ARCADIA

Transformative climate resilience by nature-based solutions in the continental bio-geographical region

Work Package 10
Mirroring the transformative processes in the fellow regions

D10.1 – Comparative analysis of fellow regions' scoping policy reviews

Co-funded by the European Union

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WP10 Mirroring the transformative processes in the fellow regions

DELIVERABLE 10.1

Comparative analysis of fellow regions' scoping policy reviews

Task 10.1 Scoping policy review of ecosystem-based adaptation and nature-based solutions

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GLOSSARY

Entry	Definition
Blue-green infrastructure	An interconnected network of natural and semi-natural elements in urban and rural environments that manage water (blue) and provide green spaces (green) to deliver environmental, social, and economic benefits. It includes rivers, wetlands, green roofs, parks, urban forests, and sustainable drainage systems.
Climate change adaptation	The process of adjusting to current or expected climate impacts to reduce harm or take advantage of opportunities.
Climate resilience	The ability of social, economic, and environmental systems to cope with climate change impacts, maintaining their core functions while adapting, learning, and transforming.
Climate risk assessment	Systematic process of identifying, analyzing, and evaluating the potential impacts of climate-related hazards (like heatwaves, floods, or droughts) on systems, communities, or infrastructure. It considers both current and future climate scenarios.
Disaster risk reduction	A process aimed at preventing new and reducing existing disaster risk and managing residual risk, all of which contribute to strengthening resilience and therefore to the achievement of sustainable development.
Multi-level governance	A system where different levels of government — local, regional, national, and sometimes international — work together with non-governmental organisations, businesses, and communities to address complex issues.
Nature-based Solutions	Actions that protect, sustainably manage, and restore natural or modified ecosystems to address societal challenges (such as climate change, food security, or disaster risk) while benefiting biodiversity and human well-being.
Stakeholder	Any individual or group that has an interest or is affected by the actions, objectives, policies, or services of an organisation.
Stakeholder engagement	Systematic identification, analysis, planning and implementation of actions designed to influence stakeholders, taking into account their needs and ensuring they are met.
Stakeholder mapping	Stakeholder mapping in climate adaptation is a process of identifying, analysing, categorizing and connecting individuals, groups, and organizations with a vested interest in or influence on adaptation strategies. It helps understand their roles, needs, and capacities to enhance collaboration and ensure equitable outcomes. This tool is essential for designing inclusive and effective climate adaptation interventions, enabling co-creation and ownership among diverse actors.
Transformative change	There is a diversity of definitions for transformative change and what it entails. In this report, it refers to a fundamental, systemic reorganisation across technological, economic, cultural and social factors, including paradigms, goals and values.
Vision	In the context of climate adaptation, a vision refers to a shared, long-term aspiration that outlines the desired future state of a community, region, or system resilient to climate impacts. It serves as a guiding framework for aligning stakeholder efforts, fostering collaboration, and driving transformative change. A well-articulated vision integrates environmental, social, and economic dimensions, ensuring inclusivity and sustainability. This vision must be discussed, agreed upon, and regularly reviewed throughout the process among stakeholders.

ACRONYMS

Abbreviated	Extended
BG	Bulgaria
BGI	Blue-green infrastructure
CRA	Climate risk assessment
CSOs	Civil Society Organisations
DRR	Disaster risk reduction
EU	European Union
KPI	Key Performance Indicators
NbS	Nature-based Solutions
NGO	Non-governmental organisation
PPPs	Public-private partnerships
RDP	Rural Development Plan
RO	Romania
SL	Slovenia

List of Tables

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Climate change adaptation is an urgent and complex challenge requiring integrated governance, robust financial mechanisms, and innovative Nature-based Solutions (NbS). This report critically evaluates the effectiveness of NbS-driven climate adaptation strategies across European regions, focusing on governance structures, risk assessments, stakeholder engagement, and financial frameworks. By examining regional adaptation goals and transformational targets, the analysis identifies best practices, systemic challenges, and strategic opportunities for scaling up NbS to achieve long-term resilience.

This report contains the analysis required upon completion of the project Task 10.1 "Scoping policy review of ecosystem-based adaptation and nature-based solutions" (M1-M18) (lead: AUP, contributors: DEDA, GECOS, WR, CKIC, ADRC, BISTRA), within the framework of the Work package WP10 "Mirroring the transformative processes in the fellow regions". It contributes for addressing the WP10 objectives i.e. mobilise partnerships and catalyse nature-based transformative processes in the **fellow regions** (i.e. **Plovdiv region** from Bulgaria, **Centru region** from Romania, and **Podravje region** from Slovenia) foster mutually beneficial processes of sharing knowledge and experiences from on-ground transformations, develop a blueprint of strategies and actions to exploit available knowledge, services and business innovation. WP10 strives to promote nature-based triggered transformations and mobilise and prepare the fellow regions and communities for enrolment in the EU Mission on Adaptation. WP10 addresses activities to be implemented in the fellow regions and hence complements the involvement of the representatives from fellow regions in activities carried out in model regions (WP6, 1-5). Fellow regions should mirror the activities of the model regions, from ambition to upscaling, and will twin up with the co-innovation labs to provide feedback about the acceptance and feasibility of the analysed nature-based interventions.

The analysis results show that regarding the **Governance and Institutional Frameworks**, Podravje region centralised governance model ensures streamlined decision-making, effective policy execution, and clear accountability. However, its rigid structure risks limiting localised adaptation and flexibility in response to region-specific climate threats. In the case of Romania, we notice also a centralized approach in the coordination of policies for adaptation to climate change. Apart from the fact that the regional level has mainly statistical purposes, the regional development agencies are recognised as actors involved in the implementation of National Strategy for Adaptation to Climate Change and have also an active role, as Managing Authorities for the Regional Program, in implementing the EU Cohesion policies, including policies related to OP2 "A greener Europe". This governance approach promotes broad participation from local level but is hampered by weak inter-institutional coordination, especially from national level to regional level. Plovdiv region demonstrates strong EU policy alignment, yet its regional execution suffers from political instability, bureaucratic inefficiencies, and overlapping institutional mandates, diminishing its ability to implement NbS effectively.

The comparison shows that a centralised model (Podravje region) enhances execution efficiency but risks ignoring localized priorities, while a decentralised approach (Plovdiv and Centru regions) fosters inclusivity but requires stronger coordination to avoid governance fragmentation.

In regard to **Climate Risk Assessment and Monitoring**, Podravje region real-time climate monitoring system enables data-driven, pre-emptive responses to emerging threats, integrating cross-sectoral risk assessments to enhance resilience planning. Centru region's reliance on historical climate data provides a strong policy foundation but lacks real-time adaptation capabilities, reducing its responsiveness to climate variability. Plovdiv region sector-specific approach emphasises water management and flood prevention but lacks a holistic, multi-sectoral risk framework, limiting its capacity to address interconnected climate risks.

The comparison shows that Podravje region's evidence-based, dynamic monitoring system sets a benchmark for proactive adaptation. Centru and Plovdiv region must shift from reactive, static assessments toward adaptive, real-time climate risk evaluations.

In regard to the **NbS and Regional Adaptation Goals**, Podravje region has successfully institutionalized NbS, embedding them within urban planning and rural resilience strategies, demonstrating their multifunctionality in climate adaptation and economic sustainability. Centru region recognises the potential of NbS, but inconsistent policy enforcement and inter-agency misalignment hinder widespread adoption. The Plovdiv region faces structural limitations in mainstreaming NbS, with fragmented policies and inadequate institutional support reducing its ability to leverage ecosystem-based adaptation benefits.

The comparison shows that Slovenia leads in NbS integration by aligning policy, funding, and implementation. Romania and Bulgaria must adopt a system-thinking approach to NbS, ensuring policy coherence and cross-sectoral collaboration.

In regard to the **Stakeholder Engagement and Multi-Level Coordination,** Slovenia's inclusive governance model facilitates meaningful collaboration among government agencies, businesses, non-governmental organisations (NGOs), and civil society, driving more cohesive adaptation efforts. Romania's complex, multi-tiered system engages diverse stakeholders but struggles with effective coordination, often leading to bureaucratic gridlock. Bulgaria's over-reliance on NGOs to drive local NbS projects indicates governance gaps, highlighting the need for stronger government-led engagement mechanisms and clearer accountability structures.

The comparison shows that while Podravje region excels in integrating stakeholders within a structured governance framework, Centru and Plovdiv regions need institutional reforms to align stakeholder engagement with national and regional adaptation strategies.

In relation to the **Financial Mechanisms and Funding Challenges**, Podravje region performance-driven financing model ensures that resource allocation is tied to measurable adaptation outcomes, reinforcing efficiency and accountability. Centru region benefits from significant EU climate adaptation funds, from Regional Program 2021-2027 but there are

also other National Programs, funded from EU or national funds that support climate adaptation. Unfortunately, the measures are not coordinated enough between different programs implementing climate adaptation measures in order to lead to an effective adaptation process. Plovdiv region's fragmented financial framework results in uneven regional implementation, undermining climate adaptation progress due to inconsistent resource distribution.

The comparison shows that Podravje region's results-based financial model offers a scalable framework for other regions. Centru and Plovdiv regions must improve fund allocation transparency, ensure inter-agency financial coordination, and adopt impact-driven financing mechanisms.

Based on the analysis, the following strategic recommendations can be formulated:

Enhancing Governance Coherence and Institutional Synergy

- Plovdiv and Centru regions must restructure governance frameworks to mitigate institutional redundancies, improve coordination, and streamline policy implementation.
- Podravje region should enhance localized governance mechanisms to allow for greater regional adaptation flexibility.

Strengthening Climate Risk Monitoring and Adaptive Planning

- Podravje region's dynamic risk assessment model should serve as a blueprint for Plovdiv and Centru regions, which must transition from reactive climate response strategies to real-time, data-informed decision-making.

Scaling Up NbS implementation

- National and regional policies should institutionalise NbS across all climate adaptation frameworks, integrating ecosystem-based solutions into urban planning, disaster risk reduction (DRR), and sustainable resource management.
- Plovdiv and Centru regions should establish standardised methodologies for NbS evaluation and replication across multiple sectors.

Optimising Financial Resource Allocation and Impact Measurement

- Plovdiv and Centru regions must align funding mechanisms with clear performance metrics to improve accountability and ensure climate adaptation financing is results-driven.
- Regional adaptation projects should integrate public-private partnerships (PPPs) to diversify funding sources and enhance financial sustainability.

Deepening Stakeholder Collaboration and Cross-Sector Integration

- Governments should establish permanent multi-sectoral coordination bodies to align national, regional, and local adaptation efforts.

- A stronger emphasis on business sector involvement will facilitate private sector-driven climate resilience investments and NbS adoption.

A comparative analysis of European regional climate adaptation strategies highlights critical governance, financial, and stakeholder engagement disparities. Podravje region's centralised, performance-based approach provides a scalable model for institutional coherence, financial efficiency, and structured stakeholder participation. However, it must improve localized adaptation responsiveness. Plovdiv and Centru regions, while benefiting from decentralised governance and EU financial support, must overcome policy fragmentation, inefficient fund allocation, and weak NbS integration.

To accelerate transformative climate resilience, regions must balance centralised efficiency with decentralised flexibility, integrate real-time risk assessment mechanisms, and scale up NbS implementation through structured financial and governance reforms. Cross-border collaboration and shared knowledge frameworks will be instrumental in closing existing adaptation gaps and ensuring sustainable, climate-resilient regional development.

1. INTRODUCTION

Climate change is a pressing global challenge that demands immediate and coordinated action. European regions are increasingly exposed to climate risks, including extreme weather events, rising temperatures, and ecosystem degradation. In response, NbS emerged as a transformative approach to building climate resilience by leveraging ecological processes to mitigate climate impacts and enhance sustainability.

This report is part of the ARCADIA Project (TrAnsformative climate ResilienCe by nAture-baseD solutions in the contInentAl bio-geographical region) under the Horizon-MISS-CLIMA-01 framework, funded by the European Union. It provides a structured assessment of regional NbS implementation, governance models, financial mechanisms, and stakeholder engagement strategies, offering a comparative analysis across selected European regions i.e. Plovdiv region (Bulgaria), Centru region (Romania), and Podravje region (Slovenia). In particular, the report presents a synthesis of the results of WP10 Task 10.1 "Scoping policy review of ecosystem-based adaptation and NbSs", which has a goal to mobilise partnerships and catalyse nature-based transformative processes in the fellow regions. The used methods allows the fellow regions to mirror the ambition phase of the model regions (WP1-5), though engaging regional societal partners (policy, research and businesses) and mobilise whole-society partnerships, collect, review and assess information on the state of advancement in climate adaptation and deploying NbS - both within and beyond their territorial jurisdictions (e.g. collecting examples of good practices beyond their regional borders). Using the adaptation scorecard methodology from WP7 (T7.1), the fellow regions will assess preparedness for and capabilities to drive societal transformation. Building on that, they will formulate and build consensus on regional goals & targets to improve readiness for change. The results of the analysis are synthesised in the present Comparative analysis of fellow regions' scoping policy reviews (D10.1).

