Recommendations on establishing urban nature-based solutions in the Western Balkans

Authors:
Kiril Arsovski Przo MSc.
Zaneta Trajkoska PhD.
Darko Malinovski MA.

UPSURGE

By

Institute of Communication Studies

2026

Contents

Summary **3**

1. Understanding nature-based solutions **4**

1.1 Conceptual foundations 4

1.2 Definitions from leading organizations 4

2. The role of nature-based solutions in building resilient urban communities **6**

2.1 Climate adaptation and risk reduction 6

2.2 Strengthening social cohesion and public health 7

2.3 Economic resilience and ecosystem services 7

3. Official EU recommendations and their relevance to the Western Balkans **8**

4. Sustainable versus unsustainable urban nature-based solutions **9**

5. Improving quality of life in major Western Balkan cities **10**

6. Addressing current environmental challenges through NBS **11**

7. Strategic recommendations for implementation **12**

Conclusion **14**

Summary

Urban areas across the Western Balkans are facing intensifying environmental pressures linked to climate change, rapid urbanization, ecosystem degradation, and social inequality. Increasing heatwaves, recurrent flooding, air pollution episodes, loss of biodiversity, and insufficient access to green public spaces are becoming structural challenges in cities such as Tirana, Belgrade, Sarajevo, Skopje, Podgorica, and Pristina. Traditional grey infrastructure alone is no longer sufficient to respond effectively to these interlinked risks. In this context, Nature-Based Solutions (NBS) offer a transformative pathway for cities in the region to build resilience while improving quality of life, strengthening biodiversity, and fostering inclusive economic development.

This policy document provides comprehensive recommendations for establishing urban Nature-Based Solutions in the Western Balkans.

1. Understanding nature-based solutions

1.1 Conceptual foundations

Nature-Based Solutions represent an evolving framework in environmental governance and urban planning. At their core, they refer to deliberate actions that protect, restore, and sustainably manage ecosystems in ways that address societal challenges while delivering co-benefits for biodiversity and human wellbeing[1]. Unlike purely engineered infrastructure that relies on artificial systems, NBS harness ecological processes, such as water filtration by wetlands, cooling through evapotranspiration, carbon sequestration in soils, and habitat connectivity to generate practical and measurable outcomes.[2] The concept reflects a paradigm shift from viewing nature as an obstacle to development toward recognizing it as a strategic asset in solving urban problems.[3] Rather than separating environmental protection from economic and social planning, NBS integrates them. In urban environments, this integration may include restoring riverbanks instead of channelizing them, expanding tree canopies to mitigate heat stress, or creating multifunctional parks that act simultaneously as recreational spaces and stormwater retention basins.

1.2 Definitions from leading organizations

Although the concept of Nature-Based Solutions is broadly agreed upon, different institutions emphasize particular dimensions.

The International Union for Conservation of Nature (IUCN) defines Nature-Based Solutions as *"actions to protect, sustainably manage, and restore natural or modified ecosystems that address societal challenges effectively and adaptively, while simultaneously providing human well-being and biodiversity benefits."* This definition highlights three essential pillars: ecosystem integrity, adaptability, and dual benefits for people and nature. The IUCN framework underscores that NBS must not compromise ecological integrity in pursuit of short-term gains.

---

1 Veljko Prodanovic, et al. "Urban Nature-Based Solutions Planning for Biodiversity Outcomes: Human, Ecological, and Artificial Intelligence Perspectives." Urban Ecosystems, 15 May 2024, https://doi.org/10.1007/s11252-024-01558-6.

2 Cook, Elizabeth M., et al. "Nature-Based Solutions for Urban Sustainability." Proceedings of the National Academy of Sciences, vol. 122, no. 29, 14 July 2025, https://doi.org/10.1073/pnas.2315909122.

3 Kabisch, Nadja, et al. "Principles for Urban Nature-Based Solutions." Ambio, vol. 51, no. 6, 17 Jan. 2022, https://doi.org/10.1007/s13280-021-01685-w.

