

CLIMATE CHANGE ADAPTATION PLANNING AT THE LOCAL LEVEL IN SERBIA: CURRENT STATUS AND LESSONS LEARNED

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Abstract. *Serbia is already experiencing the consequences of the changed climatic conditions caused by climate change and according to the available climate models, it will be significantly affected by climate impacts in the future. Adaptation to climate change at the local level, including planning, implementation, and financing, represents a challenge that cities and municipalities in Serbia will progressively face in the near future. For the successful implementation of these processes, it is necessary to establish a stimulating institutional framework, appropriate and predictable sources of financing, and a sufficient level of competence - knowledge and skills of local institutions. The study examines the consequences of the altered climatic circumstances in Serbia, the existing strategic and institutional framework, as well as the practical strategies for adapting to the altered climatic circumstances at the national and local levels, and, based on this analysis, proposes suitable recommendations for adapting to climate change at the national and local levels.*

Key words: *climate adaptation, local adaptation, Serbia*

1. INTRODUCTION

In the face of increasingly extreme weather events and rising global temperatures, many countries are struggling to adapt to the effects of climate change. Serbia is no exception. The country, located in southeastern Europe, has seen its fair share of extreme weather events in recent years, including heatwaves, droughts, floods, and forest fires. These events pose significant challenges to local communities, especially those that are vulnerable and lacking in resources.

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Key documents at the global and European levels addressing the green agenda and climate change strongly emphasize the importance of local resilience. The Paris Agreement [1], the United Nations 2030 Agenda for Sustainable Development [2], and the 2013 EU Adaptation Strategy [3] call for strengthening resilience to changing climate conditions in cities and at the local level in general, especially through adaptation measures. Considering that in highly decentralized social systems that characterize most European countries, actions and tools for adaptation to changing climate conditions are mainly implemented at sub-national (regional and local) levels of government [4], and the fact that local authorities are largely responsible for public functions central to adaptation (including land use regulation and planning, infrastructure development and maintenance, emergency planning, public health, and social protection) [5], the importance of local adaptation planning and its coordination with national adaptation plans is becoming increasingly important to national climate policy.

This paper provides an overview of the opportunities and challenges in the Republic of Serbia for locally-led adaptation. The paper focuses on the results of a review of approaches, practices, and literature, as well as consultations with a range of stakeholders involved in climate adaptation in Serbia.

2. FRAMING LOCAL ADAPTATION TO CLIMATE CHANGE

Local governments play a crucial role in climate change adaptation. One of their primary responsibilities is to develop climate change adaptation plans that assess the potential impacts of climate change on their communities and identify strategies to mitigate those impacts. These plans should evaluate the most significant climate change-related risks and vulnerabilities in the local government's services and infrastructure. The development of these plans is critical for local governments to effectively address the challenges posed by climate change and ensure the resilience of their communities.

The International Panel on Climate Change (IPCC) defines adaptation as "the process of adjustment to actual or expected climate and its effects" [6]. Recognition of the local impacts of climate change has led to increasing support for locally-led adaptation initiatives (as opposed to national, top-down strategies) [5,6,7,8]. Locally-led adaptation actions are processes in which local actors have decision-making authority in planning, implementation, monitoring, and evaluation. When local government, local private sector subjects, local communities, and citizen groups are involved as decision-makers in actions that affect them, one can speak of substantial locally-led adaptation. Given the key role that local governments play in public tasks that are central to adaptation (land use regulation, infrastructure protection, emergency planning, etc.), and the fact that local governments and stakeholders are believed to be better able to agree on collaborative solutions through proximity to stakeholders and face-to-face communication [5,10], locally led adaptation can realize the great potential of climate change adaptation. It goes beyond the stakeholder engagement approach used in classic community-based approaches: local actors, who are directly accountable to people in the community, make decisions about development and adaptation so that decisions are aligned with the interests of those most affected, are context-specific, and simultaneously address multiple risks and achieve multiple benefits [11].

To be successful and not compromise community efforts to adapt, adaptation at the local level should rely on strong institutional and technical capacity adapted to different contexts, including financial capacity and access to external funding [8]. The UN Global Commission on Adaptation, launched in 2018, developed a set of principles to strengthen locally-led adaptation in 2021:

1. Devolving decision-making to the lowest appropriate level;
2. Addressing structural inequalities faced by women, youth, children, people with disabilities, people who are displaced, Indigenous Peoples, and marginalized ethnic groups;
3. Providing patient and predictable funding that can be accessed more easily;
4. Investing in local capabilities to leave an institutional legacy;
5. Building a robust understanding of climate risk and uncertainty;
6. Flexible programming and learning;
7. Ensuring transparency and accountability;
8. Collaborative action and investment.

