



Enhancing Nature-based Solutions in Serbia

The role of ecosystems in disaster risk reduction and climate change adaptation

Tanja Popovicki



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The views expressed in this publication do not necessarily reflect those of IUCN or other participating organisations.

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Executive summary

Serbia is exposed to various natural hazards, including earthquakes, floods, landslides, droughts, wildfires and storms and faces major environmental challenges and climate-related risks, calling for a stronger agenda to improve the national resilience to and mitigation of climate change. Floods and droughts have caused significant damage to infrastructure, the economy, and human livelihoods in the past, especially among vulnerable groups. Climate change may intensify the frequency and scale of natural disasters.

This Scoping Study has been developed, among other, to enable better understanding of the Serbian national context, in terms of the institutional, policy and legal framework and reveal the key challenges for the application of Nature-based Solutions along with the recommendations and entry points for the mainstreaming of the Nature-based Solutions into national disaster risk reduction and climate change policies and strategies.

The identified key findings and recommendations for enhancing the Nature-based Solutions in Serbia are given below:

- 1. Priority challenges:** Agriculture, forestry and hydrology and water resources are recognised as the most vulnerable sectors in terms of climate change impact. This is especially pertinent to Nature-based Solutions (NbS) considering the wealth of knowledge and experience behind NbS for food security and water security. **Recommendation:** At the same time, existing flood protection infrastructure (linking all the above vulnerable sectors) in Serbia is well developed. NbS can complement and add additional resilience to address limitations rather than replace infrastructure. The application of NbS in the context of a watershed-based approach (based on the ongoing activities in the Zapadna Morava watershed) might be further explored as a priority.
- 2. Mainstreaming:** Policies relating to NbS are disaggregated and separated. The current institutional framework for NbS application is very complex and requires additional efforts to ensure coordination and collaboration among different sectors and between the different administration and governance levels in Serbia. There are some indications of NbS-complementary policies and measures; however, there are no publicly available and accessible data or records of their implementation and impact. There are goals with no or weak indicators. **Recommendation:** NbS needs to be integrated into and applied through the existing policy and institutional framework,

mainly in the disaster risk reduction and climate change sectors, and further mainstreamed and incorporated within the urban development, agriculture and rural development, land-use, forestry, water management and biodiversity and nature protection sectors.

3. **Data needs:** There is a deficit of validated and up-to-date data, making it difficult to obtain a clear picture of the environment and ecosystem services. This is also especially evident in regards to local knowledge and practices. For example, the significance of natural ecosystems in the mitigation of floods and water treatment continues to be neglected, with watercourses assessed separately from their accompanying ecosystems. In addition, climate change and disaster risks are generally treated as separate issues. Therefore, it is not possible to estimate where and to what extent floods, droughts, forest fires occur (frequency/seasons), or to assess the vulnerability of different ecosystems to recover or their capacity to be resilient to climate change and disasters. **Recommendation:** planning and application of NbS approaches for climate change adaptation and/or disaster risk reduction requires comprehensive analysis and research based on the context of the specific location or site/territory. The assessment, in addition to identifying the needs and capacities of ecosystems, should also identify possible trends in terms of floods, droughts, forest fires, degradation, deforestation and their impact on people, their communities and the economy, including the potential of existing ecosystems; for example, to determine the water retention capacity of a natural system to mitigate flooding and determine its current susceptibility to climate change.
4. **Capacity gap:** There is a lack of structured information sharing and exchange, capacity weaknesses, and a general lack of awareness and understanding related to ecosystem disaster risk reduction or climate change adaptation, and even less for NbS. **Recommendation:** Prioritise showing the benefits and building a common understanding in the relevant stakeholders including a tailor-made minimum framework for understanding NbS in Serbia. Recommend dedicating sufficient time and efforts to mobilise local community actors and stakeholders, to ensure a bottom-up approach, two-way communication with the public, and to educate and promote concepts and approaches.
5. **Identifying examples:** The gaps in data and repositories proved to be a barrier in identifying NbS case studies in Serbia. Instead, all that was available and accessible was research providing recommendations for NbS and undocumented local

knowledge of sustainable practices. These word-of-mouth sustainable practices contain untapped potential in documenting, promoting and upscaling NbS in Serbia. As of yet, there are no repositories or databases capturing this local knowledge and practice. **Recommendation:** Identifying and supporting sustainable local knowledge and practices that have the potential to align with or contribute to the concept of NbS use the IUCN Global Standard for NbS™, ensuring the availability of data that should enable evidence for case studies and/or good practice examples of NbS. Efforts should be made to also account for gender data disaggregation and ensure this data spans a range of sectors, stakeholder groups and applications.

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Acronyms

AFWM	Agriculture, forestry and water management
BUR	Biennial update report
CC	Climate change
CCA	Climate change adaptation
CSO	Civil society organisation
DRR	Disaster risk reduction
EbA	Ecosystem-based approach
Eco-DRR	Ecosystem disaster risk reduction
GDP	Gross domestic product
GHG	Greenhouse gases
GI	Green infrastructure
IUCN	International Union for Conservation of Nature
LDN	Land degradation neutrality
LSG	Local-self government
NbS	Nature-based Solutions
NDC	Nationally determined contribution
PE	Public enterprise
PIMO	Public investment management office of the Republic of Serbia
PUC	Public utility company
PWMC	Public water management company
RCC	Regional Cooperation Council
SCTM	Standing Conference of Towns and Municipalities
SEM	Sector for emergency management of the Ministry of the interior
SEPA	Serbian environmental protection agency
Sida	Swedish International Development Cooperation Agency
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention to Climate Change
WFD	Water Framework Directive

1. Purpose and methodology of the scoping study

The overall purpose of the scoping study (hereinafter: Study) is to provide a state-of-the-art overview of the **Serbian national context with regards to the application of Nature-based Solutions (NbS) approaches for climate change adaptation (CCA) and disaster risk reduction (DRR).**

Moreover, the objectives of the Scoping study are to: 1) understand the national context, in terms of the institutional, policy and legal framework for the application of NbS, 2) provide an overview of the most common natural hazards and disasters in Serbia and the correlated risks, 3) elaborate on the added benefit of deploying NbS in the given context, 4) identify knowledge, institutional and capacity gaps and barriers for the application of NbS, and 5) provide recommendations and entry points for mainstreaming NbS into national disaster risk reduction and climate change policies and strategies.

The Study relies on the available and accessible data and information originating from existing policies, programmes and strategies (global, regional, national and local), taking into account data collected on past and ongoing initiatives, projects and activities in Serbia on Nature-based Solutions for disaster risk reduction, and the impacts on climate change and the environment. It includes a rapid overview of the current development in Serbia concerning NbS and their application in the Serbian context, to inform semi-structured interviews and discussions with selected key partners and relevant national stakeholders.

Furthermore, in order to identify and elaborate best practice cases and examples of NbS application, a comprehensive desk study was performed during the initial phase to compile data and information on all ongoing projects, programmes, activities or initiatives that are currently applying Nature-based Solutions in Serbia.

Special attention has been given to screening and examining relevant national documents and policies: strategies, plans and programmes that reveal existing or potential linkages between Nature-based Solutions, climate smart adaptation and disaster risk reduction policies and measures, including climate and biodiversity, as well as climate and gender interconnections.

The Study also maps and identifies the experiences with Nature-based Solutions in/or involving Serbia that can illustrate the benefits and applicability of NbS and reveal entry points for possible scale-up of NbS interventions based on existing experiences.

The main findings and conclusions of the Study were further cross-checked, and inputs and suggestions of stakeholders and partners were incorporated. In addition to feedback from relevant stakeholders and other actors across sectors on the identified priorities and potential pilot sites proposed for Serbia, this process contributed to knowledge building and awareness raising through the sharing of data and information on the current state of affairs regarding disaster risks, climate change impacts and the identification of opportunities presented by the application of Nature-based Solutions.

The Study was developed as part of the ADAPT: *Nature-based Solutions for resilient societies in the Western Balkans* project, funded by the Swedish International Development Cooperation Agency (Sida) and implemented by IUCN.

DISCLAIMER: Due to their relevance and importance for the scope and content of this Study, the text below refers to several laws that still were in the draft phase at the time of preparation of this Study (June – December 2020). These laws have since been enacted:

1. Draft Law on Climate Change. The Law was officially adopted on 18 March 2021 (Official Gazette 26/21). Available at:
<http://www.parlament.gov.rs/upload/archive/files/lat/pdf/zakoni/2021/337-21-lat..pdf>
2. The obsolete Law on Gender Equality. The new Law was officially adopted on 20 May 2021 (Official Gazette 52/21), Available at:
<http://www.parlament.gov.rs/upload/archive/files/lat/pdf/zakoni/2021/741-21-lat..pdf>
3. The draft Nature Protection Programme of the Republic of Serbia for the period 2021–2023. The document was officially adopted on 24 May 2021. Available at:
<https://www.ekologija.gov.rs/sites/default/files/inline-files/Program%20zastite%20prirode%20RS%202021-2023.%20godine.pdf>

2. The ADAPT Project

The [ADAPT: Nature-based Solutions for resilient societies in the Western Balkans](#) project aims to increase ecosystem and community resilience to climate change and environmental degradation in the Western Balkans. This regional umbrella initiative works with six Western Balkan economies, regional and local partners.

ADAPT aims to introduce Nature-based Solutions as a contribution towards reducing of environmental degradation and increasing climate resilience, including social equity and gender equality, in the Western Balkan region. In order to achieve balanced results and achieve a positive, long-term impact on communities and ecosystems in the region, the project has strong regional and national components. Regionally, it focuses on aligning NbS and DRR policy, knowledge generation and sharing, capacity development and networking, while the focus at the national level is on national policy, stakeholder engagement and demonstration through pilot NbS projects.

The project is implemented through the following three strategies:

- ✓ Enhance knowledge and awareness of Nature-based Solutions for disaster risk reduction among decision makers, natural resource managers and local communities, with a specific focus on gender;
- ✓ Integrate NbS and equitable climate-smart planning into adaptation and disaster reduction policy; and
- ✓ Implement NbS for disaster risk reduction and their scale-up.

3. Introduction

The Western Balkans is one of the most vulnerable regions in Europe in terms of climate change and environmental impacts. Extreme events, such as floods, droughts and forest fires, are predicted to occur more frequently and with higher impacts, calling for measures that increase resilience and climate change adaptation, while reducing disaster risks. The 2016 European Environment Agency report¹ on climate change impacts and vulnerability in Europe considers South East and Southern Europe are highly prone to climate change effects, with the highest impacts of climate change and number of severely affected sectors and domains.

The Study on climate change in the Western Balkans,² published by the Regional Cooperation Council (RCC) in June 2018 “shows an alarming increase of temperature over the whole territory, with an expected temperature increase of 1.2°C in the near future, destined to warm further by 1.7–4.0°C and even exceeding 5.0°C by the end of the century, depending on the global effort to reduce greenhouse gases (GHG) emissions”. Analyses of climate change impacts in the region recognise that human health, safety and quality of life are strongly affected by natural hazards and weather-related losses, while also identifying agriculture, forestry, water resources and human health as sectors that will suffer the greatest impacts.

Serbia is exposed to various natural hazards, including earthquakes, floods, landslides, droughts, wildfires and storms. In May 2014, Serbia suffered the most severe flooding in 120 years. The disaster affected 22% of the total population and the estimated cost was 4.8% of GDP. By way of illustration of the impact of this flood, it caused the Serbian economy to contract by 1.8% in 2014, in contrast with a projected growth of 0.5%. Additionally, 30% of the country is at risk from landslides. The Average Annual Loss from droughts alone is estimated at 1.4% of GDP.³

Serbia faces major environmental challenges and climate-related risks, calling for a stronger agenda to improve the national resilience to and mitigation of climate change. Floods and droughts have caused significant damage to infrastructure, the economy, and human livelihoods in the past, especially among vulnerable groups. Climate change may intensify the frequency and scale of natural disasters. Meanwhile, low efficiency in energy, transport, water,

¹ European Environment Agency (2017). [Climate change, impacts and vulnerability in Europe 2016. An indicator-based report](#). Luxembourg: Publications Office of the European Union, 2017. DOI:10.2800/534806

² Vuković, A and Mandić, M. (2018). [Study on climate change in the Western Balkans region](#). Sarajevo, Bosnia and Herzegovina: Regional Cooperation Council.

³ Public Investment Management Office (2018). Case Study // Round Table SDG 11: Promoting resilient and sustainable cities and human settlements: intersectoral cooperation and evidence-based policies. Presented at: Regional Forum on Sustainable Development for the UNECE region, Geneva, 2 March 2018. Available at: https://unece.org/DAM/RCM/Website/Case_Study_SDG11_2_Serbia.pdf

waste management and agricultural practices results in a high carbon footprint, significant losses of extracted water and elevated levels of air pollution in major cities such as Belgrade, Subotica and Niš. Pollution and poor environmental management overall in turn impact economic growth and human welfare, for example, through reduced productivity, poorer health outcomes and reduced learning capacity. Overall, institutional strengthening, policy development and enforcement are necessary to strengthen Serbia’s environmental sustainability and climate action.⁴



NbS are “actions to protect, sustainably manage and restore natural and modified ecosystems in ways that address societal challenges effectively and adaptively, to provide both human well-being and biodiversity benefits.”

- [IUCN Resolution](#) (WCC 2016 Res 069)

There is an increasing understanding that nature provides ‘no-regret’ solutions that are cost-effective and can contribute to increased community resilience beyond society’s capacity to absorb and recover from a single disaster, such as a flood or drought. While still an emerging concept, Nature-based Solutions (NbS) (Figure 1) have clearly demonstrated their value in providing multiple benefits to societies, e.g., in mitigating and adapting to climate change impacts, reducing disaster risks, improving community resilience and livelihoods, and safeguarding ecosystems and biodiversity (for more details on the global NbS context and approach please see Annex II of the Study).



Figure 1. NbS approaches based on the IUCN definition including the seven societal challenges that NbS address (climate change adaptation and mitigation, disaster risk reduction, economic and social development, human health, food security, water security and ecosystem degradation and biodiversity loss. (Source: IUCN, 2020, see footnote 7).

Various approaches support the application of NbS, including green infrastructure (GI) projects, ecosystem-based disaster risk reduction (Eco-DRR) or ecosystem-based adaptation (EbA), in different fields. Measures facilitating the practical implementation of NbS through policy development and enforcement, stakeholder involvement and building capacities of national institutions and/or local

⁴ World Bank (2020). [Serbia Systematic Country Diagnostic Update](#). Washington, USA: World Bank.

communities are equally important.⁵ The IUCN Global Standard for Nature-based Solutions™,⁶ launched in July 2020, with its associated guidance⁷ operationalises NbS by providing a common language and framework in order to design, verify and scale up NbS applications and policies.

In order to outline the specific context of Serbia concerning the opportunities deriving from the application of NbS approaches in addressing climate, community resilience or disaster risks, it is first necessary to understand the overall framework for their implementation in Serbia. NbS is an overarching, crosscutting concept that by definition involves various sectors, as shown in Figure 2. Climate change and DRR issues are those that penetrate into all relevant sectors, addressing challenges through climate adaptation and mitigation measures or actions striving to reduce the risks from disasters.

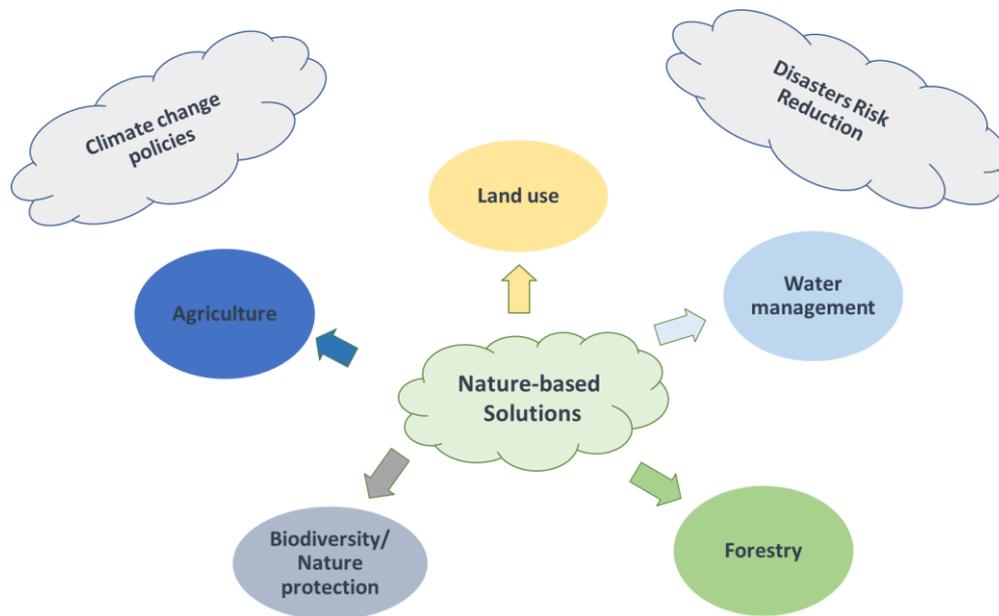


Figure 2. Current framework for NbS implementation in Serbia. Linkages identified between NbS and specific sectoral policies (in circles). These linkages are then impacted by cross-sectoral policies (in clouds)
(Source: This figure is created by the author of this study.)

⁵ Popovicki, T. (2019). *Study on Nature-based Solutions in Serbia*. Belgrade, Serbia: UNDP.

⁶ IUCN (2020). *Global Standard for Nature-based Solutions. A user-friendly framework for the verification, design and scaling up of NbS*. First edition. Gland, Switzerland: IUCN.

⁷ IUCN (2020). *Guidance for using the IUCN Global Standard for Nature-based Solutions. A user-friendly framework for the verification, design and scaling up of Nature-based Solutions*. First edition. Gland, Switzerland: IUCN.