The European Commission describes Nature-Based Solutions as *"solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience."* The European perspective strongly emphasizes multifunctionality and cost-efficiency, reflecting the EU's commitment to sustainable development, climate adaptation, and economic competitiveness.

Similarly, the United Nations Environment Programme (UNEP) views NBS as actions that protect, sustainably manage, and restore ecosystems in an integrated manner to address societal challenges while supporting sustainable development goals. UNEP places particular emphasis on climate mitigation, adaptation, and biodiversity protection within a global sustainability agenda.

The European Environment Agency frames NBS within the context of ecosystem-based adaptation and green infrastructure, focusing on their role in enhancing urban resilience and improving quality of life. It stresses that hybrid approaches combining natural systems with engineered components can also qualify as NBS when ecological processes remain central.

Across these definitions, several common elements emerge. **First, NBS must address concrete societal challenges. Second, they must generate benefits for both ecosystems and human communities. Third, they must be sustainable and adaptive over time. These shared principles form the normative foundation for applying NBS in Western Balkan cities.**

2. The role of nature-based solutions in building resilient urban communities

Urban resilience refers to a city's ability to anticipate, absorb, adapt to, and recover from shocks and stresses.[4] In the Western Balkans, such stresses include heatwaves, floods, landslides, air pollution, infrastructure deterioration, demographic shifts, and economic transitions. Nature-Based Solutions contribute to resilience through ecological, social, and economic pathways.[5]

2.1 Climate adaptation and risk reduction

Climate change is intensifying both slow-onset stresses and sudden extreme events. Rising temperatures exacerbate urban heat islands, particularly in densely built districts with limited vegetation.[6] Heat stress increases mortality among vulnerable populations, strains public health systems, and drives higher energy consumption for cooling. Urban forests, green roofs, vegetated corridors, and shaded public spaces mitigate heat by lowering surface and ambient temperatures. Vegetation cools through shading and evapotranspiration, reducing the accumulation of heat in concrete and asphalt surfaces.[7] In addition to thermal regulation, tree canopies improve pedestrian comfort and enhance urban microclimates.

Flood risk is another growing concern. Extreme rainfall events overwhelm drainage systems, leading to surface flooding and infrastructure damage.[8] Instead of relying solely on expanded stormwater pipes, NBS approaches restore natural hydrological cycles. Wetlands, retention basins, permeable pavements, and bioswales slow down runoff, increase infiltration, and reduce peak flow. These interventions not only mitigate flood risk but also improve water quality and urban aesthetics.

---

4 Bona, Sara, et al. "Nature-Based Solutions in Urban Areas: A European Analysis." Applied Sciences, vol. 13, no. 1, 1 Jan. 2023, p. 168, www.mdpi.com/2076-3417/13/1/168, https://doi.org/10.3390/app13010168.

5 "World Bank. 2024. Reshaping Cities: Readying Cities in the Western Balkans for a Changing Climate. © World Bank.

6 WWF. "Urban Nature-Based Solutions." Wwf.panda.org, wwf.panda.org/projects/one_planet_cities/what_we_do/urban_naturebased_solutions/.

7 Paolini, Riccardo, and Matthaios Santamouris. Urban Climate Change and Heat Islands. Elsevier, 15 Nov. 2022.

8 Zhou, Kejing, et al. "Urban Flood Risk Management Needs Nature-Based Solutions: A Coupled Social-Ecological System Perspective." Npj Urban Sustainability, vol. 4, no. 1, 22 Apr. 2024, pp. 1–12, www.nature.com/articles/s42949-024-00162-z#:~:text=For%20instance%2C%20constructing%20green%20roofs, https://doi.org/10.1038/s42949-024-00162-z.

