DELIVERABLE 4.10

Capacity needs assessment report and training modules for front-running regions

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Disclaimer

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Abbreviations

LAND4CLIMATE	Utilization of private land for mainstreaming nature-based solution in the systemic transformation towards a climate-resilient Europe
EU	European Union
WP	Work Package
CNA	Capacity Needs Assessment
FRRs	Front-runner regions
NBS	Nature-based solutions
NGOs	Non-governmental organization
KPI	Key performance indicator
GDPR	General Data Protection Regulation
RR	Replicating region
AT	Austria
CZ	Czech Republic
DE	Germany
IT	Italy
RO	Romania
SK	Slovakia

Executive Summary

This report is based on a transnational Capacity Needs Assessment (CNA) implemented in six Front-Runner Regions (FRRs): Austria, Czech Republic, Germany, Italy, Romania and Slovakia within LAND4CLIMATE project and proposes a list of tailored training modules to support the effective implementation of Nature-Based Solutions (NBS) on private land. The main objective of this deliverable is to identify and understand knowledge gaps and needs of key stakeholders involved in NBS implementation processes such as farmers, foresters, urban planners, municipalities, public sector, NGOs, land planners associations, academic sector, other educational institutions, etc. Based on a survey and additional stakeholder consultations, the report presents an assessment of current capacities, challenges and training needs, with a specific focus on stakeholders directly or indirectly involved in NBS project implementation.

The analysis of survey results identified several common challenges across the 6 regions:

- The limited practical experience in nature-based solutions implementation;
- A fragmentation of institutions involved in NBS projects implementations;
- Complex/ over bureaucratic processes in getting the necessary permits for specific NBS implementation;
- Lack of cross-sectoral coordination regarding NBS projects implementation;
- Insufficient inclusive participatory processes;
- Barriers to engaging private landowners and vulnerable groups, despite their pivotal role in the success of NBS implementation:
- Insufficient tools for the evaluation of NBS impact;
- Insufficient resources for NBS monitoring.

To address these challenges, the deliverable aimed to develop training programs, organized with flexible modules, designed to consider regional specificities. Learning pathways are tailored for different stakeholder groups (local authorities, planners, NGOs, academic institutions, landowners). Modules are based on a wide range of topics including policy integration, stakeholder engagement, hydrological design, project financing, ecological restoration and citizen awareness. Overall, this report supports the main vision of LAND4CLIMATE aiming to empower local actors with the skills and tools needed to implement NBS and advance climate resilience in diverse territorial contexts on private land.

Keywords

NBS implementation, stakeholders, capacity needs assessment, training programs

1. Introduction

1.1 Capacity building and vision for effective NBS implementation

The LAND4CLIMATE project aims to develop capacities on local and regional level for implementing NBS on private land as a strategic pathway to enhance climate resilience across Europe. The projects recognizes that resilient landscapes need integrated action, where public objectives for climate adaptation and biodiversity restoration are met in consideration and coordination with the interests of landowners and users (esp. farmers).

Successful NBS implementation depends on local and regional capacities. Local adoption of NBS remains limited despite their recognized cost-effectiveness and sustainability for climate solutions. This is, in part, because of missing technical expertise and institutional capacities combined with a poor cross-sectoral coordination and public participation (Calliari et al., 2022; Kauark-Fontes et al., 2023; Meraj and Hashimoto, 2024; Martin et al., 2025).

NBS can achieve their best performance to foster rural and urban climate resilience when stakeholders from different sectors have appropriate tools, relevant competencies and actively participate in decision-making processes. Stakeholders require scientific knowledge, technical skills and financial abilities, together with governance support to be able to design and implement effective NBS measures (McCarthy and Russo, 2023; Falana et al., 2025; Ibrahim et al., 2025)

The LAND4CLIMATE capacity-building approach is based on a shared understanding that successful NBS implementation relies not only on technical expertise but also on enabling frameworks that align governance, finance and stakeholder collaboration. In this context, the present CNA report contributes to empowering local actors to co-design, implement and sustain NBS practices within diverse territorial and socio-economic settings.

In the LAND4CLIMATE, capacity gaps should be understood as missing knowledge, training needs and critical leverage points within broader socio-ecological systems. This can integrate:

- Ecological complexity: NBS operates on a wide range of diverse habitats (e.g. wetlands, agricultural landscapes, urban ecosystems) where different ecological functions (e.g. water retention, biodiversity connectivity, microclimate regulation etc.) depend on context-specific interactions.
- Social diversity: stakeholders have and integrate diverse interests and values that shape NBS design, uptake and maintenance.
- Institutional interdependencies: land policy, funding mechanisms, permitting processes are not usually harmonized. Strengthening capacity means enabling cross-sectoral alignment and fostering co-production of solutions.

Implementing NBS in an effective manner should not be based only on technical skills or regulatory knowledge but also on an approach that recognizes the dynamic linkages between ecological processes, social actors, land-use systems and institutional structures (van der Jagt et al., 2023; Carlone and Mannocchi, 2024).

In this report, the CNA is therefore framed as a step toward developing adaptive governance and collaborative learning systems for climate resilience. A capacity-building approach for implementing NBS involves developing the knowledge, skills and resources needed to successfully design, implement and manage NBS. This approach is crucial for cities and regions to transition towards sustainability and resilience by leveraging natural systems. Key elements include training, technical support, networking, and policy development.

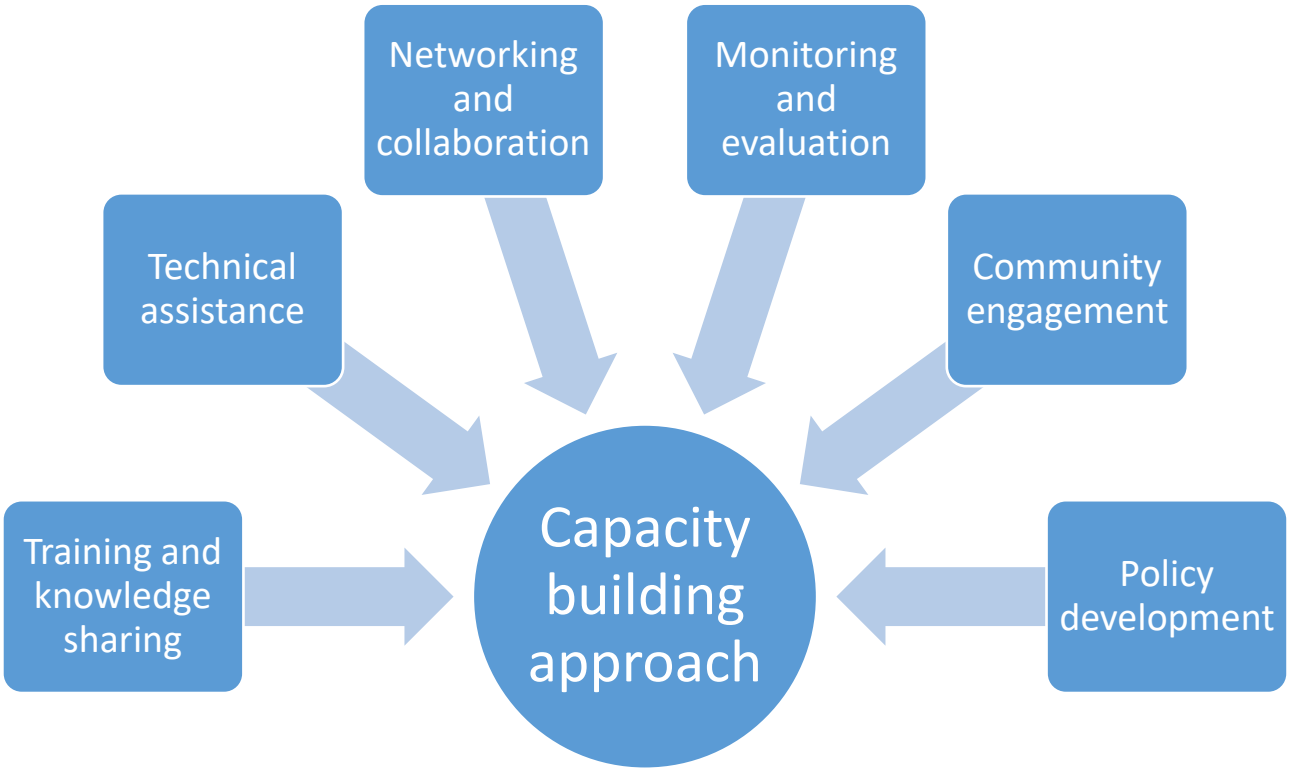

Figure 30 Key aspects of the capacity-building approach

Key Aspects of a Capacity-Building Approach:

- Training and Knowledge Sharing: Providing training programs, workshops, and technical deep dives to enhance understanding of NBS principles, design, and implementation strategies.
- Technical Assistance: Offering expert guidance and support to help practitioners develop NBS projects, access funding and navigate technical challenges.
- Networking and Collaboration: Facilitating connections between different stakeholders, including researchers, policymakers, practitioners and local communities, to foster knowledge exchange and collaboration.
- Policy Development: Supporting the development of policies and regulations that promote the adoption of NBS and create an enabling environment for their implementation.
- Monitoring and Evaluation: Establishing systems for monitoring the effectiveness of NBS and evaluating their social, economic and environmental benefits.
- Community Engagement: Involving local communities in the planning, design and implementation of NBS to ensure their needs are met and to foster a sense of ownership and stewardship.

Why is Capacity Building Essential?

- Overcoming Implementation Barriers: NBS can be complex, requiring specialized knowledge and skills that may not be readily available.
- Ensuring Effectiveness: Capacity building ensures that NBS are designed and implemented effectively, maximizing their benefits and minimizing risks.

- Fostering Innovation: Training and knowledge sharing can inspire new approaches and solutions to address environmental and social challenges.
- Promoting Sustainability: By building local capacity, NBS can be sustained over the long term, contributing to long-term resilience and sustainability.
- Empowering Communities: Capacity building empowers communities to participate in NBS projects, fostering a sense of ownership and responsibility.

1.2 Objectives for developing this report

The main objective of developing this report is to synthesize the results of a CNA survey conducted across the six FRRs. Based on these results, the report outlines a framework of training modules designed to strengthen local and regional capacity for NBS implementation.

The specific aims of capacity-building for NBS implementation are:

- To identify and analyze the knowledge gaps, skill weaknesses and institutional barriers experienced by key stakeholder groups involved in NBS deployment;
- To map the capacity needs across different stakeholders involved in NBS projects sectors (e.g. urban planning, agriculture, water management, governance, etc.)
- To propose structured training strategies for each FRR, tailored to the needs of various stakeholder groups and types of NBS interventions;
- To support the design and delivery of effective capacity-building programs that facilitate long-term integration of NBS into policy and practice.
- To ensure alignment, cross-fertilization of ideas and collaboration between WP4's capacity-building strategy for FRRs and WP5's activities targeting replicating regions (RRs) and external stakeholders, to enhance coherence and impact.

Thus, we identified focused training programs alongside inclusive involvement and knowledge sharing to develop NBS interventions that are both locally relevant and responsive to stakeholders. To expand NBS implementation and guarantee their long-term success, municipalities alongside NGOs, academic institutions, private landowners and planners need strengthened capacities.

To guide regions on their path toward climate resilience, LAND4CLIMATE will adapt and integrate proven elements from two established capacity-building programs that bring complementary strengths:

- The Regional Resilience Journey (RRJ), which provides a structured yet adaptable pathway developed under the Pathway2Resilience (P2R) initiative (www.pathways2resilience.eu/regional-resilience-journey).
- UrbanByNature (UbN), which offers a globally recognized iterative framework tailored to mainstreaming NBS (www.urbanbynature.eu).

LAND4CLIMATE will systematically analyze the methodologies, tools, and lessons learned from these programs, and will select, adapt, and combine relevant components to develop tailored and flexible training modules. This approach ensures methodological rigor, traceability of sources, and alignment with the specific needs and contexts of participating regions.

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2. Methodology

2.1 Methodology overall approach

The methodology for the LAND4CLIMATE CNA is designed to identify, compare and synthesize the knowledge gaps, capacity needs and institutional barriers related to NBS implementation across the six FRRs from Austria, Czech Republic, Germany, Italy, Romania and Slovakia. The approach is structured around three core phases:

- Standardized stakeholder survey design in collaboration with FRRs and academic partners
- Data collection at national/ regional level in each FRR
- Analysis and comparative synthesis of capacity needs

This methodology ensured consistency across countries while allowing flexibility to reflect specific regional and institutional contexts.

2.2 Survey design

The CAN survey was conducted using a structured questionnaire developed collaboratively by partners in Task 4.3.1, drawing on the authors' expertise in NBS implementation, capacity development and stakeholder engagement, as well as on key findings from existing literature and knowledge gap assessments. In particular, the design was informed by the *Nature-based Solutions Knowledge Gaps* report produced under the NetworkNature initiative (NetworkNature, 2021), which identifies critical technical, governance and socio-economic barriers to NBS uptake across Europe.

The survey included predefined multiple-choice, ranking and open-ended questions, combining quantitative and qualitative elements to collect data regarding:

- Institutional background (type, scope, mission),
- Experience and involvement in NBS projects,
- Stakeholder roles, motivations and expertise,
- Barriers to NBS implementation,
- Lacking capacities and collaborations,
- Preferred formats and topics for capacity-building,
- Key performance indicators (KPIs) and monitoring capacity.

The questionnaire does not collect personal data from respondents and thus fully meets the General Data Protection Regulation (GDPR) standards.

The questionnaire was made available in English and German to increase accessibility and ensure accurate responses and is presented in Annex 1.

2.3 Stakeholder targeting and distribution

The questionnaire was sent to stakeholders selected based on their relevance to NBS planning, implementation, or policy influence at the local or regional level involved in the LAND4CLIMATE FRRs. These stakeholders were approached through the FRRs, who were responsible for selecting the most relevant participants to whom the questionnaire was sent. The FRRs made these selections because they have the best understanding of the local context and are therefore well-positioned to

identify the most appropriate stakeholder categories, ensuring that the survey reached the most relevant individuals for the task at hand. The targeted groups included:

- Local and regional authorities (e.g., municipalities, county councils),
- Environmental NGOs and civil society organizations,
- Academic and research institutions,
- Landowners,
- Private companies, including agricultural, forest and industrial sectors,
- Public agencies (e.g., water basin administrations, environmental institutions).

The survey was distributed through project partners' (FRRs) institutional networks by email and links to online platforms (e.g. Google forms), between January and March 2025. Each FRR was responsible for coordinating the survey dissemination within its own region.

The stakeholder landscape for NBS implementation extends beyond standard categories (e.g. municipalities, NGOs) and includes a range of actors with varying levels of influence, interest and dependency on land-based interventions. To better inform training design and tailoring the training to the target audience, stakeholders are grouped using a power–interest–dependence typology (Fares, 2024). In Table 1, stakeholders are categorized based on three interrelated dimensions that affect their role in NBS implementation:

- "Influence" refers to the stakeholder's ability to affect decisions, policies, or the allocation of resources relevant to NBS. This includes formal authority (e.g., local governments, regulatory agencies) as well as informal leverage (e.g., NGOs with strong community outreach).
- "Interest" captures the level of concern or engagement a stakeholder has regarding the outcomes of NBS implementation. Stakeholders with high interest are typically those whose missions, values, or operational goals align closely with NBS objectives.
- "Dependency" reflects the degree to which a stakeholder relies on the successful implementation of NBS for their own well-being, land management practices, or regulatory compliance. For example, landowners who manage land directly affected by NBS interventions often exhibit high dependency.

The stakeholder classification presented in Table 1 provided a practical framework for the FRRs in the process of selecting and categorizing stakeholders to be contacted for participation in the survey. By distinguishing between levels of influence, interest, and dependency in relation to NBS implementation, this typology supported FRRs in identifying the most relevant actors and ensuring that diverse perspectives were included in the capacity needs assessment.

Table 1: Stakeholder categories for NBS implementation, classified by influence, interest, and dependency

Category	Role in NBS implementation	Influence	Interest	Dependency
Landowners	Control access to land and maintenance of NBS measures	High	High	High
Local authorities	Planning, regulation, co-funding	High	Medium–High	Medium
NGOs	Advocacy, implementation support, community mobilization	Medium	High	Low–Medium
Academic institutions	Technical support, research, monitoring and evaluation	Low–Medium	Medium	Low

Regional/ national agencies	Policy oversight, funding management, permitting	High	Medium	Low
Private developers	May oppose or align with NBS depending on regulation/ incentives	Medium	Low–Medium	Low
Citizens/ residents	Affected by urban/ rural NBS, potential co-beneficiaries	Low	Medium	Medium

Understanding stakeholder roles in terms of their influence, interest and dependency is critical for a better targeting of training content and delivery methods. The LAND4CLIMATE training program tailors its modules to meet the distinct functional needs of each group while supporting collaborative NBS implementation across governance levels.

High-influence actors (e.g. local authorities, regional or national agencies) can play a very important role in enabling or constraining the scaling of NBS. Generally, their tasks include integrating NBS into local/ regional development plans, navigating administrative procedures and mobilizing funding. Thus, these high-influence actors should be the primary target groups for training modules approaching:

- Policy and regulatory alignment
- Permitting and legal frameworks
- Project development and financing strategies

High-interest and high-dependence actors, including farmers and private landowners, are essential for the long-term viability of NBS measures, especially in peri-urban and rural settings. They directly manage land and will strongly influence the implementation process. Training for this group includes topics like:

- Participatory and co-design approaches
- Conflict-sensitive land-use negotiation
- Technical guidance for maintenance and operations

NGOs and academic institutions generally act and serve as knowledge brokers, facilitators and advocates for NBS. Even having a lower institutional power, they are key actors of learning, experimentation and public outreach. They are well-positioned to increase the impact of training through their networks and should be engaged through the following modules:

- Communication and awareness campaigns
- Ecological and hydrological monitoring
- Community engagement and citizen science

Tailoring the training using this approach ensures better uptake and relevance and also fosters synergy between actors, unlocking the collective capacity needed for successful and equitable NBS implementation.

To better tailor training interventions, stakeholders have been classified not only by institutional category, but also by their role, influence, interest and dependency in relation to NBS implementation. Table 2 summarizes these attributes and links them to relevant training modules proposed in Chapter 5. The intention here is that these training modules would appeal to and be relevant for FRRs, RRs and, more broadly, other local actors involved in the implementation of NBS across Europe.

Table 2 Stakeholder types and corresponding recommended training modules

Stakeholder type	Recommended training modules
Landowners	Stakeholder engagement and landowner mediation; Monitoring and evaluation of NBS impact
Local authorities	Permitting, policy and legal tools for NBS; Urban green infrastructure and climate resilience
Environmental agencies	Permitting, policy and legal tools for NBS; Monitoring and evaluation of NBS impact
NGOs	Communication and awareness campaigns; monitoring and evaluation of NBS impact
Academic institutions	Monitoring and evaluation of NBS impact; Hydrological design and water retention modeling
Private developers	Funding and project development for NBS; Permitting, policy and legal tools for NBS
Citizens / Residents	Communication and awareness campaigns

2.4 Data collection and regional coverage

A total of 32 stakeholders across the six FRRs, including RRs, responded to the survey. While this number provided valuable insights, it is not sufficient to support representative conclusions across all regions or stakeholder categories. The findings presented in this report should therefore be interpreted as a qualitative synthesis of the perspectives and experiences shared by the respondents, rather than as a quantitative representation of the broader stakeholder landscape. These qualitative results serve primarily to highlight indicative trends, recurring themes, and context-specific needs, which will be complemented by further consultations, workshops, and reflexive monitoring within the LAND4CLIMATE project.

The survey responses is presented in Table 3.

Table 3 Survey response distribution by country and number of contacted stakeholders

Country	Responses	No. of contacted stakeholders
Austria	8	41
Czech Republic	4	The survey was distributed through several online platforms
Germany	2	2
Italy	4	
Romania	10	10
Slovakia	4	12

Responses were anonymized and centrally compiled using structured Excel templates. Before analysis, each dataset was examined to confirm its consistency and completeness.

While the survey captured a broad spectrum of organizations and viewpoints, limitations include:

- Overall low response rate. Originally, it was expected that each FRR could achieve at least 10 replies from local stakeholders. Given, language barriers, the level of detail required in the survey, the scale at which some FRRs operate and timing restraints this was not possible for all FRRs. Results need to be considered indicative of local stakeholders rather than representative.
- Uneven response rates across different FRRs / RRs
- Under-representation of specific stakeholder groups
- Self-reporting bias in assessing institutional capacity

The LAND4CLIMATE consortium developed an approach for stakeholder engagement that aimed to include diverse actors influencing or affected by NBS implementation (e.g. local authorities, NGOs, researchers, public agencies). However, engaging private landowners and vulnerable population groups was very challenging in practice, despite their central importance to the success of NBS on private lands.