4. Serbia country overview

Serbia is a landlocked country in Southeast Europe, at the crossroads of the Pannonian Plain and the Balkans, bordering with Hungary to the north, Romania to the northeast, Bulgaria to the southeast, North Macedonia to the south, Croatia and Bosnia and Herzegovina to the west, and Montenegro to the southwest, and claiming a border with Albania through the disputed territory of Kosovo.⁸ Serbia covers an area of 77,474 km².⁹ The terrain varies from rich fertile plains in the north, limestone ranges and basins in the east and mountains and hills in the southeast. There are three major geographical areas: the lowland Pannonian Plain, Vojvodina in northern Serbia as a predominantly flatland of alluvial debris and plateau covering about 25% of the territory, and Central Serbia with the Šumadija Highlands as a predominantly hilly region ranging in elevation from 100 to 500 metres. Areas with an elevation over 1,000 metres cover less than 10% of the national territory and are mainly located south of the Zapadna Morava and Nišava Rivers.

Serbia is a parliamentary republic with a unicameral parliament. The government is divided into three branches: legislative (parliament), executive (government) and judiciary. The Head of State is the president, elected by a popular vote every five years, while the head of the government is the prime minister.

According to the Statistical office of the Republic of Serbia,¹⁰ the estimated population in the Republic of Serbia in January 2020 was 6,926,705 (the estimations are based on the results of natural changes statistics and population internal migration), 51.3% women and 48.7% men. The capital and largest city is Belgrade (population 1.6 million). The official language is Serbian and the official script is Cyrillic.

The majority of the population (55%) is urban with steady rural to urban migration. The rural population is generally poor and highly dependent on agricultural production and farming. In addition, 8.8% of the population, mostly in rural areas, lives below the poverty line. Due to domestic migration, the rural population is increasingly vulnerable as a greater proportion of the individuals remaining in the inland, mountainous areas belong to older age groups.

⁸ Kosovo is the subject of a territorial dispute between the Republic of Kosovo and the Republic of Serbia. The Republic of Kosovo unilaterally declared independence on 17 February 2008. Serbia continues to claim it as part of its own sovereign territory. The two governments began to normalise relations in 2013, as part of the 2013 Brussels Agreement. Kosovo is currently recognised as an independent state by 97 out of the 193 United Nations member states. In total, 112 UN member states have recognised Kosovo at some point, of which 15 later withdrew their recognition. Source: <https://en.wikipedia.org/wiki/Serbia>

⁹ Figures do not include Kosovo.

¹⁰ Ibid.

Table 1. Serbia basic statistics (Source: Statistical Office of the Republic of Serbia, see footnote 11)

Serbia basic statistics ¹¹	
Population	▼ 6,926,705 (1 January 2020)
GDP per capita Current USD	7,681.2
GDP current USD billion (2020)	53
Life expectancy at birth, years (2018)	75.7
Unemployment	— 9.7% (Q1, 2020) ▼ 25.5% youth unemployment (Q1, 2020)
Average net salary	RSD 59,941 EUR 510 USD 562 monthly (January 2020)

The depopulation trend continued, meaning that the population growth rate, compared with the previous year (2018), was negative and amounted to -5.4%. At the same time, the process of demographic ageing of the population is seen in the low and steadily declining participation of young people and the high and continuously increasing share of the elderly in the total population.

According to the data for the Republic of Serbia in 2019, 20.7% of the population was aged 65 and over and only 14.3% were under the age of 15.

According to the activity status for persons aged 18 and over, the most exposed to the at-risk-of-poverty were unemployed persons (49.0%), while the lowest at-risk-of-poverty rate was recorded for employees working for employers (6.8%). In case of self-employed persons, this rate amounted to 31.0%. The at-risk-of-poverty rate for pensioners was 17.1%.¹²

Based on the 2018 Annual progress report of the European Commission for Serbia,¹³ activity and employment rates were at their highest, while unemployment (for 15 years and over) dropped to 12.7%. Although long-term unemployment, and female and young people unemployment continued their downward trend, the activity rate for young people has declined. The proportion of young people in the age group 15–24 not in employment, education or training fell further to 16.5% in 2018. The share of informal employment, two-thirds of which was in agriculture, fell to around 20% of the total.

A steady population decline by 0.5% every year, along with emigration and the brain drain, especially of educated young people, remain key medium-to-long-term economic challenges. In addition, persistent skill mismatches and large regional disparities have continued to be a major labour market issue, resulting in high structural unemployment.

¹¹ Data of the Statistical Office of the Republic of Serbia. Available at: <https://www.stat.gov.rs/en-US/oblasti/stanovnistvo/procene-stanovnistva>. Accessed on 18 August 2020.

¹² Data of the Statistical Office of the Republic of Serbia. Available at: <https://www.stat.gov.rs/en-us/vesti/20191015-siromastvo-i-socijalna-nejednakost-2018/?s=0102>. Accessed on 18 August 2020.

¹³ European Commission (2018). [Serbia 2018 Report](#). Strasbourg, France: European Commission.

The Serbian economy is relatively diverse though highly reliant on industrial manufacturing and energy production that account for nearly 30% of GDP. Food production is the largest subsector of manufacturing and accounts for almost one-fifth of employment and value-creation in manufacturing. Agriculture and forestry contribute around 10% of GDP. This is of special significance in this Study since the links between NbS and agriculture is a source of further research currently being conducted by international organisations such as FAO and IUCN.¹⁴

Between 2008 and 2015, the global economic crisis, combined with climate-induced disasters (such as the 100-year rain event that occurred over the Western Balkan region including Serbia, in May 2014), created an economic environment of zero growth. As a result, among the formally employed, almost half are employed in the public sector. Despite this, poverty measured at the USD 5/day poverty line is projected to continue to slowly decline to around 13% by 2020.¹⁵

Food and agricultural products account for about 13% of the country's exports, 17% of employment and 7% of GDP. While most of Serbia's approximately 630,000 farms are small (less than 4.5 ha), the country's northern region (Vojvodina) has large farms—14.7 ha on average in the Central Banat region, some of which are highly productive commodity producers focused mainly on cereals and oil-seeds. There are also farms with competitive fruit production for export. The agriculture sector has had a net positive effect on growth and exports in recent years, although its weather dependence creates substantial volatility risks.¹⁶

4.1 Gender issues

The Republic of Serbia has ratified all international and regional treaties and conventions that set the standards in the fields of human rights, women's rights and gender equality and developed a broad anti-discrimination and human rights legal framework. The Constitution guarantees the equality of women and men and obliges the state to develop equal opportunities policies (Art. 15). The Constitution guarantees equality before the law, and prohibits both direct and indirect discrimination based on any ground, particularly on race, sex, national origin, social origin, birth, religion, political or other opinion, property status, culture, language, age, mental or physical disability.

¹⁴ Iseman, T. and Miralles-Wilhelm, F. (2021). [Nature-based Solutions in agriculture – The case and pathway for adoption](#). Virginia, USA: FAO and The Nature Conservancy.

¹⁵ World Bank [website]. Available at: <https://www.worldbank.org/en/country/serbia/overview>. Accessed on 10 October 2020.

¹⁶ World Bank Open Knowledge Repository [website]. Available at: <https://openknowledge.worldbank.org/handle/10986/33736>. Accessed on 10 October 2020.

Gender equality clauses, including affirmative measures, have been integrated in the legislation related to the specific sectors, such as labour, employment, family relations, elections, social protection, health care, media, education and textbooks, disaster risk reduction, sports, etc. Despite the evident progress, there are many areas needing improvement.

Despite increases in economic growth, there is still high gender inequality in access to employment and resources, including property, land, financial markets, transport, jobs, support programs for businesses, and agricultural loans, with persistent gender gaps within the labour market. The 2019 employment rate of the working-age population (15–64) was 65.6% for men and 52.0% for women.¹⁷

The Law on Gender Equality,¹⁸ adopted before the general Law on Discrimination, has numerous shortcomings that still need to be addressed, as seen in practice. Although the Law makes a distinction between sex and gender (Art. 10), it refers only to equality between the sexes and equal opportunity policy and does not introduce gender equality. De facto discrimination against women is not clearly recognised or targeted by the Law. The Law also fails to introduce efficient implementation mechanisms, clear mandates and sufficiently specific provisions that would govern gender equality mechanisms at all levels, application of the principle of equal treatment in the access to and supply of goods and services, and effective penalties for noncompliance with the statutory provisions.¹⁹

Since 2014, the primary institution addressing gender-related issues is the Coordinating Body for Gender Equality of the Government of Serbia.²⁰ In addition to the Coordinating Body, other institutions involved in gender-related issues include the Ministry of Labour, Employment and Social Policy, the Ministry of the Interior, the Network of Women Members of Parliament, the Provincial Secretariat for Gender Equality, local-level bodies for gender equality, and women's NGOs.

The 2009 Law on Gender Equality stipulates that all local self-governments establish their own gender equality mechanisms. However, local governance bodies are without the resources to

¹⁷ Labor Force Survey for 2018, 2019; SORS. Available at: <https://www.stat.gov.rs/en-us/oblasti/trziste-rada/anketa-o-radnoj-snazi>. Accessed on: 24 September 2020.

¹⁸ Anon. (2009). *Zakon o ravnopravnosti polova* (Law on Gender Equality) (Official Gazette of RS 104/09). Belgrade, Serbia: National Assembly of the Republic of Serbia. Available at: https://www.paragraf.rs/propisi_download/zakon_o_ravnopravnosti_polova.pdf

¹⁹ Dokmanovic, M. (2016). *Gender Analysis Serbia*. Belgrade, Serbia: IBF International.

²⁰ For more information, please visit www.gendernet.rs

implement activities, lack sufficient knowledge on gender equality, are unable to report on progress, and have minimal collaboration with the civil society.²¹ In 2016, a new version of the law was drafted and entitled the Law on Gender Equality, though it still today has not been put on the parliamentary agenda and there has been little transparency on the process for its review and adoption.

4.2 Environmental context

The Republic of Serbia stands out for its high genetic, species, ecosystem and landscape diversity. The high mountainous and mountainous regions of the country, as part of the Balkan Peninsula represent one of the six hotspots of European biodiversity.

The Corine Land Cover database for 2018 indicates the following land use distribution for the territory of Serbia

- Agricultural land 54.7%
- Forests 39.96%
- Urban land 3.69%
- Other (wetlands and water basins) 1.65%

According to the Statistical Office of the Republic of Serbia,²² i.e., the results of the last agricultural census from 2018, Serbia has 3,467,788 hectares of total available agricultural land, representing 60% of the national territory, and offering ecosystem services of vital importance for human health and welfare. Within the utilised agricultural land, more than 70% is arable land, whereas meadows and pastures account for about 20%.²³

The country's rivers belong to the three main river basins: Black Sea, Adriatic Sea, and Aegean Sea. The largest part of the territory falls within the Black Sea Basin, also called the Danube Basin (approximately 92%, i.e., approximately 98% excluding Kosovo and Metohija). Three rivers are navigable along their whole length through Serbia: the Danube, Sava and Tisa, and together their catchments account for more than 90% of all surface water resources. Other major rivers are Zapadna Morava (308 km), Južna Morava (295 km), Drina (220 km) and Timok (202 km). Most of the rivers have a rain-snow regime of water levels and flow rates, where the maximum water level is recorded in the spring and the minimum in August and

²¹ Provincial Ombudsman (2015). *Rodna ravnopravnosti i smanjenje rizika od katastrofa* (Gender Equality and Disaster Risk Reduction). Novi Sad, Serbia: Provincial Ombudsman.

²² Data of the Statistical Office of the Government of Serbia, Available at: www.stat.gov.rs. Accessed on 12 November 2020.

²³ Ministry of Agriculture and Environmental Protection (2014). *The Fifth National Report on Implementation of the Convention on Biodiversity*. Belgrade, Serbia: Ministry of Agriculture and Environmental Protection.

September. The high variability in terrain relief creates high rates of soil degradation and highly erosive river flows.

There are only a few natural lakes in Serbia (with the exception of Palić Lake), and most are very small, originating from erosion or accumulation processes. On the other hand, there are numerous artificial lakes throughout the country serving as water reservoirs or for flood prevention and erosion control purposes.²⁴

The state of the environment in Serbia has been regularly monitored, based on an established set of environmental indicators. Monitoring is performed by the Serbian Environmental Protection Agency (SEPA) that publishes the Report on the State of the Environment in Serbia on an annual basis.²⁵ Throughout the predefined set of indicators, SEPA monitors and reports on air quality, climate change (including GHG inventory), water quality, biodiversity, waste management, noise, ionising radiation, forestry, hunting and fishing, sustainable use of natural resources, and the legal, economic and social issues that influence the environment in the country.

4.3 Serbia's climate change context

An analysis of the observed climate change in Serbia shows that the rising temperature trend is increasing further over time. In January 2019, the Republic Hydrological and Meteorological Service announced that 2018 was the hottest year on record in the Republic of Serbia. In recent decades, changes in climate conditions have also led to more frequent droughts, while more precipitation can be related to intensive precipitation events, frequently causing flash floods. Furthermore, in the national territory, temperatures are expected to continue rising until the end of this century to values that are on average 3 to 5°C higher than the temperatures from the mid-20th century. Such changes will further destabilise the climate system and this progressive change in climatic conditions will be conducive to the onset of extreme heatwaves, severe drought episodes and an increase in precipitation accumulations during extreme events.²⁶

The risks of climate change to Serbia's sustainable development are evident, and the impacts of climate change may jeopardise infrastructure, agriculture productivity, water availability and

²⁴ Ministry of the Interior (2017). *Procena rizika od katastrofa u Republici Srbiji* (Assessment of Disaster Risk in the Republic of Serbia). Belgrade, Serbia: Ministry of Internal Affairs.

²⁵ Serbian Environmental Protection Agency [website], Available at: www.sepa.gov.rs. Accessed on 26 September 2020.

²⁶ UNDP (2018). *Climate changes observed in Serbia and future climate projections based on different scenarios of future emissions*. Belgrade, Serbia: UNDP Serbia.

public health, with agriculture, forestry and hydrology and water resources recognised as the most vulnerable sectors.²⁷

The total material damages caused by extreme climate and weather conditions in Serbia exceeded EUR 5 billion in the period 2000–2015 alone, with more than 70% of losses caused by drought and high temperatures, followed by flooding. In 2014 alone, floods caused enormous damages and recovery required an estimated EUR 1.35 billion.²⁸

Drought, insect invasions and forest fires have significantly impacted forest ecosystems in Serbia. In the long run, climate change can cause a transformation of entire forest ecosystems, changing the distribution and composition of Serbian forests. Climate change will affect the spatial variation in agro-climatic conditions, the conditions for plant breeding and the selection of suitable varieties. Certain scenarios for the period 2071–2100 predict a corn yield reduction of up to 52% for the territory of Serbia for conditions without irrigation. Impacts on other crop and vegetable varieties can also be expected.²⁹

4.4 Serbia's disaster risk context

Serbia is prone to natural hazards such as floods, landslides, droughts, earthquakes and wildfires that can have a significant impact on people and infrastructure. The number of people affected by flooding is estimated at about 200,000 per year on average, at an estimated cost of USD 1 billion in GDP. Serbia ranks fourth among Europe and Central Asia countries in output affected by a 100-year flood. The risk posed by climate change is high for Serbia, as the country ranked 8th in 2017 and 35th in 2018 of all countries on the German Climate Risk Watch Index in terms of losses relative to GDP. Major floods in May 2014 caused damages equivalent to 2.7% of GDP and pushed an estimated 125,000 people into poverty. More recently, parts of central and western Serbia were affected by heavy rain and flash floods in June 2019, with 20 municipalities declaring a state of emergency.³⁰

The risks are not equal across the entire territory and vary depending on the type of hazard, exposure, vulnerability and coping capacity. However, based on the Sector for Emergency Management (SEM), Ministry of Interior data on the severity and frequency of emergency

²⁷ Ministry of Environmental Protection (2019). [Predlog Programa zaštite prirode za period 2020-2022](#) (Draft Nature Protection Programme for the period from 2020 to 2022). Belgrade, Serbia: Ministry of Environmental Protection.

²⁸ UNDP (2019). [Study on the Socio-economic Aspects of Climate Change in the Republic of Serbia](#). Belgrade, Serbia: United Nations Development Programme.

²⁹ Government of the Republic of Serbia (2015). [Intended Nationally Determined Contribution for the Republic of Serbia](#). Belgrade, Serbia: Government of the Republic of Serbia. Official document based on the obligations towards the UN Convention on Climate Change.

³⁰ World Bank (2020). [Serbia Systematic Country Diagnostic Update](#). Belgrade, Serbia: World Bank.

situations, the two most prominent risks in Serbia are deriving from extreme temperatures and floods (Figure 3). The third most common risk are earthquakes.

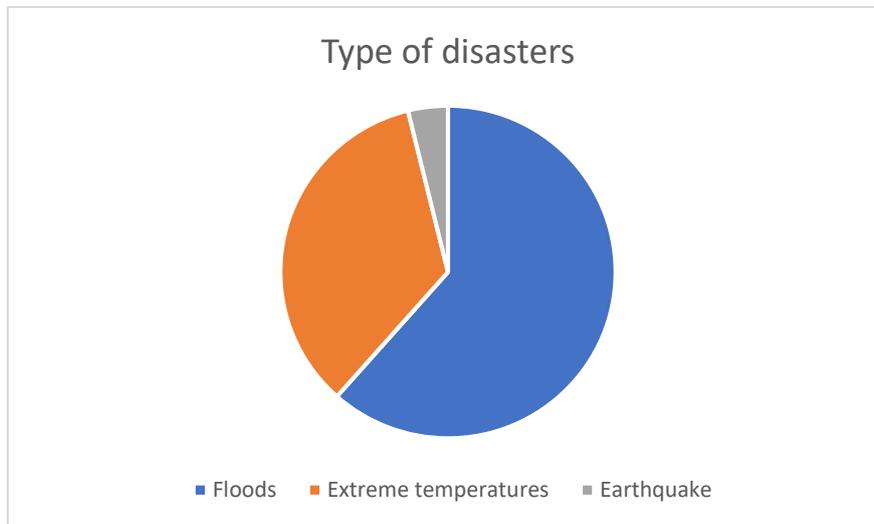


Figure 3. Based on EM-DAT database for Serbia the most common types of disasters recorded in Serbia since 2007 are floods, extreme temperatures and earthquakes (Source: *International Disaster Database*, <https://public.emdat.be/data>.)

