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THE ROLE OF STRATEGIC PLANNING IN INNOVATIVE FINANCING FOR ADAPTATION REGARDING CLIMATE CHANGE: A CASE STUDY OF MUNICIPALITIES IN BOSNIA AND HERZEGOVINA

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ABSTRACT

This paper aims to explore key aspects of strategic planning for investment activities to ensure that municipalities can adequately adapt to climate change. The main research question investigates the extent to which strategic planning is focused on climate change adaptation measures. The hypothesis is: Municipalities have planned and developed mechanisms for financing activities aimed at climate change adaptation. To validate this hypothesis, we used a methodology that included desk research and a case study of four local government units in Bosnia and Herzegovina - two from each entity. This paper provides empirical evidence on the direction that local government units, municipalities should take in adapting to climate change through strategic planning. The limitations of the research stem from the complexity of the constitutional structure of Bosnia and Herzegovina and the differing legislation applied in the two entities in the area relevant to this study.

KEY WORDS: management, climate, sustainability, climate change, local government

JEL CLASSIFICATION: M21, Q54, H70

1. Introduction

Adapting to climate change is becoming essential for society as a whole. Reducing the impacts of climate change contributes to environmental protection, the preservation of biodiversity, and

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the promotion of sustainable development. At the same time, promoting and investing in energy efficiency, renewable energy sources, sustainable water resource management, waste management, and the planting and preservation of green spaces can stimulate economic growth and create new jobs (Gouldson et al., 2015). The concept of sustainability encompasses natural, social, and economic resources. It is well established that investments in transport infrastructure generally have a positive impact on economic growth, regardless of the mode of transport (Praticò and Fedele, 2022).

If Bosnia and Herzegovina aligns strategic document and policies with international goals international donators can provide it access to grants, technical assistance and low interest rates loans (Novaković et al. 2024). Effective financial planning is crucial for the successful implementation of climate policies and for enabling Bosnia and Herzegovina's transition to a low-carbon economy, while meeting regional and global climate goals (Jokić et al., 2024).

Therefore, this study provides an overview of strategic documents, institutional barriers, regarding the local community level in Bosnia and Herzegovina. The methodology applied in the research is based on desk research, through which a detailed analysis was conducted of:

- Available and potential international sources of funding (EU funds, Green Climate Fund, EBRD, World Bank) and domestic sources (budgets, environmental protection funds, public enterprises).
- Institutional and regulatory barriers to attracting investment in Bosnia and Herzegovina.

The value of this paper lies in guiding local communities towards more efficient planning and financing of adaptation measures, as well as fulfilling Bosnia and Herzegovina's obligations under international climate agreements: the Paris Agreement, the Sustainable Development Goals (SDGs), and the Green Agenda for the Western Balkans.

Bosnia and Herzegovina is currently facing increased vulnerability to climate change, as are most other countries. The factor that affects BiH are its geographical location. During the previous period of time BiH suffered significant losses due to floods with direct affection on the agriculture sector, forestry and management in water sector (The World Bank Group, 2021). According to the 2014 Climate Risk Index Bosnia and Herzegovina ranked third in terms of total losses and damages caused by climate events (UNFCCC, 2021). The environmental consequences of the floods were also substantial, causing erosion and environmental effects in long-term.

Floods in Bosnia and Herzegovina have become increasingly frequent over the last two decades, especially in 2021 and 2023 (The World Bank Group, 2024). The cause of such changes and impacts on the environment is certainly human activity, namely inadequate maintenance of existing drainage systems, insufficient capacities of local communities to act in a timely manner, and the like (Adeoti et al., 2022). We have estimates that the costs directed at mitigating climate change, as a share of GDP, should amount to between \$1 and \$2 annually, and the costs resulting from inaction on this issue from 5% to 20% of global GDP each year (Gouldson et al., 2015).