Although private landowners were explicitly and clearly listed among the target groups and invited to respond via FRRs, their representation in the survey results was limited. This limitation may be attributed to multiple barriers like time constraints, lack of awareness about the relevance of NBS, distrust or limited connectivity with institutional networks, etc. Vulnerable population groups such as low-income residents from rural areas, elderly citizens from flood-prone areas and marginalized communities were not directly addressed through the initial survey due to some limiting factors like methodological constraints and data protection concerns. However, LAND4CLIMATE consortium recognized these limitations and the need for more efforts in the next phase to involve these key groups. Academic partners, FRRs and RRs will continue the work to identify tailored engagement strategies that could include:

- Strengthening collaboration with farmer cooperatives, social services, or local NGOs that already have established relationships with private landowners or vulnerable populations, to build trust and facilitate communication.
- Developing and implementing more accessible community-based workshops (in local language, organized in familiar settings, with participatory facilitation)
- Integrating social equity considerations in future capacity-building activities and training content.

LAND4CLIMATE team will continue to refine its stakeholder engagement framework using data from FRRs and RRs workshops and the WP5 reflexive monitoring process. This approach will ensure that the capacity-building strategy will reflect the needs and perspectives of those who are often underrepresented but crucial to climate resilience through NBS implementation on private land.

Despite these limitations, the results provided a base for developing capacity-building measures that address the needs of diverse stakeholders across the six FRRs, involved in NBS implementation at the local level.

2.5 Data analysis

Given the low and uneven response rates, particularly in some FRRs, meaningful statistical analysis is not possible. Thus, the data was analyzed through a combination of:

- Descriptive statistics (e.g., frequency of selected barriers, preferred training formats);
- Thematic content analysis for open-ended responses;

- Comparative analysis across FRRs / RRs to identify common patterns and region-specific needs.

Based on widely used frameworks for capacity assessment in climate adaptation and NBS implementation (e.g., UNDP Capacity Development Framework, EEA Urban Adaptation Report 2020, EC NBS Handbook 2021), the capacity gaps were categorized along the following key thematic areas:

- Technical and scientific expertise
- Institutional and policy capacity
- Funding and project development
- Stakeholder engagement and communication
- Monitoring and evaluation capabilities

These thematic areas reflect the core dimensions most frequently identified as critical for enabling effective design, execution and maintenance of NBS measures across diverse governance and socio-economic contexts. They also provide a logical structure for analysing capacity gaps and linking them to targeted training interventions.

3. Results of capacity needs assessment – key findings

The following chapter presents the results and interpretation of the stakeholder questionnaires conducted as part of the LAND4CLIMATE capacity needs assessment. The survey was designed to collect insights from key actors on their current capabilities, experiences and needs related to the implementation of Nature-Based Solutions (NBS).

Administered online for convenience, the questionnaire targeted stakeholders from the front-running regions (FRRs), aiming to capture a broad perspective on existing strengths, knowledge gaps and priority areas for action. The information gathered is used for identifying and addressing the most relevant capacity gaps.

3.1 Synthetic presentation of capacity needs assessment questionnaire results

3.1.1 Austria

Table 4 Capacity needs assessment results – Austria

1. Organizational background		
• Respondents represent governmental organizations (37.5%), advocacy groups (12.5%), companies (25%) and NGOs (25%). • There is a broad representation across public, private and civil society sectors. Most are based in the state of Burgenland and the surrounding districts.		
2. Responder background		
Education	Roles	Experience
Bachelor's and Master's levels dominate.	Range from mayors and department heads to conservation advisors.	In organizations: 37.5% with <5 years, 25% with >25 years. With NBS: 50% with <5 years, 25% with >10 years (indicates a mix of

<table>
<tr><td colspan="2"></td><td colspan="3">seasoned professionals and newer practitioners. Overall, we can discuss about a moderate NBS familiarity).</td></tr>
<tr><td colspan="5">3. Organization expertise</td></tr>
<tr><td>Operational domains</td><td>Organizations years of activity</td><td>NBS goals (top priorities)</td><td>Commitment</td><td>Ongoing/ Planned projects</td></tr>
<tr><td>Primarily regional (Burgenland), some national.</td><td>Varies widely (from 1 to 70 years).</td><td>Improving ecosystem services, enhancing climate resilience, biodiversity promotion and better water management.</td><td>12.5% highly committed
37.5% moderately committed
50% somewhat committed</td><td>Lafnitz river restoration; Educational and awareness projects; Agricultural and hydrological innovation (e.g., EBR modeling); Conservation within ÖPUL (Austrian agri-environmental program)</td></tr>
<tr><td colspan="5">4. Stakeholder role and involvement</td></tr>
<tr><td colspan="2">Roles</td><td colspan="2">Expertise</td><td>Motivations</td></tr>
<tr><td colspan="2">Advocacy, project implementation, technical support, education, partnership building</td><td colspan="2">Over 75% have at least 5 years of experience. Planning, design, implementation, monitoring and consultation; includes specialized skills in wetland protection and species management.</td><td>Strong environmental commitment and community benefit focus. Regulatory compliance and financial incentives are also relevant.</td></tr>
<tr><td colspan="5">5. Implementation challenges or obstacles</td></tr>
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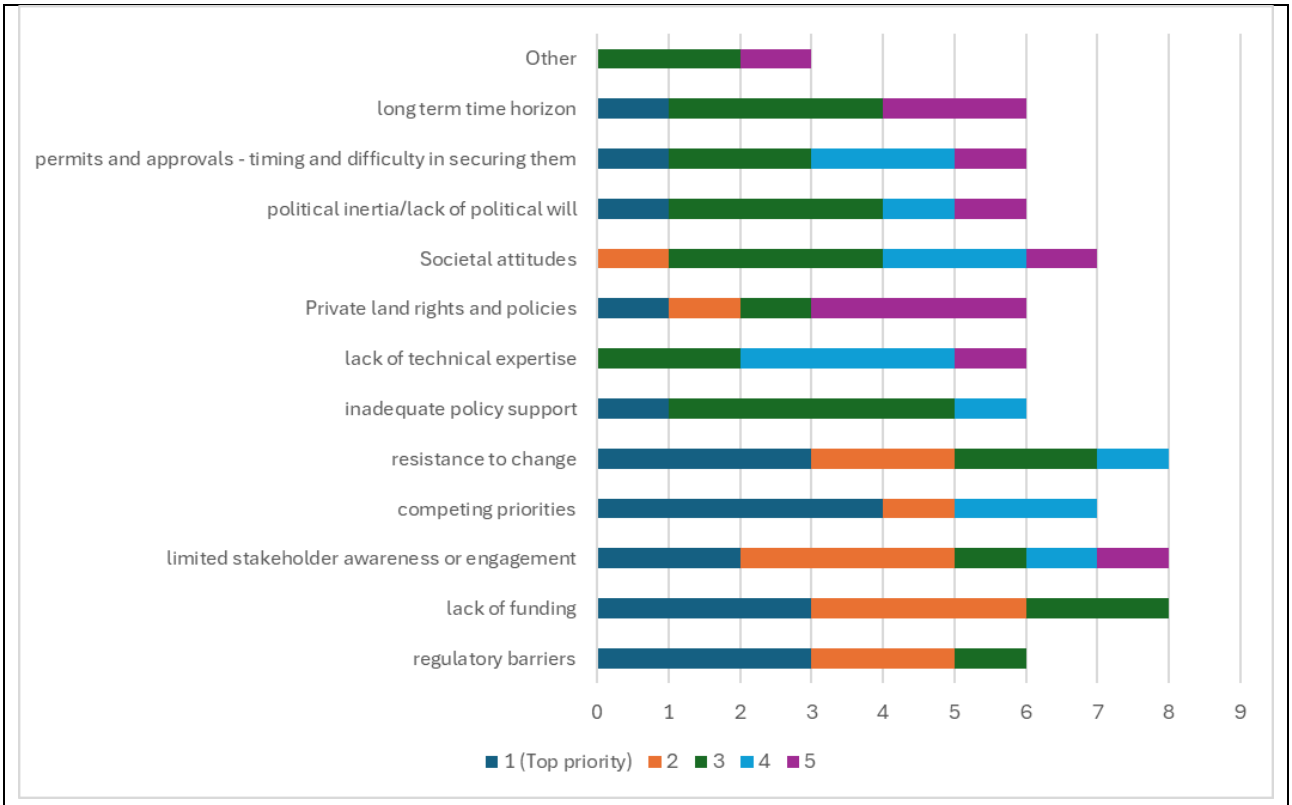


Figure 31 The principal challenges or obstacles that Austrian stakeholders encounter in the implementation of NBS projects

6. Solutions to address or mitigate the identified challenges to NBS implementation

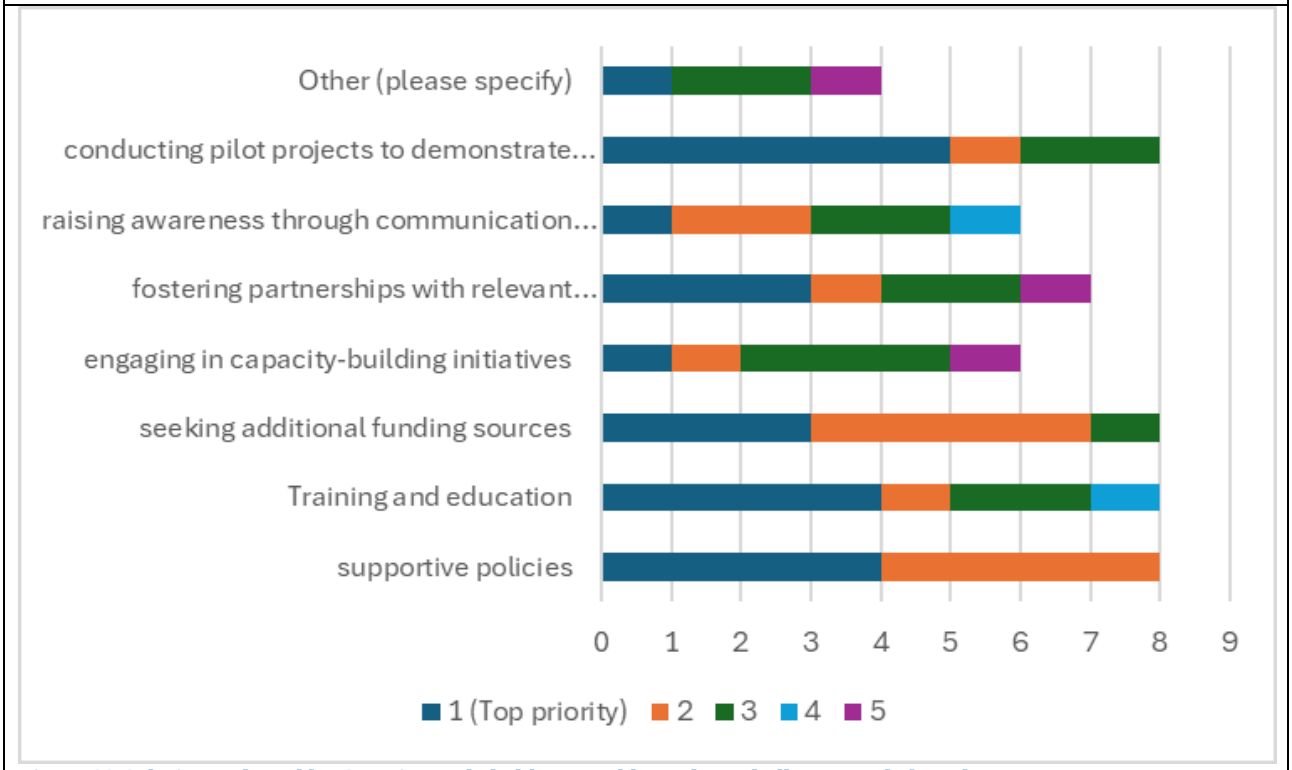


Figure 32 Solutions selected by Austrian stakeholders to address these challenges and obstacles

7. Topics that should be covered in training to support NBS implementation

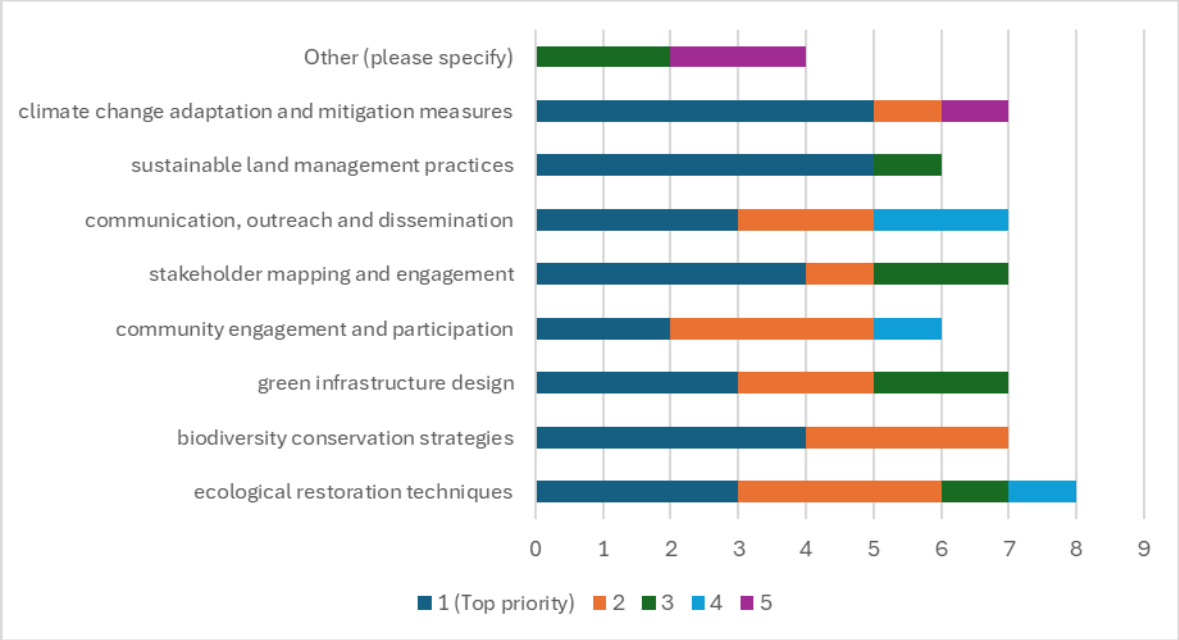


Figure 33 Topics or content that should be covered in training courses for Austrian stakeholders to implement NBS effectively

8. Preferred training format

- In-person training

9. Preferred training materials

- Most useful: Workbooks (62.5%)
- Others: Policy briefs (12.5%), technical fact sheets (12.5%) and practical experience reports (12.5%)

10. Importance of partnerships for NBS projects

- Most respondents see partnerships as important (50%) or very important (37.5%), underscoring the collaborative nature of NBS implementation.

11. Missing collaborations and underutilized partners

Figure 34 Austrian stakeholders who are crucial for successful NBS implementation but are underutilized

12. Most relevant Key Performance Indicators (KPIs) for measuring the success of NBS projects
• Biodiversity metrics (tree and species counts) • Damage reduction from droughts and floods • Area under natural water retention • Landscape water balance • Communication and stakeholder collaboration metrics
13. Monitoring and evaluation capacity of NBS initiatives
25% of stakeholders are partially equipped for monitoring and evaluation activities 25% of stakeholders are minimally equipped 25% are not equipped 12.5% are planning to outsource monitoring and evaluation activities For 12.5% monitoring and evaluation is not relevant • Mixed capacities across organizations; while some are equipped, others require new tools, resources, or systems for systematic NBS monitoring.

3.1.2 Czech Republic

Table 5 Capacity needs assessment results – Czech Republic

1. Organizational background		
Four respondents from different sectors participated: • Academia (J. E. Purkyně University) (50%) • Municipal government (Obec Staré Křečany) (25%) • NGOs or similar (České Švýcarsko o.p.s.) (25%) They represent a mix of research, education and local project implementation.		
2. Responder background		
Education	Roles	Experience
Includes researchers, project managers and	Range from associate professors to municipal project managers.	In organization: 30–50+ years institutional presence.

directors primarily in environmental geography.		With NBS: Most have <5 years of NBS experience, though one has 10–15 years.

3. Organization expertise				
Operational domains	Years of activity	NBS goals (top priorities)	Commitment	Ongoing/ Planned projects
National and local/regional operations.		Top goals include improving water management, increasing resilience to climate change and community engagement. One response emphasized scientific research and innovation.	25% moderately committed 75% somewhat committed	Range from building wetlands and waterworks to barrier analysis, university campus greening and applied research dissemination.

4. Stakeholder role and involvement		
Roles	Expertise	Motivations
Research, education, policy advocacy, project implementation and community engagement.	Mainly in planning and implementation; limited design or monitoring experience.	Environmental sustainability and innovation, Community benefits and risk management, Some financial and regulatory incentives, Responses highlight fragmented and complex motivations across organizations.

5. Implementation challenges or obstacles

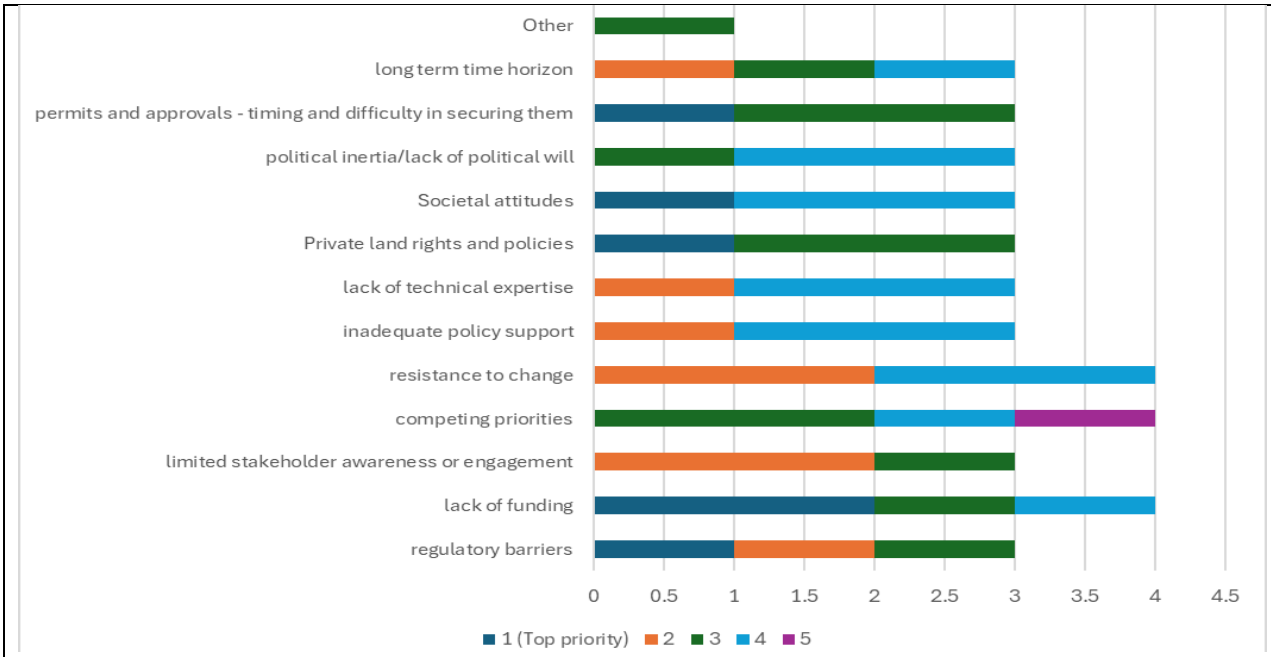


Figure 35 The principal challenges or obstacles that Czech stakeholders encounter in the implementation of NBS projects