However, efforts to plan and implement climate change adaptation measures at the local level continue to face, for the most part, a severe and chronic lack of funding, while the influence of local authorities and local stakeholders is often insufficiently incorporated into decisions about funding, design, and implementation of measures [11,12].

3. METHODOLOGY

The objective of this paper is to examine the present circumstances and previous accomplishments related to planning adaptation to the evolving climatic conditions in the Republic of Serbia. Additionally, it aims to develop suggestions for modifying the approach to planning and executing adaptation initiatives at the local level. The study relies on both desk research and focused interviews conducted with key stakeholders at the national and local levels in Serbia.

Climate parameters and indices for the Republic of Serbia were evaluated by analyzing observed and expected values. The data used was obtained from the Digital Climate Atlas of Serbia [14], which was developed based on information provided by the Coordinated Regional Climate Downscaling Experiment (CORDEX) initiative of the World Climate Research Program and the Copernicus Climate Change Service. These organizations provide climate monitoring products for Europe, based on surface in situ observations by the national meteorological service (in Serbia's case, the Hydrometeorological Institute of the Republic of Serbia). The analysis was conducted using two greenhouse gas emission scenarios: RCP4.5 (medium scenario) and RCP8.5 (unfavorable scenario). The years 1986 to 2005 were used as a reference to demonstrate anticipated climate changes, and three future periods were examined: 2011-2040 (recent future), 2041-2070 (mid-century), and 2071-2100 (end of the century).

As part of the "Cities and Climate Change Program" project, which is backed by the French Development Agency (AFD), interviews were conducted with important stakeholders at both the national and local levels. These interviews took place during the initial phase of the project from January to December 2020, as well as throughout 2021 as part of the ongoing project.

4. RESULTS AND DISCUSSION

4.1. Observed and expected climate changes in Serbia

In recent decades, Serbia has experienced notable changes in the frequency, intensity, and duration of extreme weather events, specifically heat waves, heavy precipitation, and droughts. The rate of temperature increase in Serbia is surpassing the global average. From 1950 to 2017, the average annual temperature in Serbia increased by 0.5 to 1.5°C compared to the reference period 1961-1990, with nine of the ten warmest years occurring after 2000. The average temperature increase was 0.36°C every ten years, however, the increase for the period of 1981-2017 reached as high as 0.60 °C.