This report is based on the project Self-Assessment study of the three fellow regions, which are cornerstones of the Common ARCADIA Assessment Framework, and is designed to guide regions through a comprehensive evaluation of their climate change adaptation measures and the integration of NbS. Prepared by the experts from the three fellow regions, the document establishes a systematic approach for regions to assess current practices, identify gaps, and formulate strategies for enhanced resilience. By drawing on a broad array of indicators and detailed methodological guidelines, the report supports decision-makers in aligning regional actions with national and European climate policies. At its core, the report is structured into three primary sections: Governance, Risk Assessment and Adaptation Planning.

The primary objective of this report is to evaluate and compare the institutional, financial, and governance frameworks that support NbS implementation in the selected regions. By doing so, the report aims to:

- Assess how NbS are integrated into climate adaptation policies at national and regional levels.
- Identify strengths, challenges, and best practices in governance, stakeholder engagement, and financing of NbS projects.
- Provide strategic recommendations to enhance the effectiveness of NbS-driven climate adaptation strategies.

The report is structured around the following core themes:

1. Governance on Climate Change Adaptation – Analysis of institutional structures, legislative frameworks, and multi-level coordination in climate policy implementation.
2. Climate Risk Assessment – Evaluation of methodologies used to assess climate risks, vulnerabilities, and impacts in different regions.
3. Regional NbS Goals and Targets – Examination of current visions, ambitions, and available resources for NbS implementation.
4. Stakeholder Engagement and Coordination – Assessment of collaboration between government agencies, businesses, civil society, and local communities.
5. Financing and Resource Allocation – Review of financial instruments, funding mechanisms, and resource management strategies for NbS projects.
6. Challenges and Opportunities – Identification of key barriers to NbS implementation and potential opportunities for policy improvement and scaling up efforts.

The Comparative Regional Overview shows that the three analysed fellow regions demonstrate varying approaches to NbS and climate adaptation, reflecting differences in governance structures, financial systems, and institutional coordination. Plovdiv region follows a decentralised governance model, relying on multiple national ministries and regional authorities to implement adaptation strategies. However, political instability and overlapping mandates often lead to fragmented execution of NbS policies. Centru region employs a multi-tiered governance system that promotes broad stakeholder participation. While this structure ensures inclusivity, it also presents coordination challenges that can delay adaptation measures. Podravje region has adopted a centralised, performance-driven approach that ensures policy coherence and streamlined execution. However, its rigid governance structure may limit localised adaptation efforts.

Each region faces unique climate risks and socio-economic challenges, necessitating tailored strategies to enhance NbS effectiveness. The findings of this report emphasise the need for cross-sectoral collaboration, transparent financing mechanisms, and integrated governance to optimize NbS-driven adaptation strategies across Europe.

The report provides significant insights for policymakers, climate adaptation practitioners, and regional stakeholders with actionable input to improve NbS governance and implementation. By leveraging best practices and addressing systemic challenges,

European regions can enhance their adaptive capacity, foster environmental sustainability, and align with broader EU climate resilience goals.

Moreover, this document emphasizes the importance of collaboration. It advocates for the active participation of a diverse range of stakeholders, including public authorities, academic institutions, private sector entities, and Civil Society Organisations (CSOs), in a coordinated effort to tackle climate change. This collaborative approach is central to the effective implementation of NbS, where local knowledge and innovative practices must merge with formal policy frameworks to achieve sustainable outcomes.

In essence, the report sets the stage for a rigorous self-assessment process that is both comprehensive and adaptable. It underscores the urgency of addressing climate change impacts through integrated strategies, while providing clear guidelines on how regions can evaluate and enhance their current adaptation and NbS initiatives. The structured framework provided by this report is intended to not only highlight current strengths and weaknesses but also to serve as a roadmap for building a more resilient future that is in harmony with natural processes.

2. ADAPTATION IN FELLOW REGIONS

2.1 Regional description

This section highlights the main economic, social and environmental features to set the basis for explaining the current framework of adaptation and NbS in the three fellow regions.

Table 1. Main features of the fellow regions

Features	Resident population (2024, no of people)	Surface (Km^2)	Density (no of inhabit/sqkm)	No of municipalities	Urbanisation rate (%)
Plovdiv Region	631 516	5972,9 (5,4% of the BG territory)	106.6 inhabitants/km^2	18	~71.2% urban
Bulgaria	6 437 360	111 000	59.3	264	73.7 % urban population
Centru Region	2.288.061	34.082	67,1	57	55.4
Romania	19.067.576	238.397	80	319	51.9
Podravje Region	329.753	2.170	152	41	54,03
Slovenia	2.120.937	20.271	104,6	213	56,09

Based on the content from the three self-assessment reports for **Plovdiv (Bulgaria)**, **Centru (Romania)**, and **Podravje (Slovenia)**, here is a summary table highlighting the core regional features:

Table 2. Core regional features and characteristics of the three fellow regions

Feature	Plovdiv (Bulgaria)	Centru (Romania)	Podravje (Slovenia)
Geographic/Administrative Context	Central Bulgaria, 18 municipalities, includes Plovdiv city.	Comprises 6 counties: Alba, Brașov, Mureș, Sibiu, Covasna, Harghita.	Located in NE Slovenia; represented by SRC Bistra Ptuj in assessment.
Key Institutions (Governance)	Multiple national ministries and regional bodies (e.g. MoEW, River Basin Directorate, NGOs, academia).	Ministry of Environment, RDA Centru (key regional body), county/local authorities.	Ministry of Natural Resources and Spatial Planning, Environment Agency, Institute for Nature Conservation.
Legislative Framework	Strong national legislation aligned with the EU (Kyoto, Paris, national acts), but no specific regional strategy yet.	SNASC 2023-2030 with action plan; aligned with EU Green Deal; strong legal structure.	Climate Change Act, Environmental Protection Act, Nature Conservation Act; regional application in progress.
Climate Risk Assessment	Focused on floods, droughts, water quality, biodiversity loss, and public health due to extreme events.	Comprehensive; includes 13 key sectors (e.g., water, health, energy, biodiversity, education).	Focus on water, biodiversity, land degradation; monitored by national and regional agencies.
NbS	Several EU/National/NGO-led projects (BIOLOC, BEAMING, LIFE Riparian Forests, etc.); rich in biodiversity.	Projects mapped by RDA Centru; includes urban forest and rainwater management (e.g., NABI, UEFISCDI).	Increasing focus; projects supported by EU/national funds; integrated into rural and urban planning.

Adaptation Planning	Fragmented; NGOs lead in NbS; some municipalities have Integrated Development Plans but lack coordination.	Integrated at regional level via RDA Centru; clear goals and monitoring in SNASC & PNASC plans.	Coordinated by the Ministry and Environment Agency; supported by multi-sectoral councils and alliances.
Funding	Horizon Europe, LIFE, Norway Funds, National Programmes; strong academia-industry-government cooperation.	Environment Fund, Just Transition Fund, ROP Centru 2021-2027; structured allocations by sector.	EU, national budget, public-private partnerships; performance tracked via defined KPIs.
Key Risks Addressed by NbS	Urban heat, water scarcity, flooding, biodiversity loss, pollution (soil, water, air), agricultural vulnerability.	Floods, droughts, urban heat, biodiversity loss; focus on socio-economic transition and resilient cities.	Biodiversity degradation, water quality, flood management, climate resilience in agriculture and settlements.
Alliances & Cooperation	Multi-sector partnerships involving academia, NGOs, public and private actors.	Covenant of Mayors, cooperation with research centers and EU agencies; innovation clusters.	Climate Alliance Slovenia, Slovenian Business Club, cooperation with national and international stakeholders.

2.2 Methodology

The assessment was based on a **shared methodological structure** with flexibility for regional adaptation. **Experts** included representatives from academia, public administration, NGOs, and project managers. Sources included **official policies**, **project records**, and **stakeholder input**. **Outcomes were shared** with partners in varying degrees: more structured in **Centru**, consultative in **Podravje**, and more academic-led in **Plovdiv**. A lack of integrated regional **NbS databases** was commonly noted as a limitation across regions.

Assessment Methodology Overview

The self-assessments in all three regions followed the **Common ARCADIA Assessment Framework**, structured into three core pillars:

1. **Governance**
2. **Risk Assessment**
3. **Adaptation Planning**

Each region was expected to complete a structured analysis guided by common prompts and criteria, ensuring comparability while allowing for local specificity.

Methodological Framework and Sources

Aspect	Description
Framework Used	All the three regions applied the **Common ARCADIA Assessment Framework**, designed to evaluate the state of climate adaptation and the role of NbS. It includes qualitative and quantitative elements across governance, risk management, and planning.
Data Sources	Each region drew from: **Official national and regional policy documents** (e.g. adaptation strategies, climate laws); **Project records and databases** (e.g. EU-funded projects such as LIFE, HORIZON, Erasmus+); **Institutional reports** (e.g. regional planning documents, local NbS inventories); **Expert interviews or institutional feedback** (where available)
NbS Mapping	Project-level data collection on existing NbS initiatives, including funding sources, objectives, geographic focus, and implementing partners.

The Experts Involved in the Regions

Region	Key Experts and Institutions
Plovdiv (BG)	Agricultural University of Plovdiv (lead author team) - Regional and national governmental bodies (e.g. Ministry of Environment and Water, Basin Directorates) - NGOs (e.g. Green Balkans) - Research institutions (e.g. Maritsa Vegetable Crops Institute, Institute of Food Quality) - Private sector stakeholders involved in agribusiness and food systems

Centru (RO)	Regional Development Agency (RDA) Centru (coordinator) - Ministry of Environment, Water and Forests (national support) - County-level environmental agencies - Academia (e.g. University of Bucharest, Focus Eco Center) - Stakeholders from projects like NABI and the Just Transition Programme
Podravje (SI)	SRC Bistra Ptuj (regional coordination) - Ministry of Natural Resources and Spatial Planning - Slovenian Environment Agency - Institute for Nature Conservation - Agricultural Markets and Rural Development Agency - Experts from sector-specific departments (e.g., landscaping, NBS, forestry, spatial planning)

Application of the Assessment

Step	Description
Institutional Mapping	Identification of public, academic, and civil society actors engaged in climate adaptation and NbS.
Policy & Legislative Review	Compilation and analysis of national and regional strategies, laws, and regulations relevant to adaptation and NbS.
Risk Analysis	Evaluation of climate-related risks (e.g. floods, droughts, heatwaves) using regional climate data, CRA frameworks, and feedback from agencies.
NbS Inventory	Cataloguing of past and ongoing NbS projects, noting objectives, types of solutions, geographic spread, and partnerships.
Performance Evaluation	Regions outlined how they assess the success of policies and NbS (e.g. KPIs, monitoring systems, stakeholder feedback mechanisms).

Each region applied the framework autonomously, but often **with internal coordination workshops**, expert consultations, and support from the **ARCADIA WP6 team**, including webinars and guidance documents.

Stakeholder Engagement and Dissemination

Region	Stakeholder Sharing & Validation
Plovdiv	Internal sharing among universities, municipalities, and NGOs. Stakeholder discussions were limited due to administrative capacity issues but NGOs played an advocacy role.
Centru	Actively shared through **RDA Centru's alliances**, including the Covenant of Mayors and regional clusters. Results were incorporated into ongoing programming for the **2021–2027 funding cycle**.
Podravje	Engagement through national alliances (e.g., Climate Alliance Slovenia, Slovenian Business Club), inter-ministerial councils, and local partners. Emphasis on **multi-level cooperation** and public-private dialogue.

Some regions reported **challenges in building regional databases**, with existing data being fragmented. However, **efforts to consolidate data and align strategies were underway**, especially in Romania and Slovenia.

2.3 Climate Risk Assessment

This section is dedicated to elaborating on how climate risk assessment (CRA) is performed in the fellow regions. CRA includes all risks associated with weather events and climate change. It reveals the actors involved in the CRA process, the risks' identification and the impact on ecosystem services. The section also highlights how the risks are communicated to decision-makers and the community.