6. Solutions to address or mitigate the identified challenges to NBS implementation

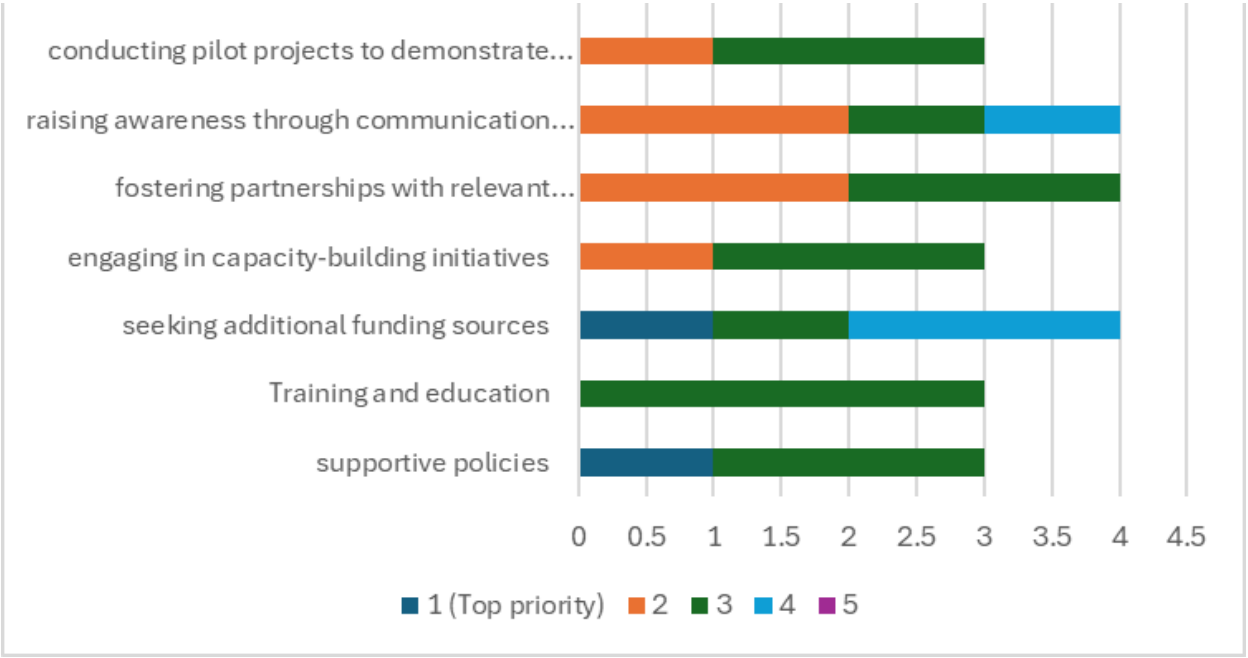


Figure 36 Solutions selected by Czech stakeholders to address these challenges and obstacles

7. Topics that should be covered in training to support NBS implementation

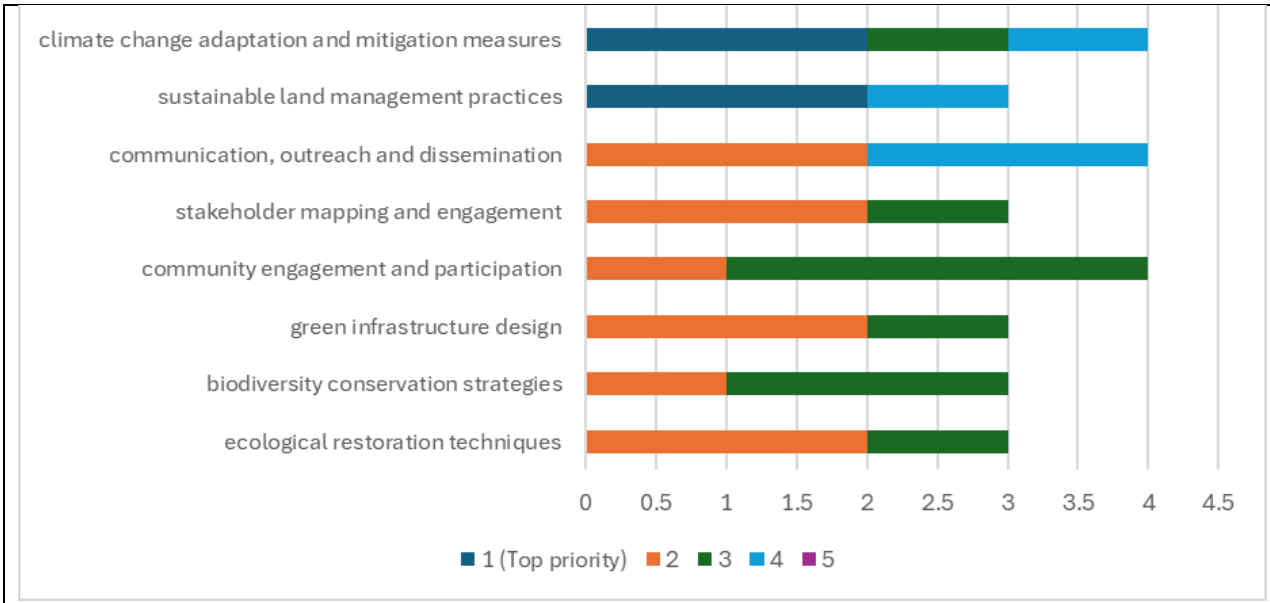


Figure 37 Topics or content that should be covered in training courses for Czech stakeholders to implement NBS effectively

8. Preferred training format

- Mixed preference:
  - 50% of respondents prefer in-person
  - 50% prefer online
- A hybrid model would best meet diverse needs.

9. Preferred training materials

- Most requested: Workbooks (50%) and technical fact sheets (50%)
- Emphasis on practicality and replicability

10. Importance of partnerships

- Rated between moderately (25%) and very important (25%)
- All respondents acknowledged the role of partnerships but not all view them as essential.

11. Missing collaborations and underutilized partners

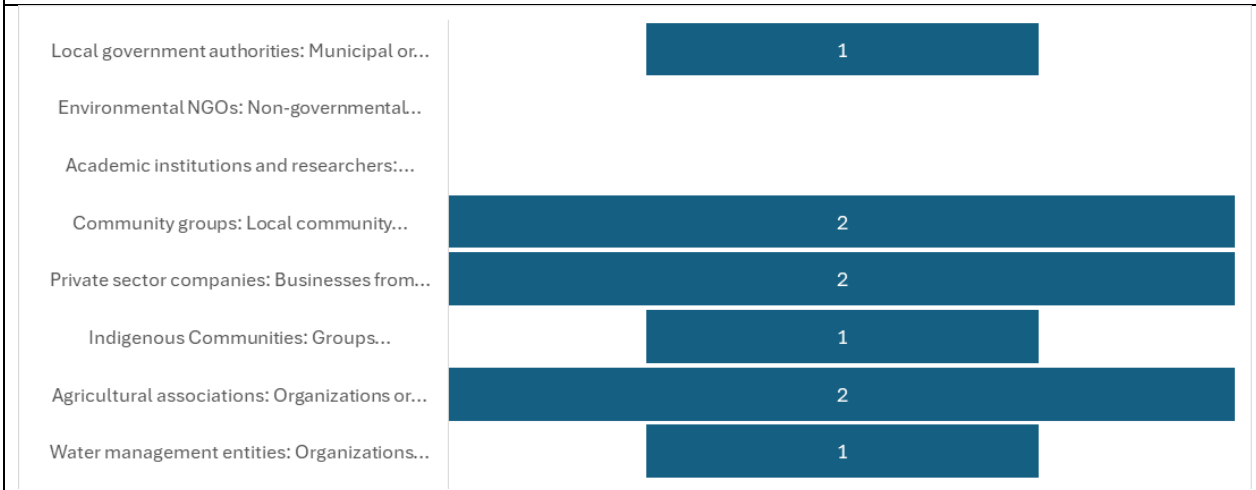


Figure 38 Czech stakeholders who are crucial for successful NBS implementation but are underutilized

12. Key Performance Indicators (KPIs)

- Hydrological and biodiversity metrics
- Public perception and acceptance
- Flood risk reduction

• Investment mobilization • Maintenance and governance mechanisms
13. Monitoring and evaluation capacity • 50% organizations are not equipped • 25% are minimally equipped • 25% are partially equipped No organization currently has a fully developed Monitoring and evaluation system, indicating a significant gap in evaluation capacity.

3.1.3 Germany

Table 6 Capacity needs assessment results – Germany

1. Organizational background				
• Academic institution (University of Bonn – Institute for Crop Science and Resource Conservation) (50%) • Non-profit organization (Miscanthus Society – MEG e.V.) (50%)				
2. Responder background				
Education	Roles	Experience		
One respondent holds a Master's, the other a Bachelor's degree.	scientific assistant in biomass cultivation and an auditor/member of a non-profit.	100% have less than 5 years of experience in their current roles, but one has 5–10 years of experience with NBS and one has 10–15 years.		
3. Organization expertise				
Operational domains	Years of activity	NBS goals (top priorities)	Commitment	Ongoing/ Planned projects
From local (Campus Klein-Altendorf) to international outreach.	15-20 years	Increasing climate resilience Carbon sequestration Political advocacy Water management	100% of organizations are highly committed to integrating NBS into their decision-making and projects.	Focus on perennial grasses (e.g., Miscanthus) for stormwater management, ecosystem services and circular bioeconomy through cascading use of biomass.
4. Stakeholder role and involvement				
Roles	Expertise	Motivations		
Technical advice, capacity building, research, education, policy advocacy, implementation.	Planning and implementation are strong Some design and monitoring present	Environmental commitment Risk management Community benefits Leadership in sustainability Innovation		

5. Implementation challenges and obstacles

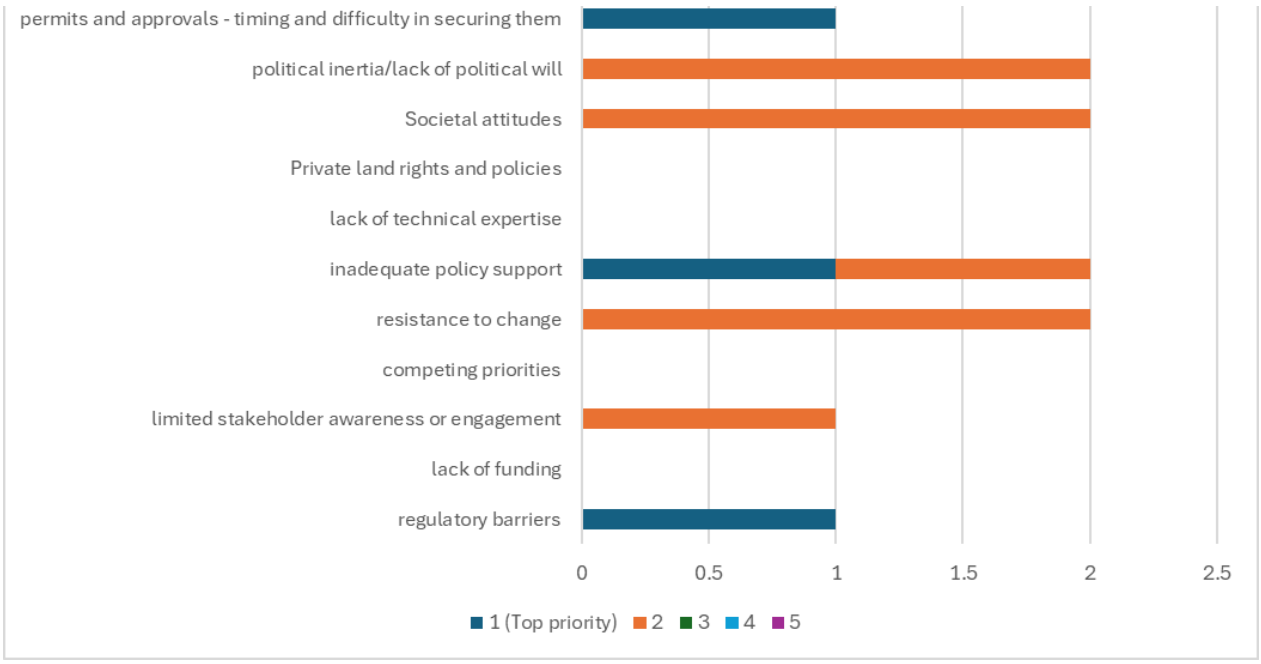


Figure 39 The principal challenges or obstacles that German stakeholders encounter in the implementation of NBS projects

6. Solutions to challenges. Top strategies

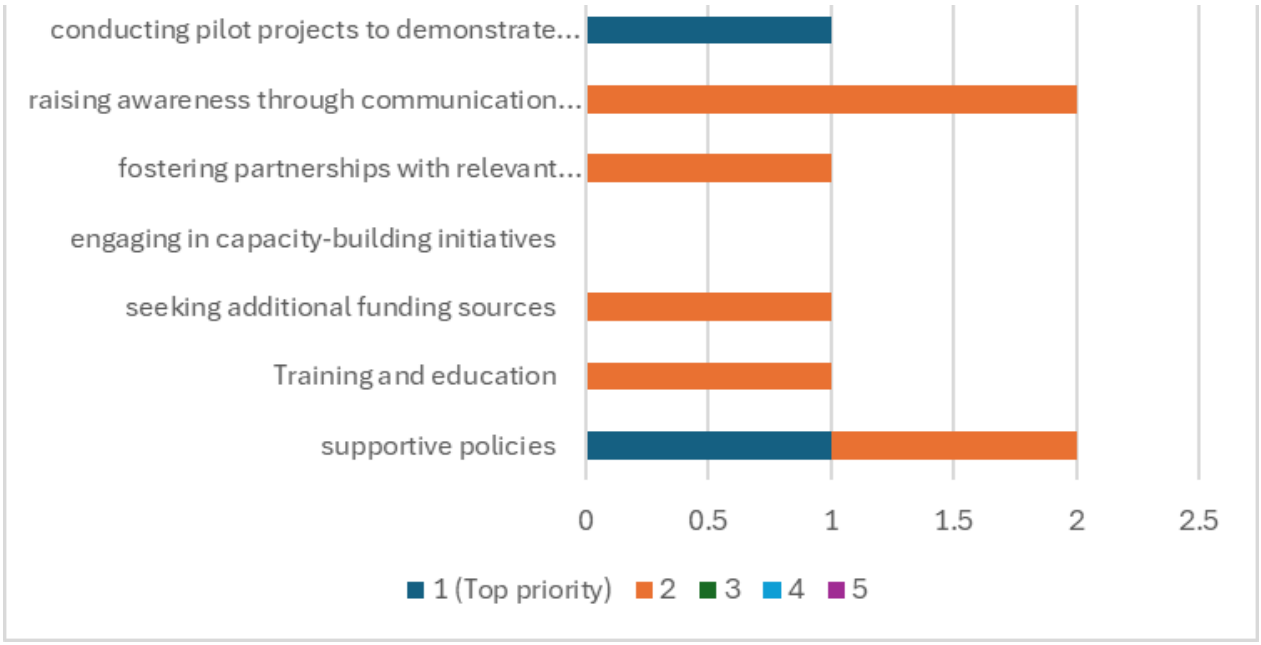


Figure 40 Solutions selected by German stakeholders to address these challenges and obstacles

7. Most relevant topics for training needs

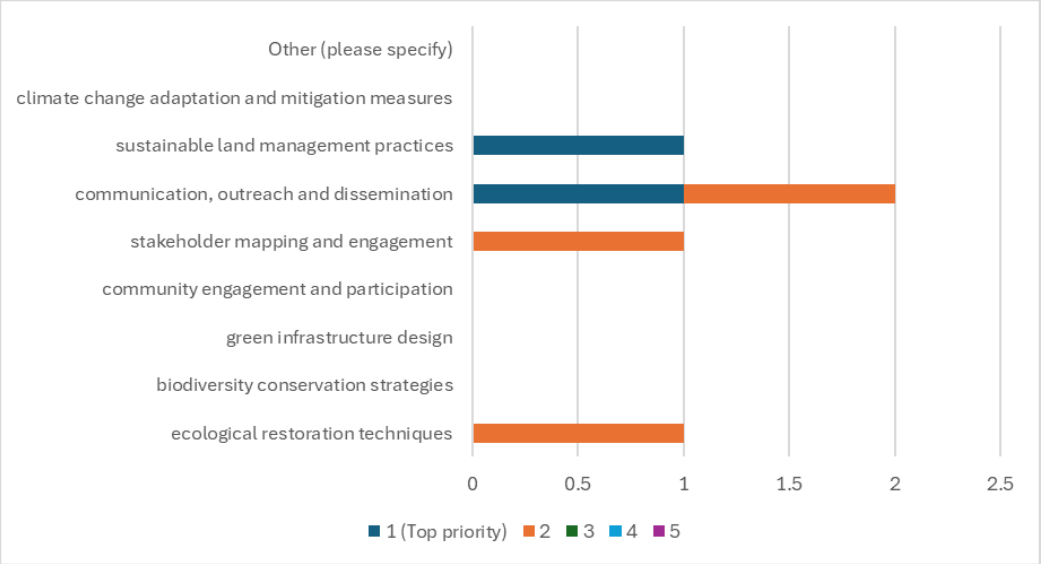


Figure 41 Topics or content that should be covered in training courses for German stakeholders to implement NBS effectively

8. Preferred training format

- Online training preferred by all respondents, pointing to flexibility and scalability as key requirements.

9. Preferred training materials

- Technical fact sheets were identified as the most useful tools (100%), with no preference for workbooks or policy briefs.

10. Importance of partnerships

- Rated as very important by both organizations, showing strong reliance on collaboration for successful NBS implementation.

11. Missing collaborations and underutilized partners

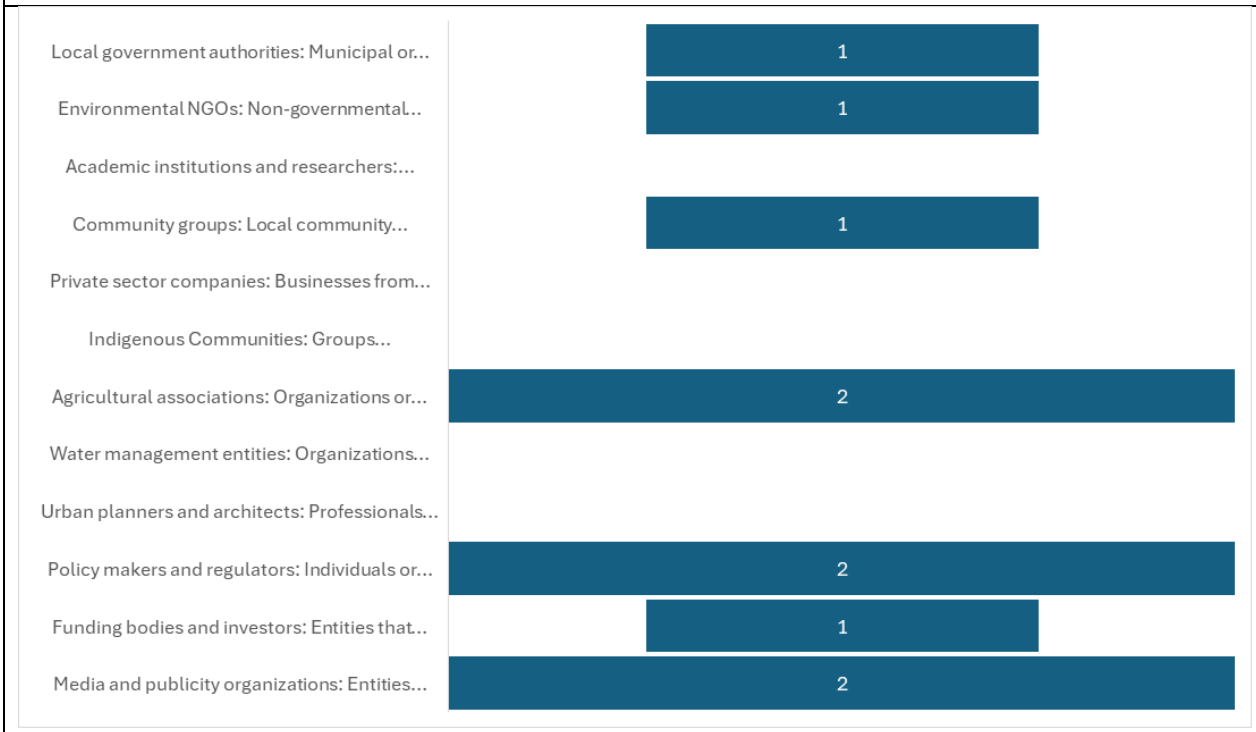


Figure 42 German stakeholders who that are crucial for successful NBS implementation but are underutilized

12. Key Performance Indicators (KPIs)
• Number of practical NBS implementations (e.g., Miscanthus areas) • Level of public and farmer acceptance • Project-based measurable outcomes
13. Monitoring and evaluation capacity
• No respondent reported being fully equipped. • 50% of responding organizations are minimally equipped, the other 50% are not equipped at all, signaling an urgent need for Monitoring and evaluation system development.

3.1.4 Italy

Table 7 Capacity needs assessment results – Italy

1. Organizational background				
Participating entities include: • Regional and municipal authorities (Regione Emilia-Romagna, UT Ferrara) • Park management authority (Delta del Po Park) • One administrative district office 75% of respondents are governmental institutions while 25% are regional administrations.				
2. Responder background				
Education	Roles	Experience		
Educational backgrounds include natural sciences, geology, geography and climate science.	Roles range from environmental officers to project managers and policy officials.	Most have substantial experience in their organizations and at least 5–10 years of experience with NBS.		
3. Organization expertise				
Operational domains	Years of activity	NBS goals (top priorities)	Commitment	Ongoing/ Planned projects
Primarily regional and coastal (Emilia-Romagna), with a focus on coastal erosion, marine ingress and park conservation.	From 11 to 50 years of operational activity.	Climate resilience, ecosystem services, water management.	25% highly committed 25% moderately committed 50% somewhat committed	Coastal nourishment using offshore sands Implementation of adaptation strategies (e.g., GIDAC Strategy) Participation in ongoing NBS projects like LAND4CLIMATE
4. Stakeholder role and involvement				
Roles	Expertise	Motivations		
Strong across project implementation, technical support, environmental monitoring and networking.	Most organizations cover full-cycle NBS implementation: planning, design, implementation, monitoring and maintenance.	Environmental commitment and risk management are dominant. Also driven by funding availability, regulatory		

		compliance and community benefits.

