inter-sectoral cooperation, better integrate scientific research into decision-making processes, and raise public awareness of the importance of biodiversity.

3.3. Key challenges in financing and implementing policies

Biodiversity financing in Montenegro and around the world often faces a lack of long-term revenue sources. While international organizations and governments invest significant funds in nature conservation, these resources are often insufficient to cover all the needs for ecosystem protection and the implementation of sustainable policies.

In Montenegro, budgetary constraints at the national and local levels further complicate the financing of urban biodiversity conservation projects. Investments are redirected towards infrastructure projects and economic growth, while nature protection remains a secondary priority. The National Biodiversity Management Strategy (NSUB) proposes the introduction of clearly marked budget items for biodiversity conservation financing, as well as the establishment of a specific Biodiversity Fund or a designated sub-account for collecting funds from various sources.

Although the Biodiversity Fund has not yet been established, the Eco Fund¹² provides certain incentives for nature conservation. For example, in 2025, in cooperation with the Ministry of Ecology, Sustainable Development, and Northern Development, through the "Integrating Biodiversity into Sectoral Policies and Practices and Strengthening Key Biodiversity Points (GEF7)" project, a Public Call for implementing support measures was announced. These measures include the conservation of endangered breeds and varieties of domestic animals and plants, as well as the preservation of biodiversity in grasslands and arable lands, i.e., the protection of landscape features.

One of the key challenges in implementing biodiversity conservation policies in Montenegro is the insufficient integration of ecological goals into sectoral strategies such as agriculture, energy, urban planning, and tourism. Biodiversity is often treated as an isolated issue, rather than being a key element when creating development plans. It is evident that in Montenegro, conflicts of interest between various institutions often occur, reducing the efficiency of nature protection. For example, urban planners and ecologists do not collaborate enough in creating sustainable strategies, while the lack of clear regulatory requirements leads to the neglect of biodiversity data in spatial plans.

National parks and nature reserves often lack stable funding sources, which makes their long-term conservation difficult. In Montenegro, as in many other countries, there is a need for the development of alternative financing mechanisms, such as eco-tourism fees, public-private initiatives, and payments for ecosystem services. The introduction of these models could enable the self-sustainability of protected areas, reducing their dependence on budgetary constraints.

Although Montenegro has laws regulating biodiversity protection, their implementation is limited due to the lack of oversight, political pressures, and inadequate penal mechanisms. In this context, one of the problems is the low level of inspection control, which leads to non-compliance with the law, illegal logging, and degradation of natural habitats. Strengthening the legal framework and improving the capacity of institutions to enforce laws are crucial steps for improving biodiversity protection.

Furthermore, the growth of urban areas and the increased need for new residential and business spaces lead to the reduction of green spaces and the loss of biodiversity. This problem is particularly pronounced in the coastal and central

¹² <https://www.eko-fond.co.me/konkurs-template?id=140>

parts of Montenegro, and these areas are also the most critical in terms of biodiversity conservation.

The challenges mentioned above are just some of the key issues that Montenegro faces on its path to biodiversity conservation. Addressing these challenges requires innovative financing approaches and stronger international cooperation to ensure a long-term financial foundation for biodiversity conservation and the integration of biodiversity preservation into economic and development strategies. It is also important to introduce fiscal incentives for nature protection, such as tax breaks for companies investing in ecosystem protection, as well as ecological taxes and ecosystem services.

4. Recommendations for sustainable management and future development

Conservation of Biodiversity and Sustainable Management of Natural Resources in Montenegro requires an integrated approach that includes institutional reforms, economic incentives, and educational initiatives. Key steps include decentralization of resource management, reform of property rights, and alignment of national biodiversity strategies with Montenegro's sustainable development policies. More efficient law enforcement, strengthening inspection capacities, and stricter penalties for environmental violations are necessary for the long-term protection of the country's natural ecosystems.

Looking at Montenegro, the following recommendations for sustainable biodiversity development in the near future can be made:¹³

- **Integration of Biodiversity into Sectoral Policies:** It is essential for nature conservation to become an integral part of national development strategies, particularly in sectors such as agriculture, tourism, energy, and infrastructure.
- **Strengthening Institutional Capacities:** The Agency for Nature and Environmental Protection should continue improving its capacity to enforce laws and monitor biodiversity status. The establishment and management of an environmental information system, which includes a registry of protected areas, represents a step in the right direction.
- **Development of Local Action Plans for Biodiversity:** Municipalities should adopt local action plans for biodiversity, in accordance with the Nature Protection Law, to ensure the implementation of protection measures at the local level.

There are several examples of good practices and economic incentives that contribute to biodiversity conservation, such as:¹⁴

¹³ <http://prirodainfo.me/>

¹⁴ Convention on Biological Diversity. (2010) Biodiversity, Development and Poverty Alleviation: Recognizing the Role of Biodiversity for Human Well-being.