2. Review of literature and key strategic planning documents related to climate change and sustainable development in Bosnia and Herzegovina

The Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) defines four possible scenarios of future global greenhouse gas concentrations, based on which climate change scenarios for Bosnia and Herzegovina have been developed (The World Bank Group 2021). By the end of 21st century climate index projections for Bosnia and Herzegovina include:

- The number of summer days is projected to increase by 20 to 69 days.
- The number of days with precipitation exceeding 20 mm is expected to increase by 15% to 27%.
- The maximum annual daily accumulated precipitation is projected to increase by 6% to 18%.
- Dry periods are expected to extend by 8% to 50%.
- The growing season is projected to increase by 19 to 55 days (UNDP, 2021b).⁵

These changes will place unprecedented pressure on municipal infrastructure, including from floods, landslides, droughts, and increased demand for water and energy (The World Bank Group, 2021).

In BiH, climate-related financing and the Sustainable Development Goals are mainly provided through donor funds such as the Green Climate Fund (GCF) and official development assistance (ODA) to climate-related sectors.

Governments continue to face financial challenges in mobilizing resources to meet environmental goals. Key barriers include limited capacity to develop financial instruments (Adeoti et al., 2022). We recognize that investments in adaptation and mitigation are needed to build resilience to the impacts of climate change (OECD, 2024). Due to limited financial resources at both higher levels of government and local authorities, external support for mitigation and adaptation projects in Bosnia and Herzegovina is essential.

This chapter provides an overview of the key strategic and planning documents related to climate change and sustainable development across different levels of government in Bosnia and Herzegovina (Čigoja et al., 2025). In line with the principle of horizontal and vertical coordination (strategic law), it is essential to ensure the alignment of local policies with the strategic objectives defined at the entity and state levels, as well as with the international commitments undertaken by Bosnia and Herzegovina. At higher levels of government, the strategic documents that define the framework for action on climate change include:

- The first step in implementing the 2030 Agenda in Bosnia and Herzegovina was the development of the Framework for the Sustainable Development Goals (SDGs) in Bosnia and Herzegovina, a joint document of all levels of government that establishes broader development directions through which authorities at all levels and society in Bosnia and

⁵ These projections are based on the Updated Existing Climate Change Scenarios for Bosnia and Herzegovina and the developed climate scenarios RCP2.6, RCP4.5, RCP6.0, and RCP8.5, as outlined in the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC).

Herzegovina strive to contribute to achieving the Sustainable Development Goals“ (UNDP, 2021b). Additionally, in line with the requirements of the 2030 Agenda and the commitments undertaken by Bosnia and Herzegovina, the Framework defines specific sub-goals and indicators by which progress will be measured (UNDP, 2021b).

- The Energy Framework Strategy for BiH till 2035. which promotes the transition to a low-carbon economy, increased energy efficiency, and the integration of renewable energy sources, with a particular emphasis on the role of local communities in implementing concrete measures (MOFTER 2023).
- The Bosnia and Herzegovina Climate Change Adaptation Strategy for the period 2020-2030, which identifies key sectors vulnerable to climate change and measures to strengthen resilience (UNCC, 2023).
- The Bosnia and Herzegovina National Adaptation Plan (NAP) with proposed measures, outlining concrete actions to reduce vulnerability and enhance resilience of key sectors to climate risks in the medium and long term (UNDP, 2021a).

Table 1 briefly presents the key data on the documents mentioned above.

Table 1 Overview of Key Documents and Measures for Sustainable Development and Climate Resilience in Bosnia and Herzegovina

Document	Goals / Focus	Key Measures / Approaches
Sustainable Development Goals (SDGs)	<ul style="list-style-type: none"> – Poverty eradication – Planet preservation – Peace and prosperity by 2030 	<ul style="list-style-type: none"> – VNR (Voluntary National Review) Bosnia and Herzegovina 2019 – SDG Implementation Platform with UNDP support
Bosnia and Herzegovina Energy Framework Strategy until 2035	<ul style="list-style-type: none"> – Sustainable, secure, and competitive energy 	<ul style="list-style-type: none"> – Efficient use of resources – Secure and affordable energy – Efficient energy consumption – Energy transition and ecology – Regulatory development and harmonization with the EU
Bosnia and Herzegovina Climate Change Adaptation Strategy 2020–2030	<ul style="list-style-type: none"> – Development of the green economy, reduction of GHG emissions, sector resilience 	<ul style="list-style-type: none"> – Flood protection, riverbed rehabilitation – Efficient water supply – Combating illegal construction – Management of torrential streams – Waste management and recycling
NAP-Adaptation plan in Bosnia and Herzegovina on Climate Change	<ul style="list-style-type: none"> – Green economy, integration of adaptation measures into policies 	<ul style="list-style-type: none"> – Scientific research and education – EU alignment of flood protection systems

		<ul style="list-style-type: none"> - Technical solutions (Ecosystem-based Solutions- EbS) - Improvement of hydrological systems- "Green roofs," ecotourism, cycling paths
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Source: Authors.