5. Implementation challenges and key barriers

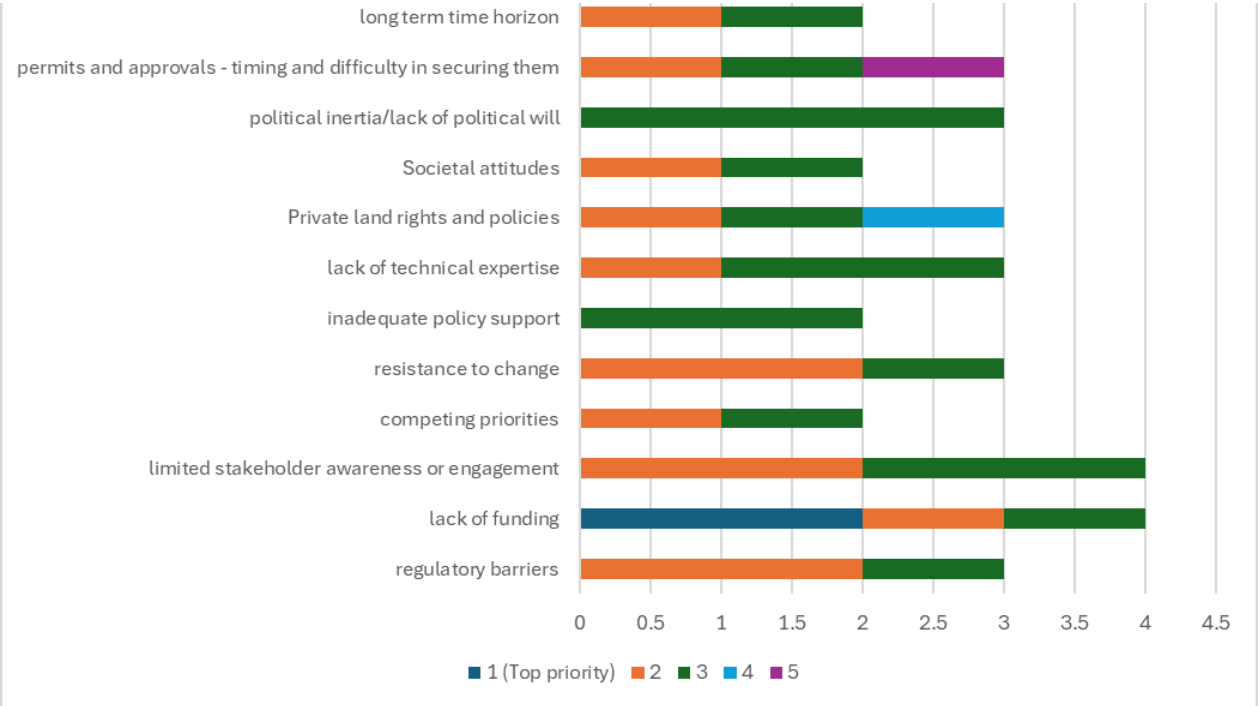


Figure 43 The principal challenges or obstacles that Italian stakeholders encounter in the implementation of NBS projects

6. Solutions to challenges. Top strategies

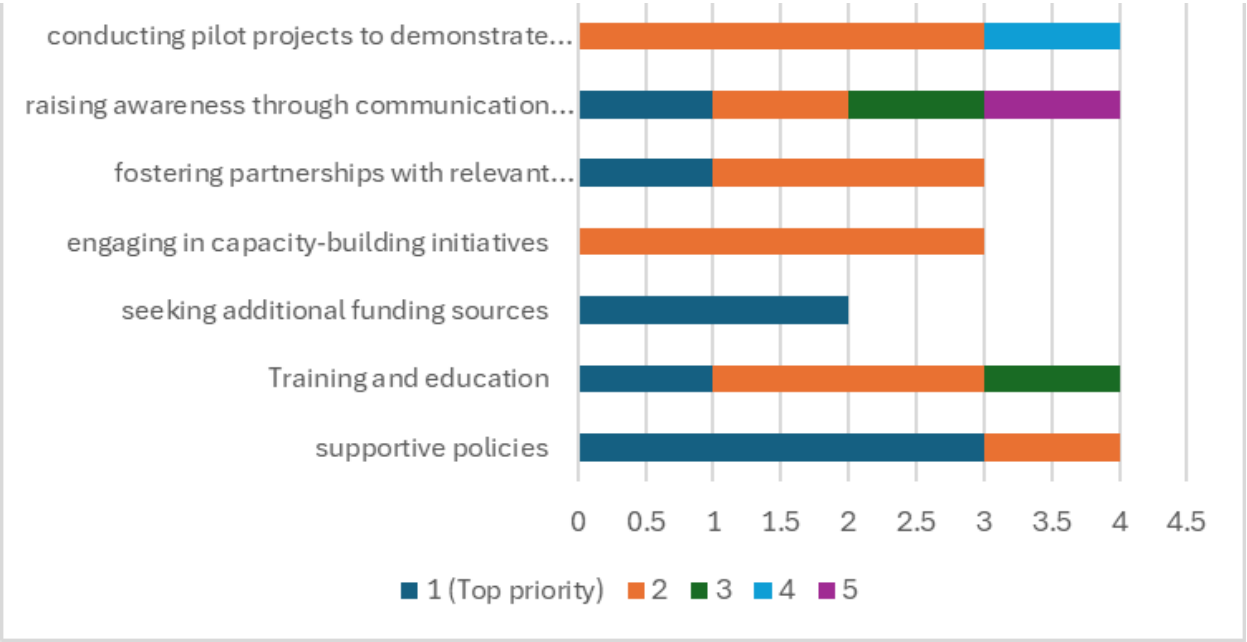


Figure 44 Solutions selected by Italian stakeholders to address these challenges and obstacles

7. Most relevant topics for training needs

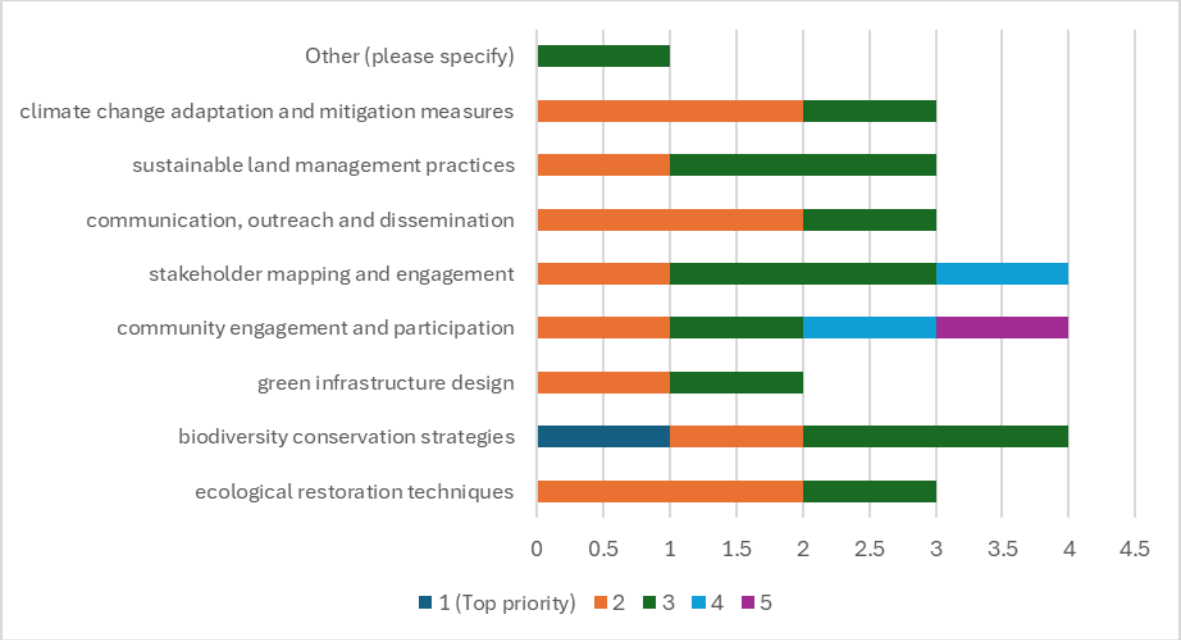


Figure 45 Topics or content that should be covered in training courses for Italian stakeholders to implement NBS effectively

8. Preferred training format
• Unanimous preference for in-person training
9. Preferred training materials
Preferred resources: • Workbooks (75%) • Integrated, comprehensive learning materials (combining technical sheets, briefs, etc.) (25%)
10. Importance of partnerships
• Rated very important (50%) or important (50%) by all participants.
11. Missing collaborations and underutilized partners

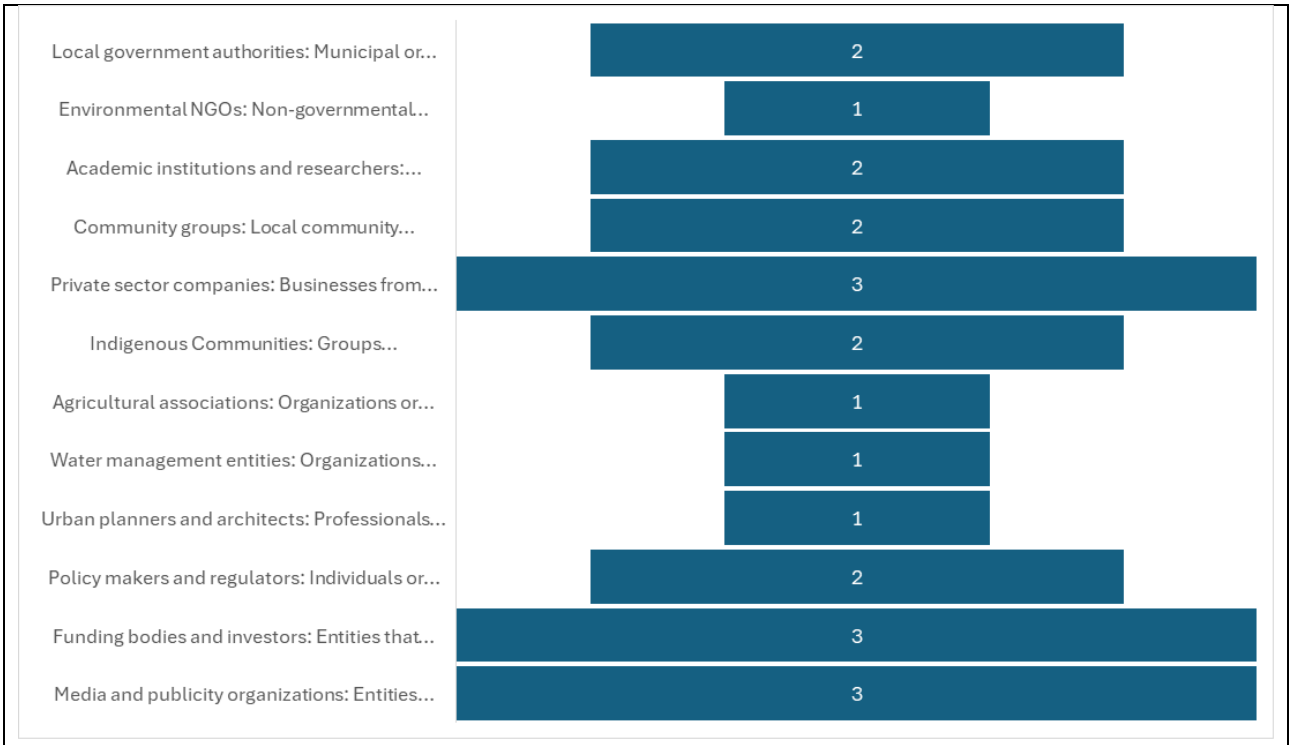


Figure 46 Italian stakeholders who are crucial for successful NBS implementation but are underutilized

12. Key Performance Indicators (KPIs)
• Risk reduction • Environmental and economic sustainability • Landscape impact • Adaptability and reversibility • Climate mitigation and land protection outcomes
13. Monitoring and evaluation capacity
• 25% of responding organizations are fully equipped • 25% of responding organizations are partially equipped • 25% of responding organizations are minimally equipped • 25% of responding organizations are planning to outsource

3.1.5 Romania

Table 8 Capacity needs assessment results – Romania

1. Organizational background		
• NGOs (e.g., Verde de Banat, Rewilding Foundation) (20%) • Local public institutions (e.g., Timis County Council, Găvojdia, Săcălaz, Timișoara Municipalities) (40%) • Private companies (e.g., Campo D'Oro, COMTIM Romania) (20%) • Academia (University of Life Sciences Timisoara) (10%) • Public institution of national interest (Banat Water Basin Administration) (10%)		
2. Responder background		
Education	Roles	Experience
Balanced distribution of bachelor's (40%), master's (30%) and PhDs (30%).	Range from technical directors and inspectors to environmental managers and researchers	Most have 5–10 years working in their organization. 70% have over 5 years of experience with NBS.

3. Organization Expertise

Operational domains	Years of activity	NBS goals (top priorities)	Commitment	Ongoing/ Planned projects
Environmental protection, water and land management, agriculture, hydrology, urban governance and conservation	Several institutions have more than 30 years of experience	Enhance ecosystem services Improve climate resilience Improve water management Promote biodiversity Sustainable urban development	50% of organizations are highly committed 40% moderately committed 10% somewhat committed	Urban greening in Timișoara (green ring), River restoration in Banat, Agricultural drainage and rainwater reuse, Biodiversity improvement on Bega Veche River

4. Stakeholder role and involvement

Roles	Expertise	Motivations
Strong focus on policy advocacy, community engagement and environmental monitoring. Also active in project implementation and technical support.	Planning and implementation: high (60%) Design and monitoring: moderate (30%) Some gaps in maintenance	Environmental commitment Community benefit Regulatory compliance Risk management Innovation and reputation

5. Implementation challenges and key barriers

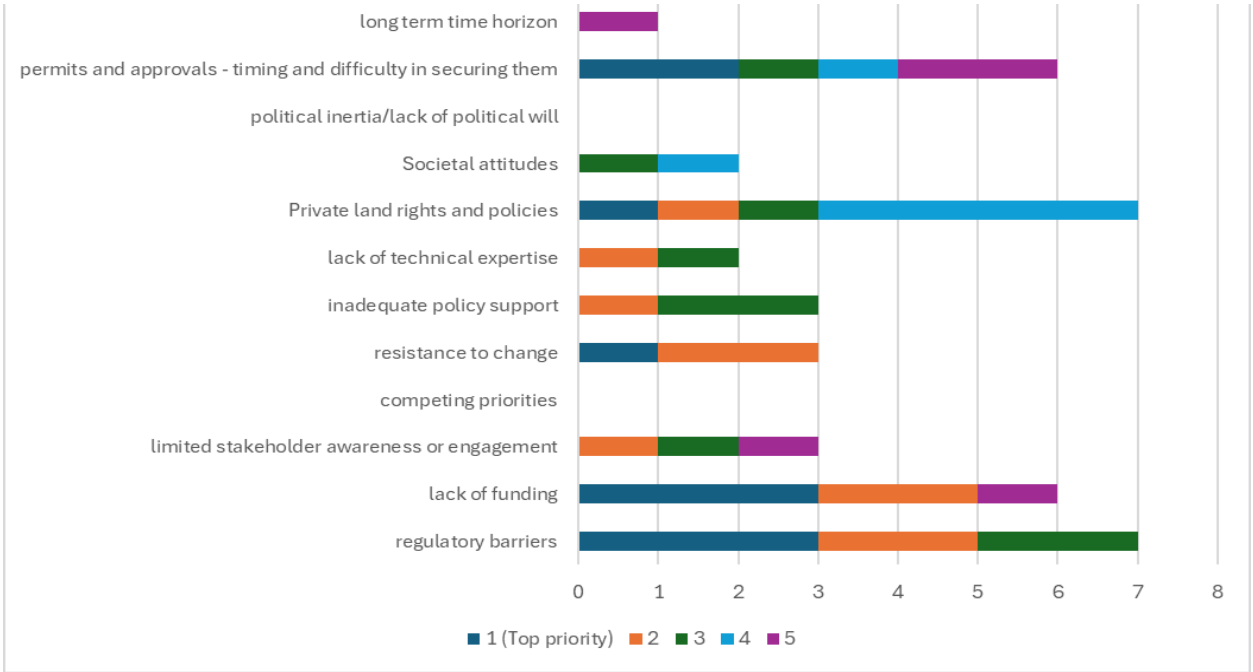


Figure 47 The principal challenges or obstacles that Romanian stakeholders encounter in the implementation of NBS projects

6. Solutions to challenges. Top strategies

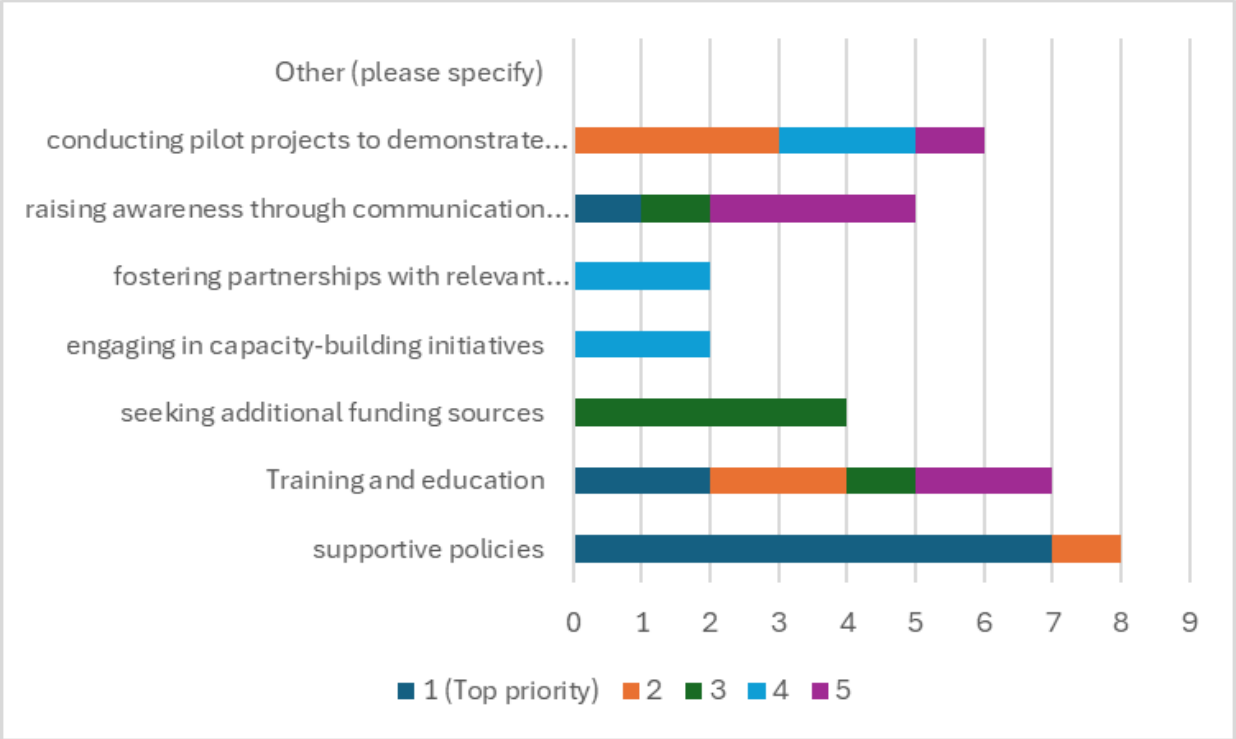


Figure 48 Solutions selected by Romanian stakeholders to address these challenges and obstacles