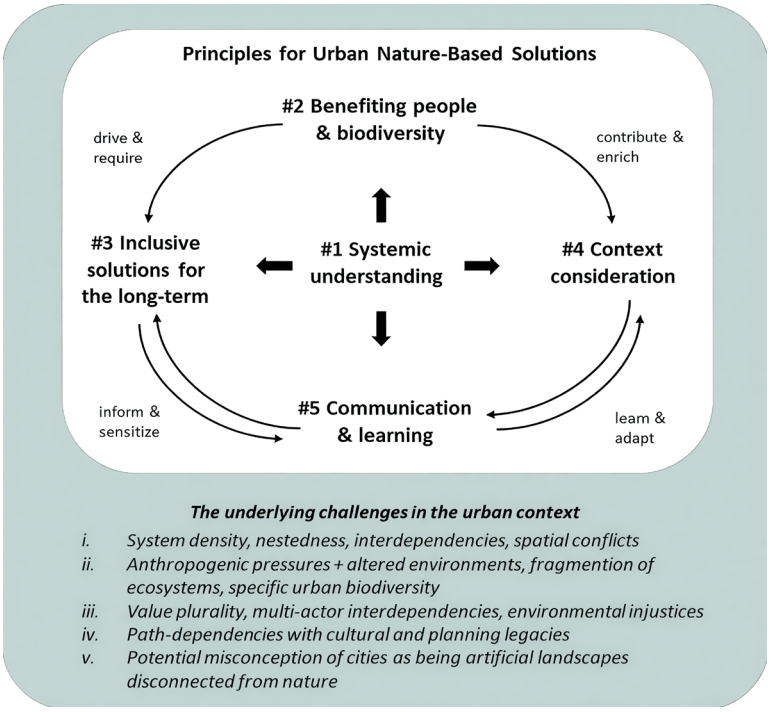
2.2 Strengthening social cohesion and public health

Nature-Based Solutions enhance social resilience by creating inclusive spaces for recreation, interaction, and community engagement. Access to green areas has been shown to reduce stress, anxiety, and depression, while encouraging physical activity.[9] In Western Balkan cities where dense neighborhoods often lack quality public space, well-designed NBS interventions can significantly improve mental and physical wellbeing.[10] Community gardens, urban orchards, and participatory park redesigns encourage civic engagement. They foster intergenerational dialogue and promote a sense of ownership. Such social capital is critical during crises, as communities with stronger internal networks are better able to support vulnerable members.

2.3 Economic resilience and ecosystem services

Nature-Based Solutions generate ecosystem services that carry economic value.[11] Urban trees increase property values, attract tourism, and reduce healthcare costs associated with pollution and heat exposure. Restored rivers and green corridors can become economic assets, supporting small businesses, cultural events, and eco-tourism initiatives.

Moreover, investing in NBS stimulates green employment.[12] Landscape architects, ecologists, environmental engineers, maintenance workers, and community coordinators all contribute to the development and upkeep of NBS projects. In the Western Balkans, where youth unemployment remains a concern, NBS initiatives can support new economic sectors aligned with sustainability.



Principles for urban nature-based solutions
(Kabisch et al., "Principles for Urban Nature-Based Solutions")

[9] Haase, Annegret. "The Contribution of Nature-Based Solutions to Socially Inclusive Urban Development– Some Reflections from a Social-Environmental Perspective." Theory and Practice of Urban Sustainability Transitions, 2017, pp. 221–236, https://doi.org/10.1007/978-3-319-56091-5_13.

[10] Samel Kruja, et al. "The Role of Urban Green Spaces on Life Satisfaction and Migration Willingness in Tirana, Albania." Human Ecology, 8 July 2024, https://doi.org/10.1007/s10745-024-00511-7.

[11] Chelli, Alessia, et al. "Cost-Benefit Analysis of Urban Nature-Based Solutions: A Systematic Review of Approaches and Scales with a Focus on Benefit Valuation." Ecosystem Services, vol. 71, 29 Nov. 2024, pp. 101684–101684, https://doi.org/10.1016/j.ecoser.2024.101684.

[12] Bockarjova, Marija, et al. "Estimating the Social Value of Nature-Based Solutions in European Cities." Scientific Reports, vol. 12, no. 1, 18 Nov. 2022, https://doi.org/10.1038/s41598-022-23983-3. Accessed 20 Mar. 2023.