2.3.1 The Climate Risk Assessment process

Based on the Self-Assessment Study, here is a comparative table synthesising the key differences and similarities among Plovdiv, Podravje, and Centru regions:

Table 3. Comparative Analysis: Climate Risk Assessment Process vs. Governance Practices

Criteria	Plovdiv region	Centru region	Podravje region
Governance Model	Decentralised, sector-specific	Multi-tiered (national, regional, local), coordinated	Centralised, streamlined
Lead Institutions (CRA)	Ministry of Environment and Water, RIEW, River Basin Directorates	Ministry of Environment, Water and Forests, ANM-National Meteorological	Ministry of Environment and Spatial Planning, ARSO, Meteorological Office

Criteria	Plovdiv region	Centru region	Podravje region
		Administration, ANAR -National Administration "Romanian Waters"	
CRA Focus	Sectoral, especially water management (floods, droughts, urban heat)	Broad, national-level strategy integrating historical data and sectoral plans	Cross-sectoral, emphasizes cascading impacts and real-time data
Risk Monitoring	Localised monitoring with strong hydrological tools (drones, GIS)	Strong national meteorological and hydrological networks, early warning systems	Advanced tech-driven systems (satellites, sensors), integrated with IPCC and EU projections
Stakeholder Engagement (Governance)	Broad but fragmented; reliant on NGOs at local level	Structured but bureaucratic; formal mechanisms exist but local engagement is weaker	Inclusive and participatory; strong integration of private sector, NGOs, and municipalities
Stakeholder Role in CRA	Limited formal role; mostly government and agency-driven	Moderate; included via consultations and data-sharing forums	Active involvement across public, private, and civil society sectors
NbS Integration	Mentioned in policy but weak in implementation; minimal impact on CRA	Growing awareness; limited cross-sector adoption; more policy than practice	Strongly embedded in both CRA and planning; aligns with resilience and performance-based governance
Performance Monitoring	Limited; fragmented and inconsistent across regions	Structured monitoring but hindered by bureaucracy	Regular, KPI-based evaluations; adaptive management integrated in policy cycle
Transparency and Communication	Government-centric communication; limited use of digital tools for CRA dissemination	Public consultations and technical reports; improving access to climate data	Transparent platforms, early warning systems, and data-sharing channels used actively
Institutional Strengths	Strong EU alignment; effective flood risk tools	Robust data systems and multi-agency support	Holistic CRA approach; strong coordination and technological integration
Institutional Challenges	Political instability; fragmented local governance limits long-term CRA planning	Bureaucracy slows local responsiveness; coordination gaps among multiple agencies	Coordination between national and local levels can be complex; small municipalities may face capacity limitations
Implication for transformation	Fragmented, NGO-dependent governance with limited regional coordination undermines large-scale NbS adoption. Despite strong national frameworks, political	Multi-level, inclusive governance offers potential for transformative adaptation but is slowed by institutional complexity and poor inter-agency	Centralised, performance-driven governance facilitates effective NbS mainstreaming and provides a strong foundation for transformation. However, the rigidity of top-down

Criteria	Plovdiv region	Centru region	Podravje region
	instability and weak performance monitoring hinder transformation. Greater institutional clarity and government-led local engagement are critical to unlock systemic change.	coordination. Improving coherence between national and local levels, and streamlining funding and monitoring systems, are essential for scaling NbS.	control may inhibit locally tailored innovation. Balancing national coordination with local autonomy can accelerate region-wide adoption.

In conclusion, Podravje region demonstrates the most advanced and integrated approach to CRA, with robust stakeholder involvement and sophisticated monitoring systems. Centru region follows with strong national strategies and historical data usage, while Plovdiv region's approach is characterised by well-defined regional and national collaboration, with emphasis on water management and agricultural risks.

Below, there is a comparative analysis of the Climate Risk Assessment and Institutional Framework and Key Features

Table 4. Comparative analysis: Climate Risk Assessment – Institutional Framework and Key Features

Criteria	Plovdiv region	Centru region	Podravje region
Lead Ministry	Ministry of Environment and Water (MoEW)	Ministry of Environment, Water, and Forests (MMAP)	Ministry of Environment and Spatial Planning
Key Institutions	Executive Environment Agency (EEA), Basin Directorates	National Administration for Environmental Protection (ANPM), National Committee for Climate Change (CNSC), Environmental Fund Administration (AFM) ANPM, ANM, CNSC, AFM	ARSO, Regional Development Agencies
Monitoring Systems	EU-aligned, focused on water (floods, droughts)	Multi-agency, comprehensive coverage	Tech-driven, using IPCC models, satellite data
Local Governance Involvement	Limited—primarily municipalities	Strong county-level involvement	Active cooperation with NGOs, local authorities, business
Cross-Sector Collaboration	Limited; primarily within government agencies	Moderate; mainly inter-ministerial	Strong; includes academia, business, NGOs
Adaptation Focus	Flood prevention, water management	Low-carbon economy, DRR	Ecosystem-based adaptation, NbS
Strengths	Strong EU legislative alignment; flood management	Structured governance, strong data infrastructure	Integrated NbS, strong cross-sector cooperation

Criteria	Plovdiv region	Centru region	Podravje region
Weaknesses	Weak stakeholder involvement, political instability	Fragmented implementation; weak NbS integration	Coordination gaps; limited local NbS technical capacity
Funding Mechanisms	EU funds, national budget	Environment Fund, EU Cohesion Funds	Public-private partnerships, EU funds
NbS Integration	Minimal, policy recognition only	Emerging, but limited in practice	High—embedded in planning and adaptation strategies

Conclusions

- **Centru region** has the most structured governance system, with strong national coordination and financial backing. Romania has a robust national-level structure with excellent data systems but faces implementation bottlenecks and coordination issues.
- **Podravje region** leads in cross-sectoral collaboration and the integration of NbS into climate policies. Podravje demonstrates the most advanced, tech-integrated, and inclusive approach to CRA, particularly in NbS integration.
- **Plovdiv region** governance is water-centric, well-aligned with EU policies but lacks cross-sectoral engagement. Plovdiv's risk assessment emphasises water-related hazards and EU compliance but lacks broader cross-sectoral and stakeholder integration.

An ideal institutional framework would combine the Centru region structured multi-agency approach, the Podravje region cross-sectoral partnerships, and the Plovdiv region strong EU policy alignment.

The region that is **most actively moving toward dynamic, real-time, and cross-sectoral risk assessments** — a key precondition for transformative resilience planning — is **Podravje region (Slovenia)**.

According to the comparative analysis in the report:

- **Podravje** demonstrates **real-time climate monitoring** integrated with **cross-sectoral risk assessments** and advanced technology (e.g., satellites, sensors).
- It has an **inclusive stakeholder model**, with strong engagement from government, private sector, NGOs, and municipalities.
- Its **climate risk assessment process** is noted as **tech-driven**, with alignment to IPCC and EU projections, and embedded in policy planning.

- **NbS** are **strongly embedded** in both risk assessment and adaptation strategies, making Podravje a benchmark for **adaptive and performance-driven governance**.

In contrast:

- **Centru region (Romania)** uses strong historical data but lacks real-time responsiveness and cross-sectoral integration.
- **Plovdiv region (Bulgaria)** is more sector-specific (focused mainly on water), lacks a holistic risk framework, and has fragmented institutional coordination.

2.3.2 Risk Identification and Major Climate Hazards

Below is the comparative analysis on the Risk Identification and Major Climate Hazards for the three fellow regions:

Table 5. Comparative analysis: Climate Risk Identification and Major Hazards

Criteria	Plovdiv region	Centru region	Podravje region
Flooding	High (pluvial, fluvial, flash floods); caused by intense rainfall, poor drainage, river overflow.	High (historic and frequent); caused by extreme weather and outdated infrastructure.	High (including alpine flooding); caused by heavy rainfall and snowmelt.
Drought	High; due to rising temperatures, inefficient irrigation, overuse of groundwater.	High; linked to persistent heat, poor irrigation, and desertification.	Moderate; seasonal with agricultural and hydropower implications.
Extreme Heat	High; significant urban heat island effect, increasing public health risk.	High; affects health and increases energy demand.	Moderate; affects health and power grids in summer.
Landslides	Moderate; driven by heavy rainfall and deforestation.	High; widespread in rural/mountainous areas, exacerbated by poor slope stabilization.	High; especially in the higher part of the region with intense mountainous regions and intense rainfall.
Forest Fires	Moderate; caused by droughts and agricultural burning.	High; prolonged droughts and poor forest management contribute.	Moderate; seasonal, affects forested areas.
Sectoral Impacts	Agriculture, water, infrastructure, energy, biodiversity, public health.	Agriculture, biodiversity, water, health, infrastructure, forestry.	Agriculture, infrastructure, energy, tourism, biodiversity.
Risk Mitigation Focus	Water management, flood prevention, heatwave response.	DRR, improved infrastructure, data integration.	NbS integration, cross-sectoral adaptation, early warning systems.

Criteria	Plovdiv region	Centru region	Podravje region
NbS Potential Highlighted	Underdeveloped; needs expansion in urban greening, agroforestry.	Recognized but underutilized; more needed in agriculture and water sectors.	Well-integrated in flood control, forestry, urban planning.
Unique Risks	Strong urban heat island effect in Plovdiv region.	Severe desertification risk and aging flood infrastructure.	Pre-Alpine world hazards (rockfalls, landslides, earthquakes).

Conclusions

- **Centru region** experiences the most diverse and intense climate hazards, including frequent flooding, severe droughts, and extreme weather events. Its long history of destructive floods shows the importance of strengthening flood defense infrastructure and water management.
- **Plovdiv region** primary climate risks revolve around water — either too much or too little. Plovdiv region is especially vulnerable to flooding, water scarcity, and extreme heat, making integrated water resource management and green infrastructure essential.
- **Podravje region's** unique mountainous geography as part of the pre-Alpine world increases the risk of landslides, rockfalls, and alpine flooding. Cross-border collaboration and early warning systems could enhance preparedness for transnational climate events like floods and droughts.
- **NbS could mitigate many of these risks**:
    - **Flood retention wetlands** and **reforestation** for water management
    - **Urban green spaces** to combat heat islands
    - **Agroforestry and sustainable agriculture** to fight drought and erosion

While Centru region risk landscape is the most severe and wide-ranging, Podravje region's alpine terrain poses unique challenges. Plovdiv region shares water-centric vulnerabilities with both — making regional cooperation and knowledge sharing vital for enhancing climate resilience across these three regions.

2.3.3 Risk Monitoring and Climate Data Availability

The more in-depth analysis of Risk Monitoring and Climate Data Availability in the three fellow regions reveals the following trends:

Table 6. Comparative analysis: Risk Monitoring and Climate Data Availability

Category	Plovdiv region	Centru region	Podravje region
Meteorological Monitoring	Extensive local network via National Institute of	Long-established system (ANM-National	High-tech with remote sensing and satellite data

Category	Plovdiv region	Centru region	Podravje region
	Meteorology & Hydrology (NIMH); real-time weather stations and alerts	Meteorological Administration of Romania); international collaboration	
Hydrological Monitoring	River & groundwater stations; flood early warning systems	Integrated National Water Monitoring (SNIMA); National Hydrological and Hydrogeological Surveillance System (SNSHH)	Uses EU disaster loss databases; climate risk profiling
Early Warning Systems	Automated alerts for floods via river basin stations	Colour-coded (yellow/orange/red) alerts for extreme weather	Satellite-based, real-time early detection systems
Data Integration	National Environmental Monitoring System (NEMS)	Multi-agency data coordination (ANAR-National Administration "Romanian Water, ANM- National Meteorological Administration , IGSU-Romanian General Inspectorate for Emergency Situations)	Cross-sectoral databases integrating IPCC, EU models
Community Involvement	Volunteer networks, local reporting active	Limited; primarily institutional actors	Weak at local level; mainly institution-driven
Technology Use	GIS, drones, remote sensing, hydro-meteorological models	Data portals, national databases	Advanced modeling, remote sensors, satellite monitoring
Institutional Strength	Strong in hydrological systems; centralised via NIMH & EEA	Robust, coordinated national monitoring framework	Centralised but linked with EU/international networks
Key Strengths	Localized, real-time monitoring; strong environmental data	Comprehensive, integrated systems; long history	Innovative tools and integration with global models
Key Limitations	Limited private sector and community-level integration	Community-level participation and flexibility low	Less granular local data; high reliance on central tech

Conclusions

- **Plovdiv region:** Excels in localised and community-based monitoring. Uses advanced tools like GIS and drones for real-time data collection.
- **Centru region:** Has the most comprehensive and centralised monitoring system, integrating multi-agency coordination and national data networks.
- **Podravje region:** Stands out with cutting-edge technology and international climate models, though local data collection remains less detailed.