7. Most relevant topics for training needs

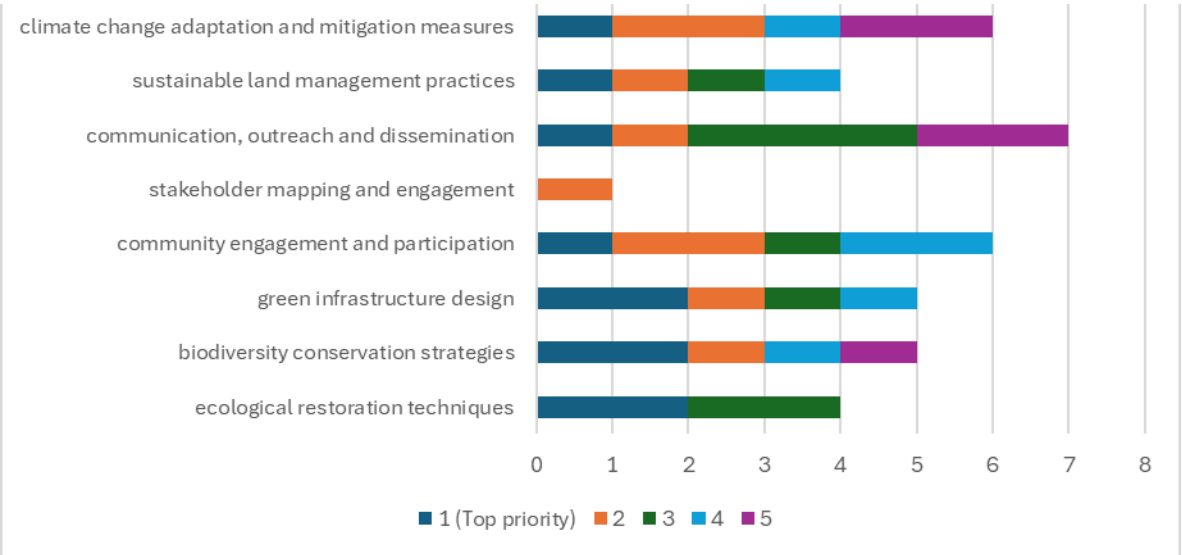


Figure 49 Topics or content that should be covered in training courses for Romanian stakeholders to implement NBS effectively

8. Preferred training format

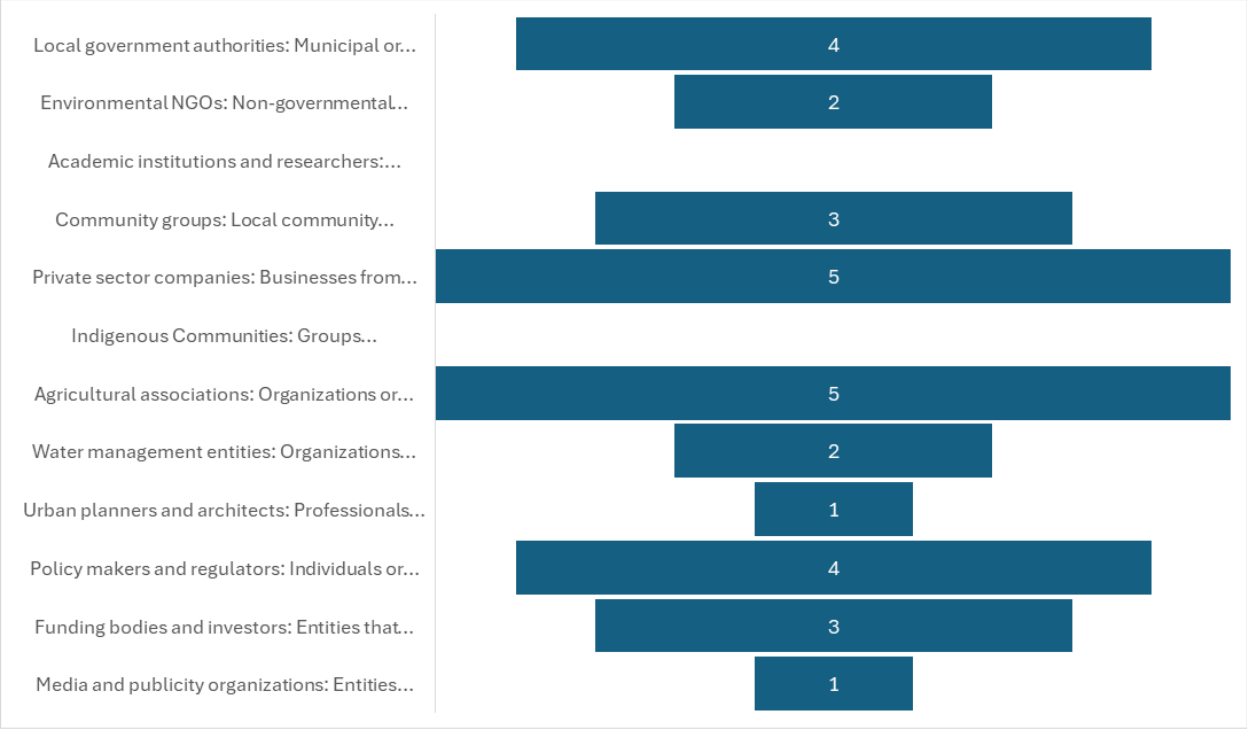
- In-person training (90% preferred this format)

9. Preferred training materials

Most valued:

- Policy briefs (80%)
- Technical fact sheets (60%)
- Workbooks (50%)
- Suggestion for integrated digital training resources

10. Importance of partnerships

• 9 out of 10 rated partnerships as very important
11. Missing collaborations and underutilized partners
 **Figure 50 Romanian stakeholders who are crucial for successful NBS implementation but are underutilized**
12. Key Performance Indicators (KPIs)
• Biodiversity metrics (e.g., number of trees, hectares reforested) • Public engagement (e.g., volunteer numbers, satisfaction) • Climate risk reduction • Project efficiency (time, budget) • Long-term socio-economic and ecological impact
13. Monitoring and evaluation capacity
• 20% of responding organizations are fully equipped with monitoring and evaluation tools • 20% are partially equipped • 20% are minimally equipped • 30% are not equipped • 10% are planning to outsource

3.1.6 Slovakia

Table 9 Capacity needs assessment results – Slovakia

1. Organizational background		
• government (City of Košice) (25%) • academic (Technical University of Košice) (25%) • regional authority (Košice self-governing region) (25%) • private sector (BeePartner). (25%)		
2. Responder background		
Education	Roles	Experience
Respondents hold master's or PhDs	strategic planning, project management and research	Most have been in their organizations for less

		than 10 years and worked with NBS for 5–10 years.

3. Organization expertise

Operational domains	Years of activity	NBS goals (top priorities)	Commitment	Ongoing/ Planned projects
Activities range from local to EU-level.	Active from 4 to 23 years.	sustainable urban development, water management and community engagement.	25% highly committed, 75% moderately committed organizations.	Include green infrastructure in cities, regional NBS in schools, EU-funded cross-sectoral resilience programs and ecosystem service markets.

4. Stakeholder role and involvement

Roles	Expertise	Motivations
Project implementation, advocacy, community education, partnerships and technical assistance.	Strong in planning; some design, implementation and monitoring skills present.	Environmental commitment and funding dominate, with some weight on community benefits, risk management and innovation.

5. Implementation challenges and key barriers

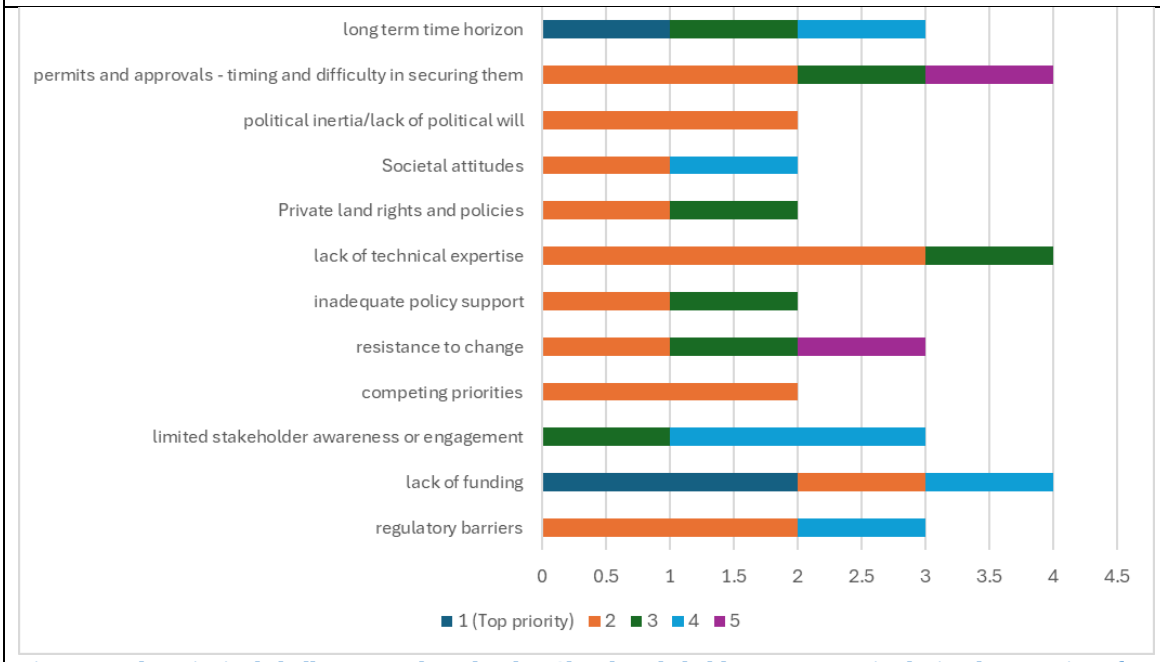


Figure 51 The principal challenges or obstacles that Slovak stakeholders encounter in the implementation of NBS projects

6. Solutions to challenges. Top strategies

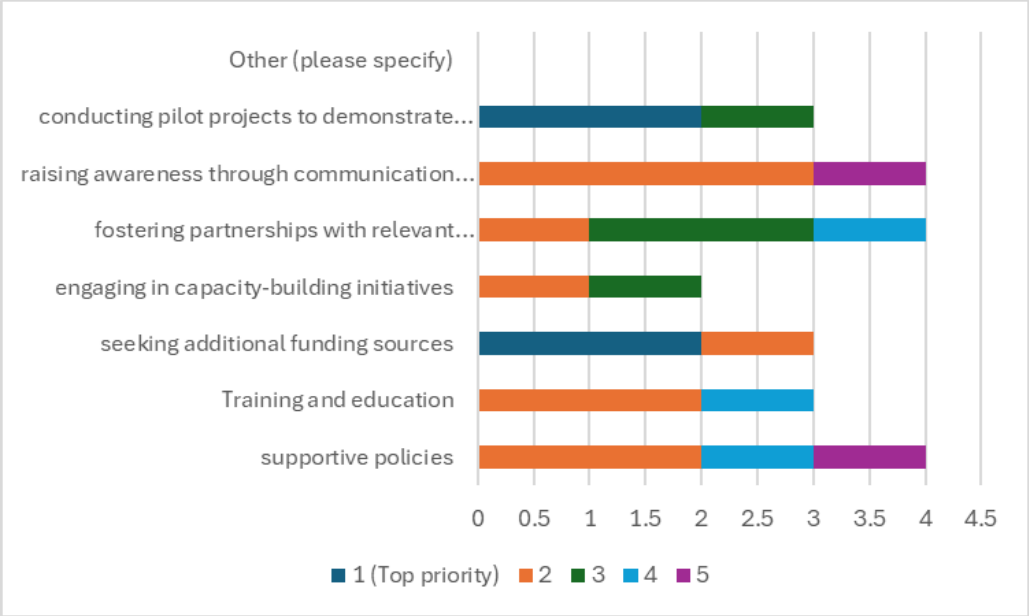


Figure 52 Solutions selected by Slovak stakeholders to address these challenges and obstacles

7. Most relevant topics for training needs

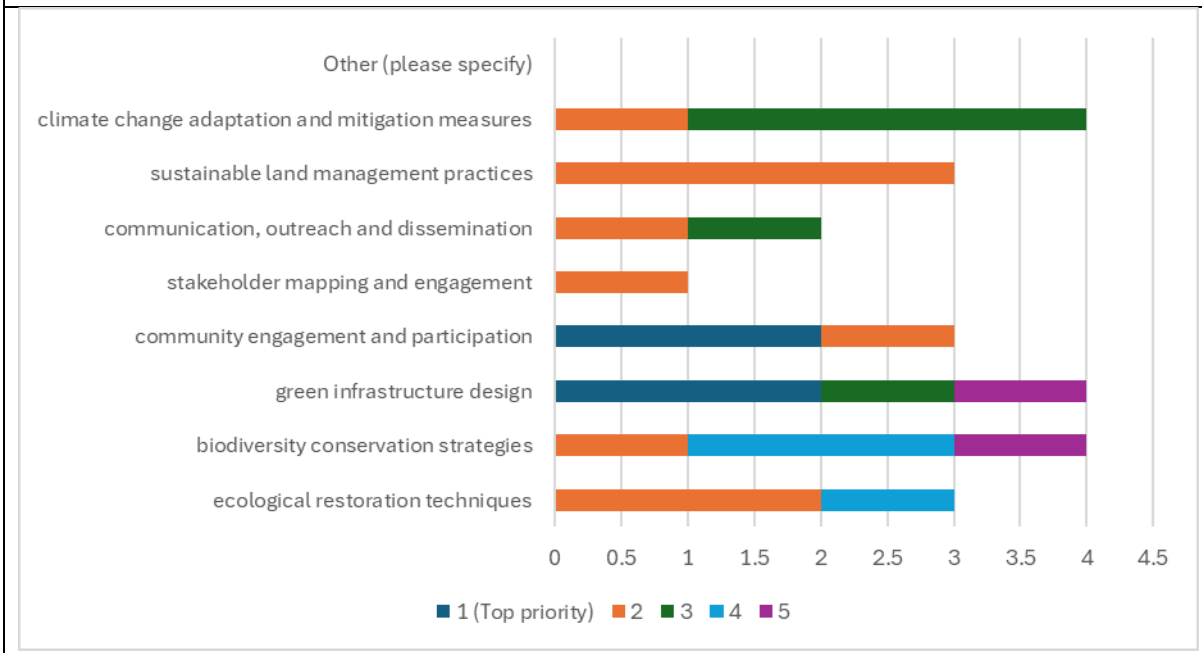


Figure 53 Topics or content that should be covered in training courses for Slovak stakeholders to implement NBS effectively

8. Preferred training format

- Split preference: 50% for in-person training, 50% for online training, indicating hybrid formats may be most inclusive.

9. Preferred training materials

- Most Useful: Technical fact sheets (75%)
- Others: Policy briefs (25%)

10. Importance of partnerships

- All respondents rated partnerships as moderately (25%) to very important (50%), reinforcing the collaborative nature of successful NBS.

11. Missing collaborations and underutilized partners

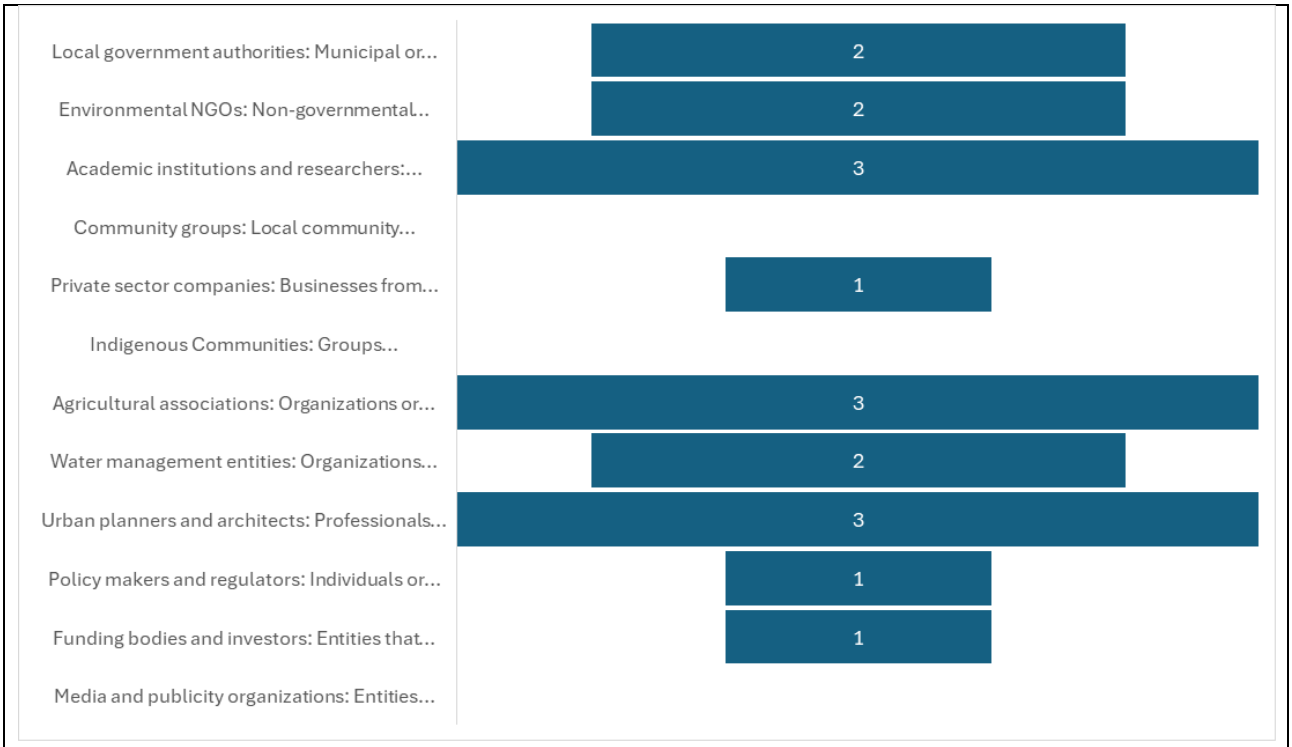


Figure 54 Slovak stakeholders who are crucial for successful NBS implementation but are underutilized

12. Key Performance Indicators (KPIs)
• Green space metrics • Biodiversity increase • Climate resilience • Stakeholder participation • CO_2 reduction
13. Monitoring and evaluation capacity
• 25% of the contacted stakeholders are fully equipped for monitoring and evaluation. • 50% are partially equipped. • 25% are still in planning stages. This reflects a critical gap in consistent evaluation of NBS impacts.

3.1.7 Key findings

The most common challenges or obstacles that stakeholders encounters in the implementation of NBS projects are (see figure 26):

- Lack of funding
- Resistance to change
- Permits and approvals – timing and difficulty in securing them
- Private land rights and policies
- Limited stakeholder awareness or engagement.

The preferred solutions to overcome these challenges are (see figure 27):

- Supportive policies;
- Conducting pilot projects to demonstrate effectiveness
- Raising awareness through communication campaigns
- Training and education
- Fostering partnerships with relevant stakeholders.