Based on the Serbian Intended Nationally Determined Contributions (INDC), “the total damage caused by extreme climate and weather conditions, from 2000–2015, exceed 5 billion euros and more than 70% of the losses are associated with drought and high temperatures. Another major cause of significant losses was floods. Currently there is no analysis of the damage resulting from long-term changes in the climate system that has been observed in the past decades”.

Since 2007, it is estimated that more than 220,000 people have been killed and injured as a consequence of the most common natural hazards (Figure 4).

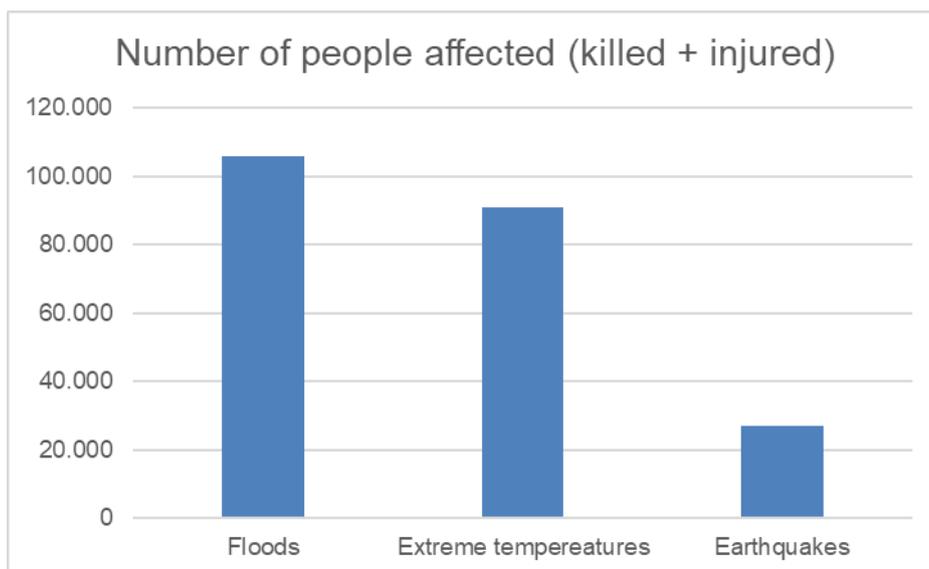


Figure 4. Number of people affect by different types of disasters, based on EM-DAT database for Serbia
 (Source: International Disaster Database, <https://public.emdat.be/data>.)

The following sections will provide an in-depth look at the most commonly identified natural hazards identified in Serbia: floods, droughts, erosion processes and forest fires.

4.4.1 Floods

Based on the Serbian Water Management Strategy³¹ all major floods in the past initiated new cycles of investment in improving the system of flood protection, which lasted for 30 to 40 years, primarily depending on economic conditions in the country. The flood of May 2014 hit 42 of 99 major floodplains in Serbia. After necessary repairs of damage to protective structures, a new cycle is launched that will ensure the reduction of the risk of flooding on a large number of waterways in Serbia. It is important that all planned works and measures are flexible and allow adaptation to future conditions that may lead to deterioration in the high-water regime, including changes in the use of basins and climate changes. The basic postulate is that the integral solution—technically feasible, economically and environmentally justified and sustainable in terms of climate change must be defined at the basin level.

The Strategy details the following priorities, based on the experience of the 2014 flood:

1. works on completion of a flood protection system along the Sava and Drina Rivers;
2. improvement of flood protection in the Kolubara River basin;
3. improvement of flood protection in the Morava River basin.

³¹ Anon. (2017). [Serbian Water Management Strategy](#). (Official Gazette of RS 03/17). Belgrade, Serbia: National Assembly of the Republic of Serbia.

River floods in the major river basins are caused by long periods of rainfall and/or intensive snow melt. Flash floods can occur in smaller catchments and are caused by short intensive rainfall, mostly due to summer storms. There are other contributing factors, such as a lack of or limited maintenance of embankments and/or flood control structures, debris and sediments blocking rivers, drainage or diversion channels that reduce the capacity of river flow and so on. In addition, the use of certain agricultural practices, such as water, soil and land management techniques, may also have an impact on flooding (flash floods or surface water flooding) and sediments.³²

Serbia has flood protection and control infrastructure to prevent and mitigate the impacts of floods. The country's flood-prone areas cover around 1.6 million hectares, including over 500 larger settlements, more than 500 large commercial buildings, around 1,200 km of railways, and more than 4,000 km of roads.³³ In order to protect against flooding, over 3,400 km of embankments have been built and river regulation of about 420 km has been completed. However, in recent years, investments for the maintenance of facilities and riverbeds have decreased. As a result, waterway embankments are highly exposed and at a risk of flooding.³⁴

According to data from the Public Management Investment Office, sanitation and repair works of the existing flood control infrastructure have been complete in more than 300 locations throughout Serbia (data from 2017), at a total estimated value of EUR 25 million. The EU and World Bank, together with other bilateral donors, have supported Serbia in reconstructing and repairing damaged and destroyed flood control infrastructure, values at approximately EUR 70 million.³⁵

The Second National Communication towards UNFCCC³⁶ identified 99 areas in Serbia that are under significant flood risk, revealing that the largest potentially flooded areas lay along the Danube, Tisa, Sava, Drina, Velika Morava, Južna Morava and Zapadna Morava Rivers. Floods occurred in these areas between 1965 and 2011, resulting in large-scale damage (total of 73 events). Based on the same document, the disastrous flood in May 2014, caused by extraordinary heavy and prolonged rainfall, hit 42 significant flood prone areas in Western and

³² FAO (2018). [Comprehensive analysis of the disaster risk reduction and management system for the agriculture sector in Serbia](#). Belgrade, Serbia: Food and Agriculture Organization of the United Nations.

³³ Climate Change Post [website]. Available at: <https://www.climatechange.org/post/serbia/river-floods>. Accessed on 24 November 2020.

³⁴ FAO (2018). [Comprehensive analysis of the disaster risk reduction and management system for the agriculture sector in Serbia](#). Belgrade, Serbia: Food and Agriculture Organization of the United Nations.

³⁵ Data of the Public Management Investment Office of the Government of the Republic of Serbia. Available at: <http://www.obnova.gov.rs/uploads/useruploads/Documents/Kancelarija-za-pomoc-poplavljenih-podrucja-infograf-11-05-2017-srb-02.pdf>

³⁶ Ministry of Environmental Protection (2017). [Second National Communication of the Republic of Serbia under the United Nations Framework Convention on Climate Change](#). Belgrade, Serbia: Ministry of Environmental Protection.

Central Serbia, affecting some 1.6 million inhabitants, while damage and losses were estimated at EUR 1.5 billion in 24 municipalities. The recurrence interval of such 2–3 day rainfall events is every 100–200 years.

Based on the Second National Communication, erosion, torrents and floods on small rivers are moderately to highly likely to occur in the future due to the expected climate changes. There is a moderate probability of increased floods on medium-size rivers and a low probability on large rivers in the near future. Further analysis needs to be done in this field.

In addition, the potentially negative effects and impacts of climate change on the water sector in Serbia will be reflected in water shortages, more frequent and prolonged periods of intense drought and areas affected by drought and an increased duration of low-flow conditions in rivers.

Due to the observed and expected effects of climate change in the water sector, specific adaptation measures have been proposed including numerous actions and measures aimed to reduce risks from floods (for more detail, see Table 6.2 in the Second National Communication on Climate Change). However, it is important to mention that some of the predefined measures can now be clearly recognised as NbS. Measures identified as such include (and may not be limited to) the following approaches, all of which are intended as protection against the adverse effects of water):

- construction of green riparian areas along river flows;
- preservation of the existing natural flood zones;
- formation of protective forest vegetation and grass communities along important “torrential streams”;
- increase in water storage capacity within river basins by constructing flood cells and retentions in flood-prone areas.

Unfortunately, there are no data available on the implementation and potential effects of these measures in Serbia.

In 2019, the Republic of Serbia adopted the Regulation on Establishing a General Flood Protection Plan (Official Gazette of the Republic of Serbia 18/19). The plan covers a six-year period and stipulates measures to be undertaken in periods of high water, the manner of institutional organisation and responsibilities, the observation and recording of hydrological and other data and the forecasting of phenomena and alerting of relevant public institutions and the public in the case of floods.

On the other hand, the Flood Risk Management Plan for the Territory of Serbia has not yet been adopted, despite the fact that the development of such a document is mandatory pursuant to the Law on Waters and the EU Floods Directive on the assessment and management of flood risks.³⁷

The application of NbS for water security: examples and potential for Serbia

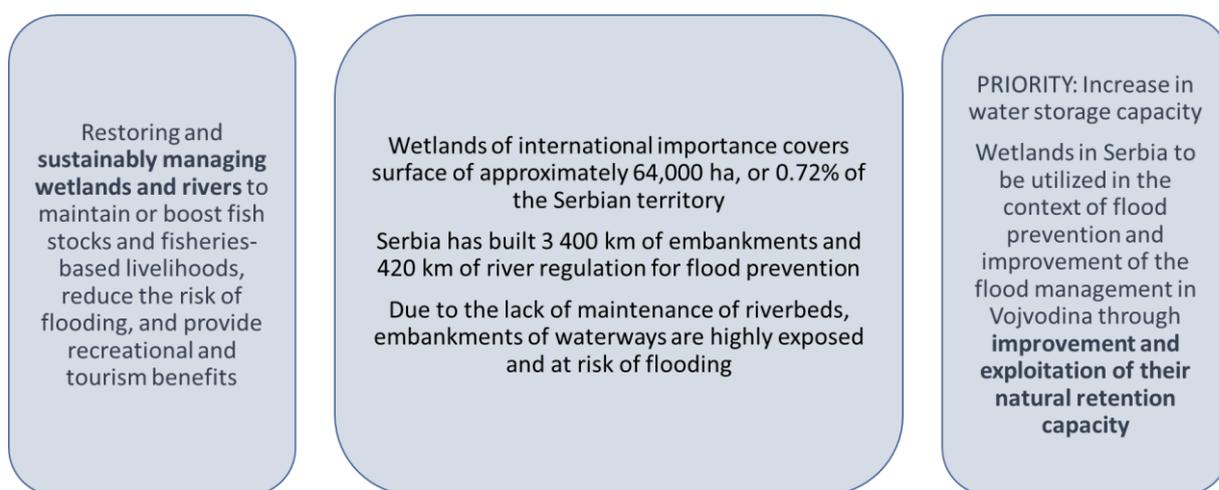


Figure 5. The application of NbS for water security (Source: This figure is created by the author of this study.)

4.4.2 Droughts

Droughts are, to a certain extent, different from other natural hazards. Since they have a slow start, they can evolve over months or even years, affecting spatially large regions and causing little structural damage. It is often difficult to precisely determine or predict their start, and their severity.

Complex and multi-level impacts of droughts on many socio-economic sectors and ecosystems have emerged in recent years in Serbia, leading to greater concerns about droughts. The projected increase in the frequency and severity of droughts related to climate change can make the situation even more unfavourable.

Most droughts in Serbia have been triggered by a lack of precipitation during the warmer months, accompanied with increased evapotranspiration due to increased temperatures. A preliminary estimate of cumulative losses that can be attributed to droughts after 2000 exceeds EUR 5 billion. Despite the significance of these losses associated with droughts,

³⁷ Coalition 27 (2020). [Chapter 27 in Serbia: Walking in the Mist](#). Belgrade, Serbia: Young Researchers of Serbia.

government responses were mainly reactive and ad hoc, after the end of drought events (Drought Initiative Recommendations for development of the National Drought Plan of the Republic of Serbia).³⁸

Furthermore, the Drought Initiative indicates that the impacts associated with droughts are the result of numerous climate factors, but are also related to societal factors that define the level of overall resilience of society. Factors, such as poverty, weak and/or ineffective governance, outdated or ineffective government policies, unmanaged land use change, degradation of environment and ecosystems, outdated technology used by some industries, such as outdated agro-technical practices in agriculture production, are just some examples that contribute to changing vulnerability to drought. While the additional benefits of NbS may contribute to different aspects of these, NbS approaches also include benefits to mitigate the degradation of environment and ecosystems.

Research in Vojvodina³⁹ has shown that drought damage depends on soil characteristics, subterranean water levels, crop and hybrid types, total precipitation deficiencies, precipitation spread and other factors (temperature, etc.). The negative impact of drought in Serbia may include all of the following:

- agriculture (the damages from drought in 2007 alone totalled EUR 600 million);
- decreasing energy production (in 2007 hydropower plants produced 1.77 billion kWh less than in 2006);
- transportation;
- commerce and industry (recreation/tourist industry declines);
- urban areas (lawn irrigation, sanitation, drinking);
- water resources, and
- environmental/ecological.

The Water Management Strategy prescribes a set of measures to neutralise or reduce the adverse effects of drought foreseen as a result of possible changes in the temperature and precipitation regime, whereas the most pronounced and most harmful effects of droughts are related to agricultural production.

Studies have shown that during the past 12 years, there were four autumn droughts, which is not suitable for winter crops and grasslands (meadows, pastures), while there were eight

³⁸ Djurdjevic, V. (2020). [Drought Initiative - Republic of Serbia](#). Belgrade, Serbia: Ministry for Environmental Protection.

³⁹ Ibid.

summer droughts, which is harmful to the overall plant production. Droughts occur regularly, every year or every other year. The intensity of droughts varies from catastrophic (2012, 2000), to moderate and mild droughts. Dry areas with precipitation below 600 mm are particularly vulnerable, which can be found in the northeast of the country in Vojvodina, in the valley of the lower course of the Velika Morava River, in the valley of the South Morava River, and in the flatlands of Negotin.⁴⁰

The review of the available literature (reports, policies, studies) in Serbia indicates that **there are limited data and research available in Serbia concerning managing and combating drought**. The only existing database on natural hazard impacts including drought is the United Nation International Strategy for Disaster Reduction's (ISDR) disaster loss database [DESINVENTAR](#). The part of the database for Serbia is maintained by the Sector for Emergency Management. Currently, for Serbia there are 45 data cards related to drought (approximately 5% of all available cards for Serbia) covering the period from 2000 to 2012. The number of recorded events and associated losses are probably underestimated, since the number of events and recorded losses are significantly smaller in comparison to some independent estimates.

As stated within the National Drought Plan, the priorities in combating drought should be:

- development of drought monitoring and early warning systems;
- assessment of drought vulnerability and risks;
- implementation of measures to limit the impacts of drought and improve response to drought.

Some elements needed to establish these three pillars have already been put in place, but they are often not fully developed, or they are fragmented and not able to function together.

4.4.3 Erosion and torrential processes

According to the Land Degradation Neutrality (LDN) Country Report,⁴¹ one of the main factors of land degradation in the territory of the Republic of Serbia is the phenomenon and development of different forms of land erosion processes, which cause a series of negative physical and physical chemical changes.

⁴⁰ UNDP (2019). [Climate Change Impacts on Serbian agriculture](#). Belgrade, Serbia: United Nations Development Programme.

⁴¹ Ministry of Environmental Protection (2020). [Report on the Applied Methodology and Identification of Targets to Achieve Land Degradation Neutrality in the Republic of Serbia](#). Belgrade, Serbia: Ministry of Environment and Environmental Protection.

Land erosion and the occurrence of torrents are two interconnected natural phenomena which, each in their own way, cause immense damage to all areas of life and economic activities in Serbia. Erosion processes are long-term, with visible changes within a one-to-ten-year period, while torrents occur and end in a relatively short period. The intensity and surface distribution of certain forms of erosion in Serbia's territory have been subject to monitoring and study for decades, but not continuously.⁴²

Within the Water Management Strategy of Serbia, erosion is grouped into five categories on a scale ranging from very weak to excessive. Land erosion has been recognised within the Serbian legislation as a national indicator of environmental quality. Unfortunately, in recent decades, there has been no systematic research that would result in a complete information database on erosion processes in the territory of the Republic of Serbia.

The erosion map (Figure) was taken from the Water Management Strategy of the Republic of Serbia and was changed only with regard to the surface areas where no anti-erosion work was performed after 1993. However, the map of the entire territory of the Republic of Serbia was not amended. It shows that the most represented forms of erosion in the northern plains of Serbia are very weak (blue) to weak (medium intensity is much less frequent), while the erosion processes in the central and southern parts of Serbia have much greater intensity, with prominent areas of strong (yellow) and excessive erosion (red). In this area, very weak erosion is present only in the plains and in river valleys.⁴³

⁴² Ministry of Agriculture and Environmental Protection (2017). [Executive Summary for the Water Management Strategy of the Republic of Serbia](#) Belgrade, Serbia: Ministry of Agriculture and Environmental Protection.

⁴³ Ibid.