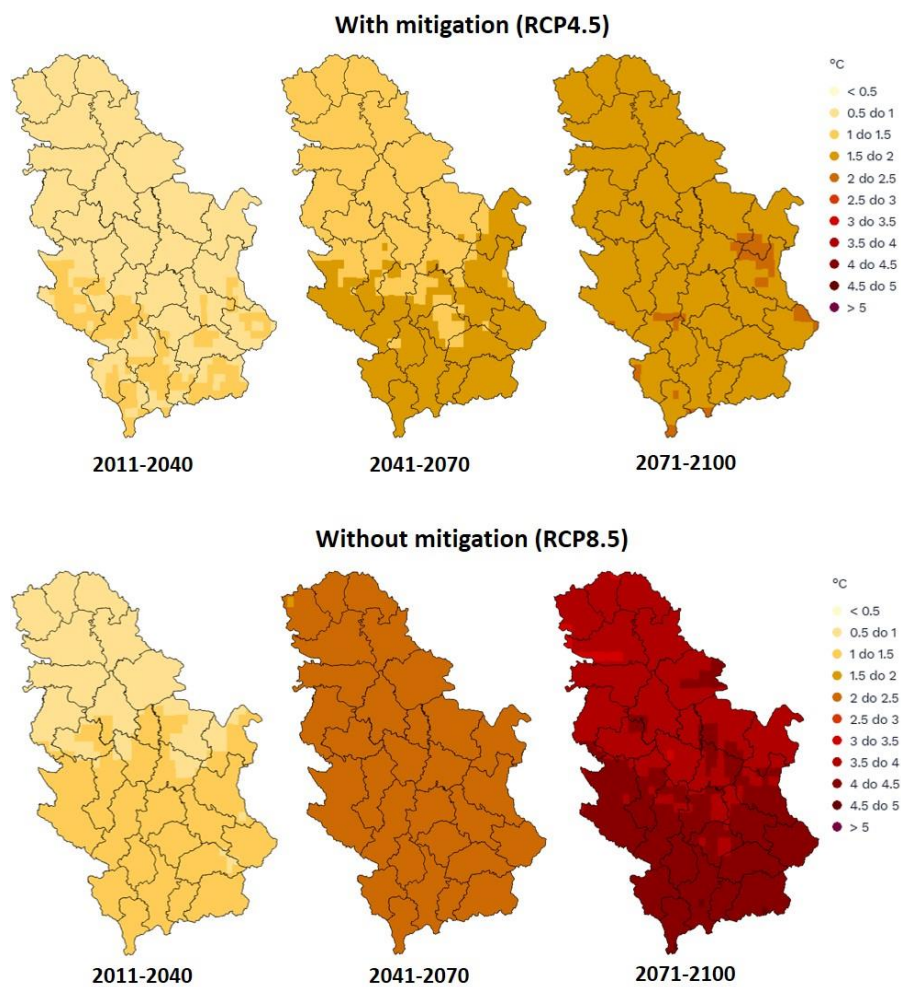


Fig. 1 Expected increase in average daily annual temperature (t_{as}) in the Republic of Serbia until 2100 [14]

Although the average annual rainfall does not show significant changes (5% increase in rainfall in the central and southern parts; 5 - 10% in the north and west of Serbia in 1998-2017; increase in the southern parts from 10% to 20% and up to 10% in the rest of the country in 2008-2017), a change in the annual distribution of rainfall was observed, with the largest decrease during the summer.

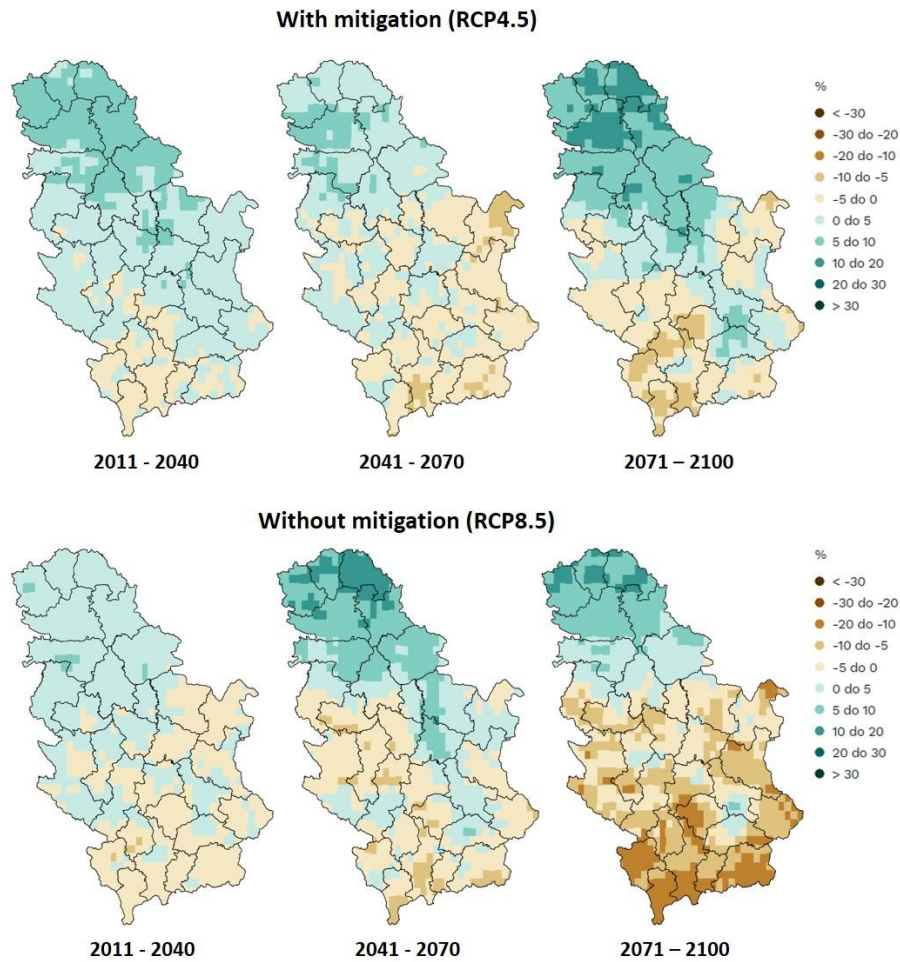


Fig. 2 Expected precipitation trends in the Republic of Serbia until 2100 [14]