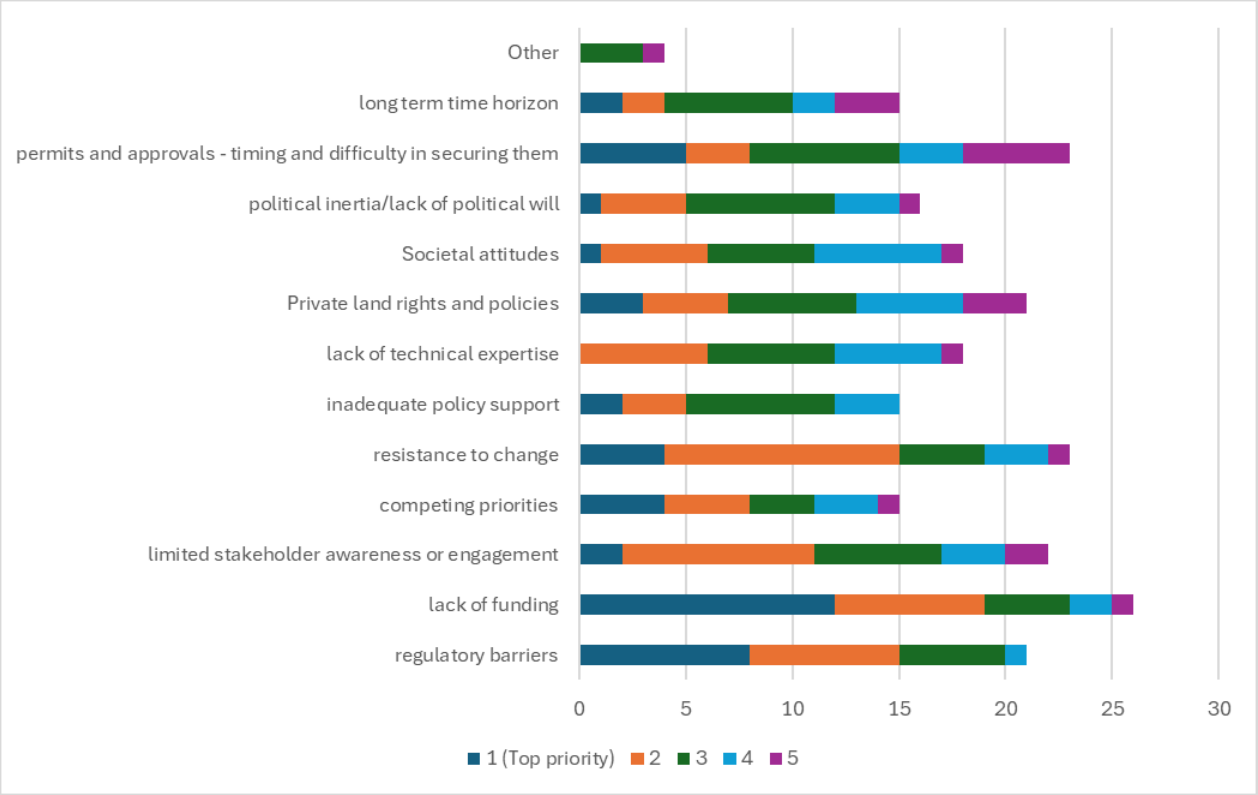


Figure 55 The principal challenges or obstacles that stakeholders encounter in the implementation of NBS projects (situation at the consortium level)

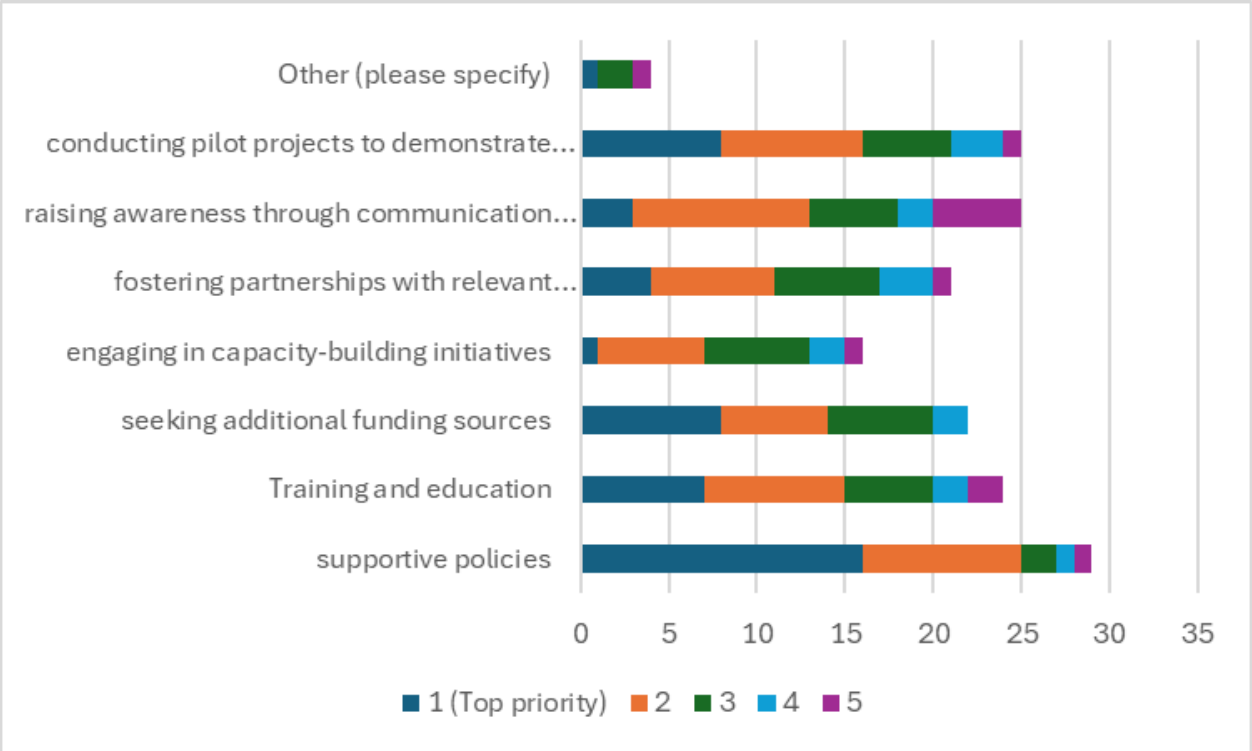


Figure 56 Solutions selected by stakeholders to address these challenges (situation at the consortium level)

The most relevant topics to be included in the training courses are (see figure 28):

- Communication, outreach and dissemination
- Climate change adaptation and mitigation measures
- Community engagement and participation
- Biodiversity conservation strategies
- Green infrastructure design.

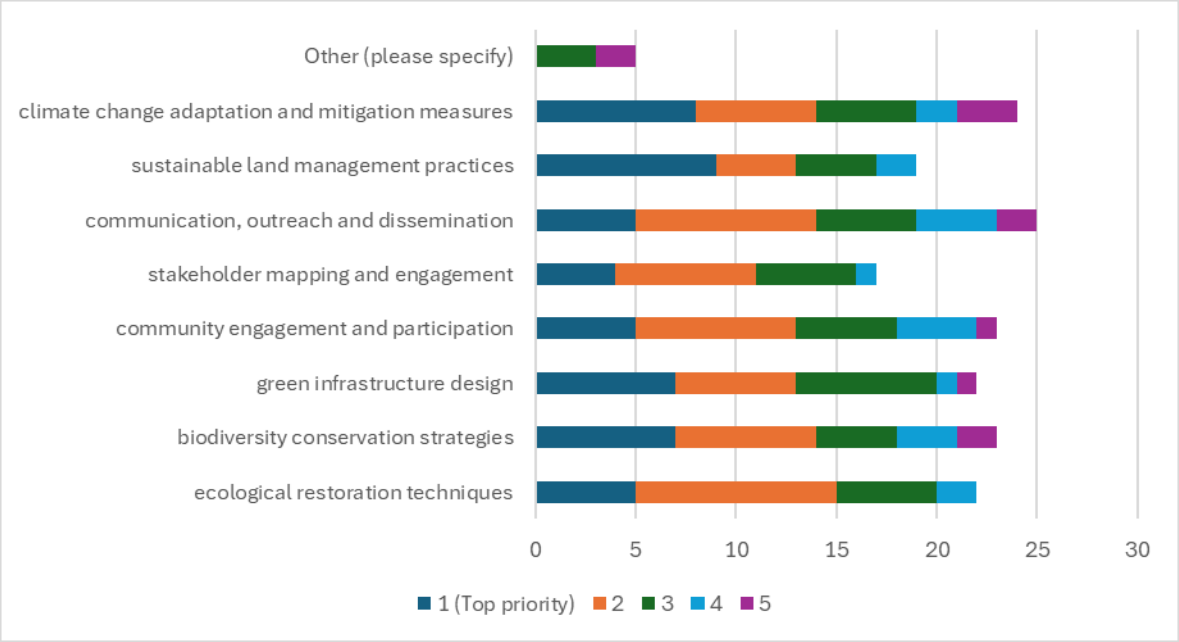


Figure 57 Topics or content that should be covered in training courses to implement NBS effectively (situation at the consortium level)

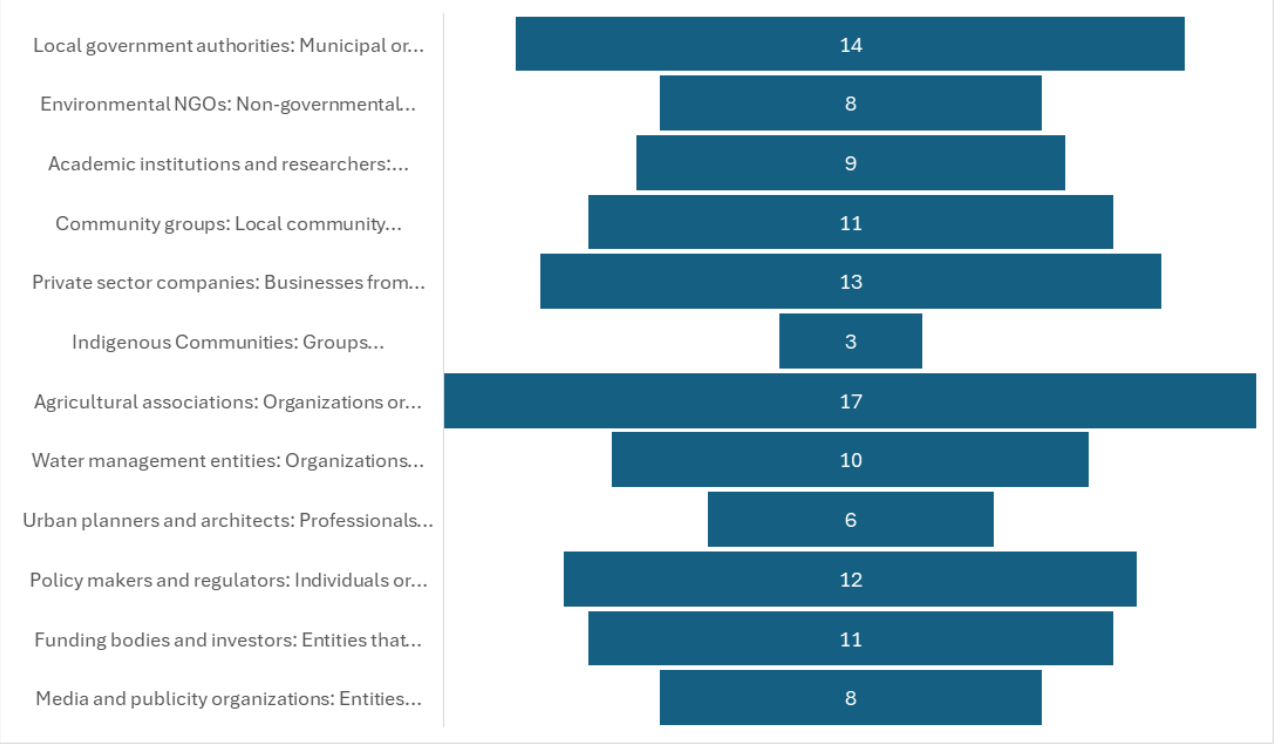


Figure 58 Stakeholders who are crucial for successful NBS implementation but are underutilized (situation at the consortium level)

At the consortium level, the most underutilized stakeholders are (see figure 29):

- Agricultural associations
- Local government authorities
- Private sector companies
- Policy makers and regulators
- Community groups.

Figures 26 – 29 show that despite regional variations, the six FRRs face shared systemic barriers in governance, financing, and stakeholder engagement. This justifies a dual approach: common training modules addressing these cross-cutting issues, combined with region-specific adaptations to reflect local conditions.

3.2 Cross-cutting capacity needs (common to all FRRs)

The capacity needs assessment revealed several recurring challenges and gaps shared across all six FRRs. Despite differences in local governance, landscape types and NBS priorities, the following cross-cutting needs are summarized in Table 10.

Table 10 Cross-cutting capacity needs across all six FRRs

Main challenges	Key needs	Comments
Technical and scientific knowledge	Stakeholders across regions emphasized the need for more robust technical understanding of NBS: • Ecological restoration techniques • Green-blue infrastructure design • Climate adaptation and mitigation strategies • hydrological modeling and soil-water interactions	In several FRRs, local authorities and practitioners expressed difficulty in applying theoretical NBS concepts to specific land types or ecosystems due to lack of contextual technical guidelines and training.
Monitoring and evaluation (Monitoring and evaluation) capabilities	Monitoring NBS performance was reported as a major skill shortage. Many stakeholders, particularly municipalities and small NGOs, lack: • Clear indicators to measure success (e.g., biodiversity metrics, resilience outcomes) • Tools and methodologies for long-term monitoring • Internal staff or units dedicated to evaluation	In most FRRs, monitoring is either outsourced, underfunded, or entirely absent, which undermines both impact assessment and replication of successful NBS interventions.
Stakeholder engagement and participatory planning	Although community involvement is recognized as a success factor, stakeholders reported limited experience with: • Co-creation processes and participatory governance • Stakeholder mapping and facilitation techniques • Conflict resolution related to land ownership or land use changes	A few FRRs reported difficulties in involving private landowners, farmers and less-represented groups, despite their essential role in NBS success.

Understanding of policy and regulation	Several respondents identified fragmentation of regulations, lack of legal recognition for NBS and difficulties in obtaining permits as barriers. Common issues include: • Need for alignment and integration between environmental, urban and agricultural policies to enable coherent NBS implementation • Long approval processes for NBS-related interventions • Limited integration of NBS into land use and spatial planning frameworks	In several countries, respondents called for clearer regulatory frameworks and cross-sectoral coordination.
Financial and operational issues	Stakeholders widely reported challenges in: • Accessing long-term, flexible funding for NBS (beyond pilot projects) • Building economic cases for NBS investment • Navigating the complexity of EU and national funding schemes	Particularly for small municipalities and civil society actors, limited internal financial capacity and reliance on external consultants hinder NBS project development.
Internal institutional capacity	• Many institutions, especially at the local level, face: • Low staffing • Lack of designated roles for NBS management • Minimal cross-departmental collaboration	This results in fragmented implementation efforts and reduces the institutional resilience needed to support long-term NBS strategies.
Tailored training and knowledge exchange	• All FRRs expressed strong interest in tailored capacity-building programs that are: • Context-specific (adapted to local ecosystems and governance structures) • Practice-oriented (focused on real-world application and case studies) • Delivered through interactive formats (field visits, peer exchange, hands-on workshops)	There is a clear demand for learning from other regions and scaling up good practices across the EU.

3.3 Region-specific findings

This section presents the capacity needs assessment results for each of the six FRRs participating in LAND4CLIMATE. Drawing on the stakeholder survey responses and their qualitative interpretation, the region-specific analysis highlights the unique strengths, gaps, priorities, and contextual factors influencing NBS implementation in each territory.

By examining the findings at the regional level, the report captures variations in governance structures, technical expertise, stakeholder engagement practices, funding availability and monitoring capacities. This disaggregated view enables a more accurate understanding of local realities and supports the development of tailored capacity-building interventions.

For each region, the results are presented in a standardized format to ensure comparability, followed by a synthesis of the main implications for designing targeted training modules and support measures. Together, these region-specific insights form a critical input for shaping flexible yet coherent capacity-building pathways that respond to both shared and context-specific challenges across the LAND4CLIMATE network. The summary of the main gaps and barriers provides a relevant indication for the training topics that should be considered for each FRR.

3.3.1 Austria

Capacity needs assessment for NBS projects aimed to be implemented by key stakeholders in Austria

Table 11 Capacity needs assessment for NBS projects aimed to be implemented by key stakeholders in Austria

NBS type / project	Key stakeholders Involved	Required competencies	Main gaps and barriers
Lafnitz River Restoration	Local municipalities (Eltendorf, Königsdorf, Deutsch Kaltenbrunn), NGOs (Naturschutzbund, Verein Berta), farmers, consultants	Hydrology, land-scape planning, floodplain ecology, participatory approaches	Regulatory complexity, funding limitations, technical expertise gaps, fragmented land ownership, local resistance to change
EBR retention modeling (Wolfersgrabenbach)	Agricultural Chamber Burgenland (LK Burgenland), local farmers, consultants	Agricultural hydrology, land management, hydrological modeling, cross-ownership mediation	Need for technical modeling skills, land-use negotiation gaps, limited understanding of multifunctional land use
LAND4CLIMATE Lafnitztal	Local authorities, planners, NGOs, academic partners	Integrated planning, stakeholder engagement, climate adaptation strategies	Limited interdisciplinary coordination, insufficient participatory planning methods, weak institutional commitment
Awareness and education projects (community-based)	Local schools, NGOs, municipalities	Communication, participatory planning, environmental education	Lack of educational materials, insufficient local engagement mechanisms, low communication capacity
Wetland establishment and	ÖPUL program managers, landowners, NGOs	Species and habitat monitoring, policy	Monitoring system limitations, unclear cross-sector

conservation (ÖPUL Areas)		alignment, subsidy program management	alignment, insufficient awareness of biodiversity benefits

3.3.2 Czech Republic

Table 12 Capacity needs assessment for key NBS projects and stakeholders in Czech Republic

NBS type / project	Key stakeholders involved	Required competencies	Main gaps and institutional/ Cultural barriers
Wetlands and waterworks projects	J. E. Purkyně University, local municipalities (e.g., Obec Staré Křečany), České Švýcarsko o.p.s. (NGO)	Hydrology, wetland ecology, landscape planning, construction and hydraulic management	Limited funding, low technical expertise in hydrology, permitting barriers, fragmented knowledge sharing, underdeveloped Monitoring and evaluation systems
River barrier removal (e.g., open river-type)	Local authorities, NGOs, river basin managers, community groups	River engineering, biodiversity monitoring, stakeholder consensus building	Resistance to change, fragmented land ownership, insufficient technical capacity, stakeholder influence gaps
University campus greening	J. E. Purkyně University (UJEP), university administration, local planners	Urban green infrastructure design, sustainable landscaping, student engagement, public awareness	Lack of design/maintenance skills, limited funding, weak community involvement

3.3.3 Germany

Table 13 Capacity needs assessment for key NBS projects and stakeholders in Germany

NBS type / project	Key stakeholders involved	Required competencies	Main gaps and institutional/ cultural barriers
Miscanthus and perennial grass systems for stormwater retention and biomass reuse	University of Bonn (INRES), Miscanthus Society (MEG e.V.), researchers, technical advisors, NGOs	Knowledge of biomass cultivation, stormwater management, climate resilience planning, carbon modeling	Low public and political awareness, weak monitoring and evaluation (Monitoring and evaluation) systems, limited outreach capacity, lack of trained personnel, minimal engagement beyond expert circles
Cascading use of crops (e.g., circular	Research institutions, agricultural	Resource-efficient biomass processing,	Fragmented inter-sectoral collaboration, lack of policy alignment,

bioeconomy projects)	associations, policymakers, investors	systemic innovation planning, market linkage for sustainable products	limited public communication capacity
Climate resilience and water management strategies	University departments, NGOs, local municipalities	Integrated land use planning, hydrological engineering, ecosystem service modeling	Political inertia, insufficient stakeholder coordination, underdeveloped institutional support for implementation
Carbon sequestration initiatives	Academic institutions, NGOs, landowners, policy stakeholders	Carbon tracking and modeling, vegetation selection, ecosystem integration	Absence of policy incentives, limited public-private partnerships, poor integration into local/regional development frameworks

3.3.4 Italy

Table 14 Capacity needs assessment for key NBS projects and stakeholders in Italy

NBS project	Key stakeholders involved	Required competencies	Main gaps and institutional/ cultural barriers
Coastal nourishment with offshore sands	Regione Emilia-Romagna, UT Ferrara (Civil Protection Agency), technical consultants, local municipalities	Coastal engineering, marine sediment management, GIS modeling, impact monitoring	Complex permitting processes, limited funding, insufficient integration into long-term urban planning, low stakeholder engagement
Wetland creation and riparian restoration	Delta del Po Park Authority, water management entities, local authorities, farmers, NGOs	Hydrology, biodiversity monitoring, wetland ecology, landscape planning	Lack of ecological restoration expertise, absence of dedicated Monitoring and evaluation tools, fragmented coordination, weak technical capacity in local administrations
Green infrastructure in urban development	Municipal authorities, urban developers, landscape architects, academic institutions	Urban greening, green-blue infrastructure design, maintenance planning	Cultural resistance in construction sector, low awareness, insufficient interdisciplinary standards for design and monitoring
Implementation of GIDAC strategy (coastal adaptation)	Regione Emilia-Romagna, Delta del Po Park Authority,	Strategic adaptation planning, stakeholder	Inconsistent inter-agency collaboration, lack of digital evaluation tools,

	civil protection services	coordination, monitoring systems	gaps in stakeholder participation and communication
Participation in EU projects (e.g., LAND4CLIMATE)	Regional authorities, research organizations, environmental departments	EU project design and management, cross-border cooperation, results dissemination	Weak alignment with national policy frameworks, lack of internal capacity for project continuity and replication

3.3.5 Romania

Table 15 Capacity needs assessment for key NBS projects and stakeholders in Romania

NBS type / project	Key stakeholders involved	Required competencies	Main gaps and institutional/ cultural barriers
Urban greening in Timisoara (green ring and forest curtains)	Timișoara Municipality, Verde de Banat Association, local/county councils	Urban ecological planning, green infrastructure design, vegetation maintenance and monitoring, community engagement	Weak maintenance planning, limited design training, permitting delays, funding shortages, limited long-term investment frameworks
River and riparian habitat restoration (Bega Veche, Banat rivers)	Banat Water Basin Administration, University of Life Sciences Timișoara, Rewilding Romania	Hydrological engineering, riparian ecology, environmental permitting, multi-stakeholder coordination	Regulatory complexity, long permitting procedures, lack of technical restoration expertise, weak inter-institutional collaboration
Rainwater reuse, agricultural drainageand wetland establishment	Campo D'Oro, COMTIM, agricultural departments, NGOs	Integrated water management, agricultural hydrology, wetland design, climate adaptation	Limited expertise in reuse systems, weak public-private coordination, difficulty accessing funding sources
Biodiversity enhancement and ecological connectivity	Verde de Banat, university researchers, land planners, NGOs	Ecological restoration, habitat planning, biodiversity monitoring, stakeholder inclusion	Lack of dedicated planning staff, underdeveloped monitoring systems, low engagement of private landowners, especially in agricultural sectors

3.3.6 Slovakia

Table 16 Capacity needs assessment for key NBS projects and stakeholders in Slovakia

NBS project	Key stakeholders involved	Required competencies	Main gaps and institutional/ cultural barriers

Urban green infrastructure (e.g., parks, green roofs, walls)	City of Košice, Košice Self-Governing Region, urban planners, architects, local government	Green infrastructure design, urban planning integration, ecological landscaping	Lack of design and maintenance skills, weak collaboration between planners and authorities, limited awareness and public campaigns
Nature-Based Adaptation Projects (e.g., MISSION CE CLIMATE)	Košice region, international partners, community groups, BeePartner	Climate adaptation planning, stakeholder coordination, policy integration	Fragmented engagement, slow policy alignment, regulatory and permitting delays
River basin and biodiversity projects (INACO, Central-BIC)	Technical University of Košice, BeePartner, agricultural associations, researchers	Ecosystem restoration, biodiversity monitoring, Payment for Ecosystem Services (PES) design	Lack of biodiversity indicators, insufficient Monitoring and evaluation tools, weak PES implementation capacity, poor cross-sector coordination
NBS for public infrastructure (e.g., school green roofs/ walls)	Košice Self-Governing Region, educational institutions, school administrators	Rainwater management, building-integrated vegetation design, environmental education	Insufficient integration of NBS into public buildings, low awareness in school systems, lack of budgets and prioritization
EU-funded workshops and trainings	NGOs, universities, regional authorities	Capacity-building facilitation, training design, local stakeholder engagement	Uneven training participation across sectors, limited continuity of knowledge transfer, weak institutionalization of training benefits
WATERADAPT Improving regional planning to better adapt to water-related risks (Interreg project)	Stakeholders from Prešov Region and 7 other partners (seven regional and local authorities (DK, FR, IT, NL, SK and AL))	Regions face a major challenge: acquiring methodological tools to assess vulnerability and provide solutions for mutually beneficial solutions	The need to know methodological procedures for joint solutions

3.3.7 Cross-country summary table

Cross-country summary table

This section (table 17) consolidates the key findings from the region-specific capacity needs assessments into a single, comparative overview. By aggregating the results across all six FRRs,

the table highlights both recurring themes and notable divergences in the capacity gaps, priorities, and barriers related to NBS implementation.