Each region has unique strengths i.e. Plovdiv region's localised expertise, Centru region's national integration, and Podravje region's technological innovation. A collaborative approach that integrates these systems could establish a model framework for climate risk monitoring in the region.

2.3.4 Risk Communication and Stakeholder Involvement

All three countries engage **stakeholders** through:

- Public meetings and forums
- Online platforms, social media, and publications
- Government-academia partnerships

However, Podravje region has the most integrated approach, involving business associations, NGOs, and civil society in CRA discussions. Podravje region is the most inclusive in involving businesses and NGOs. Centru region has the most structured approach, with clear national strategies for risk communication. Plovdiv region integrates EU standards, but its local engagement is more focused on government institutions.

Below is the comparative analysis on Risk Communication and Stakeholder Involvement for the three fellow regions:

Table 7. Comparative analysis: Risk Communication & Stakeholder Involvement

Criteria	Plovdiv	Centru	Podravje
Primary Communicators	Ministry of Environment and Water (MoEW), East Aegean River Basin Directorate, local municipalities	Ministry of Environment and Climate Change, (ANAR-National Administration "Romanian Water, ANM- National Meteorological Administration ANAR, ANM)	Ministry of the Environment and Spatial Planning, ARSO, local municipalities
Communication Methods	Formal reports, limited digital tools, public consultations (mostly formal)	Official publications, government portals, public forums	Multi-stakeholder platforms, public-private partnerships, advanced digital tools
Stakeholder Involvement Level	Limited; mainly government-driven, NGOs active in campaigns, weak private sector role	Moderate; structured but bureaucratic, strong academic collaboration	High; inclusive approach with strong business, NGOs, and local authority involvement
Strengths	EU-aligned consultation practices, national technical capacity	Strong climate data systems, structured consultation formats	Broad engagement, real-time digital tools, cross-sector partnerships

Criteria	Plovdiv	Centru	Podravje
Weaknesses	Top-down, weak community integration, capacity constraints at local level	Bureaucratic delays, limited community involvement, sectoral silos	Resource constraints in smaller municipalities, complex coordination needs
Use of Digital Tools	Expanding early warning systems	Data portals, early warning systems	Advanced real-time monitoring, digital dashboards
Role of Local Authorities	Implement national plans, but with limited autonomy and capacity	Align with national plans, low flexibility	Actively shape and execute local adaptation plans
Private Sector Engagement	Minimal, mostly regulatory compliance	Involved in project-level risk assessments	Actively involved in planning and implementation

Conclusions

- **Plovdiv region aligns well with EU standards but needs to strengthen local engagement and cross-sector coordination.** The current government-led approach would benefit from greater involvement of businesses and civil society in policy-making and implementation.
- **Centru region benefits from strong data systems and formalized consultation processes,** but these are often slowed by bureaucracy and lack agility in addressing emerging risks.
- **Podravje region applies an inclusive, participatory approach.** Its emphasis on multi-stakeholder platforms and cross-sector partnerships results in more balanced and effective climate risk communication.

Recommendations:

- **For Plovdiv region:** Develop regional climate forums to better integrate local perspectives and foster collaboration between municipalities, businesses, and NGOs.
- **For Centru region:** Simplify bureaucratic processes and expand digital tools to enhance real-time risk communication and local-level engagement.
- **For Podravje region:** Continue to invest in capacity-building for smaller municipalities to ensure equitable participation across regions.

The Podravje region approach is the most well-rounded, but there's something to learn from each country. A hybrid model combining Centru region strong data infrastructure, Podravje region inclusive stakeholder engagement, and Plovdiv region alignment with EU frameworks could set the standard for effective climate risk communication in the region.

2.4 Governance on Climate Change Adaptation

This section provides an overview of the adaptation in the three fellow regions from the institutional and legislative point of view. It identifies the bodies established to guide climate change adaptation, the principles and agreed goals of the governance, and the extent to which NbS have been recognised as a preferred solution. The section summarises the mandate for regional adaptation and how it is connected to the national level. It also clarifies which laws and directives are relevant. The funding of the suitable adaptation measures and NbS is highlighted. The use of databases/inventories of past and current NbS projects and the methodology for assessing their performance is described. The alliances established to adapt to climate change in the fellow regions are shown as well.

2.4.1. Institutional Framework

Based on the detailed information provided in the Self-Assessment study, here is a comparative table summarising the Institutional Frameworks for climate change adaptation governance in the three fellow regions:

Table 8. Comparative Analysis: Institutional Framework

Criteria	Plovdiv region	Centru region	Podravje region
Governance Model	Decentralised, multi-ministerial	Centralized	Centralised, streamlined
Key Institutions	Ministries of Environment, Agriculture, Regional Development, etc.; Regional Inspectorates, NGOs	Ministry of Environment, , National Meteorological Administration , National Administration Romanian Waters, Department for Energy Situation, including county and local levels authorities; the regional development agencies (set the regional priorities and facilitate regional cooperation among stakeholders	Ministry of Natural Resources and Spatial Planning; Environment Agency

Criteria	Plovdiv region	Centru region	Podravje region
Role of Regions	Strong regional infrastructure (e.g., Regional Governor Administration) but fragmented execution	Active regional development agencies and local governments with complex coordination	No region structure, only national and local coordination; we have established regional development agencies with no decision power just coordination of municipalities within the region. Less regional autonomy, with central coordination guiding regional efforts
Legislative Framework	Strong EU-aligned laws (e.g., Climate Change Mitigation Act)	Comprehensive strategic documents (e.g., National Strategy on Climate Change Adaptation, Energy Plan)	Integrated policy environment (e.g., Environmental Protection Act, Water Act, Spatial Planning Act)
NbS Integration	Recognised in policy but limited implementation due to regional capacity gaps	Growing recognition, but practical adoption hindered by coordination challenges	Well-integrated into legal and strategic frameworks; mainstreamed into urban and rural planning
Performance Monitoring	Limited and inconsistent across regions	In development; some systems in place but fragmented and inconsistent	High: Uses indicators, regular evaluations, stakeholder feedback
Stakeholder Engagement	Reliant on NGOs at local level; broad but uneven engagement	Diverse stakeholder base, but coordination and consistency are weak	Systematic and inclusive; regular consultation across sectors
Strengths	Broad institutional coverage, EU policy alignment	Extensive institutional base, national strategies align with EU directives	Coherent institutional structure, strong performance-based adaptation governance
Challenges	Political instability, overlapping mandates, regional fragmentation	Inter-agency coordination gaps, overlapping responsibilities, slower decision-making	Rigid structure may limit responsiveness to local needs

Comparative Reflections

- **Centralisation vs. Decentralisation:**

  Podravje's and Centru's centralised system promotes clarity and effective coordination, whereas Plovdiv decentralised and multi-tiered models, while rich in expertise, risk fragmentation if inter-institutional collaboration is not strengthened.

- **Legislative Foundations:**

All three countries have developed robust legislative frameworks aligned with EU directives. The challenge lies in translating these into cohesive actions at the sub-national level, particularly in Plovdiv and Centru regions, where regional political dynamics and administrative overlaps complicate implementation.

- **Performance Monitoring and Adaptability:**

  Podravje's focus on measurable outcomes and regular performance assessments offers a model for adaptive governance. In contrast, Plovdiv and Centru regions must address gaps in monitoring and evaluation to ensure that policy ambitions are met effectively across all regions.

The institutional framework is the backbone of effective climate adaptation governance. Podravje's streamlined, performance-driven model offers clear advantages in terms of coordination and adaptive management. Meanwhile, Plovdiv and Centru regions benefit from diverse institutional participation and comprehensive legislative bases, but they must enhance inter-agency communication and coordination, particularly at the regional and local levels, to overcome fragmentation and ensure that policies are effectively implemented.

These insights underscore the need for tailored strategies that not only build on each country's strengths but also address the inherent challenges of managing complex, multi-level governance structures.

2.4.2 Legislative framework and strategic orientation

Based on the Self-Assessment Study, here is a comparative analysis table summarising the key legislative and strategic features of climate change adaptation governance in the three fellow regions:

Table 9. Comparative Analysis: Legislative Framework and Strategic Orientation

Criteria	Plovdiv region	Centru region	Podravje region
Legal Framework Type	Comprehensive but fragmented	Comprehensive but complex	Integrated and adaptive
Key Legal Instruments	Climate Change Mitigation Act[1], National Adaptation Strategy[2],	National Strategy on Climate Change Adaptation[5], Integrated	Environmental Protection Act[7], Spatial Planning Act[8],

[1] https://www.moew.government.bg/static/media/ups/articles/attachments/Climate_Change_Mitigation_Actb79ac7271ff39de8cf1d9459a418e3f0.pdf
[2] https://www.moew.government.bg/static/media/ups/categories/attachments/Strategy%20and%20Action%20Plan%20-%20Full%20Report%20-%20%20ENd3b215dfec16a8be016bfa529bcb6936.pdf
[5] https://climate-laws.org/document/the-national-strategy-on-adaptation-to-climate-change-2022-2030-first-version_cde7
[7] https://www.varuh-rs.si/en/about-us/legal-framework/powers-of-the-hro-in-other-laws/environmental-protection-act/
[8] https://www.fao.org/faolex/results/details/en/c/LEX-FAOC203422/

Criteria	Plovdiv region	Centru region	Podravje region
	Water Act[3], Forestry Act[4], etc.	National Energy and Climate Plan[6], etc.	Nature Conservation Act[9], Water Act[10], Energy Laws
Strategic Orientation	Long-term low-carbon vision with regional planning (e.g., BULGARIA 2030)	Cross-sectoral integration aligned with EU Green Deal and climate directives	Continuous improvement with performance metrics and dynamic monitoring
Integration of NbS	Mentioned in strategy, limited on-ground implementation due to regional capacity gaps	Recognized in policy; implementation slow due to institutional complexity	Strongly mainstreamed across legal and planning frameworks
Policy Coherence	Moderate – affected by overlapping mandates and reliance on NGOs at local levels	Moderate – strategic coherence exists but hampered by coordination challenges	High – central coordination ensures streamlined implementation
Performance Monitoring	Inconsistent and regionally varied	In development; fragmented systems with varying regional effectiveness	Regular stakeholder reviews, adaptive policies tied to measurable indicators
Institutional Coordination	Weak – overlapping responsibilities across ministries	Moderate – multiple layers with potential for duplicated efforts and unclear lines of responsibility	Strong – centralised execution ensures policy alignment and accountability
Implementation Challenges	Political instability, regional fragmentation, over-reliance on NGOs	Coordination issues among agencies, slow practical adoption of strategic goals	Rigid structure may limit responsiveness to localized needs
EU Alignment	Strong alignment in documents but inconsistently operationalized regionally	High-level alignment, but complexity hinders effective implementation	Fully aligned and well-integrated within national and local governance
Strengths	Robust national-level strategy; broad legal coverage	Comprehensive cross-sectoral strategy; structured national guidance	Performance-driven governance; adaptive framework; clarity in legal structure
Weaknesses	Poor regional cohesion; fragmented implementation	Bureaucratic complexity; fragmented execution across regions	Potential lack of local flexibility

These insights emphasise that while all three countries have **strong legal foundations**, the key to successful climate adaptation lies in not only the formulation of robust laws but also

[3] https://lex.bg/laws/ldoc/2134673412
[4] https://eea.government.bg/bg/legislation/forest/Zgori_en_21.pdf
[6] https://energy.ec.europa.eu/system/files/2020-06/ro_final_necp_main_en_0.pdf
[9] https://www.ecolex.org/details/legislation/nature-conservation-act-lex-faoc061725/?
[10] https://www.ecolex.org/details/legislation/water-act-lex-faoc061692/?xcountry=Sudan&page=621

in ensuring that these laws are cohesively implemented through coordinated, adaptive governance structures.

Plovdiv region

- **Robust Legal Base:** The country's climate adaptation governance is underpinned by a series of legislative documents — such as the Climate Change Mitigation Act and several national and regional strategies — that are designed to fulfill EU obligations.
- **Fragmentation at the Regional Level:** While the legislative framework is comprehensive, the implementation at the regional level is often hindered by political instability and inconsistent local strategies.

Centru region

- **Comprehensive Strategy Suite:** Romania's legal framework includes the National Strategy on Climate Change Adaptation, the Integrated National Energy and Climate Plan, and several other directives focused on risk management (e.g., flood and drought strategies).
- **Sectoral and Cross-Sectoral Integration:** The strategy outlines sector-specific objectives, aiming to integrate adaptation measures across water, agriculture, energy, and more. However, the challenge lies in operationalizing these strategies through effective regional coordination.