3. Official EU recommendations and their relevance to the Western Balkans

The European Union has positioned Nature-Based Solutions at the heart of its environmental and climate agenda. Although not all Western Balkan countries are EU members, most are candidate or potential candidate countries. Aligning urban planning with EU standards therefore has strategic importance. The EU's Green Infrastructure Strategy encourages the development of interconnected networks of natural and semi-natural areas to deliver ecosystem services. Urban areas are explicitly included within this framework. The strategy calls for integrating green infrastructure into spatial planning, transport, water management, and climate adaptation strategies. The EU Biodiversity Strategy for 2030 further reinforces the role of urban ecosystems in halting biodiversity loss. It promotes restoring degraded habitats, increasing tree cover, and ensuring that cities contribute to broader ecological connectivity across landscapes. The EU Adaptation Strategy encourages cities to prioritize nature-based approaches when addressing climate risks. It recognizes that purely engineered defences are often costly and inflexible, whereas NBS offer adaptive, cost-effective, and co-beneficial alternatives.

For Western Balkan countries, aligning with these recommendations yields multiple benefits. First, it strengthens policy harmonization in the context of EU accession. Environmental chapters in accession negotiations require compliance with EU environmental acquis, including biodiversity, water management, and climate adaptation frameworks. Integrating NBS into urban planning demonstrates commitment to these objectives. Second, EU funding instruments increasingly prioritize nature-based approaches. Pre-accession assistance, research grants, and infrastructure loans often require alignment with EU climate and biodiversity priorities. Cities that embed NBS in their development strategies are better positioned to access financial support. Third, cooperation with EU institutions facilitates knowledge transfer. Western Balkan cities can benefit from best practices, technical guidelines, and pilot projects implemented elsewhere in Europe. This exchange reduces the risk of poorly designed or ineffective interventions.

4. Sustainable versus unsustainable urban nature-based solutions

While the concept of Nature-Based Solutions is widely embraced, implementation quality varies. Distinguishing between sustainable and unsustainable approaches is crucial for long-term success. Sustainable NBS are rooted in ecological science. They prioritize native species, respect local hydrology, and enhance biodiversity rather than displace it.[13] They are multifunctional, addressing multiple challenges simultaneously. For example, a restored urban wetland can reduce flood risk, filter pollutants, create habitat, and provide recreational space.[14] Sustainable NBS are also socially inclusive. They ensure that benefits are distributed equitably, not concentrated in affluent neighborhoods.

Long-term management is another defining feature. Sustainable projects incorporate maintenance plans, monitoring systems, and adaptive management frameworks. They anticipate future climate scenarios and demographic changes, ensuring that interventions remain effective over decades.

Unsustainable NBS, by contrast, are often superficial or poorly integrated. They may prioritize aesthetics over functionality, leading to decorative installations that fail to address environmental challenges. In some cases, inappropriate species selection can increase water consumption or introduce invasive plants. Projects without maintenance budgets may deteriorate rapidly, undermining public trust and wasting resources. Greenwashing is another risk. Labeling conventional landscaping as "nature-based" without delivering measurable ecosystem services dilutes the concept and reduces credibility.[15] Policymakers must therefore establish clear criteria and evaluation standards to ensure authenticity and effectiveness.

[13] Bush, Judy, and Andréanne Doyon. "Building Urban Resilience with Nature-Based Solutions: How Can Urban Planning Contribute?" Cities, vol. 95, no. 102483, Dec. 2019, www.sciencedirect.com/science/article/pii/S0264275119313976, https://doi.org/10.1016/j.cities.2019.102483.

[14] Grayson, J.E, et al. "The Assessment of Restoration of Habitat in Urban Wetlands." Landscape and Urban Planning, vol. 43, no. 4, Jan. 1999, pp. 227–236, https://doi.org/10.1016/s0169-2046(98)00108-x. Accessed 19 Feb. 2020.