This cross-country perspective serves two main purposes:

- Identify shared challenges and opportunities – enabling the design of common training modules and knowledge exchange activities that benefit all participating regions.
- Recognise context-specific requirements – ensuring that capacity-building measures remain sensitive to local governance structures, socio-economic contexts, and environmental conditions.

The synthesis presented here forms the analytical bridge between the region-specific findings in Chapter 3.3 and the development of targeted, flexible training modules described in Chapter 4.

Table 17 Cross-country summary of NBS projects, stakeholders, capacity needs and barriers

Country	Main NBS types / projects	Primary stakeholders	Key competency needs	Common barriers and gaps
Austria	River restoration, retention modeling, wetlands, awareness and education	Municipalities, NGOs, farmers, consultants, Agricultural Chamber	Hydrology, floodplain ecology, land use negotiation, education and engagement	Regulatory complexity, limited funding, fragmented land ownership, technical skill shortages, resistance to change
Czech Rep.	Wetlands, river barrier removal, campus greening, community outreach	Universities (UJEP), NGOs, local officials, municipalities	Wetland ecology, river engineering, participatory planning, public awareness	Permitting hurdles, resistance to change, insufficient funding, technical and stakeholder engagement gaps
Germany	Miscanthus systems, cascading biomass use, climate resilience strategies	University of Bonn, MEG e.V., researchers, municipalities, NGOs	Biomass cultivation, climate modeling, system innovation, stakeholder outreach	Weak monitoring and evaluation systems, limited awareness, political inertia, fragmented collaboration
Italy	Coastal nourishment, wetland restoration, urban green infrastructure, EU project integration	Regione Emilia-Romagna, Delta del Po Park Authority, municipalities, urban developers, NGOs	Coastal engineering, GIS, landscape planning, EU project management, stakeholder coordination	Complex permitting, fragmented governance, limited stakeholder engagement, cultural resistance in

				construction sector
Romania	Urban greening, riparian restoration, rainwater reuse, biodiversity connectivity	Timișoara Municipality, Banat Water Administration, COMTIM, Verde de Banat, academia	Green infrastructure design, hydrological engineering, integrated water management, biodiversity monitoring	Bureaucratic delays, funding shortages, low private landowner engagement, weak monitoring systems, lack of long-term strategies
Slovakia	Urban green infrastructure, school NBS, biodiversity and river basin projects, adaptation planning, rainwater harvesting	Košice City and Region, BeePartner, Technical University of Košice, schools	Green design, PES systems, stakeholder engagement, climate adaptation, environmental education, project development	Policy misalignment, regulatory delays, weak institutional integration, poor cross-sector coordination, lack of awareness and budget prioritization in education sector

4. Outline of tailored capacity-building modules

4.1 Structuring the capacity-building program

The LAND4CLIMATE training program is designed to be **flexible**, meaning it can be adjusted to different stakeholder needs and regional contexts, and **adaptive**, meaning it evolves in response to feedback, new knowledge, and changing climatic or institutional conditions. It supports stakeholders through every phase of NBS planning and implementation. The proposed holistic capacity-building roadmap is intended as the overarching structure for guiding regions from initial assessment through to long-term integration of NBS. This progressive approach ensures that capacity development is coherent, sequenced, and linked to the broader objectives of the LAND4CLIMATE project.

However, the roadmap is not meant to exclude targeted, stand-alone training modules. On the contrary, the modular design allows for specific training to address clearly identified gaps, which can then be combined and sequenced according to regional needs and priorities. In this way, the approach provides both structure and flexibility: the roadmap ensures strategic alignment and continuity, while the modular components offer the adaptability to respond to urgent or context-specific capacity deficiencies.

Practically, the modules proposed in this chapter respond to several interlinked challenges:

- Understanding and diagnosing local climate risks, environmental conditions and institutional readiness

- Developing common visions
- Co-designing strategies for NBS planning
- Strengthening both technical and procedural capacity to foster NBS implementation
- Building the capacity to monitor, evaluate and adapt over time interventions
- Analysis of policies, funding schemes and long-term governance structures relevant for NBS implementation

This structure ensures that stakeholders can engage with the program at different levels and with different commitments, depending on their prior experience and immediate responsibilities. It also promotes alignment with EU-level strategies and tools, enabling coherence across scales and countries

4.2 Capacity-building programs structure

In the FRRs involved in the LAND4CLIMATE project the training programs were carefully tailored to address the needs of local stakeholders. While each country followed a context-specific approach, a number of common features can be observed.

The programs are structured around differentiated learning pathways, addressing a wide audience (local authorities and technical experts to landowners, NGOs and educators). These pathways include both introductory modules (e.g. for awareness raising) as well as advanced components focused on technical, planning or implementation skills.

Each program was designed to address capacity gaps clearly identified through the survey and following discussions with FRRs. These gaps include nature-based design, participatory planning, hydrological modelling, integration into urban planning documentation and long-term impact monitoring.

In terms of delivery formats, a combination of in-person sessions, hybrid workshops and digital tools will be used, depending on the local context. For example, in Austria and Romania, the emphasis was on field-based exchanges, while in Germany and Slovakia, flexible online modules were preferred.

For logistical and operational reasons, as well as based on capacity needs assessment resulting from questionnaires completed by stakeholders in all FRRs, a series of common modules were structured that address similar themes and challenges identified at transnational level. These modules – such as stakeholder engagement, impact assessment, accessing funding or mainstrea-ming into policies – serve as the core for coherent yet flexible training that can be adapted to each national context. This approach allows for both a more efficient delivery of the training program and a stronger exchange of good practices between countries, providing a solid basis for coordinated actions on the implementation of NBS in Europe.

4.2.1 Austria

Based on the survey results, the Austrian FRRs training program will follow a modular, flexible format targeting both introductory-level participants and advanced practitioners.

Two learning pathways are proposed:

Introductory pathway - for local stakeholders with limited prior engagement in NBS.

Advanced pathway - for technical staff, planners, consultants and experienced NGO representatives already implementing or designing NBS projects.

The modules will be organized around the main capacity gaps identified in this country:

- NBS planning and selection
- Multifunctional land use and negotiation across parcel boundaries
- Participatory methods and stakeholder mapping
- Hydrological and ecological monitoring
- Maintenance, monitoring and adaptive management

All Austrian respondents prefer in-person formats. The program will therefore prioritize:

- On-site field labs and peer exchanges (e.g., hedge planting, wetland creation)
- Local/regional workshops
- Short residential training for planners and local officials
- Technical coaching for NGOs and consultants

4.2.2 Czech Republic

The training strategy for the Czech Republic is based on the survey's results from a mixed stakeholder group (academic, municipal, NGO actors). Thus, the structure of the training program will need to adopt a modular, flexible and hybrid format to answer diverse capacity levels and preferences.

Learning pathways:

Introductory pathway: addressing local authorities, municipal representatives and civil society organizations unfamiliar with operational NBS deployment.

Technical pathway: designed for academics, researchers and practitioners involved in planning or implementing NBS (e.g., campus greening, wetland construction). Training modules will address the main identified gaps and will be aligned with respondents' preferences, especially for:

- Sustainable land management
- Sustainable water management
- Climate adaptation and mitigation
- Stakeholder engagement
- Stakeholder communication
- Regulatory compliance and project permitting
- Monitoring and evaluation design

Stakeholders show mixed preferences about training format, so a hybrid training format will be used:

- In-person formats: Field trips, demonstration sites and peer exchanges
- Online formats: Webinars, technical briefings and virtual workshops
- Blended: Initial online module followed by local workshop or field visit

4.2.3 Germany

The German training strategy is focused on stakeholders working with bio-based and multifunctional land use systems (e.g. Miscanthus cultivation) and targets both academic and applied stakeholders involved in stormwater management, carbon sequestration and climate resilience.

Learning pathways:

- Introductory pathway: addressing early-career researchers and NGO members unfamiliar with regulatory or implementation aspects of NBS.

- Technical pathway: for staff working in research, education and NBS implementation (e.g., perennial grasses, cascading biomass use).

Modules are based on major capacity needs:

- Communication and outreach for NBS acceptance
- Sustainable and multifunctional land use
- Policy alignment and permitting
- Monitoring and impact evaluation
- Circular bioeconomy and climate mitigation

Online training is preferred by all respondents. The modules will be designed around asynchronous and synchronous learning (e.g., self-paced courses, expert-led webinars) and will consider downloadable resources (technical fact sheets, video demos). Optional in-person visits to Miscanthus sites and bioeconomy demonstration areas are also considered.

4.2.4 Italy

The training program for Italy is designed for public-sector professionals operating in coastal, environmental and civil protection domains. The program will be modular and practice-oriented, addressing technical and policy-level staff across different institutions in the Emilia-Romagna region.

Learning pathways:

- Technical pathway: for staff involved in planning, designing, implementing and monitoring NBS
- Policy pathway: for decision-makers dealing with risk management, climate adaptation and regulatory processes.

Modules address the most relevant training needs:

- Climate change adaptation and risk reduction
- Stakeholder mapping and participatory processes
- Biodiversity conservation and ecological restoration
- Sustainable land and water management
- Monitoring, permitting and governance of coastal NBS

In-person training is unanimously preferred by respondents. Thus, the formats will include regional workshops, field visits and technical demonstrations, local seminars with hands-on sessions. The training program will be supported by training materials including technical fact sheets, policy references, practical case studies and templates.

4.2.5 Romania

The Romanian training program will have to address a fragmented stakeholder landscape: NGOs, local governments, academia and private actors. The structure will need to focus on cross-sectoral training modules considering the complexity of regulatory, funding and land ownership barriers.

Learning pathways:

- Technical pathway: for engineers, environmental officers and NGO project managers needing applied ecological restoration and green infrastructure skills.
- Administrative pathway: for municipal leaders, regional authorities and planning staff involved in policy integration, community engagement and permitting.

Training will focus on bridging knowledge and coordination gaps, with content tailored around:

- Restoration and ecological design
- Stakeholder communication and land-use negotiation
- Urban-rural integration and nature-based flood/drought control
- Monitoring and evaluation capacity
- Regulatory navigation and policy advocacy

The delivery format is based on a strong preference for in-person training (9 out of 10 respondents). Thus, a mix of regional workshops, demonstration field labs, case-based simulations and peer exchanges between local governments and NGOs is proposed for this training program. Policy briefs and technical fact sheets are most requested for this training.

4.2.6 Slovakia

The Slovak training program will address a cross-sectoral landscape with stakeholders from government, academia, regional administrations and the private sector. These actors are involved in diverse programs (from urban greening to transnational climate resilience). The training must address both technical gaps and structural obstacles (e.g. permitting, coordination).

Learning pathways:

- Technical pathway: for engineers, project designers, environmental practitioners involved in NBS design and implementation.
- Strategic pathway: for urban planners, policy managers, project leaders working on governance and citizen engagement.

Modules are designed to match identified gaps in:

- Green infrastructure design (especially for cities and school campuses)
- Permitting and long-term planning for NBS
- Climate adaptation, ecological restoration and biodiversity protection
- Stakeholder engagement and communication strategies
- Monitoring and assessment for NBS

The delivery modes will need to consider the mixed preference among stakeholders (50% prefer in-person, 50% prefer online). Therefore, a hybrid format is recommended including online basic training (theory, regulatory context) and in-person workshops (case study analysis, technical simulations).

Preferred training materials are technical fact sheets, but policy briefs and interactive online case studies are also valued. workbooks are less favored.

Overview of the training program structure

Table 18 Overview of training program structure by country

Country	Learning pathways	Main capacity gaps	Training format	Priorities
Austria	Introductory (local stakeholders); Advanced (planners, consultants, NGOs)	NBS selection, land use negotiation, participatory planning, monitoring	In-person (field labs, peer exchange, workshops)	Hands-on ecological design, stakeholder mediation, hydrological modeling

Czech Republic	Introductory (municipalities, NGOs); Technical (academics, engineers)	Wetland design, climate adaptation, stakeholder engagement, permitting	Hybrid (online briefings + local workshops/field trips)	Land and water management, participatory planning, Monitoring and evaluation, communication
Germany	Introductory (early-career researchers); Technical (bioeconomy practitioners)	Outreach, circular bioeconomy, policy alignment, Monitoring and evaluation	Online (webinars, e-learning, downloads), optional site visits	Communication, multifunctional land use, funding design, monitoring
Italy	Technical (coastal/environmental planners); Policy (decision-makers)	Climate risk reduction, ecological design, permitting, governance	In-person (workshops, site demos, simulations)	Coastal NBS, participatory processes, landscape restoration
Romania	Technical (engineers, NGOs); Administrative (municipal staff)	Stakeholder engagement, land use planning, Monitoring and evaluation, restoration skills	In-person (workshops, labs, peer exchanges), policy briefs and technical factsheets	Ecological connectivity, urban green infrastructure, landowner mediation
Slovakia	Technical (designers, consultants); Strategic (planners, educators)	Green infrastructure, permitting, communication, biodiversity indicators	Hybrid (online theory + in-person practice)	Urban and school NBS, policy alignment, funding partnerships

4.3 Capacity-building program modules

This section outlines the set of capacity-building modules developed under the LAND4CLIMATE framework to address the capacity gaps and priority needs identified through the stakeholder survey and regional consultations. The modules are designed to strengthen the ability of local and regional actors to plan, implement and sustain NBS in ways that are technically sound, financially viable and institutionally supported.

Each module targets a specific thematic area, ranging from technical and scientific expertise to governance, financing, stakeholder engagement and monitoring. The program follows a modular design, allowing regions to select and combine the most relevant modules according to their unique needs, contexts, and development stage.

While the modules can be delivered as stand-alone trainings to address specific deficiencies, their full potential is realized when implemented as part of the integrated LAND4CLIMATE capacity-building roadmap, ensuring a progressive path from initial assessment to long-term institutional integration of NBS practices.

Table 19 Core capacity-building modules for NBS – shared focus and country coverage

Module title	Shared focus	Countries
Introduction to NBS and policy integration	Fundamentals of NBS, alignment with EU/local climate and biodiversity goals	AT, CZ, DE, IT, RO
Stakeholder engagement and landowner mediation	Co-creation, participatory planning, land negotiation techniques	AT, CZ, IT, RO, SK
Hydrological design and water retention modeling	Techniques for stormwater management, retention areas, agricultural hydrology	AT, CZ, IT, RO, SK
Monitoring and evaluation of NBS impact	Developing indicators (biodiversity, hydrology), participatory monitoring	AT, CZ, DE, IT, RO, SK
Funding and project development for NBS	Accessing EU/national funds, business cases, co-benefits for scaling NBS	AT, CZ, DE, RO, SK
Ecological restoration and biodiversity connectivity	Planning ecological corridors, buffer strips, wetland or forest habitat restoration	AT, DE, IT, RO, SK
Urban green infrastructure and climate resilience	Design and maintenance of green roofs, rain gardens, parks, school spaces	CZ, DE, IT, RO, SK
Communication and awareness campaigns	Public engagement strategies, NBS storytelling, local education initiatives	AT, DE, IT, RO, SK
Permitting, policy and legal tools for NBS	Regulatory compliance, integrating NBS into spatial planning and long-term strategies	CZ, DE, IT, RO, SK

In the current version of the report, the training modules are presented after the regional capacity analysis to ensure that their design is linked to the identified gaps and priorities. However, the final prioritization and sequencing of modules will not be fixed at the project level in advance. Instead, a proposed list of modules serves as the common reference framework, from which each FRR will work with the LAND4CLIMATE capacity development team to agree on specific priorities.

These priorities will be determined through bilateral discussions and planning sessions, taking into account:

- The relevance of each module to the FRR's identified capacity gaps;
- The dynamics of local governance, stakeholder readiness and available resources;
- The specific challenges and opportunities related to NBS implementation on private lands in that region.

This approach ensures that the training program remains flexible and adaptive, allowing FRRs to focus first on the modules that address their most urgent needs while still operating within a coherent overall framework for capacity development.