Podravje region

- **Integrated Legislation:** Slovenia benefits from a set of interlinked laws (e.g., Spatial Planning Act, Nature Conservation Act) that promote not only adaptation but also the mainstreaming of NbS in planning.
- **Emphasis on Continuous Improvement:** The legal framework supports a dynamic adaptation process, with established mechanisms for monitoring, stakeholder consultation, and performance reviews that ensure policies remain effective and responsive.

2.4.3 Funding and Financing Mechanisms

Based on the Self-Assessment Study, here is a comparative analysis table summarising key funding structures, challenges, and strengths in the three fellow regions:

Table 10. Comparative Analysis: Funding and Financing Mechanisms for Climate Adaptation and NbS

Category	Plovdiv region	Centru region	Podravje region
Overview of Funding Sources	Multiple EU Operational Programmes (e.g. Environment, Innovation, Rural Development), national	National Environmental Fund, Sustainable Development Programme,	Balanced mix of national, EU, international funding (including PPPs)

Category	Plovdiv region	Centru region	Podravje region
	budget, and international funds	Just Transition Programme, EU funding	
Allocation & Mechanisms	Fragmented disbursement, weak regional integration due to political instability and bureaucratic inefficiency	Comprehensive, but fragmented; overlaps between funding channels complicate regional delivery	Streamlined, centrally coordinated; funds aligned with national strategies and performance metrics
Performance Monitoring	Weak, lacking consistent evaluation frameworks across regions	Moderate: exists but needs consolidation across different governance levels	Strong: funding tied to clear KPIs, regular audits, adaptive mechanisms
Transparency & Accountability	Limited: multilayered bureaucracy reduces visibility of allocation and delays fund delivery	Moderate: Fragmentation reduces transparency, weak cross-agency reporting consistency	High: Transparent linkage between funding and outcomes; regular stakeholder consultations
Financial Sustainability	Diverse funding sources available, but implementation gaps threaten long-term impacts	Sufficient funds available, but sustainability is jeopardised by poor coordination and planning inefficiencies	Predictable, performance-driven disbursements support long-term planning
Strategic Policy Alignment	Strong at national level but poorly integrated into regional plans	Good alignment, but dispersed strategic focus reduces implementation coherence	Tight alignment with EU and national goals; integrated budgeting
Key Strengths	Robust access to EU funding; wide variety of programmes	Broad instrument coverage; strong national strategy; synergy with EU frameworks	Performance-based model; effective governance; high accountability
Key Challenges	Fragmentation, political instability, and slow fund disbursement	Coordination gaps, siloed implementation, fragmented monitoring and reporting	Potential rigidity in local adaptation needs

Comparative Insights and Recommendations

- **Integration vs. Fragmentation:**

  Podravje region centralised and performance-oriented financing model serves as an exemplar of integration, where funds are not only available but also tightly managed and tracked. Plovdiv and Centru regions, while having robust funding instruments, face challenges in integrating these resources at the regional and local levels.

- **Strengthening Monitoring Systems:**

  Adoption of performance monitoring practices similar to those used in the Podravje region could benefit both Plovdiv and Centru regions. Enhanced transparency,

regular audits, and clearly defined key performance indicators would help ensure that allocated funds are used efficiently and effectively.

- **Coordinated Policy Implementation:**

  For Plovdiv and Centru regions, strengthening inter-agency coordination is crucial. This includes consolidating reporting mechanisms and ensuring that regional adaptation strategies are fully aligned with national and EU funding priorities.

- **Capacity Building:**

  Investing in administrative and technical capacity at the regional level would improve the management of complex funding portfolios, reducing the risk of fragmentation and enhancing overall responsiveness to climate adaptation challenges.

The funding and financing mechanisms for climate change adaptation reveal significant differences in execution and efficiency across the three countries.

- **Plovdiv region** has access to diverse funding sources but struggles with fragmentation and inconsistent regional disbursement, undermining the full potential of its financial instruments.
- **Centru region** boasts a comprehensive array of funding channels that align with national and EU strategies, yet coordination challenges at multiple governance levels impede optimal resource allocation.
- **Podravje region** benefits from a centralised, transparent, and performance-driven model that ensures both the availability and effective utilization of funds.

Addressing these gaps through enhanced integration, better monitoring, and improved inter-institutional coordination will be key for Plovdiv and Centru regions to fully harness the financial resources necessary for robust and sustainable climate change adaptation.

2.4.4 Coordination, Stakeholder Engagement, and Governance Practices

Based on the Self-Assessment Study, here's a comparative analysis table summarising Coordination, Stakeholder Engagement, and Governance Practices in the three fellow regions:

Table 11. Comparative Analysis: Coordination, Stakeholder Engagement, and Governance Practices

Category	Plovdiv region	Centru region	Podravje region
Coordination Mechanisms	Fragmented with overlapping ministerial roles. NGOs play a compensatory coordination role due to	Multi-tiered, with national, regional, and county-level bodies. Integration efforts underway but implementation is still fragmented.	Centralised with clearly defined institutional roles. Strong alignment of policy formulation and implementation.

Category	Plovdiv region	Centru region	Podravje region
	weak inter-agency synergy.		
Stakeholder Engagement	Broad but uneven. Heavy reliance on NGOs; government-led coordination is limited. Few unified platforms for engagement.	Multi-layered stakeholder involvement. Structured national participation but inconsistent engagement across levels.	Systematic, continuous stakeholder engagement. Inclusive of businesses, NGOs, civil society.
Transparency & Communication	Limited by lack of integrated platforms and formal coordination mechanisms.	Structured but bureaucratic. Data shared through formal channels; public involvement remains limited.	Transparent communication channels, regular consultations, and participatory decision-making.
Governance Practices	Reactive and fragmented. Strong laws but weak execution and coordination at regional levels.	Comprehensive but complex. Governance spread across many institutions, leading to delays and inefficiencies.	Performance-oriented. Adaptive governance with KPIs, monitoring, and stakeholder feedback.
Strengths	Diverse institutional landscape; NGO-driven innovation.	Comprehensive strategy suite; strong national frameworks.	High institutional coherence; adaptive and inclusive practices.
Challenges	Political instability, coordination voids, reliance on NGOs.	Overlaps in mandates; fragmented execution at sub-national levels.	Requires strong inter-departmental collaboration to maintain efficiency.

Synthesis

In the three fellow regions, the tendencies show that Podravje region's centralised system provides a clear model for efficient coordination, whereas Plovdiv and Centru regions struggle with fragmentation due to multi-layered structures and overlapping responsibilities. Stakeholder engagement in Podravje region again leads with its systematic and transparent engagement practices, while Plovdiv region's broad but uneven engagement and Centru region's multi-layered yet sometimes inconsistent efforts reveal opportunities for improvement. Governance practices are performance-driven, with an adaptive approach in Podravje, which contrasts with Plovdiv's reactive governance and Centru region's complex but comprehensive system. Each country has strengths in its legislative and strategic frameworks, yet practical implementation is most effective in Podravje, with Plovdiv and Centru needing further integration and harmonisation among their institutional layers.

In Plovdiv region, there is a wide stakeholder base. A broad range of actors e.g. from government agencies to NGOs are involved, but the lack of a singular regional strategy often leads to uncoordinated efforts. The involvement of numerous ministries sometimes results in overlapping responsibilities, which can dilute accountability.

In Podravje region, there is an integrated stakeholder engagement. The region stands out with its well-defined mechanisms for engaging stakeholders, including regular performance reviews and clear accountability frameworks. Centralised institutions work together to ensure that adaptation measures are both coherent and aligned with national and EU objectives.

In Centru region, there is an inclusive but complex approach, which includes multiple layers of coordination, e.g. from national commissions to local authorities, but the multiplicity of actors can lead to communication gaps and operational inefficiencies. Recent strategies (e.g., the revised National Strategy on Climate Change Adaptation) aim to streamline coordination, though challenges remain in fully integrating regional initiatives with national plans.

By examining these dimensions in depth, it becomes clear that effective climate change adaptation not only depends on a robust legal and institutional framework but also on the quality of inter-agency coordination, stakeholder participation, and adaptive governance practices. Enhancing these areas is critical for Plovdiv and Centru regions to fully leverage their comprehensive strategies, while Podravje region model provides valuable lessons on the benefits of centralised coordination and continuous stakeholder engagement.

Comparative Insights and Conclusions

The comparative analysis synthesising the insights and conclusions drawn from the governance on climate change adaptation in the three fellow regions reveals following trends and insights:

Synthesis

- **Comparative Efficiency:**

  Podravje's centralised, performance-oriented model demonstrates how streamlined institutional coordination, coupled with clear legislative and monitoring frameworks, can yield effective climate change adaptation outcomes.

- **Complexity and Coordination Challenges:**

  Plovdiv and Centru regions, despite having comprehensive legislative and institutional structures, face challenges in harmonising efforts across different levels of government. Their decentralised frameworks capture local diversity but require enhanced coordination mechanisms to avoid fragmentation and inefficiency.

- **Recommendations for Improvement:**

  - **For Plovdiv region:** Focus on reducing institutional overlap by clarifying roles at the regional level and strengthening government-led stakeholder engagement.

- **For Centru region:** Enhance inter-level coordination by establishing centralised monitoring and evaluation systems that tie together national strategies with local implementation.
- **For both:** Consider adopting elements from Podravje's model, such as clear performance metrics and adaptive management practices, to improve coherence and accountability.

This deeper analysis underscores that while each country's approach reflects its unique socio-political and administrative context, there is significant potential for cross-learning. Podravje's streamlined system offers a benchmark for effective governance, while Plovdiv and Centru regions have opportunities to refine their coordination and resource management to better realise their ambitious adaptation goals.

- **Coherence vs. Complexity:**
  - **Podravje region** offers a more coherent, centralised model with clearly defined roles and robust performance monitoring, making its adaptation governance arguably the most streamlined of the three.
  - **Plovdiv and Centru regions** both operate within a multi-institutional framework; however, Centru region's model, despite its complexity, is actively working toward better inter-level coordination, while Plovdiv region faces significant challenges at the regional level due to political instability and fragmented governance.
- **Legislative Strength and Implementation:**
  - All three fellow countries have strong legislative frameworks aligned with EU directives. Podravje and Centru regions have managed to integrate these frameworks into a more holistic approach, whereas Plovdiv's legal provisions are sometimes undermined by regional implementation challenges.
- **Financial Management and Resource Allocation:**
  - Podravje's transparent and performance-driven financing model contrasts with Plovdiv and Centru regions' more fragmented approaches. Centru has a broad array of funding mechanisms but must improve coordination to ensure efficient use of resources.
- **Stakeholder Engagement:**
  - Podravje excels in stakeholder engagement and regular performance reviews, leading to adaptive governance that can quickly respond to emerging challenges. Plovdiv and Centru regions also engage a wide range of stakeholders, but Plovdiv in particular faces difficulties in unifying efforts at the regional level.

Podravje region emerges as having a highly integrated and performance-oriented governance system that effectively coordinates national policies with regional

implementation, bolstered by robust stakeholder engagement and clear funding mechanisms. **Centru region** offers a comprehensive and inclusive framework that aligns well with EU strategies; however, its multi-layered system requires further refinement to overcome coordination challenges. **Plovdiv region** possesses a strong legislative foundation and broad institutional involvement, yet its adaptation governance is hampered by fragmentation at the regional level and political instability, which undermines the full realization of its climate change adaptation strategies.

Each country's approach reflects its unique political, administrative, and socio-economic context, highlighting that while Slovenia's centralised model may serve as a benchmark for coherence and efficiency, Plovdiv and Centru regions experiences underline the critical importance of bridging national strategies with effective regional implementation. This comparative insight provides a foundation for learning from best practices and addressing the existing gaps in governance on climate change adaptation.