National Adaptation Plans (NAPs) and Strategies provide a mechanism for doing so. Currently, all OECD countries have a plan or strategy in place. By September 2023, 143 developing countries were in the process of developing NAPs, with 49 of those countries having submitted completed documents to the UNFCCC. However, in general, these plans and strategies have limited coverage of how the measures within the NAP or NAS will be funded, and limited discussion of how to strengthen the enabling environment for investments in adaptation. Furthermore, NAPs are often led by ministries of environment with varying degrees of government ownership. Systematic engagement of ministries of finance in NAP preparation committees can help ensure that NAPs are integrated into wider budget management processes (OECD, 2024).

Extreme weather events will include heavy, short-duration rainfall causing floods and landslides, as well as prolonged droughts and heatwaves that will lead to increased water demand for both the population and agriculture, along with higher energy consumption. Adapting to these climate changes requires the implementation of appropriate projects. Furthermore, most investments aimed at climate change adaptation and environmental protection do not generate direct revenues and thus require alternative approaches to accessing private sector financing. Funded projects in Bosnia and Herzegovina cover a wide range of sectors and thematic areas, ranging from small local interventions to large-scale infrastructure investments. According to the Ministry of Finance and Treasury of BiH (2023), the most frequently targeted sectors include energy, environmental protection, water management. Key initiatives include:

- GEF (Green Energy Financing Facility) and GGF (Green for Growth Fund) – instruments that support investments in renewable energy sources and energy-efficient technologies, particularly in the housing sector and among small and medium-sized enterprises.
- WBIF (Western Balkans Investment Framework) – a mechanism providing support for project documentation development, capacity building, and the implementation of integrated urban development solutions.
- UNDP projects for local community decarbonization – focused on reducing CO₂ emissions and promoting sustainable development practices at the local level.

Key financiers during this period included:

- The European Union, through IPA funds and direct budgetary support for the energy and environment sectors.
- The Green Climate Fund (GCF), a global fund supporting climate resilience and adaptation.

- The European Bank for Reconstruction and Development (EBRD) and KfW Bank, which provide credit lines under favorable conditions for renewable energy and energy efficiency projects.
- The World Bank, mainly provides technical assistance and support for infrastructure projects.
- Bilateral donors such as Sweden (SIDA), Germany (GIZ/KfW), the United States (USAID), and Japan (JICA), financing various mitigation and adaptation projects.

The dominant financial mechanisms currently in use in Bosnia and Herzegovina are primarily based on grants and subsidized credit lines (DCF, 2023). The entities (Republic of Srpska and Federation BiH) have the responsibility for providing legal documents (laws, regulations) while strategies for mitigation and adaptation to climate change are adopted at the BiH level.

Table 2 briefly presents the key data on the documents mentioned above.

Table 2 Overview of Key Documents and Measures for Sustainable Development and Climate Resilience in Republika Srpska

Document	Energy Development Strategy of RS (2035)	Environmental Protection Strategy of RS (2022–2032)
Focus	Sustainable, competitive, and secure energy; transition to clean sources; use of domestic resources	Preservation of natural resources, pollution reduction, protection of health and ecosystems, climate resilience
EU Alignment	Yes – alignment with the EU Third Energy Package, ETS system, and EU legislation	Yes – aligned with EU directives on water, air, nature, waste, chemicals (adopts the Natura 2000 approach)
Main aspects	<ol style="list-style-type: none"> 1. Efficient resource use 2. Energy security 3. Energy efficiency 4. Environmental sustainability 5. Regulatory reforms 	<ol style="list-style-type: none"> 1. Waste management 2. Water quality 3. Quality of air 4. Mitigation regarding climate 5. Biodiversity, nature protection

Source: Authors.