[15] Gałecka-Drozda, Anna, et al. "Potential Nature-Based Solutions and Greenwashing to Generate Green Spaces: Developers' Claims versus Reality in New Housing Offers." Urban Forestry & Urban Greening, vol. 65, Nov. 2021, p. 127345, https://doi.org/10.1016/j.ufug.2021.127345.

5. Improving quality of life in major Western Balkan cities

Nature-Based Solutions have tangible implications for daily life in cities across the Western Balkans. Many urban areas in the region face environmental stressors linked to industrial legacies, traffic congestion, insufficient green space, and rapid urban growth.[16] In cities such as Tirana and Skopje, rising temperatures intensify summer discomfort.[17] Expanding urban tree canopies and establishing green corridors can reduce heat exposure in residential districts. These measures not only protect health but also lower energy demand for air conditioning, reducing household expenses. Flooding presents recurring challenges in cities like Belgrade and Sarajevo, where heavy rainfall can overwhelm drainage systems.[18] Restoring riverbanks, preserving floodplains, and integrating water-sensitive urban design reduce vulnerability while enhancing scenic value. Air pollution remains a serious public health issue in several Western Balkan urban centers. Vegetation helps capture particulate matter and contributes to improved air quality. Combined with policies promoting active mobility, green infrastructure can shift urban transport patterns toward healthier alternatives. Beyond environmental benefits, NBS enhance civic identity. Parks, riverfront promenades, and community gardens create spaces where residents gather, celebrate cultural events, and engage in public life. In societies navigating economic and political transitions, such shared spaces strengthen democratic participation and social cohesion.

[16] Obradović, Saša, et al. "Energy, Urbanisation and Carbon Footprint: Evidence from Western Balkan Countries." Urban Science, vol. 9, no. 4, 10 Apr. 2025, p. 119, www.mdpi.com/2413-8851/9/4/119, https://doi.org/10.3390/urbansci9040119.

[17] Belis, Claudio A., et al. "Urban Pollution in the Danube and Western Balkans Regions: The Impact of Major PM2.5 Sources." Environment International, vol. 133, Dec. 2019, p. 105158, https://doi.org/10.1016/j.envint.2019.105158. Accessed 19 July 2021.

[18] Arjola Pilua, et al. "Green or Grey: Investigating the Urban Rivers' Landscapes along the Capital Cities of Western Balkans." European Planning Studies, vol. 33, no. 7, 4 May 2025, pp. 1195–1221, https://doi.org/10.1080/09654313.2025.2495807.

6. Addressing current environmental challenges through NBS

Urban Nature-Based Solutions directly respond to contemporary environmental challenges. Climate change, biodiversity loss, soil degradation, and water scarcity are interconnected crises requiring integrated responses.[19]

Heatwaves linked to climate change are increasing in frequency and intensity.[20] NBS provide natural cooling and carbon sequestration simultaneously. Flood management strategies based on restored wetlands improve water retention while supporting aquatic ecosystems. Biodiversity loss is another pressing concern. Urban sprawl fragments habitats and isolates species populations. Creating ecological corridors within cities reconnects habitats and supports pollinators, birds, and small mammals. These measures contribute to national biodiversity commitments while enhancing urban liveability. Water management is particularly critical in areas facing both floods and droughts. Blue-green infrastructure approaches combining vegetation with water-sensitive design enhance infiltration and groundwater recharge, reducing both extremes.

Importantly, NBS align with global sustainability agendas[21]. They contribute to climate mitigation targets, biodiversity conservation, public health improvements, and sustainable urban development simultaneously.

[19] Ryfisch, Simon, et al. "Policies and Practices Impacting the Implementation of Nature-Based Solutions: A Comparative Study of Ponds and Pondscapes in Eight Countries." Journal of Environmental Planning and Management, 30 Oct. 2024, pp. 1–31, https://doi.org/10.1080/09640568.2024.2418966.