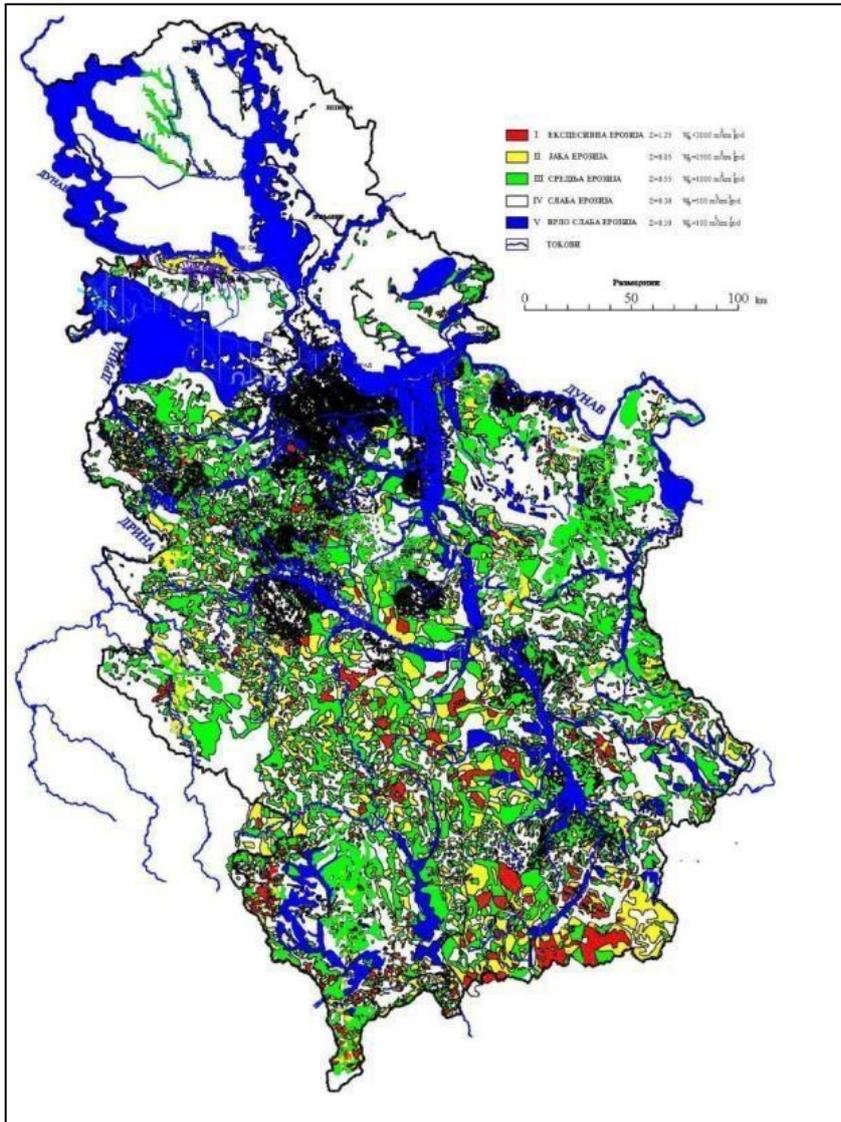


Figure 6. Erosion map of the Republic of Serbia (Source: *Water Management Strategy of the Republic of Serbia, 2017.*)

Anti-erosion protection and landscaping of basins are implemented as part of measures for integral utilisation, landscaping and timely protection of accumulations from filling with deposits. In conformity with the strategy for transforming the so-far utilised lower value agricultural land into quality forests, biological measures of protection represent a priority – afforestation, renewal of degraded forests, grass sodding and melioration of pastures. The goal is, by implementing anti-erosion protection measures, to create conditions in which the systems provide a stable income, which further secures regular maintenance.⁴⁴

⁴⁴ Ministry of Agriculture and Environmental Protection (2014). *The Fifth National Report on Implementation of the Convention on Biodiversity*. Belgrade, Serbia: Ministry of Environment and Environmental Protection.

The LDN Country Report for Serbia sets out the following goals for reaching land degradation neutrality in the territory of the Republic of Serbia by 2030:

1. recognising elements and targets of land degradation neutrality in legislation, spatial-planning and strategic documents;
2. improvement, restoration and rehabilitation of degraded areas, implementation of measures of sustainable land management in the Republic of Serbia;
3. establishment and development of sustainable, systematic land monitoring according to determined national environmental indicators: land use changes, soil organic carbon, land productivity, land erosion;
4. establishment of appropriate, detailed national databases for the territory of the Republic of Serbia, for the implementation of the LDN methodology;
5. raising public awareness and the role of education in combating land degradation and droughts.

According to the Spatial Plan of the Republic of Serbia from 2010 to 2020 (Official Gazette of RS 88/10), the goal is to increase the area of national territory under forests to 41.4% by 2050. Within that, to increase the level of forest cover in areas under bare and degraded soil in the mountainous areas south of the Sava and Danube Rivers, over an area of 100,000 ha by 2030, so as to control erosion and torrential processes (Water Management Strategy in the Territory of the Republic of Serbia).

The Water Management Strategy of the Republic of Serbia further emphasises that over the last twenty years, new anti-erosion activities and the maintenance of existing activities have been significantly reduced due to a reduction of the necessary funds for investments in this domain. As a result, in recent years there have been floods throughout Serbia caused by torrential flows. The construction of new facilities and the execution of necessary protective works require significant resources, because of their complexity and high cost, and the fact that there are still large areas prone to erosive processes. It is estimated that at least EUR 280/ha should be invested in regulating land with low erosion rates, where no additional afforestation is needed, while in the cases of high erosion rates specific costs reach EUR 2,000/ha. In order to achieve a satisfactory condition, it is necessary to invest approx. EUR 240 million in the anti-erosion regulation of affected areas over the next twenty years, while preserving the operational design of constructed facilities and executed works will require an annual investment of around EUR 7.5 million.⁴⁵

⁴⁵ Ministry of Agriculture and Environmental Protection (2017). [*Executive Summary of the Water Management Strategy of the Republic of Serbia*](#). Belgrade, Serbia: Ministry of Agriculture and Environmental Protection.

5. Stakeholder analysis

The purpose of the stakeholder analysis is to provide insight into the importance and influence, interests, and potential roles of various stakeholder groups in relation to NbS for climate change adaptation and disaster risk reduction. The analysis strives to reveal relations between the various stakeholder groups at the national and local levels, and how they may benefit from NbS.

In order to identify and analyse relevant stakeholders, one should take into account that NbS approaches could be applied in various sectors, penetrating into many fields of actions, including water management, nature protection and biodiversity, forestry, urban development, spatial planning, infrastructure, agriculture, etc. The formal competencies for policy development and implementation are held by various institutions (government bodies, public utility companies, or public agencies) that are in charge of implementing, in whole or in part, some of the important policies closely related to NbS, DRR and CCA. Therefore, the plethora of stakeholder groups and/or various actors could potentially influence and/or contribute to the policy-making, promotion, knowledge building and application of NbS in Serbia.

The overview of the competencies of the relevant Serbian institutions illustrates the **complexity of the current system relevant for the application of NbS and emphasises the need for coordination and collaboration among different sectors and between various administrative and governance levels in Serbia**. It is also important to mention, that due to the overarching and multidimensional nature of NbS, the competencies related to application of some solutions, such as ecosystem restoration or ecosystem-based adaptation, are not just divided between various sectors, but also among various divisions/units/departments within a single ministry. For example, the Sector for Climate Change and Nature Protection within the Ministry for Environmental Protection is in charge of biodiversity, climate change, nature protection and protected areas, while the Forest Directorate within the Ministry for Agriculture, Forestry and Water Management holds the exclusive mandate for forest management.

In order to determine the interest and influence of the various stakeholder groups in the application of NbS, stakeholders were clustered into primary, secondary and other interest groups (Figure , Table 2) and a power-interest grid (

Table 3) was used to identify the importance and influence of each of group. Even though all interested groups and institutions could possibly benefit from NbS, it was not possible, without additional analysis, to provide a precise estimate of the scope of the impact or benefits of NbS for the local population affected by DRR and climate change. Therefore, further research

among the identified interested groups including reflections on gender and vulnerable groups should be considered.

GROUP 1: Government bodies, primarily line ministries in charge of climate change, forestry, water management, DRR and other complementary policies (Ministry of Environment, Ministry of AFWM, Ministry of Interior, Ministry for Construction, Transport and Infrastructure) representing the most important stakeholder group in charge of both policy development, planning and close monitoring of its implementation, considering their role also in delegating tasks regarding, for example, flood protection or sustainable forest management, to local administrations or public enterprises (in charge of water or forestry management respectively), monitoring and approving the operational plans of the public enterprise's (PE), etc.

The Public Investment Management Office (PIMO) has a significant role in flood prevention and overall coordination of DRR policies, programmes and projects.

GROUP 2: Local self-governments (LSGs) and public enterprises (PEs), due to their competencies representing the key spots for the application of the NbS approaches in the field. However, the interest among various LSGs vary across the country and as the risk of disaster increases, so too does the interest for closer involvement and inclusion of local governments and local public enterprises. Besides, PEs managing forests and waters (Srbijašume, Vojvodinašume, Srbijavode and Vode Vojvodine) have clear mandates to manage and arrange services related to sustainable forest management, forest fires and forestation, illegal cutting, water management, flood protection, watershed management, etc., and therefore represent the key operational institutions to be engaged in the implementation of NbS throughout Serbia.

GROUP 3: Other important stakeholders, media, civil society organisations (CSOs), academic and scientific institutes and organisations, donor community that have a relatively high interest in the topic, but do not have significant influence or power in developing policies or making decisions regarding NbS. This group also includes women, youth and socially vulnerable groups, who are particularly at risk of natural disasters and effects of climate change and should be given special attention.

It is important to consider the role of involved and affected local communities as they can have considerable impact at the local level for the certain issues that are of high interest for them. This influence is becoming more visible and can be considerably high at level of local communities, as shown by several citizens movements that have been recently established

around local environmental issues in Serbia (for example protests against small hydropower plants on Stara Planina, protest in Smederevo due to air pollution from a steel plant, initiative for adoption of the Air Quality Strategy for Serbia and similar). The public pressure and influence of these groups has proven to be significant at the level of community.

In this regard, and depending on the context, the local communities can represent a highly influenced interested group and should be considered part of Group One.

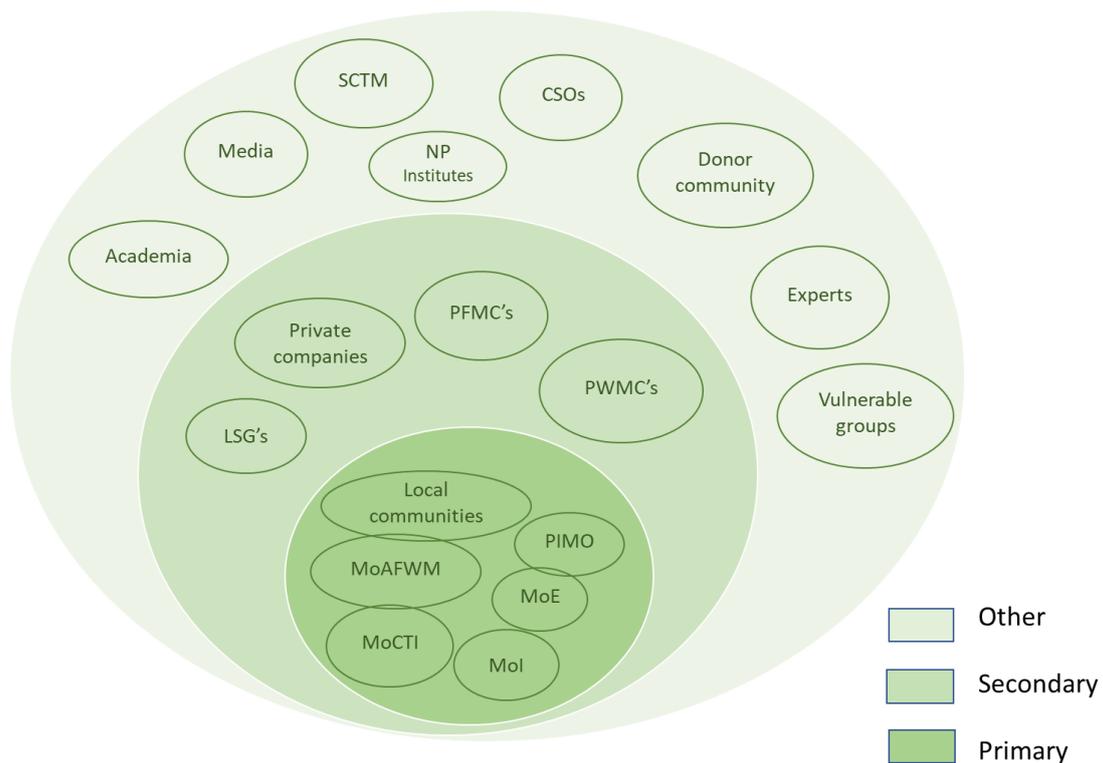


Figure 7. Division of stakeholders based on their interest, influence and importance on NbS (Source: This figure is created by the author of this study.)

Table 2. Key stakeholders for application of NbS in Serbia (Source: Data compiled by the report author)

PRIMARY	SECONDARY	OTHER
Ministry of Environmental Protection	Srbijavode Vojvodina vode	Institute for Nature Protection (Sr/Vojvodina)
Ministry for Agriculture, Forestry and Water Management	Srbijašume Vojvodina šume	Republic Hydrological and Meteorological Institute
PIMO	LSGs	Academic institutions
Ministry of Interior	Private enterprises (water, forestry)	CSOs
Ministry of Construction, Transport and Infrastructure		Media
Local communities (population affected by the CC and disasters)		Donor community
		Women, youth and other vulnerable groups

Table 3. Stakeholder power-interest grid analysis and primary roles (Source: Data compiled by the report author)

Stakeholder*	Importance (score 1-5)	Influence (Score 1–5)	Total score (Imp x interest)	Primary role in NbS application
Ministry of Environment	5	3	15	Policy development
Ministry for AFWM	4	4	16	Policy development
Ministry of Interior	4	5	20	Policy development
PIMO	4	5	20	Policy development/ NbS implementation
Ministry of CTI	3	4	12	Policy development
Local community	3	4	12	Advocacy/implementation of NbS
Srbija/Vojvodina vode	4	3	12	Policy enforcement/NbS implementation
Srbija/Vojvodina sume	3	3	9	Policy enforcement/ NbS implementation
Institute for Nature Protection	3	2	6	Policy development/research
Private companies	3	3	9	NbS implementation
SCTM	3	3	9	Community engagement
Academia	2	3	6	Policy/NbS applicability
LSGs	4	2	8	NbS implementation /community engagement/policy

Vulnerable groups	3	2	6	Advocacy/community engagement
Media	2	4	8	Advocacy/awareness raising
CSOs	3	2	6	Advocacy/community engagement

* Score: 1 = very little importance or influence, to 5 = very great importance or influence.

5.1 Key stakeholders for NBS in Serbia

In the **Ministry of Environmental Protection**, the Climate Change Unit serves as the UNFCCC focal point. The Ministry of Environmental Protection is also the main government institution responsible for coordination of the process of preparation of National Communications and Biennial Update Reports, and for overall compliance and coordination with UNFCCC and EU climate policy requirements.

The Ministry is also in charge of air protection issues, land management and droughts and acts as focal point for the UN Convention to Combat Desertification, CBD, etc.

The **Ministry of Agriculture, Forestry and Water Management: Water Directorate** holds the core responsibility for flood protection and water management at the national level regarding level one priority watercourses.⁴⁶ The Water Directorate is in charge of flood protection infrastructure and flood protection planning. It also focuses on hydrological drought management and provides advice on the accumulation and flow regimes if water levels are low. Furthermore, it coordinates international water management programmes and projects, thereby ensuring that there is coherence in the flood risk assessment and mapping methodologies, although the Directorate is not itself involved in these activities as it plays a more managerial role.

Flood control in watersheds is organised and implemented by public water management companies (Srbijavode PWMC, Vode Vojvodine PWMC and Beogradvode) in their respective territories. These companies are directed by the Ministry of Public Administration and relevant the local self-government unit.

⁴⁶ According to the Law on Water (Official Gazette of RS 30/10), level one watercourses are all international watercourses and all other surface watercourses defined by the Government of Serbia based on predefined criteria such as state borders, size and characteristics of the watershed, and other defined by the Law.

Water and flood management of level two watercourses⁴⁷ are within the mandate of local governments, which are tasked to prepare flood risk plans, conduct flood risk assessments, implement flood protection plans/measures and all operational activities related to emergency situations, overall management, coordination and evaluation of the contingency infrastructural works (e.g., cleaning riverbeds, construction and maintenance of river walls, water gates), and managing the technical, human and financial resources.

The **Ministry for Agriculture, Forestry and Water Management: Forest Directorate** is the administrative unit in charge of providing public and professional services related to forestry policy, forest conservation, improvement and use of forests, implementation of measures for forest protection, control of seeds and seedling materials, inspection works in forestry and hunting.

Two public enterprises are responsible for forest management of state-owned forests, Srbijašume and Vojvodinašume, while privately owned forests are managed by private companies under the supervision and monitoring performed by the Forest Directorate.

The **Unit for Climate Change in Agriculture** within the Ministry of Agriculture, Forestry and Water Management has the responsibility for inclusion of climate change issues into sectoral policies and legislation and strategic planning of climate change adaptation and mitigation measures in the sector of agriculture and rural development, among others. This Ministry also acts as the National Focal Point for the Green Climate Fund.

The Ministry of Interior leads the National Emergency Management Headquarters, which is in charge of the protection and rescue management activities as well as the mainstreaming of DRR policy in the country. The Sector for Emergency Management (SEM)⁴⁸ is directly under the Minister of Interior and its five directorates are responsible for civil protection, prevention, risk management, fire and rescue, and the National Training Centre (NTC). They have the competencies to protect life and property in the event of natural or human-made disasters, to work in the field of emergency prevention and prompt first response in the event of emergencies, and to coordinate the activities of all state institutions involved in emergency and disaster management.

⁴⁷ Includes all watercourses not classified as level one watercourses.

⁴⁸ The organizational architecture of SEM can be seen at the following link:
<http://prezentacije.mup.gov.rs/svs/HTML/organizacija.html>.

The Public Investment Management Office (PIMO) was established in 2015 by Government Decree. According to the Decree, PIMO is mandated to manage the expert, administrative and operational affairs of the Government related to the coordination of project implementation, recovery and improvement of public objects under the jurisdiction of the Republic, autonomous province and local self-governments in regards to the collection of data on existing and planned projects and needs for the reconstruction and recovery of public facilities, needs assessment and justification of the proposed projects, prioritisation, coordination of public procurements processes, execution of contracting commitments and payments, etc.

The state enterprise Srbijašume manages state forests and forest lands on a surface area of 892,073 ha. Since its establishment, enterprise operations have been directed towards meeting society's needs and the requirements given the times we live in, striving to be modern, market-oriented and profitable. Its business strategy, mission and vision are in compliance with the plans and policies of the Government of the Republic of Serbia. The enterprise objectives are complex and result from the fact that forests represent a conditionally renewable natural resource and a common good, and that they need to be managed by following the principles of sustainable use. Such forest management implies the alignment of business activities with growing environmental and social requirements. Enterprise employees are obliged to manage forests as good stewards, taking into account forest cultivation, protection and utilisation.