Between 1998 and 2017, the average annual rainfall in Serbia remained relatively stable, with a slight 5% increase observed in the central and southern regions, and a 5-10% increase in the north and west. However, there was a notable shift in the distribution of rainfall throughout the year, characterized by a significant decrease during the summer season. Additionally, there was a considerable reduction in the occurrence of frosty and

icy days with temperatures below 0°C. Specifically, during the second decade of this period, the decrease exceeded 10 days, reaching over 15 days in certain areas.

Conversely, the number of summer days, featuring maximum temperatures above 25°C, experienced an extension of half a month compared to the reference period. This extension amounted to an additional 25 days between 2008 and 2017. In the lowland regions of Serbia, there was an average increase of 20 days per year in the number of tropical days, where maximum temperatures exceeded 30°C. Moreover, the occurrence of heat wave days saw an average annual increase of 20 days during the 2008-2017 period. Notably, the average number of extreme heat wave days rose by 2-3 days per year, with certain regions, such as western and southwestern Serbia, experiencing an increase of over 4 days annually.

The analysis of the data also reveals a noticeable trend towards an increase in the occurrence of droughts since the late 1980s, which has been further amplified in the 21st century. Between 2000 and 2017, a total of seven years with drought conditions were recorded, in contrast to only three such years from 1950 to 2000.

Furthermore, there has been an average prolongation of the vegetation season by over 5 days since 1981, with certain regions, especially those at lower elevations, experiencing an extension of more than 10 days. Over the past decade, the length of the vegetation season has shown a growth of up to 25 days, with a maximum extension of over 40 days observed in central Serbia.

It is anticipated that the average annual temperature will rise significantly in the future, regardless of the scenario used. According to the RCP8.5 scenario, the mean annual temperature is expected to increase by 1°C by 2040, 2°C by 2070, and over 4.3°C by the end of the century. In comparison to the projected RCP8.5, the RCP4.5 scenario predicts an expected increase in the mean annual temperature of around 0.5°C lower for the first two examined periods (Fig. 1). A 2°C rise relative to the reference era is predicted by the end of the century. Under the RCP8.5 scenario, the average change in mean maximum and mean minimum temperature by the end of the century is 4.5°C, with the highest change occurring during the summer and reaching 4.7°C by the end of the century. The greatest expected seasonal changes will occur during summer and autumn [14].

The expected pattern of precipitation displays variability both spatially and temporally. Based on the RCP8.5 scenario, it is projected that by the end of the 21st century, the central and southern regions of Serbia will experience a decrease of more than 10% in precipitation compared to the reference period of 1971-2000. This trend is expected to continue as the average annual precipitation is predicted to decline in the latter half of the century. The RCP8.5 scenario forecasts a reduction in precipitation ranging from an average of 20.5% during the June-August period in 2081-2100, up to 40% in the southern regions [14].

The data displays a noteworthy reduction in the number of frost and ice days as elevation increases. The RCP4.5 scenario predicts an average decline of 10 frost days per year between 2016 to 2040, and a decrease of 15 frost days between 2041 to 2065. In the case of the RCP8.5 scenario, ice days will only occur in the highest mountainous regions and will be less frequent than in the current climate. The number of summer and tropical days will continue to increase, with the summer season expected to grow by almost half a month by 2040 and almost a month in the second half of the 21st century. Heat waves will become more frequent and intense, happening 2-3 times per year on average. The RCP8.5 scenario predicts that by the end of the 21st century, extreme heat waves will occur seven times per year and more than ten times in some areas. The growing season's

length will significantly increase, and heavy precipitation events' frequency and total precipitation amount will also rise. The RCP4.5 scenario predicts that by the end of the 21st century, days with extremely high precipitation will produce 40% more precipitation than their average output.