Table 3 provides a brief overview of the key data from the documents mentioned above.

Table 3 Overview of key documents and measures for sustainable development and climate resilience in the Federation of BiH

Document	Framework Energy Strategy of the Federation of BiH until 2035	Environmental Protection Strategy of the Federation of BiH 2022–2032
Focus	Energy efficiency, security, renewable sources, emission reduction	Management of water, waste, air, climate, nature, and natural resources
EU Alignment	Yes – aligned with the EU Third Energy Package	Yes – aligned with Chapter 27 (Environment and Climate Change)
Main aspects	<ol style="list-style-type: none"> 1. Efficient resource use 2. Energy security 3. Energy efficiency 	<ol style="list-style-type: none"> 1. Strengthening climate resilience 2. Action plans and coordination 3. Adaptation financing

	4. Environmental sustainability 5. Regulatory reforms	4. Support for climate-sensitive sectors
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Source: Authors.

The structural measures that proposed for climate change adaptation were acceptable except for one measure in the forestry sector which had a profitability index of less than one, as shown by the cost-benefit analysis carried out (Cupać et al., 2020).

3. Project financing as a response to climate change in Bosnia and Herzegovina

Climate finance represents a key component of sustainable development in Bosnia and Herzegovina, especially in the context of increasingly pronounced climate changes and their impact on socio-economic structures. This section provides a detailed examination of the institutional framework, financial flows, project typology, current financial instruments, the role of local government levels, and offers concrete recommendations for improving the system.

European Commission does not monitor or report contribution from EU budget to achievement of the SDGs. This is a complaint from the European Court of Auditors, despite the European Union's commitment to sustainability and the Sustainable Development Goals (SDGs). In line with these recommendations, the Commission is currently exploring the establishment of a mechanism to monitor EU budget spending in order to clearly see the impact and contribution to the implementation of the SDGs (Cavalli et al., 2022).

The private sector remains weakly involved in green investments. The main reasons for this are a lack of incentives and support, regulatory uncertainty, and a poorly developed market infrastructure for sustainable financial products. Domestic banks are not yet systematically aligned with ESG (Environmental, Social, and Governance) lending, although there are initiatives aiming to change this trend.

Bosnia and Herzegovina, as a decentralized state, has a complex constitutional and administrative system that reflects the division of competencies among the entity level and state level, ten cantons within the Federation, and hundreds of municipalities. Such decentralization creates numerous obstacles to establishing a unified, functional, and efficient climate finance system (Novaković et al., 2024). In order to establish an adequate system that will be functional in terms of financing projects related to climate change in BiH, a clear understanding of the flow of financial resources from international donors through entity to local government funds is necessary. (Novaković et al., 2024). Local communities, such as East Sarajevo, often remain marginalized in this environment. Due to the complexity and diversity of regulations at the entity level, as well as administrative barriers, local authorities struggle to access funds or must rely on donor-funded projects with limited sustainability. Additionally, the lack of professionally trained staff for project preparation and implementation further slows down these processes. Moreover, the absence of mechanisms for joint planning and information sharing between levels of government reduces investment efficiency, complicates the integration of climate goals into sectoral policies, and

diminishes Bosnia and Herzegovina's ability to respond timely to climate change challenges. Over the past decade, Bosnia and Herzegovina has succeeded in gaining access to numerous international funding sources dedicated to climate projects. BiH has received almost USD 1.7 billion (EUR 1.4 billion) in support to all investments in key sectors, including tourism, water, forestry, biodiversity, agriculture, water, municipal infrastructure, industry, buildings, and transport, in the period 2012 to 2020 (Ministry of Physical Planning, Civil Engineering and Ecology, 2022).