- Payments for Ecosystem Services: Mechanisms such as financial compensation to local communities for forest, waterway, and other environmental protection efforts. For example, farmers and forest workers can receive financial incentives for preserving natural habitats, reducing pesticide use, and applying agroecological practices.
- Sustainable Tourism: Models that show how tourism can contribute to local development and ecosystem protection, ensuring economic benefits for local communities. For example, tourism in national parks can involve local guides, crafts, and eco-friendly accommodations.
- Ecological Certifications and Market Incentives: Programs that allow consumers to recognize products that come from sustainable sources, thereby encouraging sustainable practices.
- Renewable Energy and Energy Efficiency: The use of renewable energy sources, such as solar and wind power, reduces pressure on ecosystems and helps in the fight against climate change.

In addition, incentives such as:¹⁵ a) Sustainable urbanism and b) Financial taxes can also be implemented. Cities around the world are adopting models based on the integration of nature into urban environments, such as "green roofs," vertical gardens, and the regeneration of degraded areas into parks. Introducing ecological taxes on polluters and redistributing the revenue into ecological projects can contribute to the long-term sustainability of urban ecosystems.

Montenegro provides a good example of integrating agriculture and biodiversity conservation through the support program of the Ministry of Ecology and the Eco-Fund, as already highlighted. At the same time, the development of ecotourism and the improvement of national park management can further contribute to the economic development of local communities while preserving natural resources.

As already mentioned, education at all levels and raising public awareness are of crucial importance for the long-term conservation of biodiversity in Montenegro, and schools and universities play an important role in promoting ecological literacy through practical projects and educational programs. Informing citizens through the media, digital platforms, and public initiatives contributes to creating ecological awareness and active engagement in the protection of natural resources. Through volunteer actions, sustainable agriculture, and ecological projects, local communities can directly participate in preserving ecosystems and strengthening ecological responsibility in Montenegro.

¹⁵ Leong, M., Dunn, R. R., & Trautwein, M. D. (2018). Biodiversity and socioeconomics in the city: a review of the luxury effect. *Biology Letters*, 14(5), 20180082. <http://dx.doi.org/10.1098/rsbl.2018.0082>

5. Conclusion

The preservation and enhancement of urban biodiversity in Montenegro represent a key challenge in the context of rapid urbanization, economic development, and institutional limitations. Although Montenegro is constitutionally defined as an ecological state and committed to international agreements on nature protection, there remains a significant gap between strategic goals and their implementation in practice.

A lack of financial resources, weak law enforcement, and limited institutional coordination contribute to the degradation of urban ecosystems. At the same time, urban development and tourism activities often have a negative impact on natural habitats, leading to the loss of native species and a decline in the quality of life for residents.

Improving sustainable biodiversity management requires the integration of ecological principles into sectoral policies, strengthening institutional capacities, and introducing economic incentives for nature conservation. In this context, it is crucial to enhance local action plans and ensure their proper implementation, increase investments in green infrastructure, and encourage greater involvement of the private sector and local communities in ecosystem conservation.

More effective biodiversity protection would not only contribute to ecological stability but also bring economic benefits through sustainable tourism, agriculture, and improved urban living conditions. Montenegro, as a country with exceptional natural wealth, has the potential to become a model for sustainable urban development, but this requires the urgent alignment of ecological policies with economic and urban planning strategies.

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SOCIOEKONOMSKI ASPEKTI UPRAVLJANJA URBANIM BIODIVERZITETOM – STANJE I IZAZOVI U CRNOJ GORI

Apstrakt: Urbani biodiverzitet ima ključnu ulogu u očuvanju ekološke ravnoteže, unapređenju kvaliteta života i podršci održivom urbanom razvoju. Ipak, ubrzana urbanizacija, intenzivne ekonomske aktivnosti i neadekvatne strategije upravljanja predstavljaju značajne izazove za očuvanje biodiverziteta u gradovima Crne Gore. Ovaj rad analizira trenutno stanje urbanog biodiverziteta u Crnoj Gori, sa fokusom na ključne socioekonomske aspekte koji utiču na njegovo upravljanje. Poseban akcenat stavljen je na uticaj urbanog širenja, ekonomskih politika i uključivanja lokalnih zajednica na očuvanje biodiverziteta, uz isticanje koristi i izazova koji prate održivo upravljanje. Takođe, rad daje preporuke za unapređenje upravljanja biodiverzitetom kroz institucionalne reforme, ekonomske podsticaje i povećanje javne svesti. Sagledavanjem ovih socioekonomskih dimenzija, cilj istraživanja je doprinos kreiranju integrisanih politika koje će uskladiti urbani razvoj sa principima ekološke održivosti.

Ključne reči: Urbani biodiverzitet, socioekonomski aspekti, održivi razvoj, Crna Gora, upravljanje biodiverzitetom.