Interreg Danube Region

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HARMONMISSIONS

Delivering the EU Climate Adaptation Mission:

Systemic Adaptation of Cities and Rural Areas to Climate Change in the Danube Region

Policy brief:

Adaptation action of urban and rural areas to decrease impacts of climate change, risks of disasters and increase water and climate resilience in the Danube Region

Key Messages

- The Danube Region is increasingly exposed to extreme heat, droughts, pluvial floods, soil degradation and climate-related disasters, requiring urgent, coordinated and systemic adaptation action across urban and rural territories.
- Climate adaptation in the Danube Region must integrate urban and agricultural heat islands mitigation, blue-green infrastructure, improved rainwater retention, soil restoration and floodplain reconnection into one coherent territorial approach.
- Sectoral approaches and the absence of systemic governance and support for adaptation activities remain barriers. The solution is to strengthen multi-sectoral cooperation and empower local communities by implementing functional solutions.
- EU Mission 1 “Adaptation to Climate Change” and Mission 4 “100 Climate-Neutral and Smart Cities” provide a strategic framework for accelerating water and climate resilience and sustainable urban transformation across the Danube Basin.
- Nature-based solutions, early warning systems, shared indicators and cross-border cooperation offer cost-effective pathways to reduce climate risks while improving public health, water security, biodiversity and quality of life.

Policy Problem

The Danube Region faces growing climate-related pressures that increasingly affect cities, rural landscapes, infrastructure and local communities. Heatwaves, torrential rainfall, floods, droughts and soil degradation are becoming more frequent and severe, while institutional responses remain fragmented and uneven across countries and governance levels. They lack an integration framework and harmonization for restoring the stability of water cycles. The most significant impact on the growth of risks is land drainage over time.

Urban areas are particularly vulnerable to urban heat islands, pluvial flooding and insufficient access to quality green infrastructure. At the same time, rural territories face declining soil-water retention capacity, erosion, landscape degradation and increasing drought vulnerability. These processes reduce ecosystems, water and climate resilience, threaten food and water security, and increase economic losses from climate extremes.

Although many cities and regions across the Danube Basin are already implementing climate adaptation measures and participating in EU initiatives, implementation capacity remains highly uneven. Economic land use practices with negative impacts on the hydrology, temperature and climate of the basins significantly outweigh the regenerative approach and the number of adaptation measures. National coordination mechanisms are often weak, funding access is fragmented or limited and adaptation measures are insufficiently integrated into spatial planning, public policies and territorial governance.

Why Action is needed

Europe is the fastest warming continent, and the Danube Basin is increasingly exposed to climate extremes. Heatwaves have approximately doubled since 1960 and are responsible for tens of thousands of premature deaths annually across Europe. Climate-related disasters caused approximately €738 billion in losses across the EU between 1980 and 2023.

Without coordinated adaptation action, climate impacts will continue to intensify:

- rising public health risks during heatwaves,
- increasing urban flood damages,
- declining water availability,
- reduced agricultural productivity,
- ecosystem degradation,
- and growing socio-economic inequalities.

The Danube Region requires a systemic and territorial response that combines urban and rural adaptation measures within a shared governance framework. Water and climate resilience cannot be achieved through isolated sectoral interventions. Instead, adaptation policies must simultaneously address water management, spatial planning, ecosystem restoration, mobility, public health and social inclusion. Climate stability follows water cycles stability. The rural landscape is of particular importance to cities, supplying them with natural resources, food, supporting the stability of small water cycles and maintaining a functional landscape climate.

The implementation of EU Missions provides a major opportunity to accelerate this transition. Mission 1 supports climate resilience through adaptation planning, risk assessment and regional cooperation, while Mission 4 promotes climate-neutral and smart urban transformation through Climate City Contracts, citizen engagement and innovative financing mechanisms which include financing the ecosystem functions of soil and land.

Evidence from the Danube Region

The HARMONMISSIONS project identified significant disparities in institutional preparedness, governance structures and implementation capacities across Danube countries. While some countries have established advanced national coordination platforms, advisory services and dedicated climate governance mechanisms, others still rely on fragmented project-based initiatives and external financing. Several positive examples already demonstrate the potential for coordinated climate action:

- Austria established the national “Klimaneutrale Stadt” initiative supporting pioneer climate-neutral cities.
- Romania created the M100 national platform integrating six ministries to support Mission implementation.
- Bulgaria and Hungary demonstrate strong municipal engagement in climate initiatives.
- Slovenia and Slovakia are integrating climate objectives into strategic planning frameworks.
- Cities across the region are developing Climate City Contracts and urban adaptation measures.