The state enterprise Vojvodina šume manages state forests on the territory of the Autonomous Province of Vojvodina. The enterprise is, among others, competent for breeding, protection, management of protected natural goods, maintenance and regeneration of forests, production of forest seeds and planting material and growing of new forests and forest plantation, as well as forest utilisation, production of forest products and other products of forestland areas, utilisation of forests for recreational purposes, sawn-wood production and other ways of forest utilisation.

The public water management companies (PWMC) perform activities of public interest related to water management on a specific territory. These companies prepare plans and programmes, organise maintenance of water facilities and systems in public ownership and flood control and protection from erosion and torrents, prepare opinions for the issuance of water acts, perform identification of water bodies of surface and groundwater intended for human consumption, keep registers of protected areas and maintain the information system for their territory, and as a delegated job, they prepare the calculations and debt balance of

payers for statutory fees. There are three public water management companies on the territory of Serbia: Srbijavode, Vode Vojvodine, and Beogradvode.

Local self-government units (towns and municipalities) have a mandate in environmental protection as well as protection from natural and other disasters (Article 20 of the Local Self-Government Act) and perform other duties and services delegated by national legislation provisions in the areas of defence, protection and rescue, firefighting, etc.

Municipalities also have competencies in performing delegated services within the inspection in health, education, environmental protection, mining, agriculture, forestry, water management and other (Article 22 of the Law).

6. Nature-based Solutions in the Serbian policy framework

Nature-based Solutions are a relatively new approach, mainly representing actions that work with ecosystems in addressing various societal challenges. There is a combination of international and regional frameworks and conventions that influences and provides provisions for NbS globally and guide national actions. The past five years have particularly seen the adoption of major global agreements that recognise the importance of ecosystems in disaster risk reduction and climate change adaptation, as well as providing entry points to upscale such approaches (for more details on relevant international and regional policies relevant for NbS please see Annex III and Annex IV of the Study).

Nature-based Solutions can be applied through a variety of different measures, approaches and interventions. They are often applied within existing CCA or DRR policies, programmes or measures without being formally recognised as NbS. Therefore, in order to understand the scope and possible impact of the application of NbS, it is necessary to identify gaps in the current policy framework. A comprehensive overview of the policy framework in Serbia is presented below, including also, besides climate and DRR, forestry, water management, biodiversity and other relevant policies. The analysis helps identify opportunities for the mainstreaming of NbS into policies, including strategies, plans and programmes, as a first step towards wider NbS application in Serbia.

6.1 Climate change policies

Existing national programmes and strategies recognise the values of ecosystems and their contribution to climate change adaptation and mitigation, but NbS are not explicitly mentioned or acknowledged as actions or tools associated with climate change.⁴⁹

Serbia submitted its Intended Nationally Determined Contribution (INDC) to the UNFCCC⁵⁰ on 15 June 2015 – prior to UNFCCC COP21 – with a pledge to reduce its GHG emissions by 9.8% from 1990 levels by 2030. In August 2017, Serbia became a Party to the Paris Agreement. With the ratification of the Paris Climate Agreement, Serbia's INDCs became its Nationally Determined Contribution (NDC). Currently, Serbia is in the process of revising its NDCs to cover the period from 2021–2030. The NDC includes climate mitigation commitments, such as reducing emissions through robust climate and energy policies, as well as CCA related interventions in key economic sectors of energy production/consumption,

⁴⁹ UNDP (2020). [Study on nature-based climate solutions in Serbia](#). Belgrade, Serbia: United Nations Development Programme.

⁵⁰ Government of Serbia (2015). [Intended Nationally Determined Contribution for the Republic of Serbia](#). Belgrade, Serbia: Government of Serbia.

agriculture, waste management, transport, and forestry to reduce national and local vulnerability that are the result of decades of negative climate impacts.

The Republic of Serbia has drafted its first national Low Carbon Development Strategy with an Action Plan, to be adopted in 2020. Following the reporting requirement under the UNFCCC, Serbia submitted its First Biennial Update Report (BUR) as well as two National Communications. The Third National Communication, and the Second BUR is currently in preparation.⁵¹ The reports Serbia submitted pursuant to its obligations under the UNFCCC provide an overview of and propose measures for climate change mitigation and adaptation in the relevant sectors. However, the cross-sectoral and comprehensive integration of climate change issues in other sectors in Serbia (environmental, agricultural, economic, social, etc.)

is still pending.⁵²



Considering proven and evident benefits deriving from NbS for climate change adaptation and mitigation, one should take advantage of ongoing climate related policy updates in order to reinforce inclusion of the NbS approach within climate change related policies and programmes in Serbia.

According to Serbia's Second National Communication to UNFCCC,⁵³ "vulnerability assessments were made for the following sectors: hydrology and water resources, forestry, agriculture and health care, and it was confirmed that these sectors are affected by the changed climate conditions.

Specific adaptation measures for each of these sectors were developed, with the aim to timely adapt to climate change, taking into account climate scenarios. However, analyses show the need for further and more detailed research in all sectors and awareness raising on needs and possibilities of adaptation at the sectoral level."

As stated within the 2020 EU Progress Report for Serbia,⁵⁴ in the field of climate change "Serbia has some level of preparation on climate change, but implementation is at a very early stage. **Serbia has still not adopted the climate law** it had prepared in 2018. The adoption and implementation of a climate strategy and action plan, which is consistent with the EU 2030 framework for climate and energy policies and which addresses adaptation to climate change, is paramount for Serbia's future low carbon development. **Serbia needs to do more to integrate climate action into other sectors.**"

⁵¹ Supported by UNDP project, <https://www.klimatskepromene.rs/en/projects/second-biennial-update-report/>

⁵² UNDP (2020). [Study on nature-based climate solutions in Serbia](#). Belgrade, Serbia: United Nations Development Programme

⁵³ Ministry for Environmental Protection (2017). [Second National Communication of the Republic of Serbia to the United Nations Framework Convention on Climate Change](#). Belgrade, Serbia: Ministry for Environmental Protection.

⁵⁴ EC (2019). [Serbia 2019 Report](#). Brussels, Belgium: European Commission.

The Law on climate change transposes the relevant EU legislation providing a legal basis for development and updates of low-carbon development and adaptation strategies, monitoring, reporting and verification of the GHG emissions and implementation of climate policies and measures.⁵⁵

The Draft Law on Climate Change was in the public debate process between 15 March and 20 April 2018; however, the Draft Law is still not in the parliamentary procedure.⁵⁶

The **draft Low Carbon Development Programme of Serbia** clearly recognises the importance of natural ecosystems for climate adaptation and mitigation within the specific objective 3: Increase the carbon sink in Serbian Forests by 17% by 2030 and between 22% and 132% by 2050 compared with 2010, and specific objective 4: Preserve the potential of mitigation measures, determined for 2030 and 2050, by increasing the resilience to climate change of the priority sectors.

The following adaptation measures and options up to 2030/2050 for each of the three priority sectors are identified as the most important:

Table 4. Proposed adaptation measures within priority sectors (Source: Draft Low Carbon Development Programme of Serbia)

Agriculture Food production	<ul style="list-style-type: none"> ✓ Installation of new irrigation systems and efficient use of existing ones ✓ Multipurpose small accumulation lakes, ponds and reservoirs for water supply, irrigation, erosion control, ecosystem services ✓ Adaptation of cultivation technologies (selection of species and agro-technical measures)
Forestry Bioenergy	<ul style="list-style-type: none"> ✓ Afforestation of new land using site mapping and climate change adapted tree species ✓ Shift of forest management practices towards a close-to-nature forest management approach ✓ Introduction of a "climate smart forestry" approach
Hydrology and water resources Hydropower generation	<ul style="list-style-type: none"> ✓ Construction of flooding/torrential barriers and additional measures in the basin ✓ Improvement of the system for observation, data collection and early warning systems for extreme climate and hydrological events ✓ Increase in water storage capacity

Furthermore, specific objective 5 is related to the promotion of transition to climate neutral and climate resilient economy and society where the activities regarding promotion are horizontal

⁵⁵ Ministry of Environmental Protection (2019). [Draft Nature Protection Programme for the period from 2020 to 2022](#). Belgrade, Serbia: Ministry of Environmental Protection.

⁵⁶ Please see the disclaimer at the page 6 of this Report.

activities and will be realised through education, skills development and training, capacity building and awareness raising.

6.2 Disaster Risk Reduction Policy Framework

The Government of Serbia significantly improved its policy and programmatic framework related to DRR in recent years, including the development of the 2011 National Strategy for Disaster Risk Reduction and Protection and Rescue in Emergency Situations, the 2014 National Programme for Disaster Risk Management, and the Action Plan for implementation of the National Programme for Disaster Risk Management (until 2020).

The National Disaster Risk Management Programme governs interventions with a focus on a long-term disaster risk management system, including DRR. The corresponding Action Plan provides a number of key areas for intervention, including the strengthening and development of institutions, monitoring, structural and non-structural risk reduction, preparedness and early warning systems, risk financing and recovery.

In 2018, Serbia adopted a new Law on Disaster Risk Reduction and Emergency Management,⁵⁷ which is fully in line with the Sendai framework for disaster risk reduction. The Law places emphasis on risk reduction and management, promotes prevention and reduction of risks, including prevention, mitigation and preparedness regarding protection and rescue in various sectors, while striving to strengthen the resilience of individuals and communities to these hazards. The Law further determines the rights and obligations of citizens, local self-governments, autonomous province and the Republic of Serbia, and promotes international cooperation, administrative inspection and other issues related to the architecture and functioning of the whole system.

Special attention within the Law is given to vulnerable groups and gender equality, harmonising those with UN recommendations, and to the establishment of partnerships between public and private sectors, participation and inclusion of scientific institutions and civil society in the processes of development and implementation of DRR measures. The Law lists (Article 13) numerous subjects within the system for DRR and emergency management: public institutions, autonomous province, local-self-governments, public utility companies, and other legal entities, entrepreneurs, CSOs, education and scientific institutions, public agencies etc. and introduces the National Platform for Disaster Risk Reduction, in charge of ensuring the

⁵⁷ Anon. (2018). [Law on Disaster Risk Reduction and Emergency Management](#). (Official Gazette of RS 87/18). Belgrade, Serbia: National Assembly of the Republic of Serbia.

coordination of actions among all the subjects in the DRR system, to be established by the Government (Article 41). **However, no specific Government mechanisms have been defined that can ensure enforcement of the Law, i.e., ensure coordination at different levels and enable inclusive participation of various stakeholders within the DRR system in Serbia.**

This Law represents a key legislative document that harmonises the regulatory and legislative frameworks in Serbia with key international policies on DRR (e.g., Sendai Framework for DRR) and enables transformation of the Serbian DRR system towards one that focuses on disaster risk reduction, prevention and community resilience instead of reaction and mitigation. The current National Strategy on Emergency Management is outdated and the Law prescribes adoption of a new one. However, there is still no indication that such a document is in the process of drafting or adoption.

Serbia developed a comprehensive and extensive disaster risk assessment in March 2019,⁵⁸ providing detailed data on all major disaster risks, including a comprehensive set of measures, activities and actions needed to be taken in order to reduce the risks. Finally, in March 2020, the Government of Serbia adopted the Regulation on the composition, organisation and procedures for the work of the emergency situation headquarters,⁵⁹ at the national, provincial, district, city and municipal levels stipulating its members, procedures of operations, competencies, etc.

According to the 2019 EU Progress Report, “Serbia needs to further strengthen internal coordination and its capacity for disaster prevention, disaster risk reduction and disaster risk management including flood risk management at national and local level”.⁶⁰

The existing weaknesses and the prevailing barriers to climate change adaptation and DRR planning in Serbia are related to lack of structured information sharing and exchange, capacity weaknesses, as well as a general lack of awareness of CCA – both at the national and subnational levels. Climate change is not integrated into existing policies, or their associated budget priorities. The underlying challenge is that there is currently no comprehensive

⁵⁸ Government of the Republic of Serbia (2017). [Assessment of Disaster Risk in the Republic of Serbia](#). Belgrade, Serbia: Government of the Republic of Serbia.

⁵⁹ Anon. (2020). [Decree on the composition, organisation and procedures for the work of the emergency situation headquarters](#) (Official Gazette of RS 27/20). Belgrade, Serbia: National Assembly of the Republic of Serbia.

⁶⁰ EC (2019). [Serbia 2019 Report](#). Brussels, Belgium: European Commission.

framework for adaptation in Serbia, though the National Communications provide a preliminary assessment of climate-induced vulnerabilities.⁶¹

6.2.1 Gender issues within CC and DRR policies

The existing body of literature indicates that climate change-related risks, as well as mitigation and adaptation capacities, greatly depend on a person's socio-economic status, citizenship, gender, age, race and disabilities. The poor and disempowered are more vulnerable to climate change because they lack access to relevant socio-economic and political resources needed for adaptation to disruptions in the immediate environment. Women are at a higher risk of poverty and have less political and socio-economic power than men. Although both men and women will suffer the negative consequences of climate change, compounded social inequalities put women in a disadvantageous position. Women in developing countries are particularly vulnerable to climate change since they are often poor and are usually the primary users and managers of natural resources.⁶²

The UNDP report *Gender and climate change in the Republic of Serbia*⁶³ recognises the differences between men and women in terms of energy and mobility and emphasises the role of women in making specific contributions to mitigation, as household and community managers. The Report also notes that women and men might benefit differently from the



Although, the National Disaster Risk Management Programme and its corresponding Action Plan prescribes a number of key areas for intervention directed towards protection from floods and erosion and strengthening of community resilience, Nature-based Solutions are still not recognised nor fully embraced to achieve CCA and DRR objectives.

positive effects of climate policy, for example from job creation in the renewable energy and energy efficiency sectors.

The research carried out by the WISE Project in SEE⁶⁴ on a nationally representative sample of women in Serbia (women professionally engaged in sustainable energy, climate change, and environmental protection, and women in households) showed that:

⁶¹ GCF (2019). [GCF Readiness Proposal with United Nations Development Programme \(UNDP\) for Republic of Serbia \(2019\)](#). Belgrade, Serbia: Green Climate Fund.

⁶² Babović, M. and Petrović, J. (2019). [Gender sensitive data for project: establishing transparency framework for Republic of Serbia](#). Belgrade, Serbia: United Nations Development Programme.

⁶³ UNDP (2015). [Gender and Climate Change in the Republic of Serbia](#). Belgrade, Serbia: United Nations Development Programme.

⁶⁴ Wise SEE (2018). [Women in sustainable energy, climate change, and environmental protection – leadership for change](#). Belgrade, Serbia: Center for the Promotion of Sustainable Development.

- Women support the state in creating energy and climate change policies promoting sustainable energy development based on the implementation of green technologies and smart and advanced solutions.
- Women consider being in line with the principles of sustainable development as very important for their work.
- The representation of women in sustainable energy, climate change, and environmental protection positions in Serbia within public institutions and companies decreases as the seniority of ranks increases.

The draft Low Carbon Development Strategy does not incorporate a gender dimension in elaborating the issues of climate change and recognises the differences among men and women only within their roles in using energy in the households, assuming that the consumption of energy will affect women more than men. The Second National Communication also does not mention gender issues. However, there are efforts, mainly driven by the UNDP office in Serbia to mainstream gender into environmental and climate related policies in Serbia. Within the UNDP Climate Smart Urban Development Project, the establishment of a gender sensitive monitoring framework has been initiated as a precondition for gender sensitive evidence-based policy-making in the area of climate change and the Guidelines on how and where to mainstream gender perspective in both climate change policies but also other relevant policy areas as gender equality is a cross sectoral and multi-sectoral issue, as well as climate change has been developed.⁶⁵

There are initiatives (i.e., Climate Smart Urban Development Project⁶⁶) to include representatives of the Gender Equality Council in the development of the Second BUR and Third National Communication and the Capacity Building Initiative for Transparency (CBIT) inter-ministerial project working group, and thus enable inputs to draft BUR/National Communication reports related to gender. **This and similar practices could be further explored and continued as to ensure that gender aspects are taken into consideration and incorporated in the measures for mitigating and adapting to climate changes in Serbia.**

After extensive floods in March 2014, resulting in the Government of Serbia declaring a state of natural disaster, the Law on Disaster Risk Reduction (DRR) and Emergency Management

⁶⁵ Babović, M. and Petrović, J. (2019). [Gender sensitive data for project: establishing transparency framework for Republic of Serbia](#). Belgrade, Serbia: United Nations Development Programme.

⁶⁶ UNDP (2020). "[Gender and Climate Change in Serbia](#)". Presentation delivered at the Third Regional Workshop Supporting the integration of gender considerations into MRV/transparency processes in the Western Balkan Countries and Lebanon, Podgorica, Montenegro, 12-13 February 2020.

was amended. The new Law integrates the gender perspective as an overall principle, and stipulates the involvement of women's organisations in the development of DRR plans, assessment of needs and damages, use of gender sensitive language and sex-segregated statistics.⁶⁷

The Law (Article 7) prescribes the principle of equality and human rights protection and stipulates that "responsible authorities and other stakeholders involved in the implementation of measures and activities for risks disasters management are obliged to consistently take care on human rights protection, gender equality and in particular protection of elderly, children and persons with disabilities, refugees and internally displaced persons and other vulnerable groups".

The analysis of the Office of the Ombudsman of the Autonomous Province of Vojvodina in 2015⁶⁸ on gender aspects within DRR, provides a set of recommendations for mainstreaming gender perspective into activities on local level necessary for risks reduction concluding that the gender aspects in emergency situations and DRR is not adequately reflected within local planning and strategic documents. The exemption is found in the municipality of Subotica and sporadically within some other Vojvodina municipalities where a gender component has been incorporated in the respective strategic documents. However, the review of available documentation in Serbia indicates that there is a lack of disaggregated data regarding roles and needs of women and men in emergency situations, and consequently on how the practical implementation of gender responsive DRR could be operationalised.

6.3 Forestry

The total area of forests in Serbia is 2,360,400 ha, and the percentage of forest cover is 26.7%, which is somewhat lower than the average percentage of forest cover in Europe. The area of state-owned forests managed by State Enterprises is 1,375,553 ha, or 51.4% of the area of forests and other wooded land in Serbia. The remaining forest area is managed by private owners, other public enterprises and/or national parks. The general condition of forests is unsatisfactory, and the current condition of state forests is characterised by insufficient production volume, unfavourable age structure, unsatisfactory density of stocking and forest

⁶⁷ Anon. (2018). [Law on Disaster Risk Reduction and Emergency Management](#) (Official Gazette of RS 87/18). Belgrade, Serbia: National Assembly of the Republic of Serbia.