4.2. Climate change strategic and policy framework

Serbia currently lacks a comprehensive national framework for climate change adaptation. The Law on Climate Change serves as the basis for planning, updating, and implementing public policies, measures, and actions related to climate change, as well as for monitoring and reporting on their progress. Relevant agencies and local governments are required to monitor and report on the implementation of adaptation and mitigation measures. Additionally, the Law on Climate Change provides the foundation for planning, updating, and implementing strategies, measures, and activities related to adapting to changing climate conditions. The Republic of Serbia is obligated to develop and adopt the Low Carbon Development Strategy and the Climate Change Adaptation Program and Action Plans, also known as the National Adaptation Plan (NAP), as per the Paris Agreement and Articles 13 and 14 of the Law on Climate Change. However, as of early 2023, the NAP had not yet been adopted. The Ministry of Environmental Protection began developing the NAP as part of the project "Improving Medium and Long-Term Adaptation Planning in Serbia," funded by the Green Climate Fund and implemented by the United Nations Development Program (UNDP). The NAP is expected to be completed by the end of 2023 and will serve as a crucial element in creating a policy and implementation environment while linking key sectoral actions. It will also serve as a bridge to other cross-cutting initiatives, such as the National Program for Disaster Risk Management (2015) and the Action Plan for the Implementation of the National Program for Disaster Risk Management (2017-2020).

At the national level, the primary strategies and programs for adapting to climate change, alongside NAP, include the Draft Spatial Development Plan of the Republic of Serbia for the period 2021-2035, the Updated Nationally Determined Contribution (NDC) of the Republic of Serbia for the period 2021-2030 submitted to the United Nations Framework Convention on Climate Change (UNFCCC) in 2022, the Draft Low Carbon Development Strategy with Action Plan, and various sectoral strategies such as the Urban Development Strategy to 2030, Agriculture and Rural Development Strategy for the period from 2014 to 2024, Forestry Development Strategy, Water Management Strategy to 2034, Draft Emergency Risk Reduction Strategy, Draft National Irrigation Strategy, etc. Despite the fact that most national strategies and programs have recognized climate change adaptation policies and measures, particularly in recent drafts, most sectoral strategic and regulatory documents only contain indirect and fragmentary references to climate change adaptation. Therefore, further coordination, integration, and progress monitoring are necessary across all sectors.

The Law on Climate Change stipulated that the strategy, adaptation program, and action plan would be developed only at the national level, while local governments were given only some reporting responsibilities. In the public debate, it was considered that local governments, by virtue of their mandate, should also contribute to the reduction of greenhouse gas emissions and adaptation to changing climatic conditions, depending on their capacities, capabilities, and circumstances. Including such requirements in the law would, among other things, help raise awareness among local communities about the

problem of adapting to climate change. On the other hand, there is the question of whether local self-governments have the capacity to prepare these documents, or whether they have the financial resources to hire experts or professional and scientific institutions to prepare them. The compromise solution included in the law requires local governments to submit a report to the Ministry every four years on adaptation measures planned at the national level, as well as on phenomena such as floods, extreme temperatures, droughts and their consequences. In addition, local governments must assess and report to the Ministry the impact of policies and measures on the level of greenhouse gas emissions in their jurisdiction and territory.

4.3. The local self-government in Serbia

The territorial organization of Serbia consists of municipalities (150 in total), cities (23), the city of Belgrade (i.e., 174 units of local self-government), all of which are local government units (LGUs), and the two autonomous provinces of Vojvodina and Kosovo and Metohija as forms of territorial autonomy. The municipalities vary greatly in terms of area (from 3 km² to 1,530 km²), population (from 1,600 to over 340,000), population density (from 5.3 pers/km² to 18.78 pers/km²), and economic strength. Of all the municipalities, 41% have less than 20,000 inhabitants. The most economically developed municipalities are located in and around the cities of Belgrade and Novi Sad, while the poorest municipalities are generally located in the border areas of southwestern, southern and eastern Serbia. According to the law, cities (Belgrade and 28 cities in total) represent the economic, administrative, geographical and cultural center of a larger area and have more than 100,000 inhabitants. Belgrade, which includes 17 municipalities, has a special status as the capital.

Local authorities in Serbia are unitary; there is no other tier of authority between the local and central governments. The constitution gives local authorities the status of legal entities and regulates, in principle, the delegation and delineation of powers, as well as the right to autonomously establish bodies and assemblies.

Local self-government in Serbia is monotypic, which means that the largest and smallest local self-government units have the same competences, but the capacities to exercise these responsibilities through the performance of their activities are very different. 46 municipalities are extremely underdeveloped (development level of less than 60% of the national average), and 23 are classified as devastated (development level of less than 50% of the national average). The largest concentration of extremely underdeveloped municipalities is in southeastern and southwestern Serbia, where 29 municipalities belong to the group of 46 extremely underdeveloped municipalities.