2.4.5 Adaptation Strategies and Future Outlook

Based on the Self-Assessment Study, here is a comparative analysis table:

Table 12. Comparative analysis: Adaptation Strategies and Future Outlook in the three fellow regions

Criteria	Plovdiv region	Centru region	Podravje region
Key Strategies	- National Adaptation Program and Action Plan (NAPAP) - Integrated River Basin Management Plans (IRBMP) - EU Floods Directive compliance	- National Strategy on Adaptation to Climate Change (2022–2030) - Integrated National Energy and Climate Change Plan (2021–2030) - National Flood Risk Management Strategy	- National Climate Change Adaptation Strategy - Integration of Ecosystem Services - Environmental and Spatial Planning Acts
Focus Areas	Flood defense, water-efficient agriculture, green urban planning	Low-carbon economy, DRR, reforestation	NbS, ecosystem restoration, BGI
Implementation	EU-aligned, but local-level gaps remain	Strong institutions, local coordination challenges	Advanced planning, delays in local implementation
Innovation	Early warning systems, sustainable irrigation	Renewable energy, advanced monitoring	NbS integration, innovative financing models
Data Monitoring	EU/local databases, hydrological tools	National & EU systems, real-time data	IPCC models, satellite tech, international collaboration
Cross-Sectoral Approach	Moderate; limited stakeholder diversity	Government-led, structured participation	Highly inclusive: business, NGOs, local authorities

Criteria	Plovdiv region	Centru region	Podravje region
Strengths	Strong EU compliance, urban/rural integration	Comprehensive framework, strong data systems	Holistic approach, ecosystem-based adaptation focus
Challenges	Legal/policy fragmentation at local level	Coordination gaps between national and local levels	Implementation lag, dependence on external funding
NbS Role	Mentioned, limited implementation	Recognized, emerging across sectors	Central strategy pillar, embedded in planning
Future Outlook	- Green/blue infrastructure expansion - Water-efficient agriculture – Early warning systems for climate events	- Renewable energy and green infrastructure expansion - DRR - Enhanced climate data monitoring	- NbS expansion - Sustainable agriculture - Cross-sector collaboration and PPPs

Conclusions

- **Plovdiv region** aligns closely with EU standards but focuses more on specific sectors such as water management and urban planning.
- **Centru region** has the most structured risk assessment and adaptation framework, with strong data monitoring and government oversight.
- **Podravje region** has the most cross-sectoral approach, integrating business, NGOs, and NbS.

Each region has strengths in different aspects of CRA. A combination of Centru region structured approach, Podravje region cross-sectoral integration, and Plovdiv region EU-aligned policies would create an ideal climate adaptation framework.

2.4.6 Adaptation Planning

This section serves as an assessment of how climate change adaptation is planned in the fellow regions and how adaptation measures are prioritised. The existing monitoring, evaluation and reporting schemes are revealed. The adaptation strategies and plans, which are integrated at the national, regional, and local levels are described. The administrative capacity with regard to adaptation planning and resilience in the fellow regions is highlighted as well.

Below, a comparative analysis summarising “Adaptation Planning" of the three fellow regions is presented:

Table 13. Comparative Analysis of Adaptation Planning

Dimension	Plovdiv region	Centru region	Podravje region
Policy Integration	Strong alignment with EU policies, especially the European Green Deal and NDP 2030	Comprehensive integration through national and regional strategies	Cross-sectoral planning, emphasis on NbS integration
Legal Framework	Climate Change Mitigation and Adaptation Act (2014); mandates local alignment	National Strategy on Climate Change Adaptation (2022–2030)	Environmental Protection and Spatial Planning Acts
Institutional Framework	Ministry of Environment and Water (MoEW); decentralised with municipal obligations	Ministry of Environment, Water and Forests (MMAP), National Committee for Climate Change (CNSC), municipalities Regional Development Agencies (RDAs) (in charge of regional planning)	Ministry of Natural Resources and Spatial Planning; centralised coordination
Implementation Focus	Flood protection, water management, urban green infrastructure	DRR, reforestation, low-carbon transition, BGI	Ecosystem restoration, BGI , nature-based resilience strategies
Monitoring & Evaluation	Early warning systems; lacks robust local mandates	Advanced data systems (ANM, ANAR), focus on real-time monitoring	Benchmarking tools; performance-based adaptation planning
Funding Mechanisms	EU funds, national budget; challenges in regional disbursement	EU and national funding; includes Just Transition and National Environmental Fund	Integrated national, EU, and PPPs funding with strong monitoring mechanisms
Strengths	EU-aligned policy, emphasis on urban resilience and water infrastructure	Strong national coordination, disaster risk mitigation, use of climate data	Centralised, performance-based model with high NbS integration and cross-sector collaboration
Challenges	Fragmented regional implementation, weak legal mandates at local level	Complex governance layers needing improved inter-agency coordination	Risk of low regional flexibility due to centralised model
Opportunities	Strengthen legal mandates for local plans, enhance stakeholder inclusion	Improve vertical coordination and funding effectiveness	Localise adaptation for regional needs while maintaining strategic clarity

Conclusions and Future Directions

Strengths across fellow regions:

- **Plovdiv region:** Strong EU policy alignment and focus on urban resilience and water management

- **Centru region:** Robust national strategy with integrated DRR and low-carbon initiatives, existing local strategies
- **Podravje region:** Innovative NbS and advanced cross-sectoral collaboration

Common Challenges:

- **Funding and Implementation Gaps:** Limited resources and dependence on external financing
- **Local-Level Integration:** Need for stronger legal mandates to enforce local climate adaptation planning
- **Stakeholder Collaboration:** More inclusive decision-making processes required for policy success

Opportunities for regional cooperation:

- **Sharing Best Practices:** Slovenia's NbS expertise can benefit Plovdiv and Centru region
- **Cross-Border Projects:** Joint initiatives on flood management, DRR, and ecosystem restoration
- **Data Integration:** Collaborative climate monitoring using IPCC models and EU databases

Together, these regions have complementary strengths that, when combined, could lead to more effective and resilient climate adaptation planning across the region.

Analysis of Ecosystem-Based Adaptation and NbS

This analysis draws on the self-assessment studies for the three fellow regions as detailed case studies and, where possible, situates the findings in a broader regional context.

Policy Review

Plovdiv region

Bulgaria's national and regional policy framework shows strong intent toward mitigating climate change through ecosystem-based approaches. National instruments such as the Climate Change Mitigation Act, the National Climate Change Adaptation Strategy and Action Plan, and various EU-funded operational programmes (e.g. Operational Programme "Environment", "Rural Development Programme") provide a legal and financial framework for NbS. In the Plovdiv region specifically, the self-assessment study highlights that while national policies support NbS measures (such as afforestation, wetland restoration, and floodplain rehabilitation), regional implementation is still emerging and faces challenges related to political stability and the coordination of multiple stakeholders.

Podravje region

Slovenia benefits from a long tradition of environmental stewardship and sustainable land management. The country's policy framework integrates sustainable development goals with climate adaptation measures. NbS are increasingly incorporated into urban planning (e.g., green infrastructure in cities), water management, and forestry. The national approach emphasises cross-sectoral collaboration linking urban renewal with ecosystem conservation although, as in Bulgaria, there remain challenges in harmonizing local initiatives with overarching policy directives.

Centru region

Romania has initiated several policies aimed at integrating NbS into its adaptation planning — especially in environmentally sensitive areas such as the Danube Delta and Carpathian regions. However, institutional fragmentation and limited financial resources have often hindered coherent implementation. Romanian strategies tend to focus on habitat restoration, sustainable agriculture, and biodiversity protection, but require enhanced coordination between national agencies and local communities to fully harness the potential of ecosystem-based adaptation.

Near and Future Ambitions

Table 14. Comparative Analysis: Near-Term and Future Ambitions

Region	Near-Term Ambitions	Future Ambitions
Plovdiv	- Implement EU-aligned legislation on climate adaptation. - Address water management and urban heat islands. - Rely on NGOs and regional agencies for project-level implementation. - Utilise multiple EU Operational Programmes.	- Improve institutional coordination and reduce political fragmentation. - Mainstream NbS across urban planning and agriculture. - Develop standardised methodologies for NbS evaluation. - Strengthen regional stakeholder engagement.
Centru	- Execute national climate strategies with sectoral integration (water, agriculture, energy). - Deploy EU and national funding mechanisms (e.g., Environment Fund). - Foster regional adaptation plans with stakeholder input.	- Consolidate and streamline multi-level governance to improve policy coherence. - Institutionalise stakeholder engagement mechanisms. - Broaden NbS uptake and harmonise regional implementation. - Build performance-driven financial monitoring systems.
Podravje	- Maintain centralised, performance-based governance. - Use clear KPIs and dynamic monitoring systems. - Embed NbS in spatial planning and rural development.	- Localise adaptation planning for better responsiveness. - Expand cross-sectoral integration of NbS. - Leverage private sector for NbS financing. - Innovate performance-based adaptation strategies for broader scalability.

Region	Near-Term Ambitions	Future Ambitions
	- Engage stakeholders systematically.	

Local Alliances

Table 15. Comparative Analysis: Local Alliances

Category	Plovdiv region	Centru region	Podravje region
Governance Model	Decentralised with overlapping institutions	Centralised, performance-driven governance	Centralised, performance-driven governance
Institutional Coordination	Fragmented; multiple ministries and regional bodies involved	National and local coordination exists but often fragmented	Clear institutional roles with strong inter-departmental coordination
Stakeholder Engagement	Broad range, but heavily reliant on NGOs	Multi-layered involvement, sometimes inconsistent	Inclusive and systematic across sectors and levels
Local Alliances in Practice	Regional authorities often depend on NGOs to implement NbS	Engagement exists via county agencies and regional bodies including interregional alliances	Strong local involvement, including municipalities and NGOs
NGO Role	Central to local NbS actions	Active but with limited strategic influence	Collaborative role, integrated into formal processes
Business Sector Engagement	Limited involvement	Engaged in infrastructure planning but not in governance	Actively involved in co-design and implementation
Strategic Platforms	Lacks unified coordination platforms	Some technical working groups exist	Established platforms for stakeholder collaboration
Performance Monitoring	Limited; monitoring is mostly national-level	Developed but bureaucratically slow	Strong KPIs and adaptive feedback loops
Transparency and Accountability	Weak at regional level	Centralised transparency, local gaps exist	Strong mechanisms, including audits and public reporting
Local Autonomy and Innovation	Limited; municipal action constrained by funding	Some regional innovation, but inconsistent	High; municipalities co-develop policies with state support

Common Challenges and Opportunities

Table 16. Comparative Analyses: Common Challenges and Opportunities in Climate Adaptation and NbS Implementation

Category	Plovdiv region	Centru region	Podravje region
Common Challenges	Political instability; overlapping mandates; reliance on NGOs for local implementation; Weak regional enforcement; legal provisions poorly implemented. Fragmented disbursement; political bottlenecks. Limited cross-sectoral integration. Top-down planning limits participatory governance. Poor mainstreaming; lack of methodological tools.	Coordination complexity; slow inter-agency communication; fragmented engagement. Duplication of roles; inconsistencies in regional application. Complex fund landscape; inefficient disbursement. Slow to adopt real-time data; fragmented regional assessments. Formal engagement often lacks effective local impact. Low enforcement; sectoral silos.	Limited local flexibility; risk of overlooking local priorities. Risk of rigidity; need for localised adaptability. Funding gaps for large-scale projects. Less granular data at local levels. Coordination complexity with diverse stakeholders. Scale limitations; technical capacity in small municipalities.
Opportunities	Leverage EU alignment for systemic reforms; build government-led regional strategies. Streamline laws at sub-national levels; increase clarity in mandates. Build transparency and capacity at regional levels. Expand integrated, multi-risk frameworks. Institutionalise engagement platforms and improve public involvement. Develop replication toolkits and standardized evaluation methods	Improve inter-agency coordination; build on an inclusive framework with structured stakeholder input. Use revised strategies to clarify inter-institutional roles and streamline execution. Consolidate funding coordination and improve transparency Enhance use of real-time tools and interagency data sharing. Foster more decentralised collaboration. Institutionalize NbS across all climate plans.	Enhance local engagement mechanisms while maintaining centralised efficiency. Use performance data to continuously adapt policy implementation. Share funding model with other regions for scaling. Share best practices in real-time CRA and cascading risk analysis. Use digital tools and participatory platforms as models. Export integration framework as a regional model.
Financial Mechanisms	EU-funded programs and national budgets; fragmented regional execution	Numerous instruments (e.g., Environmental Fund, Just Transition); coordination challenges	Balanced mix of national and EU funds, PPPs; Performance-based funding model
CRA	Sector-focused (water, agriculture); good hydrological monitoring	Comprehensive, historical, data-driven; multi-agency involvement	Advanced real-time monitoring; Cross-sectoral, predictive modeling

Category	Plovdiv region	Centru region	Podravje region
Stakeholder Engagement	Government- and NGO-led; limited multi-sector platforms	Structured but formal; low public engagement	Inclusive, regular multi-sector collaboration
NbS Integration	Fragmented; limited institutional support	Recognized potential but low operational adoption	Embedded in legislation and planning; performance-monitored

Ecosystem-based adaptation and NbS offer a promising pathway to address the multifaceted challenges of climate change in Bulgaria, Slovenia, and Romania. Although Bulgaria's national policies and regional experiences (as illustrated by the Plovdiv case) provide a solid foundation, the effective translation of these policies into action requires:

- Stronger local alliances and enhanced stakeholder coordination.
- Improved institutional frameworks and sustainable financing mechanisms.
- Clear, measurable targets and robust monitoring systems.