⁶⁸ Provincial Ombudsman (2015). [Gender equality and disaster risk reduction](#). Belgrade, Serbia: Office of the Provincial Ombudsman

cover percentage, unfavourable stand condition - high percentage of stands with discontinuous canopy and weeded areas, unsatisfactory health condition.⁶⁹

According to the data from the National Forest Inventory, which was the most recent comprehensive evaluation of forest resources, Serbia is a medium-forested country. Of the total territory, 29.1% is under forests (in central Serbia 37.1% and in Vojvodina 7.1%). Other forestland, which according to the international definition includes thickets and shrubs, covers 4.9%. In comparison with the reference year 1979, there is a 5.2% increase of areas covered with forests. In comparison with the total covered forest, the forest stock of Serbia is dominated by coppice forests that make up 64.7% of the total. Natural high stands cover 27.5% of the territory, whereas artificially raised stands with cultures covering 7.8%.⁷⁰

The Serbian policy and strategic framework regulating forestry remains obsolete despite many years of attempts and efforts at improvement. Currently, the only officially adopted strategic document is the 2006 Forestry Development Strategy of the Republic of Serbia. The National Forestry Programme was drafted in 2010, but was never adopted. It, however, emphasises “conservation and improvement of the state of forests and the development of forestry as an economic branch” and provides guidance to stakeholders in relation to the development of the sector and includes specific targets, namely for afforestation.⁷¹

The pressure on forests is increasing over time as the result of difficult economic conditions and higher demands for forest products and services. Many challenges as consequences of the historic and economic conditions of that sector, and of the absence of an adequate national forest policy and instruments for its implementation, resulted in the following facts:

- only 28.8% of all forests in Serbia are high forests;
- there is a high percentage of overmatured forests with no growth increment;
- silvicultural measures are inadequately applied, and
- 57% of all forests in Serbia are coppice and devastated forests.

The LDN Report for Serbia⁷² set the following measures in relation to afforestation as associated measures needed to achieve land degradation neutrality by 2030:

⁶⁹ Ministry of Agriculture, Forestry and Water Management (2015). [Forest Development Strategy of the Republic of Serbia](#). Belgrade, Serbia: Ministry of Agriculture, Forestry and Water Management.

⁷⁰ Ministry of Agriculture and Environmental Protection (2014). [The Fifth National Report on Implementation of the Convention on Biodiversity](#). Belgrade, Serbia: Ministry of Agriculture and Environmental Protection.

⁷¹ Ministry of Environmental Protection (2019). [Draft Nature Protection Programme for the period from 2020 to 2022](#). Belgrade, Serbia: Ministry of Environmental Protection.

⁷² United Nations Convention to Combat Desertification [website]. Available at: <https://knowledge.unccd.int/home/country-information/countries-having-set-voluntary-ldn-targets/serbia>. Accessed on 12 December 2020.

1. increase the area of the national territory under forests to 41.4% by 2050 (Act on the Spatial Plan of the Republic of Serbia);
2. increase the area under forests in the Autonomous Province of Vojvodina to 14.3% (in relation to the total area of the province), primarily by applying a system of forest protection belts;
3. increase the level of forest cover in areas under bare and degraded soil, in mountainous areas south of the Sava and Danube Rivers, in the area of 100,000 ha by 2030 so as to control erosion and torrential processes;
4. maintain the determined positive trend of land degradation neutrality, applying appropriate measures and activities, through spatial and planning documentation.

Afforestation measures have a major impact on a range of problems, for which appropriate solutions need to be found: mitigating the effects of climate change in rural and urban areas (increased O₂ generation, decreases CO₂ emissions); soil erosion control (more than 70% of the national territory is threatened by erosion processes); protection of watershed areas of water reservoirs that are part of the water supply systems (located in mountainous area, with a significant share of eroded areas and barren lands, which leads to the filling of reservoir spaces); prevention of torrential floods, which are associated with erosion processes and represent the most common natural catastrophe in the territory of Serbia; realisation of the concept of development of the mountainous region through the agroforestry system; conservation and restoration of biodiversity.

It is of particular importance to increase the forest cover of the Autonomous Province of Vojvodina, which is the lowland breadbasket of Serbia, primarily through the forming of forest belt systems. This will protect the soils from aeolian erosion in the lowland parts, protect railway, road and water management infrastructure (water system "Danube-Tisa-Danube"), and create a corridor for biodiversity restoration and ecological network structure. Therefore, afforestation measures are important not only for forestry, but for a whole range of vital activities aimed at restoring ecosystem services, preventing natural hazards and protecting the economic potential of the country, and this is incorporated in Serbia's basic spatial planning and strategic documents.

According to the Draft Low Carbon Development Strategy, Serbian forests contribute to the removal of carbon dioxide from the atmosphere through photosynthesis (carbon sink or carbon sequestration). In 2015, the CO₂ removed from the atmosphere by Serbian forests amounted to 4533 ktCO₂, equivalent to 7.4% of Serbia's emissions.

Within the draft Forest Development Programme with Action Plan (2010), although not in force, the issues of forest soils erosion are recognised along with the effects of climate change on forests and in particular vulnerability caused by wind erosion. However, the precise measures for addressing those issues are missing (except afforestation). The Programme also provides guidance to stakeholders in relation to the development of the forest sector and includes specific targets, namely for afforestation. Such approaches/targets are aligned with the need to increase the carbon sinks in Serbia but there is no GHG emissions reduction targets and it is not a driver for forestry related actions. In addition, the Spatial Development Strategy of Serbia in the field of forestry determines the long-term basis and the objectives of development and use of forests and forestland management, management of hunting opportunities and the protection of natural resources. Serbian forests are particularly vulnerable to biotic (such as pests and diseases) and abiotic (such as fires) factors, which will be further aggravated by climate change. In order to minimise impacts, sustainable forest management requires the adoption of practices that take into account scenarios of future climate.⁷³

The application of NbS examples and potential for Serbia

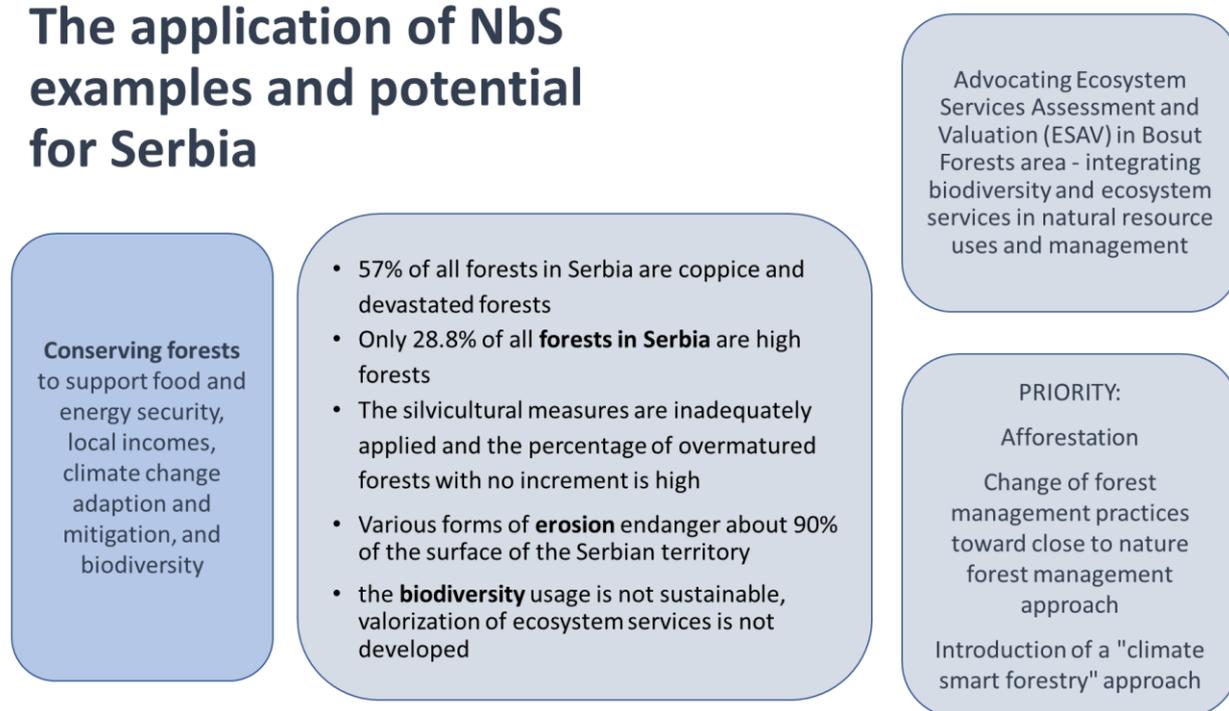


Figure 8. The application of NbS to forest ecosystems – examples and potential in Serbia (Source: This figure is created by the author of this report.)

⁷³ Anon. (2019). [Draft Low Carbon Development Strategy and Action Plan, Republic of Serbia](#). Belgrade, Serbia: GFA Consulting Group.

6.4 Biodiversity

Protected areas in Serbia currently cover an area of around 678,000 ha, representing 7.65% of the territory. There are a total of 462 protected areas: five national parks, 18 nature parks, 21 special nature landscapes, 68 nature reserves, six protected habitats, 308 natural monuments, and 36 areas of cultural and historical importance. According to the Spatial Plan of the Republic of Serbia (Official Gazette of the Republic of Serbia 88/2010), protected areas should cover 12% of the national territory by 2020. The five national parks (Đerdap, Tara, Kopaonik, Fruška Gora and Šara Mountain) cover a surface of approximately 1.75% of the Serbian territory.

According to the Convention on Wetlands of International Importance, in particular habitats of marsh birds (Ramsar Convention), there are 10 Ramsar areas in Serbia, covering a total area of approximately 64,000 ha, or 0.72% of the territory.

Based on the UNESCO Convention on the Protection of World Heritage, two areas in Serbia have been enlisted as part of the Man and Biosphere (MAB) programme: Golija – Studenica Biosphere Reserve with an area of 53,084 ha (0.61% of the territory) and Bačko Podunavlje Biosphere Reserve with an area of 176,635 ha.⁷⁴

The National Nature Protection Programme⁷⁵ expresses concerns about the decrease of biodiversity, inefficient system for management of protected areas, weak integration of biodiversity within other sectors, lack of knowledge and public awareness, etc. The document particularly emphasises that the biodiversity usage is not sustainable, and that the distribution of benefits and economic values – valorisation and contribution of ecosystem services - is not fully integrated in the price of most of products, nor are values of important areas (protected areas, forests reserves, wetlands and other highly diversify areas) appreciated enough and often managed in a way that degrade or erode the delivery of ecosystem services.

The pressures influencing biodiversity in Serbia over the past 3–4 years include:

- fires in protected areas, which have impacted forest ecosystems and led to changes in the biogeocenotic balance;
- influence of agricultural production: exaggerated application of artificial fertilizers and pesticides, uncontrolled drainage of liquid manure from cattle farms, land management in steppe and saltwater habitats and diffuse pollution on agricultural fields;

⁷⁴ Ministry of Environmental Protection (2019). [Draft Nature Protection Programme for the period from 2020 to 2022](#). Belgrade, Serbia: Ministry of Environmental Protection

⁷⁵ Ibid.

- construction of hydropower plants;
- intensive exploitation of sand and gravel from river beds, changing the river's morphological and hydrological properties, causing destruction of floodplain vegetation, decreasing bank stability and increasing the risk of flooding during high water levels;
- regulation of rivers and flood prevention measures, due to the interruption of connections between rivers and floodplains along river beds and drainage of these areas;
- protection of agricultural land from internal waters, and the drainage of wet meadows and pastures with the aim of increasing the surface of arable land, which endangers natural habitats that represent a priority for protection, as well as the species connected to them.⁷⁶

6.5 Hydrology and water management

As all surface waters do not have the same importance for water management, waters are classified into first- and second-order waters. First-order waters, primarily concerning water activity, which is related to waterway regulation and flood control, are under the national and/or provincial jurisdiction, while second-order waters are under the local jurisdiction. Water management is delegated to the state-owned water management companies having jurisdiction in each territory.

The Water Management Strategy's main strategic goal is **achieving integrated water management, the uniformity of the water regime throughout the territory of the Republic of Serbia and establishing water management to ensure maximum economic and social effects in a fair and sustainable manner in compliance with international agreements.**

Furthermore, the Strategy explains that the regulation of water flow includes the construction and maintenance of water facilities for regulating waterways and works related to maintaining the stability of banks and riverbeds and increasing or maintaining the flow capacity for water, ice and sediment.

Protection against the harmful effects of water means the implementation of a series of works, facilities, measures and other activities that protect people, natural and human-made material goods and resources from floods and water erosion in a rational way. With regard to the origin

⁷⁶ Ministry of Agriculture and Environmental Protection (2014). [The Fifth National Report on Implementation of the Convention on Biodiversity](#). Belgrade, Serbia: Ministry of Agriculture and Environmental Protection.

of water and the nature of its adverse effects, this field is usually divided into three major segments:

- protection against floods resulting from spillage of water from the riverbed of larger - permanent waterways (protection from fluvial flooding);
- protection against all forms of water erosion and torrents;
- protection against excess rainwater and groundwater (protection from pluvial and groundwater flooding).

The Strategy emphasises that the current system of flood protection facilities, with a network of regulated waterways, is a very important infrastructure system in Serbia, critical for the survival and development of urban and economic centres, and infrastructural corridors in river valleys.

One of the basic objectives of the EU Water Framework Directive is to achieve the good ecological status of water bodies. The fulfilment of this objective includes large-scale river and river habitat restoration projects, aimed at eliminating hydrological and morphological pressures that have an adverse impact on water ecosystems. There are still no serious river restoration initiatives in Serbia, despite a high percentage of watercourses having been significantly altered and/or negatively impacted. Initiating and implementing these projects requires cooperation with other sectors, primarily the energy sector, which exerts the most pressure on rivers (river damming and regulation); these sectors will need to take part in river restoration project funding.⁷⁷

Although the new Law on Waters and the Water Management Strategy introduced the concept of integrated water resource management into public policies, it is being implemented slowly in practice. Outdated approaches to watercourse regulation are still prevailing at the expense of the protection of watercourse and aquatic ecosystems. The significance of natural ecosystems in the mitigation of floods and water treatment continues to be neglected, with watercourses assessed separately from the accompanying ecosystems. There are no data about activities or plans for the integral renewal of watercourses. Moreover, proposals have been made for very harmful projects that will place significant hydro morphological pressures on watercourses and further deteriorate already unfavourable watercourse conditions. An example is the construction of a residential complex on Ribarsko ostrvo, a waterside area in Novi Sad, which has recently been reported on by the media. Although only unofficial information has been reported by the media about this project, it is concerning that any

⁷⁷ Coalition 27 (2020). [Chapter 27 in Serbia: Walking in the Mist](#). Belgrade, Serbia: Young Researchers of Serbia.

proposal would include moving the existing embankment and the expansion of construction land at the expense of the floodplains.⁷⁸

6.6 Agriculture

The Serbian Strategy for Agriculture and Rural Development for the period 2014–2020,⁷⁹ listed the key challenges, such as inadequate response to the effects of climate change, lack of systemic solutions for agricultural adaptation to climate change, and lack of awareness of climate change impacts on agriculture. The Strategy emphasises negative effects of climate change on water resources, which has an inverse effect on irrigation and agricultural production. These issues are recognised as highly complex and the necessity for the comprehensive and systemic climate change adaptation measures is clearly noted. However, the Strategy does not propose any such measures.

The World Bank Systematic Country Diagnostic Report for Serbia⁸⁰ highlighted that agriculture is the sector most vulnerable to weather hazards and climate change. More frequent and intensive droughts in the past two decades have had a significant impact on the Serbian agriculture sector. Droughts can reduce the average crop yield by over 40%, and this could worsen as the climate continues to change. The United States Agency for International Development's 2017 Climate Change Risk Profile for Serbia projects a rise in temperature and decline in precipitation by 2050 that will affect the rain fed crops that dominate Serbian agriculture. Diversification in Serbia's agriculture would be important to reduce risks through climate mitigation and improve resilience through climate adaptation. Unsustainable agricultural production practices are, however, common in Serbia, particularly among smallholders. There is also little support or technical assistance in promoting agri-environmental practices, despite the increased threat of climate change and extreme weather events that are expected to disproportionately affect poor rural households that often depend on agriculture for their livelihoods.

The UNDP analysis Climate Change Impact on Serbian Agriculture⁸¹ listed a set of adaptation measures for prevention of flooding and droughts, including measures that represents the application of NbS, for example: restoration of wetlands and vegetation, reforestation, multi-purpose accumulations for water supply, introducing and growing varieties/hybrids resistant

⁷⁸ Ibid.

⁷⁹ Anon. (2014). [Strategy of Agriculture and Rural Development of the Republic of Serbia for the period 2014–2024](#) (Official Gazette of RS 85/2014). Belgrade, Serbia: National Assembly of the Republic of Serbia.

⁸⁰ World Bank (2020). [Serbia Systematic Country Diagnostic](#). Belgrade, Serbia: World Bank.

⁸¹ UNDP (2019). [Climate Change Impacts on Serbian Agriculture](#). Belgrade, Serbia: United Nations Development Programme.

to drought and heat, installation of shade nets to save water and lower temperature, erection of windbreak belts to reduce wind erosion and soil drying and ensure uniform watering.

6.7 Other assigned national policies

Urban development

The Sustainable Urban Development Strategy of the Republic of Serbia adopted in July 2019 recognises that the uneven quality of the environment, health care and safety of citizens, and urban settlements' non-adaptation to climate change as the key challenges for urban development. Consequently, one of the five objectives of the Strategy is dedicated to the quality of the environment with a view to *"improving the quality of the environment, health and safety of citizens and adaptability of the urban areas to climate change"*. The Strategy relies, inter alia, on the EU Urban Agenda⁸² (one of whose thematic partnerships is devoted to sustainable use of land and nature-based solutions).