Local self-governments in Serbia perform a wide range of tasks, including competencies (original or their own tasks) and delegated tasks, i.e. tasks transferred from a higher level with the aim of more efficient and rational fulfillment of citizens' rights and duties. The umbrella Law on Local Self-Government [15] regulates the specific competences of the municipality. The municipal activities that fall under the jurisdiction of the LSG are listed in the Law on Communal Affairs [16] (water supply, purification and drainage of atmospheric and fecal wastewater, generation and distribution of thermal energy, municipal waste management, urban and suburban passenger transport, cemetery management and burial services, management of public parking lots, provision of public lighting, management of public green marketplaces, maintenance of streets and roads, maintenance of cleanliness of

public areas, maintenance of public green areas, chimney sweeping services, and zoo hygiene activities). According to this law, the municipality is responsible, among other things, “to take care of environmental protection, to adopt programs for the use and protection of natural values, and to establish environmental protection programs, i.e. local action and rehabilitation plans, according to strategic documents and their interests.”

While local self-government (LSG) units perform a wide range of functions and have many competencies, there are very few areas in which they exercise truly sovereign power. Local self-government units have full competence in the areas of culture, recreation, preschool education, communal services, and local roads and housing. To carry out their functions, LSGs establish local public enterprises, such as utilities for water supply and wastewater, waste management and district heating, as well as institutions and organizations in various fields (education, culture, sports, social policy, etc.). In many of the other areas - such as social protection, education, health and environmental protection - the Republic (and the autonomous provinces) can and does delegate responsibilities. To date, however, policy in these areas has been largely determined by the republic, which retains ultimate decision-making authority and most of the funding. The LSGs are generally the executors.

4.4. Climate Change Action Planning and other initiatives involving LSGs

Some municipal governments in the Republic of Serbia have already begun developing and putting into effect strategic documents or action plans for adaptation to changed climatic conditions or reduction of greenhouse gases (GHG) emissions based on their individual capacity. In 2015, the city of Belgrade developed “Climate Change Adaptation Action Plan and Vulnerability Assessment” [17] through participation in the regional project “Climate Change Adaptation in the Western Balkans” (2012-2015), funded by external assistance. The project aim was the integration of climate change adaptation in city management and urban planning in Tirana, Podgorica, and Belgrade. The multisectoral working group, formed in September 2014, was led by a managerial group made up of the City manager, Secretary and Deputy Secretary of the Department for Environmental Protection, representatives of donors, and external consultants. The majority of the working group's participants were representatives of the climate change-related departments (referred to as “secretariats”) of the City of Belgrade. The Plan was primarily organized and carried out by the City's Department for Environmental Protection. This Action Plan was particularly significant as a reference point for upcoming climate change adaptation activities because of the City of Belgrade's extremely significant position, its exceptional importance for the overall economy and society of Serbia, but perhaps more so because some of the most significant sources of GHG are located on its territory.

The Association of Local Governments in Serbia (Standing Conference of Cities and Municipalities - SCTM) developed in 2018 a distinctive methodological framework for planning local adaptation measures under the project “Capacity Building for Improved Implementation of International Environmental Agreements”, which is carried out by the United Nations Development Program (UNDP) and the Ministry of Environmental Protection using Global Environment Facility (GEF) funds. The process of vulnerability analysis and design of local climate adaptation plans, including a list of measures in the most vulnerable sectors, was documented in the “Manual for climate change adaptation planning in local communities in Serbia” [18]. The methodology was tested in the Vojvodina

Autonomous Province's City of Bečej, where the local climate change adaptation plan was formally adopted.

As part of larger GEF-funded projects “Establishing Transparent Framework for the Republic of Serbia” and “Second Biennial Update Report and Third National Communication under the UNFCCC”, UNDP also initiated local climate change adaptation planning initiatives in 2019. Three local self-governments (the cities of Kraljevo, Zrenjanin, and Ub municipality) created Local Action Plans on Climate Change Adaptation and Resilience with assistance from UNDP. Lastly, as part of the “Cities and Climate Change Program” project, implemented by the Ministry of Environmental Protection of the Republic of Serbia and funded by the French Development Agency, the City of Smederevo created an Action Plan for Adaptation to Climate Change in 2022.