For Podravje and Centru regions, while the policy frameworks are evolving and innovative projects are emerging, there remains a critical need for better coordination and resource allocation to fully realize the potential of NbS. Overall, leveraging these opportunities can help these regions build more resilient ecosystems and foster sustainable economic development in a changing climate.

3. REGIONAL NBS GOALS AND TARGETS

3.1 Current vision in the regions

3.1.1 Plodviv region

The current vision for NbS in the region is both aspirational and in a developmental phase. The document reveals that, while there is a strong awareness of NbS as a critical tool for climate adaptation and sustainable development, there is still a notable absence of a consolidated, formal strategy at the regional level. For example, the self-assessment study explicitly states that "currently, there are no established national or regional adaptation strategies in the Plovdiv region" and emphasizes the urgent need to define core principles and establish clear, agreed-upon goals for NbS implementation.

This vision is shaped by several key observations:

- **Aspirational Framework and Existing Gaps:**

The region recognizes NbS as a preferred approach for addressing challenges such as flood risk, water retention, biodiversity loss, and the impacts of extreme weather events. However, the lack of a stable political environment and a coherent adaptation strategy has meant that, despite strong policy instruments at the national level, local implementation remains fragmented. NGOs have emerged as the main drivers of NbS awareness and pilot projects, highlighting both the potential and the current gaps in governance.

- **Leveraging Natural Assets and Local Initiatives:**

Plovdiv region is rich in natural assets, including significant biodiversity, protected areas (like the Central Balkan National Park), and unique landscapes such as the Plovdiv hills. These assets form the backbone of the envisioned NbS approach by providing the ecological foundation necessary for sustainable flood management, afforestation, and the restoration of wetlands. The document underscores that these natural resources should be strategically managed to deliver not only environmental benefits but also social and economic resilience.

- **Emerging Collaborative Efforts:**

Even though a formal regional NbS strategy is still missing, several local alliances and partnerships have been established. Initiatives like the Regional Bioeconomy Hub and collaborations led by the Agricultural University-Plovdiv demonstrate a bottom-up approach where PPPs are actively working on pilot projects under frameworks like Horizon Europe and LIFE. These initiatives indicate a growing momentum that could eventually be scaled up and integrated into a comprehensive regional strategy.

- **Alignment with Broader Policy Objectives:**

The vision in the region is also informed by the national and European policy landscape. Despite local challenges, there is an underlying intent to align with EU directives, secure funding through various operational programmes, and contribute to the broader goals of a

climate-neutral, bio-based, and circular economy. This alignment is seen as a key driver for eventually formalizing NbS into regional planning and development.

In summary, the current vision is one of cautious optimism as it recognises the immense potential of NbS to enhance regional resilience and sustainability, yet it is hampered by institutional and political constraints that delay the formulation of a unified strategy. The study suggests that a stronger, more coordinated approach that formally integrates NbS into regional adaptation planning is needed, leveraging existing local initiatives and natural assets to achieve long-term sustainability objectives.

3.1.2 Centru region

In the case of Centru region, the vision is rooted in the ambition that, in the medium term, the region will become a clean and attractive area for its residents and tourists, with a competitive economy driven by knowledge and innovation, where the sustainable use of resources is a shared responsibility among all citizens. The strategic vision of the Centru Region Programme aligns with and contributes to the objectives set out in both the Centru Regional Development Plan (RDP) 2021–2027 and the Centru Smart Specialisation Strategy (S3 Centru). Accordingly, the programme aims to foster a cleaner, more attractive region with a knowledge- and innovation-based economy, where environmental protection and the sustainable, rational use of resources are key priorities.

- **Aspirational Framework and existing Gaps:**

Centru region, especially through its Regional Development Strategy, provides a comprehensive strategic framework to guide the complex process of sustainable regional development. This vision is structured around six strategic development areas, most of which incorporate environmental principles. Notably, one strategic domain — Strategic Development Area 4 (DS4) — is fully dedicated to environmental protection, energy efficiency, and climate change mitigation. DS4 focuses on four priority areas, including: improving environmental quality, increasing energy efficiency, especially through the use of renewable energy sources (RES) and alternative fuels, protecting and preserving biodiversity and reducing the effects of climate change and preventing natural hazards. Mitigating the effects of climate change — especially those linked to rising temperatures, increased CO_2 emissions, and long-term consequences — is a central priority of the programme. Accordingly, the financial allocations for investments related to green infrastructure, energy efficiency, sustainable mobility are over 200 million euro (priority 3 and priority 4.).

Despite this strategic focus, the Centru Region still faces several critical challenges, including:

- Limited access to data, studies, methodologies, and scientific research at a regional level to support integrated approaches
- Ensuring the impact and effectiveness of climate change awareness campaigns

- Creating economic and employment opportunities by encouraging investment in innovative and green technologies that contribute to climate change mitigation
- The need to develop, diversify, and expand monitoring and warning infrastructure for hydro-meteorological phenomena and their consequences
- Implementing integrated risk prevention actions to reduce the impact and damages caused by natural disasters
- Promoting the use of NbS and raising awareness among potential regional stakeholders (e.g. local authorities, individuals, research institutions, private sector) regarding their benefits and opportunities.

In this regard, the ARCADIA project has an important role as it represents a significant and practical step forward. It provides a solid starting point at the regional level by addressing key questions surrounding NbS. Moreover, the project facilitates the creation of a regional cooperation network among various stakeholders and offers a framework for:

- Enhancing understanding of NbS as an effective response to climate change
- Support twinning with regions with similar interests
- Identifying resources and implementation opportunities
- Disseminating best practices, know how, methods etc.

3.1.3 Podravje region

In Podravje region the commitment towards NbS implementation is strongly developed. The region has a good understanding of possibilities and the importance of NbS implementation, along with strong expert knowledge support in landscaping architects. With good technical support in various fields, the region possesses good data collection and predictions of living conditions for its citizens. With help from national directives and financial funds, the region was able to implement several NbS solutions. The region, or more precisely, its municipalities, are dedicating important amount of time in planning of green solutions, in providing strategies (ex: Strategy development plans 2035 approved by different municipalities in region Podravje) and visions of green and healthy environment for its citizens, and to mitigate the climate change effects, which are becoming increasingly stressful for everyday activities. It is of high importance to assure that the liveability of the region stays on high level. And green infrastructure with NBS implementation is an important part of that commitment.

An important issue is also that it's not only local authorities and decision-makers that are in charge of implementing NbS, but all citizens can contribute to this goal. NbS implementations are also suitable for every backyard. And with joint activities stronger results can be achieved.

- **Aspirational Framework and existing Gaps:**

Regional development of region Podravje is frame-worked through local development strategies and national development strategies. Big impact on green infrastructure development is provided through structural funds, led by corresponding ministries. Region Podravje has a strong green frame within development visions. The **Spatial Development Strategy of Slovenia 2050** (ReSPR 50) is the key national strategic document outlining the long-term vision, goals, and guidelines for spatial development in the Republic of Slovenia up to the year 2050. It serves as the fundamental framework for coordinating sectoral policies (e.g. transport, energy, environment, economy) from the perspective of sustainable spatial planning and the protection of natural resources. The strategy emphasizes the creation of comprehensive green systems within and between settlements. It proposes that every urban settlement should contain at least 40% public green space, easily accessible on foot within 300–500 meters. Green infrastructure should be linked with agricultural, forest, and water areas, supporting recreation, urban cooling, and biodiversity.

The Slovenian government allocates substantial funds to green infrastructure through various national and EU-supported programmes. These investments are part of Slovenia's broader commitment to sustainable development, climate neutrality, and environmental protection. Slovenia has been allocated over **€3.2 billion** under the EU Cohesion Policy for the 2021–2027 period. Of this, approximately **€793 million** is earmarked specifically for green and low-carbon initiatives, including investments in green infrastructure, renewable energy, energy efficiency, flood prevention, and wastewater treatment. Under the EU's Recovery and Resilience Facility, Slovenia's plan allocates **42% of its total €2.5 billion** funding to green transition measures. This includes investments in renewable energy, energy-efficient building renovations, sustainable mobility, and climate change adaptation. In July 2021, Slovenia issued its inaugural Sovereign Sustainability Bond, raising over **€1.05 billion**. The proceeds are allocated to environmental and social projects, including those related to green infrastructure, clean transportation, and sustainable environmental management. These funding mechanisms collectively support Slovenia's strategic objectives for green infrastructure development, aiming to enhance environmental sustainability, promote biodiversity, and improve the quality of life for its citizens.

Despite of strategic focus, and green funds allocation, Podravje region still faces some challenges and gaps, including:

- Limited possibilities to support integrated approaches of whole region – funding is limited to municipalities and they can develop within their borders;
- Social acceptance of citizens of NbS needs to be increased with awareness campaigns – when citizens embrace the solutions, solutions will also get more visibility in governmental decisions regarding green solutions;
- Limited knowledge on green solutions and NbS of local decision-makers;
- Stronger cooperation among national authorities and local authorities and regional development agencies when planning green investments and mitigating climate change challenges.

With knowledge of project ARCADIA and shared knowledge of living labs in model regions within the project region can provide significant progress in NbS implementation and increase of social acceptance regarding NbS. Disseminated know-how, good practices, methods and other NbS knowledge will shorten the steps towards a greener environment and increase the liveability of our citizens.

3.2 Fellow Regions' Areas of Expertise and Areas of Interest

This overview highlights the core expertise of the fellow Regions – Centru (RO), Plodviv (BG), and Podravje (SI) – to support effective twinning with Model Regions. The identified strengths are grouped into four key thematic areas (see Table 17 below): **Climate Governance & Institutional Readiness, Climate Risk Assessment & Monitoring, NbS & Ecosystem Services, Funding Mechanisms & Financial Readiness.** An overview of these thematic areas with the respective focus topics is given below. Following the table, more information on the fellow regions' experiences for each focus topic are presented in more detail.

Table 17. Four thematic areas of grouping the fellow regions expertise and the focus topics of the twinning

Thematic Area	Focus Topic
Climate Governance & Institutional Readiness	Governance Structures Strategic & Legal Alignment Stakeholder Engagement
Climate Risk Assessment & Monitoring	Hazard Types Monitoring Systems Cross-Sectoral Impact Analysis
NbS & Ecosystem Services	Policy Integration of NbS Implementation & Institutional Capacity Ecosystem Service Management Rural NbS Urban Green Infrastructure
Funding Mechanisms & Financial Readiness	Access to Funding Program Implementation Innovative Financing Approaches

1. Climate Governance & Institutional Readiness

a. Governance Structures

- Multi-level coordination with regional and local leadership; strong agency roles and municipal integration (RO)
- Centralized, performance-driven governance ensuring clear mandates and accountability (SI)
- Decentralized governance with NGOs support and varied local capacities (BG)

b. Strategic & Legal Alignment

- Regional climate priorities embedded in development strategies, with strong links to EU Green Deal and Just Transition (RO)
- Fully integrated climate adaptation and NbS in planning and land-use regulation (SI)
- Strong national legal foundation, but local strategies often lack NbS clarity or enforcement (BG)

c. Stakeholder Engagement

- Inclusive local stakeholder engagement processes including working groups and municipal strategies (RO)
- Structured collaboration across public, private, and civic actors (SI)
- Active NGO participation in awareness and co-creation, limited institutional continuity (BG)

2. Climate Risk Assessment & Monitoring

a. Hazard Types

- Multi-hazard exposure: floods, heatwaves, drought, and desertification risks across agrosystems, forests, and urban areas (RO)
- Pre-Alpine world climate risks: flooding, landslides, droughts, and seismic activity; urban heat islands (SI)
- Water-related risks: fluvial and pluvial floods, erosion, and downstream pollution (BG)

b. Monitoring Systems

- Use of regional climate data for risk mapping and planning strategies; risk matrix and value system for prioritization (RO)
- Regional and local meteorological modeling, early warning systems, and flood prediction tools (BG)
- Real-time monitoring and scenario modeling based on IPCC standards (SI)

c. Cross-Sectoral Impact Analysis

- Climate adaptation integrated across water, forestry, energy, agriculture, and urban development sectors (RO)
- Ecosystem degradation and flood risk linked to land-use and agricultural practices (BG)
- Risk modeling tools applied across sectors to assess cascading climate impacts (SI)