The Strategy sets out a comprehensive set of measures under Strategic Goal No. 4 related to the quality of the environment. Several of these measures could be considered as application of the NbS principle.

For example:

- mitigation of climate change by improving the quality of the environmental parameters, inter alia, through green infrastructure measures and green roofing, and
- adaptation to climate change and establishment of a rapid response system for risks and hazards in urban settlements, inter alia, through the conservation of biodiversity of urban areas (green surfaces, green infrastructure, protected areas, landscape, water surfaces, etc.).

Forestry and land use

The LDN Country Report sets the National Targets by 2030 for land use in Serbia as follows:

- recognising elements and targets of land degradation neutrality in the legislation;
- improvement, restoration, rehabilitation of degraded areas, implementation of measures of sustainable land management;
- establishment and development of sustainable, systematic land monitoring;
- establishment of appropriate, detailed national databases for the implementation of the LDN methodology;

⁸² European Commission [website]. https://ec.europa.eu/regional_policy/en/policy/themes/urban-development/agenda/#:-:text=The%20Urban%20Agenda%20for%20the%20EU%20is%20an%20integrated%20and,of%20life%20in%20urban%20areas. Accessed on 20 December 2020.

- raising public awareness and the role of education in combating land degradation and drought.

Protected areas and ecosystem services

Research and evaluation of ecosystem services in Serbia are underdeveloped and performed sporadically. Since this is a relatively new concept, the very term is still not clear enough and not accepted by the general public. A more detailed analysis of ecosystem services has not been performed for any areas. There is no system in place or any harmonised methodology of ecosystem services research.⁸³

A protected areas benefits assessment was conducted by WWF in 2017 for six protected areas (PA) in Serbia.⁸⁴ It showed that stakeholders in Serbia recognise a wide array of PA values and benefits. They identified many values that are important for their subsistence or for economic development. These are not only values based on traditional and direct use of natural resources (i.e., forestry, mining), but also include other values based on sustainable practices and that are highly dependent on the protection and conservation of natural resources (i.e., tourism and education).

The most recognised values are tourism and recreation, natural values and biodiversity, cultural and historical values, water quality and quantity, wood/forestry, and wild food plants and mushrooms. Tourism is the economic activity that is most easily linked with PAs by local stakeholders. PAs and their natural and cultural values are attractive tourist destinations that support local economies in a variety of ways.

Serbia recently joined the Global Ecosystem Services Partnership, which aims to map and evaluate ecosystem services at the national level.

Tourism

The Tourism Development Strategy (Official Gazette of RS 91/06) recognises preserved natural values as a comparative advantage of tourism in Serbia, following the trend of the increase in the number of tourists interested in natural values. Bearing in mind that the potentials of nature represent one of the advantages on which competitiveness of tourism in Serbia is grounded, the provision of long-term protection and integrated management of natural and cultural resources are included in the goals of the development of tourism.

⁸³ Ministry of Agriculture and Environmental Protection (2014). *The Fifth National Report on Implementation of the Convention on Biodiversity*. Belgrade, Serbia: Ministry of Agriculture and Environmental Protection.

⁸⁴ Nature for People [website]. Available at: https://natureforpeople.org/protected_areas/. Accessed on 24 December 2020.

According to the tourism vision outlined in the Strategy, Serbia should present itself as a country dedicated to the maximum conservation and protection of all of its natural and cultural treasures, making it is necessary to increase the surface of protected areas to 15–20% of the national territory to improve the tourism appeal.

However, due to insufficient cooperation between sectors, it has been assessed that the necessary protection of natural resources has not yet been achieved.⁸⁵

⁸⁵ Ministry of Agriculture and Environmental Protection (2014). *The Fifth National Report on Implementation of the Convention on Biodiversity*. Belgrade, Serbia: Ministry of Agriculture and Environmental Protection.

7. Key findings and challenges regarding NbS application in Serbia

7.1. Experiences with NbS in Serbia

In accordance with the methodology, a comprehensive desk-analysis was performed to identify acting and potential NbS interventions in Serbia. At the time of this scoping study, the gaps in data and repositories proved to be a barrier to identifying NbS case studies in Serbia. Instead, research providing recommendations for NbS and undocumented local knowledge of sustainable practices were available and accessible. Regarding the former, three research studies providing concrete recommendations for NbS practices are listed below, although action has yet to be taken in each at this time. For the latter, there are sustainable practices that are known of by word-of-mouth that hold potential to either be an NbS or contribute towards a larger NbS.

These word-of-mouth sustainable practices hold untapped potential in documenting, promoting and upscaling NbS in Serbia. As of yet, there are no repositories or databases capturing this local knowledge and practice. Identifying and supporting sustainable local knowledge and practices is a global challenge; one that the framework of NbS, and specifically the IUCN Global Standard for NbS™, seek to address. A few interventions were identified that have the potential to align with or contribute to the concept of NbS, however data gaps (either a lack of data altogether or the data available being obsolete) means these could not be included as full case studies and/or good practice examples of NbS (

Table 5).

It is important to note that the potential examples identified in Table 3 are lacking in terms of accessible documentation or further consultation. This means that currently there is no strong link identifiable for CCA or DRR (although they likely contribute towards these via added benefits) and that no clear links have yet been identified to the principles of NbS. These would need to be screened using the IUCN Global Standard for NbS™ to assess their complementarity to NbS.

Table 5. Interventions with the potential to align with NbS (Source: Data compiled by the report author)

Intervention	Approach	Link
FORRET	Green infrastructure for water and forest management	https://www.voda.hr/hr/novosti/medunarodna-suradnja-hrvatske-srbije-na-projektu-forret
iWAM	Environmentally friendly water management	https://keep.eu/projects/6582/Environmentally-friendly-wat-EN/

REFOCUS	Sustainable forestry	http://www.interreg-danube.eu/approved-projects/refocus http://www.interreg-danube.eu/uploads/media/approved_project_output/0001/38/a0cf5e7952cff701cfa54b79cc73768932056894.pdf
LIFELINEMDD (Bačko Podunavlje Biosphere Reserve)	Improvement of water management and retention in the floodplain and oxbows	http://www.interreg-danube.eu/approved-projects/lifelinemdd http://www.interreg-danube.eu/uploads/media/approved_project_output/0001/42/e2fa3703558c3c6e18950038e551fe79a95a6a33.pdf
Danube floodplain	Floodplain restoration and preservation manual	http://www.interreg-danube.eu/approved-projects/danube-floodplain http://www.interreg-danube.eu/uploads/media/approved_project_output/0001/40/cbd0129ca5f4d56b8da516b57b8f25d424e588db.pdf

The barriers to identifying NbS case studies in Serbia could be due to multiple conditions and is likely due to a combination of the following:

- approaches considered NbS are not implemented in Serbia;
- conservation-focused projects are not communicated as NbS approaches as the benefits in terms of resilience and risk reductions are not appreciated/identified;
- climate adaptation and disaster risk reduction projects are not communicated as NbS approaches as their benefits to biodiversity/ecosystem integrity are not appreciated/identified;
- NbS approaches implemented are not documented (primarily local knowledge and practice);
- NbS approaches implemented are documented however this is not publicly accessible.

Type of NbS approach: Flood prevention through the use of natural retention capacities in wetlands

Due to the traditionally strong regulation of water flows and the narrowing of flooded areas, flood waves often do not have enough space for spilling, therefore the wave moves downstream more quickly and can cause more damages than it normally would. This becomes the case with lowland rivers, in particular during the floods in 2014, and in these cases, the

existing flood protection systems consisting primarily of dams and accumulations cannot neither prevent nor slow flooding due to their limited capacity.

Given the more extreme hydrological phenomena caused by extreme weather conditions, one could expect that flooding and flood waves might occur more frequently, and that flood protection needs to be strengthened as much as possible through the usage of natural retention capacities. The natural retention capacity of the Sava and Danube Rivers could provide more space for these rivers for spilling, while also representing cost-effective solutions, that are cheaper than the construction of dams or other expensive grey infrastructure (the latter should however still be considered in certain cases such as for protection of industrial complexes or important roads). The current flood protection system in Serbia includes massive water accumulations that combines dams, a system of channels, deepening riverbeds and/or construction of embankments, cleaning of the natural river vegetation, etc. However, these measures proved to be inefficient and insufficient during the 2014 floods in Serbia, as the ground was already saturated from the rain and could not absorb the high waters and strong flood waves. Therefore, a possible solution for preventing flooding and slowing the flood wave, in particular in the Vojvodina region, could be the application of the NbS approach.

The natural river valleys should be expanded to enable more space for water spilling, creating a self-regulating mechanism for large flood waves. The natural flooded areas could mitigate or decrease the negative effects of the floods downstream. Some examples of natural retention areas that could be transformed and upgraded so as to enable more efficient prevention of floods are the special natural reserves Zasavica, Obedska Bara, Gornje Podunavlje and Karadjordjevo.

In accordance with the Convention on wetlands of international importance, in particular habitats of marsh birds (Ramsar Convention), 10 Ramsar areas have been proclaimed in Serbia, covering a total surface of approximately 64,000 ha, or 0,72% of the territory. These areas hold **the potential for application of the NbS in context of flood prevention and improvement of the flood management in Vojvodina through improvement and exploitation of the natural retention capacity, and this should be further explored in this sense.**

It is not known at this time what measures are taken at these locations to improve their capacities for flood prevention and protection.

Type of NbS approach: Ecosystem-based approach for increasing the value of ecosystem services

Advocating Ecosystem Services Assessment and Valuation (ESAV) in the Bosut Forests area – Integrating biodiversity and ecosystem services in natural resource uses and management⁸⁶

This case study aimed to present the possibilities for increasing benefits, both quantitative and qualitative, through the introduction of integrated planning and multipurpose utilization of the Bosut Forests area, near Sremska Mitrovica.

A comprehensive study of the conditions, proposed scenarios, and costs and benefits was performed and the most optimal scenario was recommended.

The case study proposes “multipurpose utilisation of the area (the establishment of a protected area with the reception of flood waves in half of the Nature Park; environmental flooding of the forest complex in order to increase forest vitality and maintain the existent habitat mosaic; the application of traditional animal husbandry as the most economical method of habitat maintenance; increasing yields and profits in the area).”

Furthermore, the authors demonstrated a likely increase in the value of four ecosystem services, selected as having the highest importance for the area (wood production, flood prevention, meat production and biodiversity), if environmental flooding of the forest complex and increase in traditional animal husbandry are implemented along with joint management and establishment of protected area:

- ✓ wood production would benefit from 30–50% less forest dieback and salvage cuttings related to water depletion, with proportionally higher quality yield in timber;
- ✓ the forest retention area will be able to store 100–200 million cubic meters of water, with extraordinary importance in flood management;
- ✓ an increased number of pigs grazing in the Bosut Forests (by 5–7 times) together with better fodder availability will result in 10–14 times the income from traditional farming. Moreover, there will be an additional benefit from better meat flavour and quality when compared with conventional pig farm production,

⁸⁶ German Development Cooperation [website]. Available at: <https://germancooperation.rs/study-on-bosut-forests-ecosystem-services-how-to-achieve-better-flood-protection-income-from-wood-production-traditional-animal-husbandry/>. Accessed on 24 December 2020.

- ✓ for six habitat types, plankton communities and nine plant and 11 animal species selected as most important, there will be improvements in their ecological status, number, population, and area of occupancy. Since these are indicators and umbrella species, improvements are expected not only for them but for most other species present in the area as well.

Improvements are also expected for many other ecosystem services (water and air purification, mitigation of climate extremes, tourism, aesthetics, pollination, pest control), improvements are also expected, but have not been quantified.

Type of NbS approach: Land use change for flood protection: **A prospective study for the restoration of the Jelašnica River watershed**⁸⁷

The case study for the Jelašnica River demonstrates how land use changes in the watershed could cause strong positive environmental impacts through the improvement of hydrological conditions, erosion control and flood protection. Land use directly affects surface runoff intensity by creating "losses" of precipitation, through the processes of interception, depression storage, evaporation, transpiration and infiltration. This is illustrated in the hydrological analysis of the Jelašnica River watershed. Since May 2007, the Jelašnica River flooded three times, damaging local roads, a bridge and houses.

The Jelašnica watershed is a typical site where land mismanagement influences the development of erosion processes, and causes soil degradation that significantly reduces the land's capacity to infiltrate and retain rainwater. Inappropriate land use and development activities replace permeable with impervious surfaces in the watershed. This leads to more rapid runoff generation and the more frequent appearance of torrential floods and bed-load deposits downstream. Environmental degradation creates economic and social problems within local societies, which is often followed by depopulation.

Restoring watersheds to their optimal hydrological state would reduce flood discharge, and increasing groundwater recharge would increase both low-flow and average discharges in springs and streams. The effective revitalisation of the Jelašnica River watershed can be based on the application of best management practices including: technical (river training works), biotechnical (afforestation; forest protective belts; silt filtering strips) and administrative measures, identification of endangered areas, specifying of land use limits (contour farming

⁸⁷ Ristic, R. Radić B., Vasiljević N., and Nikić Z. (2011). [Land use change for flood protection: A prospective study for the restoration of the river Jelašnica watershed](#). *Glasnik Šumarskog Fakulteta* 103: 115-130. DOI: 10.2298/GSF1103115R.

and terracing of arable land on slopes; limits for grazing; rotational grazing) and permanent control by experts. Administrative measures are applied through the “Plans for announcement of erosive regions and protection from torrential floods in the Leskovac municipality”. The plans prohibit clear cutting, cuttings in protective forests, straight row farming down the slope, uncontrolled urbanisation, and overgrazing (Articles 15 and 30 of the Law on Waters; Official Gazette of the Republic of Serbia 54/96). Landowners are required to apply contour farming and terracing of arable land as effective measures of erosion control.

The results of this study show that protection from torrential floods can be enhanced by planned land use change through the calculation of the effect of selected restoration measures on the hydrological performance of the Jelašnica River, showing that modest land use changes can have significant impacts. Forest vegetation significantly decreases the amount and velocity of surface water and intensity of erosion processes, helping the development of soil and its infiltration capacity. Planting stable forest stands on bare lands and steep slopes is an effective anti-erosive and flood protective measure. Similarly, positive effects can be provided by properly treating arable land with contour farming and terracing.

7.2 Main obstacles for NbS application in Serbia

Nature-based Solutions are a relatively new approach, promoted during recent decades by the international community to address climate change issues, natural disasters and other societal challenges. As per its definition, NbS can be applied in numerous fields and through various approaches (ecosystem-based adaptation, green infrastructure, ecological/environmental engineering, forest landscape restoration, etc.). The IUCN Global Standard for Nature-based Solutions™ provides guidance on how to design and monitor NbS interventions. The **application of NbS requires comprehensive analysis and research based on the context of the specific location or site/territory** and iterative decision-making processes facilitating the selection of the best available and most cost effective and efficient (also feasible) option.⁸⁸

The policies in Serbia are still fragmented and cross-sectoral mainstreaming is lacking. Despite many attempts to mainstream climate change issues into other policies (even within the environmental sector), the recognition of climate change impacts on different sectors remains insufficient. Moreover, **climate change and disaster risks are generally treated as separate issues**, presenting an additional challenge for the application of NbS in Serbia.

⁸⁸ Mainly taken from: UNDP (2020). [Study on Nature-based Solutions in Serbia](#). Belgrade, Serbia: United Nations Development Programme.

The analysis of available documents, strategies and policy frameworks for Serbia reveals that climate change is not integrated into existing policies or their associated budget priorities. The underlying challenge is that currently there is no comprehensive framework for adaptation in Serbia, though the National Communications to NFCCC provide a preliminary assessment of climate-induced vulnerabilities. Furthermore, **there is a lack of structured information sharing and exchange, capacity weaknesses, as well as a general lack of awareness related to CCA** – both at the national and local levels. These are the main weaknesses and prevailing barriers to climate change adaptation (CCA) and disaster risk reduction (DRR) planning in Serbia.

Even though some data on the socioeconomic impact of the effects of climate change in Serbia are available, with estimations of the effects of some disasters (for example, assessment of the 2014 floods), there is currently no systematic information on geographical areas most affected by disasters, or the types of risks that prevail. There is no national climate vulnerability assessment for Serbia, and there are no data available on the overall impact on physical, environmental and socio-economic effects of climate change. Therefore, it is difficult to find accurate data and updated information related to the specific geographic areas that are prone to disasters. Consequently, **it is not possible to give an estimation of the vulnerability of different ecosystems to recover or their capacity for resilience to climate change and disasters.**

Due to its multi-sectoral nature, **formal policy competencies for NbS application cannot be attributed to a single sector or institution** (Government bodies, local administrations, public utility companies, or public agencies) to partially or fully implement some of the important policies closely related to NbS, DRR and CCA. Competencies related to its application are not only divided among different sectors, but also among different divisions/units/departments within a single ministry. For example, the Sector for Climate Change and Nature Protection of the Ministry for Environmental Protection is in charge of biodiversity, climate change, nature protection and protected areas, while forest management lies exclusively under the jurisdiction of the Forest Directorate of the Ministry for Agriculture, Forestry and Water Management. Additionally, issues related to specific measures and projects addressing identified climate change challenges or risk reduction are to be considered and tackled mostly at local (or regional) levels. The **various ministries and local governments have limited formal competencies to integrate climate change adaptation or DRR into their policies and plans.** There is no formal structure to integrate climate change related concerns into other national development programmes and policies, and planners and

decision-makers lack the tools and frameworks that would enable mainstreaming of climate change into existing national processes and systems. Therefore, **the current institutional framework for NbS application is highly complex and requires additional efforts to ensure coordination and collaboration among sectors and between administration and governance levels in Serbia.**

In terms of DRR, the situation has improved since 2014; however, this is still no integrated system for the collection and processing of data on risks or climate change, despite efforts of the Government and international organisations to establish and support such a system. **The capacities for DRR within the institutions in charge of various sectors and domains remain low. Even where formal cooperation structures exist, they are hampered by limited resources and knowledge.** The data are not shared or disseminated accurately. Within the context of these capacity gaps, most efforts to improve national policies and plans on climate change and DRR retain a specific sectorial emphasis, lacking multi-sectorial coordination mechanisms for both policy and implementation.⁸⁹

7.3 Recommendation and next steps in NbS application in Serbia

Within the existing Serbian policy framework, the values of ecosystems and their contribution to climate change adaptation and mitigation and DRR are partly recognised, but NbS are not explicitly mentioned as associated actions or tools. However, some nature-based concepts appear sporadically among actions recommended in Serbia's strategies and several newly developed strategic documents made clear reference to NbS.