It is difficult to assess Serbia's State contribution to the environment and climate change due to the lack of a specific public finance review. The Fiscal Council of the Republic of Serbia considers the government's efforts in this area to be very low. They suggest an increase of investment to €500 million a year, compared to a total fiscal revenue of €20 billion. The Green Fund was re-established in 2017, with three levels of governance (State Green Fund, Provincial Budget Fund for Environmental Protection and Budget Funds of Local Self-Governments for Environmental Protection). Local budget funds come from special fees for protection and improvement of the environment based on the use of residential and business buildings, performing business activities, use of land for performing activities, performing activities that affect the environment, transport of oil and oil derivatives, raw materials, products, and semi-finished products of chemical and other hazardous substances from the industry; 40% of the compensation for ozone-depleting substances and compensation for plastic bags; 40% charges on SO₂, NO₂, powdered substances, and disposed waste; and 20% of the compensation for environmental pollution in areas of special national interest. The Fiscal Council believes that the lack of investment in environmental protection is a major reason for Serbia's chronic under-investment. However, the earmarked fees for environmental protection are often higher than the amount effectively spent in most local governments, particularly due to the Law on Budget System in 2015, which allows local governments to allocate funds from environmental protection fees to other purposes.

Thus, the donors' contribution remains the main source of funding for local adaptation. Donors support the main sectors affected by climate change, such as energy, water and wastewater management, solid waste, transport, etc., by combining budget and project financing (financial support through the Instrument for pre-accession assistance (IPA2), and financing of individual projects by the World Bank (WB), European Bank for Reconstruction and Development (EBRD), European Investment Bank (EIB), Kreditanstalt für Wiederaufbau (KfW), etc.) Programmatic projects (implemented through calls for projects) have also been implemented for a few years within the sector, through three different arrangements: (i) EU/IPA2 project implemented in 2017-2020 in 99 municipalities and supported by the United Nations Office for Project Services (UNOPS); (ii) EIB municipal project implemented by the Ministry of Public Administration and Local Self-governments and the Public Investment Management Office as an executive agency; (iii) GEF funds allocated as technical assistance to the Ministry of Environment, and administrated by the UNDP. Policy-based loan (or financing) within the sector of Climate Change is carried out by the EU through IPA2 Program. Finally, the Program for Results is carried out by the WB through the Enhancing

Infrastructure Efficiency and Sustainable Program (energy efficiency and roads maintenance, 2018-2023).

The dominant position of the EU in this field enables a large part of the subsidies. However, Serbia is classified as a higher middle-income country and the conditions of international financial institutions are regular. The analysis shows that public financing of infrastructure is provided to local governments, usually through the Public Investment Management Office of the Ministry of Finance. The only way for municipalities to receive a loan is a sub-sovereign loan (with a state guarantee or without a government guarantee), because currently there is no special instrument that would direct the loan from the central government to the municipalities. Direct financing of local public utility companies is not well developed because most local public utility companies are not financially credible.

The planning and implementation of national and local initiatives for adapting to climate change in Serbia were analyzed, and it became clear that there were a number of issues that affected all local governments involved and could be seen as obstacles to the implementation of adaptation policies in the future. The local government's avoidance of engaging in the already evident challenges related to climate impacts is influenced by the absence of legal obligations at the local level and the absence of clear roles and responsibilities of local government in the process of adaptation planning. The fact that the adoption of strategic documents and legislation for adaptation to climate change was postponed (and is still delayed) undoubtedly has an impact on this. Local governments, same as in other domains, are subject to limitations that appear in the interactions between policies and regulations within broader governance frameworks. Similar to the federal level, climate adaptation is still not acknowledged as a mainstream policy, all the more so as it remains a novelty for towns and municipalities.

On the other hand, most local communities in Serbia do not have adequate capacities to effectively formulate and implement adaptation policies. In the past time period, there weren't many analytical tools available to deal with local climate change impacts. Also, there were considerable constraints on the kinds of adaptive efforts that people and organizations could take.

Our research additionally finds that the public's understanding and acceptance of the necessity for immediate adaptation measures are still not at an acceptable level. Although there is awareness of the issue of climate change among the population, there is still a lack of specific demands for government action. As a consequence, local governments lack sufficient motivation to deal with climate adaptation. Adaptation often requires huge investments and immediate effort, and expected benefits are often long-term, invisible, and costly for Serbia to achieve. In this context, faced with insufficient incentives, both from citizens and from higher levels of government, local administrations in Serbia most often choose to engage in activities that will generate short-term results, avoiding climate adaptation.