However, an analysis of the allocation of funds reveals a clear disproportion between investments in adaptation and mitigation to climate risks. Over 90% of financial resources have been directed towards projects related to reducing greenhouse gas emissions, such as the efficiency in energy sector, while projects focused on climate change adaptation, such as flood protection, agricultural resilience, or water resource management, have received significantly less attention and financial support (Ministry of Physical Planning, Civil Engineering and Ecology, 2022). In Republika Srpska, there is no cantonal level like in the Federation of BiH, which further facilitates cities like East Sarajevo, which can communicate directly with entity and state institutions, without intermediate levels of support. Cities and municipalities in Republika Srpska, including the City of East Sarajevo, have significant competencies in sectors that are crucial for climate resilience, such as water management, waste, energy, urban planning, public health and municipal infrastructure. However, due to the lack of specialized institutional mechanisms, limited professional capacities and unstable financing, the local level of government often plays a peripheral role in the implementation of climate investments. Certain cities and municipalities have shown a proactive approach:

- The City of East Sarajevo, by adopting the "SECAP", has laid the foundations for strategic planning for climate resilience, with clearly defined goals and measures in the areas of energy efficiency and flood protection.
- Cities such as Prijedor and Bijeljina are establishing local teams for managing environmental and energy transition projects.
- Some projects within international initiatives, such as the UNDP NAP project and the EU4AGRI program, have enabled local communities to develop capacities for drafting project proposals and applications for international funds.

4. Review of strategic documents in selected municipalities in Bosnia and Herzegovina

The key problem being investigated is to what extent strategic planning is focused on planning climate change mitigation measures and whether there are financial mechanisms that are applied in municipalities. The hypothesis set is: municipalities have planned and developed mechanisms for financing activities to adapt to climate change. To validate predefined hypotheses, we used a methodology that included desk research and a case study on four local self-government units in Bosnia and Herzegovina, two from each entity.

This paper provides empirical evidence on the direction municipalities should take to adapt to climate change through strategic planning. The limitations of the research are reflected in the fact

that the constitutional order of Bosnia and Herzegovina is complex, and the different legislation that is applied in the entities in the area under investigation.

Strategic planning has a critical role in supporting investment by raising awareness of climate risks and adaptation opportunities, facilitating discussion about acceptable levels of risk and identifying priority actions and policy tools to accelerate adaptation finance. Planning processes can also contribute to improved institutional coordination and provide clarity about the responsibility for managing climate-related risks (OECD, 2024). Table 4 provides a summary overview of strategic documents for municipalities from the perspective of monitoring the impact of climate change and taking appropriate measures to adapt to climate change.

Table 4 Overview of strategic documents for selected municipalities

Local communities	Čapljina	Gračanica	Doboj	City of East Sarajevo
Validity period	2017-2027	2023-2027	2023-2029	2023-2029
Focus on energy efficiency	Investments in alternative energy sources and infrastructure modernization	District heating, solar systems, replacement of outdated equipment	Energy efficiency in public buildings, thermal insulation, expansion of heating	Focus on decarbonization, energy efficiency of buildings, public lighting
Use of renewable energy sources (RES)	Solar, hydro, support for organic production	Support for solar and biomass projects	Research and use of RES, reduction of CO ₂ emissions	Replacement of combustion plants, electric vehicles, energy transition
Waste management	Sustainable waste management, selection	Landfill rehabilitation, selective waste collection	Recycling, regional landfill "Karabegovac"	Recycling plants, circular economy
Water resources and floods	Preservation of alluvial plains and waters for agriculture	Flood prevention, riverbed revitalization	Expansion of water supply and sewage network	Focus on water quality and distribution
Air and soil protection	Emission reduction, soil and biodiversity protection	Replacement of asbestos roofs, control of traffic emissions	Land reclamation, emission control	Replacement of coal combustion plants, reduction of PM2.5
Adaptation on climate change	Focus on the resilience of resources for agriculture	Education, local plans, resilience measures	Reduction of vulnerability for 10,000 inhabitants	Implementation of the Green Agenda, goals until 2050
Citizen participation and education	Cooperation with the non-governmental sector	Youth education, schools in "green projects"	Awareness raising, education about waste	Citizen information, smart city platforms

Digitalization and smart technologies	Digitalization of administration and services	Not explicitly stated	Not explicitly stated	Implementation of the smart city platform
Green areas and biodiversity	Protection of Hutovo Blato, ecotourism	Not specifically highlighted	Modernization and protection of green areas	Tree planting, urban afforestation, parks

Source: Authors.