- The **new draft National Forestry Programme clearly recognises the potential for NbS**, incorporating NbS approaches through envisaging the contribution of the forestry sector to economic, environmental and social development through the synergistic effects of carbon storage, conservation of biodiversity and economic benefits, coppice conversion, i.e. carbon storage through conversion of coppice to high-forest, and promotion of multifunctional sustainable forest management (biodiversity, carbon storage, ecosystem services in economically sustainable areas).
- Furthermore, clear **linkages to NbS approaches within the new Sustainable Urban Development Strategy of the Republic of Serbia** adopted in July 2019 opens new possibilities and creates an enabling environment for the application of NbS or similar approaches in urban areas through mitigation of climate change by improving the quality of environmental parameters, through both adaptation to climate change and

⁸⁹ Mostly taken from: UNDP (2019). [GCF Readiness Proposal with United Nations Development Programme for the Republic of Serbia](#). Belgrade, Serbia: United Nations Development Programme.

establishment of a system of rapid response to risks and hazards in urban settlements, and through the conservation of biodiversity of urban areas (green surfaces, green infrastructure, protected areas, landscape, water surfaces, etc.).

In order to derive maximum benefits from the existing natural phenomena and ecosystems in Serbia, NbS need to be mainstreamed and their application strongly linked with other sectoral measures and plans. Therefore, **NbS needs to be integrated into and applied through the existing policy and institutional framework mainly in the DRR and climate change sectors and further mainstreamed and incorporated within the urban development, agriculture and rural development, land-use, forestry, water management and biodiversity and nature protection.** Also, since the majority of NbS actions is to be applied at the local level, the ongoing process of the development of Local Development Strategies throughout Serbia, enforced by the Planning System Act,⁹⁰ present an excellent opportunity for the recognition and reinforcement of NbS concepts in local planning.

In order to plan and apply appropriate adaptation measures or to apply NbS approaches for the reduction of risks from disasters, **it would be beneficial to have data on where and to what extent floods, droughts, fires occur (frequency/seasons).** The assessment should identify of the needs and capacities of ecosystems, and also the possible trends in terms of fires, degradation, deforestation and their impact on people/economy/communities, and determine the water retention capacity of natural systems to mitigate flooding and provide overall estimation on how fragile are the systems already to climate change.

NbS approaches have been sporadically applied in several ongoing initiatives in Serbia, mainly through inchoate steps in integrating the new way of thinking into existing planning systems in forestry or local flood protection, but **there is no clearly “recognisable” NbS project implemented in Serbia so far.** Some of the applied “nature-based” principles in wetlands like Zasavica or Obedska Bara in Vojvodina could be “marked” as applications of the NbS approaches in increasing the use of natural retention capacity of the wetland and marshes to prevent flooding and/or improve flood prevention in these areas. On the other hand, the vast majority of nationally-driven implemented measures for flood protection and prevention implemented since the 2014 floods were focused on immediate emergency response, and based on grey infrastructure principles without consideration of nature and existing ecosystems or nature’s potential for addressing the issues. In Serbia, according to the Ramsar Convention, there are ten Ramsar areas covering a total area of approximately

⁹⁰ Pursuant to the Law on the Planning System, every municipality is required to prepare and adopt a Local Development Strategy by the end of 2020.

64,000 ha, or 0.72% of the territory. These areas representing **the potential for application of NbS in the context of flood prevention and improvement of flood management in Vojvodina through improvement and exploitation of the natural retention capacity and needs to be further explored in this sense.**

The detailed analysis of the global concepts, approaches, examples and lessons learnt from the application of NbS shows that policy enforcement, stakeholder engagement, a multi-sectoral approach and local participation are just as important for putting NbS into practice as an enabling environment supported by the integration of NbS into national strategic and policy frameworks. Therefore, it is of the highest importance when implementing such a novel initiative **to dedicate sufficient time and efforts to mobilise local community actors and stakeholders, to ensure two-way communication with the public and to educate and promote concepts and approaches** to be applied along with the benefits that will be gained through the application of NbS.

An example of good practice is the initiative in the Zapadna Morava watershed, where the municipalities belonging to the watershed signed a Memorandum of cooperation, joining forces to ensure effective and better disaster response and cooperation in creating more resilient communities. The signatories of the Memorandum agree to jointly prepare strategic and planning documents and projects, and to act towards disaster prevention and reduction in the watershed. The justification behind this approach lies in the experiences from the field that demonstrate that watersheds follow natural ecosystem boundaries, thus having similar climate conditions and common hazards and risks. Therefore, this approach represents a logical entity and enables multifunctional, multisectoral and all-inclusive approach in addressing climate change and risk-related issues and **the application of NbS in the context of watershed-based approach might be further explored** in flood prevention and disaster risk reduction planning in Serbia (including other watersheds such as Velika Morava, Kolubara, Drina and Gornje Podunavlje).

ANNEXES

Annex I: Key terms and definitions

THE KEY TERMS AND DEFINITIONS

Climate Change Adaptation: The IPCC defines CCA as adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities

Disasters: UNISDR defines a disaster as “a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources”.

Disaster risk reduction (DRR) UNISDR defines DRR as “reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events” (UNISDR, 2009)

Ecosystem-based Disaster Risk Reduction (Eco-DRR): Based on PEDRR, the Eco-DRR are defined as “Sustainable management, conservation and restoration of ecosystems to provide services that reduce disaster risk by mitigating hazards and by increasing livelihood resilience.”

Ecosystem-based Adaptation (to Climate Change) (EbA): IUCN defines EbA as the conservation, sustainable management, and restoration of ecosystems to help people adapt to the impacts of climate change. It includes for example, sustainable agriculture, integrated water resource management, and sustainable forest management interventions that use nature to reduce vulnerability to climate change.

Natural hazards: events such as cyclones, earthquakes, tsunamis that occur in the physical environment and that can potentially cause harm to people

Nature-based Solutions (NbS): According to the IUCN, NbS are “Actions to protect, sustainably manage and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits.

Annex II: Nature-based Solutions for disaster risk reduction (DRR) and climate change adaptation (CCA)

Nature can provide solutions that are cost-effective, and can contribute to the community resilience beyond their capacity to absorb and recover from a single disaster, such as a flood or drought. At the 2016 World Conservation Congress and Members' Assembly, IUCN's Members adopted a motion (WCC-2016-Res-069) which, for the first time, defined the use of nature for simultaneous benefits to biodiversity and human well-being. According to the Resolution, Nature-based Solutions (NbS) are *“actions to protect, sustainably manage and restore natural and modified ecosystems in ways that address societal challenges effectively and adaptively, to provide both human well-being and biodiversity benefits.”*⁹¹

While still an emerging concept, NbS have clearly demonstrated their value in providing multiple benefits to societies, e.g., in mitigating and adapting to climate change impacts, reducing disaster risks, improving community resilience and livelihoods, and safeguarding ecosystems and biodiversity. There is growing evidence on the value and importance of NbS and a steady progress with documenting, communicating and mainstreaming NbS into climate change and sustainable development policy and disaster risk management.

Nature-based Solutions are considered an umbrella framework for ecosystem-based approaches that are used to address major societal challenges.

NbS actions can contribute to flood prevention and protection, managing risks of natural disasters, improving forest management, ensuring food and water security, combating climate change and contributing to the global improvement of the social, economic and health conditions, by strengthening the local communities' resilience to natural disasters.

NbS are a powerful mechanism for climate change mitigation due to their capacity to prevent degradation and loss of natural ecosystems, for example through sustainable forest management or improved conservation and land management actions. Moreover, natural and modified ecosystems can also effectively contribute to combating climate change thanks to their function of a 'natural carbon sink', i.e., absorption and insulation of CO₂ emissions.

⁹¹ World Conservation Congress (2016). [Resolution 069](#). Adopted at the World Conservation Congress, at its session in Hawaii, USA, 1-10 September 2016.

Nature-based solutions to disaster risk reduction (DRR) and climate change adaptation (CCA) are a good strategy for the integrated management of land, water and biodiversity. They can provide low risk, low maintenance and low-cost solutions to many climate change related disasters and impacts. They prioritise nature conservation and sustainable land use practices that can be implemented in harmony with more traditional methods. The central role of ecosystems and biodiversity to address DRR and CCA challenges is endorsed in major risk-related agendas, including the Sendai Framework on Disaster Risk Reduction (SFDRR), the Paris Agreement on Climate Change (COP21) and the Sustainable Development Goals (SDGs).

Specifically, SFDRR mentions ecosystems as being vulnerable to natural and human activity induced hazard impacts, and therefore need to be adequately protected.⁹²

Various approaches can be used to apply NbS in different fields, including green infrastructure (GI) projects or ecosystem-based approaches (EbA). Measures facilitating the practical implementation of NBS through policy development and enforcement, stakeholder involvement and building the capacity of the national institutions and/or local communities are equally important.⁹³

Nature-based Solutions can be implemented alone or in an integrated manner with other solutions to societal challenges (e.g., technological and engineering solutions). They have been applied in a wide variety of sector; to address a plethora of societal issues. Some of the NbS interventions examples are found in section 6.1 of the IUCN publication *Nature-based solutions to address global societal challenges*.⁹⁴

⁹² Ilieva, L., McQuistan C., Rodriguez A.V., Guevara O., Cordero D., Podvin, K., and Renaud F. (2018). "[Adopting nature-based solutions for Latin America](#)". Working Paper of the Latin America Regional Workshop, "Towards nature-based solutions: Green infrastructure for flood risk reduction", Lima, Peru, 11-12 December 2017.

⁹³ UNDP (2020). [Study on nature-based climate solutions in Serbia](#). Belgrade, Serbia: United Nations Development Programme.

⁹⁴ IUCN (2016). [Nature-based solutions to address global societal challenges](#). Gland, Switzerland: IUCN.

Annex III: Global policies relevant for NbS application

The most important milestones for NBS application are the following:

- ✓ At the CBD COP12 in 2014, the decision XII/20 “Biodiversity and Climate Change and Disaster Risk Reduction” was adopted. The decision encourages Parties to promote and implement ecosystem-based approaches to climate change and disaster risk reduction
- ✓ In March 2015, the Sendai Framework for Disaster Risk Reduction 2015–2030 was adopted as the successor to the Hyogo Framework for Action 2005–2015. This new framework places a stronger emphasis on the importance of ecosystems and biodiversity, and proposes a more rigorous monitoring framework, which strongly advocates for capacity development and knowledge transfers for risk management
- ✓ In June 2015, the Ramsar Convention Decision XXII.13 was adopted, recognising the role of wetlands in disaster risk reduction
- ✓ In September 2015, the UN General Assembly adopted the Sustainable Development Goals (SDGs)
- ✓ In December 2015, the Paris Agreement was adopted by 195 countries.

In July 2020, IUCN launched the Global Standards for NbS,⁹⁵ as a set of clear parameters defining Nature-based Solutions and a common framework in order to increase the scale and impact of the Nature-based Solutions approach, to prevent unanticipated negative outcomes or misuse, and help funding agencies, policy makers and other stakeholders assess the effectiveness of interventions.

Serbia has ratified and adopted the following relevant international treaties related to the Eco-DRR/CCA.

Table 6. International treaties related to Eco-DRR/CCA (Source: Data compiled by the report author)

Policy Agreement	Description
The Sendai Framework on Disaster Risk Reduction (SFDRR)	The SFDRR is the global framework on DRR with seven targets and four Priorities Reduction – for Action. It seeks to prevent new and reduce existing disaster risk through the mainstreaming of DRR across all development sectors, programmes and policies. While the SFDRR is a voluntary, non-binding agreement, it calls for an all-of-society engagement, with governments having the primary role of reducing disaster risk.

⁹⁵ IUCN (2020). [Global Standard for Nature-based Solutions. A user-friendly framework for the verification, design and scaling up of NbS.](#) First edition. Gland, Switzerland: IUCN.

Sustainable Development Goals – SDGs (2015–2030) and 2030 Sustainable Development Agenda	With a total of 17 goals and 169 targets, the SDGs focus three main areas: (i) eradication of poverty; (ii) protecting the planet from degradation, while ensuring that economic, social and technological progress occurs in harmony with nature; and (iii) promoting universal peace and just and inclusive societies. While the SDGs are not legally binding, governments are expected to take ownership and establish national frameworks for the achievement of the 17 Goals
United Nations Framework Convention on Climate Change (UNFCCC)	UNFCCC provides the global framework to cope with the adverse effects of climate change. The ultimate objective is to stabilise greenhouse gas concentrations in the atmosphere at a level that will prevent dangerous human interference with the climate system.
UNFCCC 21 st CoP – Paris Agreement on Climate Change	The Paris Agreement seeks to significantly scale-up climate actions and deal more comprehensively with climate change impacts to safeguard development and eliminate poverty. Countries committed to hold the global average temperature to well below 2°C above pre-industrial 30 levels (and to pursue efforts to limit the increase to 1.5°C). It specifically aims to “significantly reduce the risks and impacts of climate change and foster climate resilience”.
Convention on Biological Diversity (CBD)	The CBD recognised for the first time in international law that the conservation of biological diversity is a universal concern for humankind and is integral to sustainable development. It covers all ecosystems, species and genetic resources. The CBD is a legally binding agreement.
UN Convention to Combat Desertification – UNCCD	The UNCCD provides the global framework for tackling the issue of land degradation and desertification. It is the only legally binding international agreement with a focus on sustainable land management. The Convention addresses specifically the arid, semi-arid and dry sub-humid areas, known as drylands. It seeks to improve the living conditions for people on drylands, to maintain and restore land and soil productivity, and to mitigate the effects of drought.
The Ramsar Convention (formally the Convention on Wetlands of International Importance)	The Ramsar Convention provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. It is an International non-binding agreement. The Convention uses a broad definition of wetlands. It includes all lakes and rivers, underground aquifers, swamps and marshes, wet grasslands, peatlands, oases, estuaries, deltas and tidal flats, mangroves and other coastal areas, coral reefs, and all human-made sites such as fishponds, rice paddies, reservoirs and salt pans.

Annex IV: Regional policies relevant for NbS application

Green Agenda for Western Balkans

The EU aims to reduce its GHG emissions to net-zero — where GHG emissions sinks balance out emission sources — by 2050 as part of the European Commission's 2050 long-term strategy. In 2019, the new Commission also published its vision for a European Green Deal, highlighting specific actions to achieve a climate-neutral EU and, as a follow-up, proposed a new climate law. The law should stipulate the 2050 climate-neutrality target and related trajectory and establish a framework for actions to enhance certainty for society. Interim targets for 2020 and 2030 should help realise the vision for a GHG emission neutral EU by 2050. In its Europe 2020 strategy, the EU committed to reducing its GHG emissions by 20% compared with 1990, improving energy efficiency by 20% and increasing the share of renewables in final energy consumption to 20%. The 2030 Climate and Energy Framework includes 2030 targets for GHG emissions, renewable energy and energy efficiency. The EU increased the ambition of the latter two targets in 2018, which are now reflected in the revised Renewable Energy Directive and the revised Energy Efficiency Directive. The targets commit the EU to cutting GHG emissions by at least 40% (from 1990 levels), achieving a minimum 32% share for renewable energy, and improving energy efficiency by at least 32.5% (compared with a projected business-as-usual scenario for 2030).

In its European Green Deal, the Commission also proposed to increase the ambition of the 2030 GHG emission target to at least 50% and towards 55% compared with 1990 levels. The Energy Union further supports the shift towards a resource-efficient, low carbon economy to achieve sustainable growth through legal frameworks and related initiatives, highlighting renewables as a key element of decarbonisation. Finally, the EU cohesion policy (2014 to 2020) sets aside EUR 29 billion for sustainable energy programmes and initiatives, including for energy efficiency, renewable energy, smart energy infrastructure and low-carbon research and innovation. The new cohesion policy (2021 to 2027) includes a 'greener, carbon free Europe' as one of its five main objectives.

SEE 2020

During the COP 23 in Bonn, Germany, ministers from the Western Balkans responsible for the environment and climate change signed a Ministerial Declaration on the 2nd High-Level Panel on Environment and Climate Action in the Western Balkans, under the framework for the implementation of the South East Europe 2020 Strategy (SEE 2020) and its Environment Dimension. The ministers re-affirmed their commitment to strengthen regional cooperation,

joint efforts and concrete common action in addressing the existing environmental and climate challenges together with preventing and mitigating the future ones. The declaration calls for further strengthening of synergies and regional cooperation for the implementation of the environment and climate change priorities in the region, as well as for strengthened high-level policy dialogue between the Western Balkans and the EU. With respect to climate change, the accession of the Western Balkan countries to the EU remains a key driver in improving environmental legislation and policy.

The South East Europe 2020 Strategy (SEE 2020) of the Regional Cooperation Council (RCC) provides a unique opportunity to mainstream and communicate the results of the project at the regional level. The SEE 2020 Pillar 3: Sustainable Growth aims to 'Increase adaptive capacity through awareness raising and education on climate change adaptation (knowledge and best practice transfer, experimental showcase projects and awareness rising in the fields of agriculture, forestry, water usage, energy usage for individual farmers, cooperatives, public and private companies and operators, local municipalities, community-based organisations and associations, media).

DPPI SEE

Another major regional programme is the Disaster Preparedness and Prevention Initiative (DPPI SEE). Launched in 2000 to assist partners prevent and deal with the impacts of natural disaster, it has since continuously provided a framework for South-East European countries to develop joint activities, programmes and projects leading to strengthened capacity in preventing and responding to natural disasters. DPPI, as an umbrella regional network for developing programmes and projects to prevent and respond to natural and human-made disasters and as such, represents one of the major regional processes on DRR and CCA.



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