5. CONCLUSION AND FURTHER RECOMMENDATIONS

Adapting to the impacts of climate change cannot be limited to local efforts. Multiple government levels and institutions are involved, each with its own set of rules and procedures. Consequently, local adaptation is part of a broader governance context where decisions made by higher levels of government can influence local outcomes. Although adaptation is a shared responsibility among all levels of government, it is not always clear

who bears responsibility for each aspect. This can hinder local governments' decision-making process on specific adaptation options, given that higher levels of government may enforce legal and regulatory rules. Coordinating efforts across diverse government levels and generating a consistent vision for adaptation is challenging. This is in part due to varying priorities and concerns surrounding climate change among different levels of government. Overcoming challenges and finding ways to work collaboratively is crucial to ensure communities can adapt to a changing climate.

Enhancing the ability of communities to address climate risks, particularly at the local level, requires urgent attention to capacity building and capacity development. To effectively adapt to climate change, it is essential for communities to have the capacity to comprehend climate risk issues, utilize available information, establish necessary institutions and networks, plan and execute suitable climate change adaptation measures, and assess and monitor them to gain knowledge from experience. Therefore, it is crucial for all levels of government to prioritize the reinforcement of existing capacities among local authorities, civil society organizations, and the private sector. This will lay the foundation for robust management of climate risk and the rapid scaling up of adaptation through community-based risk reduction and effective local governance.

Financing local climate change adaptation in Serbia must be prioritized. Investment is needed to develop and implement effective adaptation strategies that can help communities withstand the impacts of climate change and prevent further harm to people, property, and the environment. Developing effective resource mobilization mechanisms for adaptation is critical. These mechanisms should encourage the inclusion of climate-proofing measures in development programs and the integration of dedicated climate change adaptation measures into development planning. Additionally, it is essential to ensure that both financial and technical support is available to local actors. Dedicated funding mechanisms should be established to support local action on climate change adaptation, and regulatory structures should align with the range of development activities at national and local levels. It is important to ensure that all mobilized resources support a unified agenda of achieving development goals and building community resilience against climate and other disaster risks. One of the key strategies for financing local adaptation in Serbia is to leverage existing funding mechanisms. As the UNFCCC signatory country, Serbia has access to international climate finance mechanisms, such as the Green Climate Fund and the Adaptation Fund. These funds can be used to support adaptation efforts in the country, as well as to build local capacity to access and manage climate financing. Another strategy is to engage local governments and stakeholders in the planning and implementation of adaptation measures. This can be done through participatory approaches, such as community-based adaptation planning, which involves local communities in the decision-making process and helps to ensure that adaptation measures are tailored to local needs and priorities. This approach can also help to build local ownership of adaptation efforts, which can increase their sustainability and effectiveness over the long term. A third strategy is to strengthen the resilience of vulnerable communities through measures such as early warning systems, disaster risk reduction, and livelihood diversification. These measures can help to reduce the impacts of climate change on vulnerable populations, improve their coping capacity, and build their resilience to future shocks and stresses.

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PLANIRANJE PRILAGOĐAVANJA NA KLIMATSKE PROMENE NA LOKALNOM NIVOU U SRBIJI: TRENUTNO STANJE I NAUČENE LEKCIJE

Srbija već oseća posledice izmenjenih klimatskih uslova izazvanih klimatskim promenama i prema dostupnim klimatskim modelima biće značajno pogođena klimatskim uticajima u budućnosti. Prilagođavanje na izmenjene klimatske na lokalnom nivou, uključujući planiranje, sprovođenje i finansiranje lokalne adaptacije stoga predstavlja izazov sa kojim će se u bliskoj budućnosti suočiti gradovi i opštine u Srbiji. Za uspešno sprovođenje ovih procesa neophodno je uspostaviti stimulativan institucionalni okvir, odgovarajuće i predvidive izvore finansiranja, ali i dovoljan nivo osposobljenosti – znanja i veština lokalnih institucija. U radu se analizira uticaj izmenjenih klimatskih uslova u Srbiji, postojeći strateški i institucionalni okvir, kao i praktične politike prilagođavanja na izmenjene klimatske uslove na nacionalnom i lokalnom nivou i na osnovu ove analize formiraju se odgovarajuće preporuke primenljive na nacionalnom i lokalnom nivou u oblasti adaptacije na klimatske promene.

Ključne reči: prilagođavanje na klimatske promene, adaptacija na lokalnom nivou, Srbija