3. NbS & Ecosystem Services

a. Policy Integration of NbS

- NbS embedded in regional and urban strategies, Just Transition Program, and Centru Region Program, RDP priorities (RO)
- NbS fully mainstreamed into legal and spatial planning frameworks (SI)
- NbS promoted in national frameworks; local uptake limited due to definition gaps (BG)

b. Implementation & Institutional Capacity

- Regional development agencies and municipalities coordinate NbS roll-out through EU funding streams (RO)
- High technical readiness and municipal coordination for NbS deployment (SI)
- Implementation driven by NGOs and pilot initiatives; technical and funding gaps persist (BG)

c. Ecosystem Service Management

- Forest ecosystem services managed through certification, Natura 2000 integration, and participatory planning (RO)
- Cultural and regulating services integrated into green infrastructure in both urban and rural landscapes (SI)
- Use of ecosystem services for water regulation, biodiversity, recreation, and land rehabilitation (BG)

d. Rural NbS

- Sustainable hedging, wetland revitalization, pasture rehabilitation, riverbank erosion control (BG)
- Forest afforestation, multifunctional land use, carbon sequestration in agriculture and forestry (RO)

e. Urban Green Infrastructure

- Green-blue infrastructure investments: retrofits, mobility, and park development via ERDF and Just Transition (RO)
- Urban greening as part of hazard mitigation and heat island adaptation strategies (SI)

4. Funding Mechanisms & Financial Readiness

a. Access to Funding

- Regional agencies act as Managing Authorities and Intermediate Bodies for EU programs (RO)
- Performance-tied allocation from national and EU sources (SI)
- Diverse EU funding options available; however, regional access inconsistent and under-resourced (BG)

b. Program Implementation

- Clear priority structuring with output targets for NbS and adaptation (RO)
- Transparent KPI-linked funding deployment (SI)
- Financial disbursement affected by bureaucratic and political instability (BG)

c. Innovative Financing Approaches

- Use of Just Transition funds to pilot workforce retraining, climate-neutral infrastructure, and green business models (RO)
- Use of blended finance and PPPs in NbS delivery and risk prevention (SI)
- Proposals for Payments for Ecosystem Services (PES), afforestation, and eco-tourism initiatives (BG).

Topics of interest
POLICY AND GOVERNANCE ● Monitoring and adaptive governance (SI) ● Policy coherence (BG, RO) ● Integration of stakeholder engagement in climate risk assessment and adaptation planning (SI, BG) FUNDING: ● EU Operational programmes (RO) ● Public-private partnership (SI) CLIMATE RISK ASSESSMENT & NBS ADAPTATION ● Real-time monitoring systems (SI) ● Integration of NbS into CRA (SI) ● Water management and flood prevention (BG) ● Forest management for multiple ecosystem services (RO) ● Data integration across different agencies (RO) ● Early-warning systems (BG) ● Remote sensing (BG)

3.3 Co-innovation Lab Methodology

Co-innovation labs are envisioned as a transformative, collaborative platform that brings together diverse stakeholders to co-design and test innovative NbS for climate adaptation. Below an analysis is presented of how the co-innovation lab methodology could be implemented in the three fellow regions.

Location:
The laboratories are expected to be strategically sited in locations that reflect both urban and rural priorities. In the case of the Plovdiv region, for instance, potential sites might include areas that have direct access to critical natural assets (such as the Plovdiv hills or proximity to river corridors) as well as urban centres where the challenges of heat islands, flood risks, and fragmented green spaces are most pronounced. By choosing locations that are both accessible and representative of regional challenges, the labs can act as living pilots for NbS implementation. In case of Centru, the lab will be located at the premises of partner 36-ADRC, in Alba Iulia.

Duration:
The initiative is conceived as a multi-phase effort. Initial pilot phases would be relatively short-term (e.g., 1–2 years) to allow for experimentation and iterative learning. Once viable solutions are identified and tested, these phases would transition into longer-term operational laboratories (spanning 3–5 years or more) to refine the solutions, build stakeholder capacity, and embed the practices into local governance and planning structures. This phased approach supports both rapid innovation and sustainable, scalable change.

Expected establishment

The Co-innovation labs in the three fellow regions should aim to deliver multiple tangible and intangible outcomes:

- **Innovative NbS Prototypes:** Development and field testing of innovative NbS tailored to local conditions, such as enhanced floodplain restoration, urban greening, or sustainable water management practices.
- **Capacity Building:** Enhanced technical and operational know-how among local stakeholders through hands-on workshops, training sessions, and collaborative problem-solving.
- **Strengthened Collaboration:** Creation of a robust network that connects public authorities, academia, private sector entities, and community organisations. This network is intended to facilitate knowledge exchange and joint problem-solving.
- **Evidence-Based Policy Inputs:** Generation of practical data and lessons learned that can inform regional adaptation strategies and influence broader policy frameworks at the national and EU levels.

- **Social and Economic Benefits:** Improved resilience of local communities leading to reduced vulnerability to climate impacts, increased local employment in sustainable sectors, and strengthened local economies.

Stakeholder Mapping:

A critical first step is the comprehensive mapping of all relevant stakeholders, which includes:

- **Public Authorities:** Regional and municipal governments responsible for urban planning, environmental management, and DRR.
- **Academic and Research Institutions:** Universities and research centres (e.g., the Agricultural University-Plovdiv) that can contribute scientific expertise and support monitoring and evaluation.
- **Private Sector:** Local businesses, especially those in the fields of bioeconomy, green technology, and sustainable agriculture, which can pilot and later scale innovative solutions.
- **Civil Society and NGOs:** Organisations that have experience in community engagement and local environmental projects, often acting as catalysts for grassroots innovation.
- **Local Communities:** Citizens and community groups who provide contextual knowledge and ensure that solutions meet local needs.

Engagement Approaches:

Effective engagement is expected to use a mix of methods, such as:

- **Interactive Workshops and Hackathons:** Facilitating idea generation and co-design sessions where diverse stakeholders come together to propose and refine innovative solutions.
- **Participatory Mapping and Field Visits:** Allowing stakeholders to visually and practically assess local environmental challenges and test prototypes in real-world settings.
- **Digital Platforms and Collaborative Networks:** Establishing online portals or forums that support continuous dialogue, resource sharing, and remote collaboration.
- **Regular Stakeholder Forums:** Periodic meetings, seminars, and webinars to review progress, adjust strategies, and scale successful prototypes.

Expected Engagement Outcomes:

Through these methods, the labs are expected to achieve:

- Greater alignment of regional priorities with local needs.
- Enhanced trust and cooperation among stakeholders.
- A dynamic, co-created repository of best practices and lessons learned that inform ongoing innovation.

Upscaling Resilient Transformative Change

Pathways for Upscaling:

The Co-innovation labs are seen as a springboard for larger-scale regional transformation. Successful pilots can be scaled up through:

- **Integration into Regional Planning:** Embedding tested NbS into formal adaptation strategies and urban/rural development plans.
- **Leveraging EU Funding:** Using evidence and success stories to attract further investment through EU programmes and national funding schemes.
- **Replication and Policy Transfer:** Creating models that can be adapted by other regions facing similar climate risks, thus promoting wider transformative change.

Challenges and Opportunities:

- **Challenges:**
    - **Institutional Fragmentation:** Aligning various levels of government and disparate institutions may be complex.
    - **Resource Limitations:** Securing sustained funding and technical resources to move from pilot phases to full-scale implementation can be challenging.
    - **Resistance to Change:** Ingrained practices and political inertia might slow the adoption of novel, collaborative approaches.
- **Opportunities:**
    - **Innovative Collaboration:** The labs create an environment that fosters cross-sector collaboration and breaks down traditional silos.
    - **Adaptive Learning:** Continuous monitoring and iterative design allow for rapid learning and the fine-tuning of interventions.
    - **Enhanced Resilience:** Successfully upscaled projects have the potential to significantly reduce local vulnerabilities and boost regional economic and social resilience.

- **Policy Influence:** Demonstrated success in the laboratories can inform and shape broader policy debates at national and EU levels, potentially driving systemic change.

In summary, the vision for Co-innovation labs for the three fellow regions is to serve as dynamic, multi-stakeholder hubs that not only test and refine NbS but also generate the evidence and collaboration needed to drive resilient, transformative change at a regional level. By carefully selecting locations, adopting phased durations, and engaging a diverse range of stakeholders through innovative approaches, these laboratories have the potential to upscale adaptive practices while navigating institutional and resource-related challenges. This integrated model offers both a pathway for immediate local benefits and a replicable framework for broader regional transformation.

4. CONCLUSIONS

Below is presented a summary of the main findings and takeaways from the analysis that has been presented in this Deliverable.

Integrated but Incomplete Implementation

The report underscores that while the three fellow regions generally have robust national policy frameworks designed to guide NbS and adaptation measures, regional implementation remains fragmented in some cases, with the risk of creating a gap between high-level strategic intent and on-the-ground execution. For example, the absence of a dedicated regional adaptation strategy in Plovdiv and the heavy reliance on NGOs for raising public awareness indicate a need to strengthen institutional frameworks at the subnational level.

Challenges in Risk Assessment and Monitoring

The report repeatedly points to deficiencies in the processes for CRA. Although extensive data are collected on environmental parameters (for instance, water quality issues in several rivers and groundwater bodies), the methodology for integrating these into a coherent risk management strategy is still underdeveloped. Furthermore, the absence of regular monitoring, evaluation, and reporting systems for adaptation measures suggests that the long-term effectiveness of NbS remains uncertain. The document highlights that many sections, particularly regarding stakeholder engagement in risk communication and systematic monitoring, are either "not available yet" or in need of further investigation.

Systemic Resilience and Upscaling Opportunities

The report emphasises that, despite the potential of NbS to provide multiple benefits in terms of climate adaptation, DRR, and provision of ecosystem services, the implementation is currently limited, and the study calls for further development of indicators to monitor the progress of NbS and adaptation measures. The systemic resilience section, though partially developed, suggests that the integration of NbS into disaster risk management plans and regional development strategies could significantly upscale successful pilot projects into broader, cross-sectoral frameworks.

Overarching Themes in the Conclusions

1. **Policy-Practice Gap**

   While national policies are well formulated and aligned with EU directives, the regional execution, particularly in Plovdiv, lacks coherence. Strengthening the link between policy and practice is essential, including through better funding mechanisms and enhanced local alliances.

2. **Need for Enhanced Coordination and Monitoring**

   The document points out that effective adaptation requires not only setting goals and developing strategies but also putting in place robust systems for risk assessment, monitoring, and evaluation. The current ad hoc nature of many

initiatives, combined with the lack of data-driven performance indicators, presents a significant barrier to sustained progress.

3. **Potential of NbS as Multifunctional Tools**

   NbS are identified as a promising strategy that can deliver simultaneous environmental, social, and economic benefits. However, to unlock their full potential, there is a need for standardized methodologies and databases that support the integration of NbS into regional planning and disaster management.

4. **Financial and Institutional Constraints**

   Funding remains a critical constraint. The report highlights multiple operational programmes (such as those under the EU Framework Programme for Research and Innovation) as the main sources of financing. Yet, there is a pressing need for a consistent investment strategy to support both the implementation and maintenance of NbS measures at the regional level.

Strategic Implications and Recommendations

- **Develop a Dedicated Regional Adaptation Strategy:**

  The regions, and similar administrative units, would benefit from crafting a clear, region-specific adaptation strategy that translates national goals into local actions. This strategy should include defined targets, timelines, and responsibilities, bridging the gap between high-level policy and local implementation.

- **Institutional Strengthening and Stakeholder Engagement:**

  To ensure successful implementation, there is a need to bolster institutional capacity. This includes enhancing the role of regional authorities, establishing stronger public-private partnerships, and creating inclusive stakeholder platforms that integrate local knowledge and expertise.

- **Robust Monitoring and Evaluation Systems:**

  Establishing a systematic framework for monitoring NbS and adaptation measures is critical. This could involve developing new performance indicators, investing in digital monitoring tools, and setting up periodic review mechanisms to assess progress and recalibrate strategies as needed.

- **Leverage EU Funding and Cross-Border Collaboration:**

  The conclusions suggest that there is untapped potential in accessing EU structural funds and leveraging cross-border initiatives. By aligning regional projects with broader European initiatives, regions like Plovdiv can secure additional financial and technical support.

Final Reflections

In summary, the conclusions of the report, as synthesised from its various sections, present a picture of considerable ambition tempered by practical challenges. The strategic emphasis on NbS is clear, but the pathway to scaling these solutions requires overcoming significant institutional, financial, and methodological hurdles. The report thus serves as both a diagnostic tool and a call to action underscoring the urgency of transforming high-level policy into actionable, measurable, and sustainable outcomes at the regional level.

This deeper analysis of the conclusions provides a roadmap for stakeholders aiming to enhance resilience through integrated, nature-based approaches, while highlighting areas where further research and institutional support are needed.