Table 5 illustrates the connections of the Doboj municipalities’ strategic document with major climate change documents at the BiH level.

Table 5 The connections between the strategic document of the Doboj municipalities and the main climate change documents at the BiH level

Document	Objectives / Focus	Key measures / Approaches	Relevance for the local level (e.g. Doboj)
Sustainable Development Goals (SDGs)	- Eradicating poverty	- VNR (Voluntary National Review) BiH 2019 - Platform for the implementation of SDGs with UNDP support	- Integration of SDG goals into local strategies (e.g. Doboj) - Focus on the fight against poverty, education, environment, equality, climate resilience
BiH Energy Framework Strategy until 2035	- Preserving the planet	- Efficient energy consumption - Ecological and energy transition - Harmonization of regulations with the EU	- Local application of the strategy through energy efficiency and RES projects in Doboj - Space for inclusion through local strategies
BiH Climate Change Adaptation Strategy 2020–2030	- Peace and prosperity by 2030	- Flood protection, watercourse rehabilitation - Efficient water supply - Fight against illegal construction - Regulation of torrential flows - Waste management and recycling	-The competence of local communities for the implementation of measures - Especially relevant for Doboj (floods, waste)
BiH Climate Change Adaptation Plan (NAP)	- Sustainable, secure and competitive energy	- Scientific research and education - EU harmonization of flood protection systems - Technical solutions (EbS) - Improvement of the hydrological system-	- Multiple measures directly applicable at the local level (Doboj) - Focus on natural solutions, tourism and infrastructure

		"Green roofs", ecotourism, bicycle paths	
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Source: Authors.

5. Conclusion

Given the lack of investment in climate change mitigation, the need for an effective response to these changes is urgent. As the years pass, long-term emissions continue to accumulate in the atmosphere, and the scope for investments that will help avoid dangerous climate change is shrinking (Gouldson et al., 2015). The main cause of the current trend of global warming and the greenhouse effect “due to heating with fossil fuels, is human behavior”. Therefore, “renewable energy projects would be a sustainable solution to mitigate climate problems from the current serious level” (Yoshino et al., 2019). Several new methods have been developed to finance green energy projects. Some of these methods include green bonds and green banks. „Green banks and green bonds have some potential to help finance clean energy. Proponents of green bonds argue that they can provide long-term and reasonably priced capital to refinance a project after it has passed the construction phase and is operating successfully. The benefits of green banks include improved lending conditions for clean energy projects, bundling small projects to achieve commercially attractive scale, creating innovative financial products, and expanding markets by spreading information about the benefits of clean energy (NRDC, 2016). Based on the identified challenges, the following recommendations represent key steps for improving the climate finance system in Bosnia and Herzegovina: development of a publicly accessible database of all projects, sources of funding and results, which would increase transparency, enable better analysis and more efficient management of funds; promotion and support for innovative financial instruments such as green budgets, green bonds and public-private partnerships, which would diversify sources of funding and increase private sector involvement and strengthening the capacities of local governments through continuous education, technical support and the establishment of project manager positions for climate investments, which would enable better planning, preparation and implementation of projects at the local level. These measures are necessary to increase the absorption capacity of the system, improve the quality of projects and the long-term sustainability of climate investments. They would also empower local communities like Dobož, providing the possibility for active role during the process of green transition and climate change adaptation. The joint recommendations could be the following: establish the adaptation funds on the local level, remove barriers to leasing, then reduce restrictions on asset-based financing to promote alternative models of financing, develop EU-aligned green taxonomies and frameworks for bonds (sustainable bond, green bond), adopt ESG standards, in line with the EU framework for sustainable and climate finance, use event-based or scenario-based stress tests to comprehensively assess climate-related risks, develop guidelines for integrating climate risk into risk management, for the financial and private sectors, we should transform the auditing legislation in order to react within ESG standards, invest in the development and implementation of advanced risk assessment and compliance monitoring tools for identification of climate change related risks regarding financial institutions and adopt strategies for climate finance.

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