[20] Ferrario, Francesco, et al. "Evaluating Nature-Based Solutions as Urban Resilience and Climate Adaptation Tools: A Meta-Analysis of Their Benefits on Heatwaves and Floods." The Science of the Total Environment, vol. 950, 1 Nov. 2024, pp. 175179–175179, https://doi.org/10.1016/j.scitotenv.2024.175179.

[21] United Nations. "Nature-based solutions (NBS) for environmental integrity, climate resilience and sustainable livelihood | Department of Economic and Social Affairs." Un.org, 1970, sdgs.un.org/partnerships/nature-based-solutions-nbs-environmental-integrity-climate-resilience-and-sustainable. Accessed 23 Feb. 2026.

7. Strategic recommendations for implementation

For Nature-Based Solutions to succeed in the Western Balkans, they must be embedded within coherent policy frameworks and institutional structures.

First, solutions must be tailored to local ecological and social contexts. Each city possesses unique climatic conditions, soil characteristics, hydrological systems, and cultural traditions. Comprehensive assessments should precede implementation to ensure that interventions respond to real needs rather than replicate external models uncritically.

Policy actions:

- Conduct local ecological assessments before design.
- Map urban green and blue assets, climate risk zones, and social vulnerability.
- Incorporate traditional knowledge and local ecological history.

Second, community participation is essential. Engaging citizens in planning and design fosters ownership and reduces resistance. Public consultations, participatory mapping, and co-design workshops ensure that projects reflect local priorities. Schools, civil society organizations, and neighborhood associations should be integrated into stewardship programs.

Policy actions:

- Establish community advisory boards for each NBS project.
- Use neighborhood surveys, public workshops, and co-design sessions.
- Provide training so citizens can steward green spaces.

Third, long-term management must be secured from the outset. Nature-Based Solutions are living systems requiring maintenance, monitoring, and adaptation. Municipal budgets must allocate resources for upkeep, and responsibilities should be clearly defined. Partnerships with universities and research institutes can support data collection and evaluation.

Policy actions:

- Allocate specific municipal budgets for NBS maintenance.
- Establish partnerships with NGOs, schools, volunteers, and businesses for stewardship programs.
- Integrate NBS into city operational plans (not just capital investment plans).

Fourth, communication strategies should accompany implementation. Informing citizens about the benefits of NBS increases awareness and encourages behavioral change. Transparent reporting on outcomes builds trust and demonstrates accountability.

Policy actions:

- Launch communication campaigns about NBS benefits.
- Provide signage and educational materials within NBS sites.
- Use digital platforms to report on progress and solicit feedback.

Finally, institutional integration is critical. NBS should not be isolated pilot projects but embedded within urban development plans, climate adaptation strategies, and biodiversity action plans. Cross-departmental coordination within municipal governments ensures coherence and maximizes impact.

Policy actions:

- Integrate NBS into climate adaptation plans, urban development strategies, and public health programs.
- Coordinate across municipal departments: planning, environment, transportation, public works.

Conclusion

Nature-Based Solutions offer the Western Balkans a strategic pathway toward resilient, inclusive, and sustainable urban futures. By working with nature rather than against it, cities can address climate risks, enhance biodiversity, strengthen social cohesion, and stimulate green economic development. However, success depends on thoughtful design, participatory governance, long-term stewardship, and alignment with European policy frameworks. The region stands at a critical juncture. Rapid urbanization and climate pressures demand innovative responses. By embracing well-designed and sustainable Nature-Based Solutions, Western Balkan cities can transform environmental challenges into opportunities for regeneration and resilience. The establishment of urban NBS is not merely an environmental initiative. It is a social, economic, and cultural investment in the future of the region's cities and their citizens.

Key to success will be

- Contextual tailoring
- Deep community engagement
- Strong stewardship and inter-institutional coordination
- Long-term monitoring and commitment

With political will and strategic investment, urban NBS can transform city landscapes into healthier, safer, and more inclusive places for all citizens.



By

Institute of Communication Studies

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101003818.