The Strategy for coordination of involvement of EU Missions in the Danube region also highlights the growing importance of:

- blue-green infrastructure within cities and urban structure,
- ecosystem use of rainwater and the need for a fundamental reduction its drainage
- cooling networks, spaces and zones, nature-based urban shading,
- water retention measures as a part of regenerative hydrology and NBS needs,
- soil restoration a protection against erosion and soil compaction,
- and floodplain reconnection including reuse of treated wastewater.

Existing European platforms and mechanisms such as MIP4Adapt, Climate-ADAPT, the European Urban Initiative, ERRIN, Climate City Contracts, SHARED and EMO provide valuable tools for accelerating implementation, knowledge transfer and cross-border cooperation in the Danube Region. Systematic restoration of soil health, landscape structures, and its water retention capacity restores the stability of watercourse flows as well as green water, along with landscape cooling and higher biomass production.

Policy Recommendations for Danube Region Countries

Policy 1: Integrate climate and landscape adaptation into spatial and territorial planning

National governments and regional authorities should systematically integrate urban and rural adaptation measures into spatial planning, land-use policies, water management and infrastructure investment frameworks. Water planning needs to be expanded to the entire water cycle by supporting green water restoration, as well as involving local communities through active local water planning.

Policy 2: Scale up nature-based solutions and blue-green infrastructure

Cities and municipalities should prioritize and implement to significant extent:

- urban greening, permeable surfaces, adiabatic and evaporative cooling systems,
- stormwater retention systems and floodplain restoration,
- and ecosystem-based adaptation measures.

These solutions deliver multiple co-benefits, including reduced heat stress, lower flood risks, improved biodiversity and enhanced public health.

Policy 3: Restore soil-water retention capacity in rural landscapes

Rural adaptation policies should support soil and water regeneration as a part of forest, agricultural, wetlands and floodplains management and restoration:

- soil health restoration and prioritizing organic fertilisers,
- landscape features restoration and management improvement
- eliminating the risks of water erosion of soil and risky surface runoff through NBS
- sustainable land management prioritizing regenerative agriculture,
- and the reconnection of natural floodplains and wetlands restoration.

Strengthening the soil-water buffer is essential for drought resilience and long-term water security. Rural communities secure stability water resources regeneration for others.

Policy 4: Improve early warning systems, climate and environmental risk monitoring

Countries should strengthen integrated early warning systems and their cross-border and territorial interconnection across all levels of government for:

- droughts, heatwaves and fires, pluvial and flash floods,
- extreme weather events (e.g. tornadoes, windstorms)
- environmental accidents as well as war conflicts warnings

Shared data platforms and cross-border monitoring can significantly improve preparedness and coordinated response capacity towards citizens, communities, critical infrastructure, private and public sectors.

Policy 5: Mobilise financing and implementation support

Danube countries should improve access to traditional EU funds and financial instruments (Cohesion Policy Funds, Horizon Europe, CAP EU, LIFE Programme, European Investment Bank instruments, and others) to support climate resilience and urban transformation. At the same time, they should develop their own innovative instruments for financing adaptation activities based on investing in, building water and climate resilience (such as regional carbon and water banks and their implementing agencies). Dedicated support mechanisms for smaller municipalities and rural regions are particularly important.

Expected Impacts

Effective implementation of Priority Area 2 can generate substantial environmental, climate, social and economic benefits across the Danube Region, including:

- reduced losses from climate-related disasters and DRR,
- improved public health and thermal comfort,
- stronger drought and flood resilience,
- improved rainwater retention and groundwater recharge,
- increased biodiversity and ecosystem stability,
- enhanced climate resilience of vulnerable communities,
- reduced pressure on urban drainage systems,
- and stronger institutional cooperation across borders.

The coordinated implementation of urban and rural adaptation measures will also contribute to the long-term objectives of the European Green Deal, the EU Strategy for the Danube Region, the EU Missions under Horizon Europe and circular bioeconomy approach.

Conclusion

Climate adaptation in the Danube Region can no longer be approached through fragmented sectoral interventions or isolated local projects. Increasing climate extremes require integrated territorial solutions that connect urban resilience, rural landscape restoration and coordinated governance across the entire Danube Basin. The key natural capital of local communities is the volume of available rainwater, which needs to be retained and slowed down on its territory throughout the year, thereby ensuring systemic risk reduction for other municipalities in the basin. Priority Area 2 provides a practical framework for linking EU Mission 1 and Mission 4 objectives through coordinated adaptation action, nature-based solutions, shared monitoring systems and stronger multi-level cooperation.

The main challenge for the Danube Region is not the lack of strategies or initiatives, but the need to better interconnect existing capacities, governance structures and financing mechanisms into a coherent implementation framework. Strengthening cooperation between countries, regions, cities and local communities will be essential to build a more climate-resilient, healthy and competitive Danube Region for future generations.

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