Table 20 Description, target groups and delivery formats for common NBS capacity-building modules

Module title	Description	Target group	Format
Introduction to NBS and policy integration	Covers the fundamentals of NBS, their role in climate and biodiversity policy and how to align them with EU and national strategies.	Local authorities, planners, NGOs, regional agencies	AT/RO/IT: in-person workshops, DE/SK/CZ: blended (lecture + discussion)

Stakeholder engagement and landowner mediation	Provides tools for participatory planning, land negotiation and effective stakeholder collaboration in NBS implementation.	Facilitators, landowners, municipalities, NGOs	AT/RO/IT: co-creation labs, CZ/SK: participatory workshops, DE: short digital modules
Hydrological design and water retention modeling	Focuses on the design of retention areas and water-sensitive NBS through basic hydrological modeling and practical case work.	Engineers, environmental planners, water agencies	AT/IT/RO: field-based technical sessions, CZ/SK/DE: webinars + demo site + recorded case studies
Monitoring and evaluation of NBS impact	Introduces methods for tracking biodiversity, hydrology and climate impacts of NBS, including participatory monitoring tools.	Researchers, NGOs, municipal staff, landowners	AT/SK/IT/RO: field Monitoring and evaluation workshops, DE/CZ: online tools
Funding and project development for NBS	Explains how to access EU, national and private funding for NBS, prepare business cases and assess co-benefits.	Project developers, municipalities, NGOs	AT/CZ/SK/IT/RO: financial workshops, DE: online classes
Ecological restoration and biodiversity connectivity	Covers ecological corridor planning, riparian buffer creation, habitat restoration and biodiversity enhancement.	Conservationists, farmers, foresters, planners	AT/IT/CZ/SK restoration site planning + peer exchange, RO: biodiversity walkthroughs, DE: case-based e-learning
Urban green infrastructure and climate resilience	Focuses on design, implementation and maintenance of urban NBS like green roofs, rain gardens and shading structures.	Urban planners, architects, municipal maintenance teams	CZ/IT: urban design studio, DE/SK: online modules, RO: demo projects, AT: city-level planning session
Communication and awareness campaigns	Provides strategies for communicating NBS benefits, building public awareness and mobilizing local support.	NGOs, educators, municipalities, communication officers	AT/IT/RO: storytelling + outreach labs, DE: digital communications, CZ/SK: interactive role play
Permitting, policy and legal tools for NBS	Explains legal and regulatory frameworks for NBS, including how to align with land use and spatial planning instruments.	Policy-makers, legal advisors, municipalities	CZ: legal workshops, DE/SK: online legal briefings, RO/IT/AT: panel discussions + roundtables

Table 21 Chapters, timelines and country-specific formats for training modules

Module	Chapters	Timeline	Format (by country)
Introduction to NBS and policy integration	Introduction to NBS concepts	half day (2x90 min sessions)	AT/RO/IT: in-person workshops, DE/SK/CZ:

	Definitions and typologies NBS in EU Green Deal and national policies Local examples of NBS integration		blended (lecture + discussion)
Stakeholder engagement and landowner mediation	Stakeholder mapping techniques Identifying interests and power dynamics Mediation and negotiation tools Participatory governance in NBS projects	1 day (3 sessions + practical exercise)	AT/RO/IT: co-creation labs, CZ/SK: participatory workshops, DE: short digital modules
Hydrological design and water retention modeling	Fundamentals of hydrological cycles NBS for water retention Tools for hydrological modeling (SWMM/QGIS) Field application in NBS planning	1 day (hands-on training)	AT/IT/RO: field-based technical sessions, CZ/SK/DE: webinars + demo site + recorded case studies
Monitoring and evaluation of NBS impact	Defining indicators for NBS impact Biodiversity and hydrological metrics Monitoring tools and technologies Citizen science and participatory Monitoring and evaluation	1 day (theory + field demo)	AT/SK/IT/RO: field Monitoring and evaluation workshops, DE/CZ: online tools
Funding and project development for NBS	NBS funding opportunities (EU/national/private) Writing project proposals and budgets Calculating ecosystem service co-benefits Building a business case	1 day	AT/CZ/SK/IT/RO: financial workshops, DE: online masterclass
Ecological restoration and biodiversity connectivity	Principles of ecological restoration Designing biodiversity corridors Soil, vegetation and habitat assessment Adaptive management and monitoring plans	1 days	AT/IT: restoration site planning, CZ/SK: peer exchange, RO: biodiversity walkthroughs, DE: case-based e-learning
Urban green infrastructure and climate resilience	Urban NBS typologies (green roofs, parks, rain gardens) Climate risk in cities Design standards and co-benefits Maintenance planning and citizen involvement	1 day (flexible structure)	CZ/IT: urban design studio, DE/SK: online modules, RO: demo projects, AT: city-level planning session

Communication and awareness campaigns	Why communication matters in NBS Framing ecosystem services Storytelling and media tools Planning and evaluating awareness campaigns	1 day	AT/IT/RO: storytelling + outreach labs, DE: digital communications, CZ/SK: interactive role play
Permitting, policy and legal tools for NBS	Legal context for NBS Permitting and planning integration Case law and administrative challenges Tools for aligning NBS with spatial strategies	Half-day intensive	CZ: legal workshops, DE/SK: online legal briefings, RO/IT/AT: panel discussions + roundtables

Table 22 Country-specific priority modules and delivery formats

Country	Most relevant modules	Delivery format
Austria	• Stakeholder engagement and landowner mediation • Hydrological design and water retention modeling • Monitoring and evaluation of NBS impact • Ecological restoration and biodiversity connectivity • Introduction to NBS and policy integration	In-person
Czech Republic	• Hydrological design and water retention modeling • Stakeholder engagement and landowner mediation • Permitting, policy and legal tools for NBS • Monitoring and evaluation of NBS impact • Introduction to NBS and policy integration	Hybrid
Germany	• Communication and awareness campaigns • Urban green infrastructure and climate resilience • Monitoring and evaluation of NBS impact • Permitting, policy and legal tools for NBS • Funding and project development for NBS	Online
Italy	• Stakeholder engagement and landowner mediation • Monitoring and evaluation of NBS impact • Ecological restoration and biodiversity connectivity • Permitting, policy and legal tools for NBS • Introduction to NBS and policy integration	In-person
Romania	• Ecological restoration and biodiversity connectivity • Urban green infrastructure and climate resilience • Monitoring and evaluation of NBS impact • Stakeholder engagement and landowner mediation • Permitting, policy and legal tools for NBS • Introduction to NBS and policy integration	In-person
Slovakia	• Urban green infrastructure and climate resilience • Permitting, policy and legal tools for NBS • Stakeholder engagement and landowner mediation	Hybrid

	• Monitoring and evaluation of NBS impact • Introduction to NBS and policy integration	

5. Implementation strategy for capacity-building program

The implementation of the tailored training program for NBS capacity building across the six FRRs requires a coherent, phased approach that balances regional autonomy with overarching strategic alignment. This chapter outlines a flexible and participatory training roll-out framework, designed to enhance local capacity, foster interregional knowledge exchange and ensure sustainability of NBS integration into policy and practice.

5.1 Objectives of the capacity-building program

- Increase the technical and institutional capacity of key stakeholders to work with NBS.
- Address region-specific knowledge and skills gaps identified through capacity needs surveys.
- Promote cross-sectoral stakeholder collaboration and involvement in NBS projects.
- Provide standardized but locally adaptable training content for long-term replication and integration.
- Facilitate a transition from pilot initiatives to systemic adoption of NBS across governance levels

5.2 Capacity-building program implementation time plan

The implementation time plan presented in this section provides a strategic framework for rolling out the LAND4CLIMATE capacity-building program across the six FRRs. While it outlines an indicative sequence of activities, the exact dates of module delivery, allocation of resources, selection and competences of speakers, and estimation of costs will be negotiated and agreed upon individually with each FRR to ensure alignment with local contexts, priorities and administrative cycles.

Participation in the program is not mandatory under a fixed deadline imposed by the LAND4 CLIMATE framework. Instead, the proposed timeline serves as a guideline to help FRRs plan and coordinate their training activities in a structured and coherent manner.

The overall supervision of the program's implementation will be coordinated by the LAND4CLIMATE team (mainly WP4 and WP5), in collaboration with the responsible partners for capacity development. FRRs will be responsible for the local execution of the capacity-building program, including logistical arrangements, stakeholder mobilization and reporting on progress.

The set of proposed modules and delivery formats is intended as a flexible framework rather than a rigid prescription. FRRs are encouraged to adapt the content, sequencing and format of modules to better meet their specific needs. In cases where significant modifications are foreseen, such as replacing core modules, altering key learning outcomes, or substantially changing the target audience, consultation with and confirmation from the LAND4CLIMATE coordination team will be required to ensure overall coherence, maintain methodological quality and document changes for traceability.

This flexible, collaborative approach ensures that the capacity-building program remains responsive to the realities of each region while preserving a shared strategic direction across the LAND4CLI MATE network.

Table 23 Implementation phases and activities for the capacity-building program

Phase	Activities
1. Preparation and tailoring	• Establish regional coordination teams in each FRR • Finalize content for priority capacity-building modules based on Chapter 4 • Develop core materials and tailor examples to local contexts and ongoing NBS projects. • Identify pilot institutions for the relevant training cohorts.
2. Regional training delivery	• Deliver the first round of trainings using the preferred formats: • In-person workshops and field labs (for Romania, Italy, Austria). • Hybrid modules with online and site-based sessions (Slovakia, Czech Republic). • Fully online modules with interactive exercises (Germany). • Deploy training materials (technical factsheets, policy briefs, guides) through a digital repository. • Ensure cross-sectoral participation by involving public institutions, civil society, landowners and academia.
3. Peer exchange and scaling	• Facilitate interregional learning via: peer-to-peer study visits, cross-border workshops, joint webinars with replication regions (under WP5)

5.3 Roles and responsibilities

Table 24 Roles and responsibilities in implementing the capacity-building program

Entity	Responsibilities
Regional coordination teams (including representatives of academic and FRR partners)	Local adaptation, delivery logistics, stakeholder invitations, feedback collection
Lead training developers (Task 4.3 partners)	Content development, trainer support, quality assurance
Local trainers / facilitators (to be identified by FRRs with the support of academic partners)	Module facilitation, local case contextualization, post-training support
WP4/WP5 interface team	Coordination of replication activities, documentation of good practices, knowledge dissemination

5.4 Next steps for capacity-building consolidation and coordination

The next steps, which are focused on operationalizing the training program across the six participating countries and ensuring its strategic integration into broader project activities, are part of a flexible process that may include the following immediate priorities:

- Finalize trainer and partner mapping: Identify lead institutions, expert trainers and regional facilitators capable of delivering the different modules, drawing on internal project capacity and relevant national actors.

- Organize national coordination sessions: Organize bilateral or multi-stakeholder online sessions with the six FRRs and their associated RRs in order to validate the training content, to confirm participant groups and to adapt the formats to country-specific logistics/ conditions.
- Synchronize with WP5 replication activities: Ensure alignment between the training rollout and the replication pathway design under WP5. Training content can be adjusted to support replication actions.
- Strengthen exchange with sister projects and platforms: Engage with projects from the NbS4EU cluster and upload selected training resources to external knowledge-sharing platforms (e.g. Climate-ADAPT, UrbanByNature)
- Initiate pilot trainings: Launch selected training modules in the FRRs and organize a system to collect feedback and improve training design and delivery over time.

These actions aim to consolidate robust, adaptable and scalable trainings that support systemic uptake of NBS across different regional and institutional landscapes

Conclusions

The capacity needs assessment conducted within LAND4CLIMATE provides valuable qualitative insights into the strengths, gaps and priorities of the six FRRs in relation to the implementation of NBS on private land. While the number of survey responses was limited and not statistically representative, the findings converge around several key messages that can guide the development of tailored training modules and flexible capacity-building pathways.

Key conclusions from the assessment are as follows:

Common systemic gaps across FRRs

- Despite regional variations, all six FRRs face challenges related to misalignment of sectoral policies, limited financial resources, insufficient stakeholder engagement, and weak monitoring and evaluation frameworks.
- These systemic barriers confirm the need for a structured, cross-country capacity-building approach that addresses governance, financing, and collaboration in an integrated way.

Need for tailored and flexible capacity-building

- While shared challenges exist, each FRR also exhibits context-specific needs depending on its governance structures, institutional maturity, and local socio-economic conditions.
- A flexible, modular approach is therefore required: common training modules to address cross-cutting needs, combined with region-specific adaptations negotiated with each FRR.

Role of private landowners

- The survey results underline the dependency of NBS implementation on private land, yet private landowners remain underrepresented in both survey responses and participatory processes.
- Targeted efforts are needed to enhance their engagement, including dedicated communication, incentive schemes, and tailored training offers.

Value of qualitative insights for module development

- Given the small sample sizes, the CNA results should be interpreted as *indicative insights* rather than representative statistics.

- Their main value lies in highlighting recurring themes and perceived needs, which, combined with literature and expert consultation, provide a solid basis for developing relevant and practical training content.

Overall, the CNA demonstrates that while the conditions for NBS implementation vary across countries, FRRs share a strong need for structured, yet flexible, support in building the capacities of local actors. LAND4CLIMATE is well-positioned to address these needs by developing and delivering tailored training modules that combine common European-level lessons with region-specific adaptations. This approach will strengthen the ability of FRRs to co-design, implement, and sustain NBS on private lands, thereby contributing to more resilient and climate-adaptive regions.

The insights presented here will be complemented by findings from upcoming online and in-person workshops with the FRRs and their respective RRs, which will corroborate the results and provide additional perspectives. There will be also further exchanges with sister projects from NBS4EU on capacity building for resilience in the upcoming months. Through these different approaches, we aim to provide a more balanced and robust perspective on the Regions' ongoing capacity-building needs in terms of skills and knowledge for NBS implementation on private land. Therefore, the Capacity Needs Assessment Report will inform the continuous improvement of the capacity-building strategy.

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Annexes

Questionnaire

Welcome to our online survey dedicated to front-running regions and stakeholders! As part of our ongoing efforts to optimize Nature-Based Solutions (NBS) implementation, we are conducting a comprehensive capacity needs assessment. This questionnaire is designed to gather valuable insights from you, our key stakeholders, on your current capabilities, experiences and needs related to NBS.

The findings from this survey will be instrumental in developing a tailored report that outlines specific training modules designed to enhance stakeholder engagement and effectively implement NBS at the local level. Your participation is crucial in shaping these resources to ensure they are both relevant and practical for addressing the unique challenges and opportunities in your region.

Please take a moment to complete this survey, which will be administered online for your convenience. Your feedback will provide a critical foundation for fostering more resilient and sustainable environments through the strategic use of NBS.

Thank you for contributing to this important initiative!

Q1. Organizational background

1.1 Name of organization:

_____

1.2 Type of organization (government, NGO, business, academic institution, etc.):

_____

Q2. Responder background:

2.1 Education:

- ◯ high-school
- ◯ college
- ◯ bachelor
- ◯ master
- ◯ doctorate

2.2 Role in the organization:

_____

2.3 Years of working in organization

- ◯ < 5 years
- ◯ 5 – 10 years
- ◯ 10 – 15 years
- ◯ 15 – 20 years
- ◯ 20 – 25 years
- ◯ > 25 years

2.4 Years of working with NBS

- ◯ < 5 years
- ◯ 5 – 10 years
- ◯ 10 – 15 years
- ◯ 15 – 20 years
- ◯ 20 – 25 years

◯ > 25 years

Q3 Organization expertise

3.1 Geographical scope of operations:

_____

3.2 Number of years the organization has been active:

_____

3.3 What are your organization's long-term goals and aspirations for NBS implementation? (Select up to three options and order them from 1 to 3 with 1 being the top priority)

◯ Enhance ecosystem services: To improve and sustain the quality and functioning of natural ecosystems through the restoration and preservation of natural habitats.
◯ Increase resilience to climate change: To strengthen the ability of our local environment and community to withstand and recover from adverse climate impacts, such as floods, droughts and heatwaves.
◯ Promote biodiversity: to increase the diversity of plant and animal species within our operational areas, supporting ecological balance and resilience.
◯ Improve water management: to enhance water quality and availability through natural water management practices, such as constructing wetlands and recharging aquifers.
◯ Community engagement and education: to actively involve local communities in the planning and implementation of NBS projects, increasing awareness and fostering sustainable practices.
◯ Policy influence and advocacy: to influence local and national policies to support the broader adoption and integration of NBS into environmental management strategies.
◯ Create economic opportunities: to leverage NBS projects to spur local economic development, including creating jobs and supporting local businesses related to ecological tourism and recreation.
◯ Scientific research and innovation: to contribute to scientific research in NBS and develop innovative approaches to ecological challenges.
◯ Sustainable urban development: to integrate NBS into urban planning to create healthier, more sustainable and livable urban spaces.
◯ Carbon sequestration and reduction: to utilize NBS to naturally sequester carbon, contributing to the mitigation of global climate change.

3.4 How committed is your organization to integrating NBS into its core activities and decision-making processes?

◯ Highly committed: Our organization is fully committed and actively integrates NBS in all relevant decision-making processes and activities.
◯ Moderately committed: Our organization is committed to integrating NBS, but implementation is currently limited to specific departments or projects.
◯ Somewhat committed: Our organization recognizes the importance of NBS and is exploring ways to integrate these solutions more broadly.
◯ Minimally committed: Our organization has limited commitment to NBS, with few initiatives underway and no formal strategy for integration.
◯ Not committed: Our organization is not currently committed to integrating NBS into its activities or decision-making processes.

3.5 Are there any specific NBS projects or initiatives that your organization is planning to undertake in the near future? Could you please describe their aims and how you plan to implement them?

_____

_____

_____
_____
_____
_____

Q4. Stakeholder role and involvement:

4.1 Describe the role of your organization in climate change adaptation and climate change mitigation.

- ◯ Policy advocacy
- ◯ Research and development
- ◯ Community engagement and education
- ◯ Project implementation
- ◯ Technical assistance and consultation
- ◯ Capacity building
- ◯ Monitoring environmental changes
- ◯ Networking and partnership building facilitation

4.2 How long has your organization been working with NBS?

- ◯ < 5 years
- ◯ 5 – 10 years
- ◯ 10 – 15 years
- ◯ 15 – 20 years
- ◯ 20 – 25 years
- ◯ > 25 years

4.3 What expertise does your organisation cover?

- ◯ planning
- ◯ design
- ◯ implementation
- ◯ maintenance
- ◯ monitoring
- ◯ other please specify:

_____
_____
_____
_____

4.4 What are the underlying motivations for your organisation's involvement in NBS projects? (Select the options you consider relevant and order them by the order of relevance, with 1 being the top priority)

◯ Environmental commitment: Our organization is committed to environmental sustainability and believes that NBS projects are essential for promoting ecological balance and biodiversity.

◯ Regulatory compliance: We were motivated by the need to comply with environmental regulations and standards that encourage or require the implementation of NBS.

◯ Community benefits: We saw a significant opportunity to enhance community well-being and resilience against climate impacts through NBS projects.

◯ Economic incentives: Financial incentives such as grants, subsidies, or potential cost savings from using NBS motivated our involvement.

◯ Reputation and leadership: Our organization aimed to establish itself as a leader in sustainable practices by adopting NBS, enhancing our reputation in the industry.

◯ Research and innovation: We were driven by the desire to participate in innovative and cutting-edge environmental solutions that NBS projects represent.

◯ Stakeholder pressure: Our stakeholders, including investors, customers and community groups, demonitoring and evaluationd more sustainable practices, prompting us to engage with NBS.

◯ Risk management: Managing environmental risks more effectively, particularly those related to climate change, such as flooding and heatwaves, motivated our involvement.

◯ Funding opportunities

Q5. What are the principal challenges or obstacles that your organisation encounters in the implementation of NBS projects?? (Select the up to 5 options you consider relevant and order them by the order of relevance, with 1 being the top priority)

◯ regulatory barriers
◯ lack of funding
◯ limited stakeholder awareness or engagement
◯ competing priorities
◯ resistance to change
◯ inadequate policy support
◯ lack of technical expertise
◯ Private land rights and policies
◯ Societal attitudes
◯ political inertia/lack of political will
◯ permits and approvals - timing and difficulty in securing them
◯ long term time horizon
◯ Other (please specify)

Q6. How do you think these challenges can be addressed or mitigated? (Select up to 5 options you consider relevant and order them by the order of relevance, with 1 being the top priority)

◯ supportive policies
◯ Training and education
◯ seeking additional funding sources
◯ engaging in capacity-building initiatives
◯ fostering partnerships with relevant stakeholders
◯ raising awareness through communication campaigns
◯ conducting pilot projects to demonstrate effectiveness
◯ Other (please specify)

_____
_____
_____
_____

Q7. What topics or content should be covered in training courses to effectively implement NBS within your organization? (Select up to 5 options that you consider relevant and order them by the order of relevance, with 1 being the top priority)

◯ ecological restoration techniques
◯ biodiversity conservation strategies
◯ green infrastructure design
◯ community engagement and participation
◯ stakeholder mapping and engagement
◯ communication, outreach and dissemination
◯ sustainable land management practices
◯ climate change adaptation and mitigation measures
◯ Other (please specify)

_____
_____

_____
_____

Q8. What would be the most effective format for the training courses (e.g. seminars, workshops, field trips) on NBS within your organization?

◯ In-person training

◯ online training

Q9. What types of materials and tools (e.g., workbooks, policy briefs, technical fact sheets) should be provided during the training sessions on NBS?

◯ workbooks
◯ policy briefs
◯ technical fact sheets
◯ Other (please specify)

_____
_____
_____
_____
_____

Q10. How important are partnerships for NBS projects?

◯ 1 (not important)
◯ 2
◯ 3
◯ 4
◯ 5 (very important)

Q11. Are there specific stakeholders or organizations that you believe are crucial for successful NBS implementation, but with whom you do not currently collaborate?

◯ Local government authorities: Municipal or regional government bodies responsible for environmental, urban planning, or infrastructure.
◯ Environmental NGOs: Non-governmental organizations focused on conservation, sustainability, or environmental advocacy.
◯ Academic institutions and researchers: Universities, colleges and research institutes with expertise in environmental science, ecology, or sustainability.
◯ Community groups: Local community organizations or civic groups representing the interests of residents, especially those in vulnerable areas.
◯ Private sector companies: Businesses from sectors like construction, real estate, or industries that impact land use and environmental resources.
◯ Indigenous communities: Groups representing indigenous peoples who often have a deep connection to and knowledge of local ecosystems.
◯ Agricultural associations: Organizations or cooperatives representing the agricultural sector, including farmers and agribusinesses.
◯ Water management entities: Organizations responsible for managing water resources, including water utility companies and river basin authorities.
◯ Urban planners and architects: Professionals involved in designing and planning urban spaces and infrastructure.

◯ Policy makers and regulators: Individuals or bodies responsible for creating and enforcing laws and regulations that impact environmental and urban development.

◯ Funding bodies and investors: Entities that provide financial resources for environmental and infrastructure projects, including banks, investment funds and grant-making organizations.

◯ Media and publicity organizations: Entities that can help raise awareness and generate public support for NBS initiatives.

Q12. Which key performance indicators (KPIs) do you consider are most relevant for measuring the success of NBS projects?

_____
_____
_____
_____

Q13. Does your organization have the necessary tools, resources, or systems in place for monitoring and evaluating NBS initiatives?

◯ Yes, fully equipped: We have comprehensive tools, resources and systems fully integrated and operational for effective monitoring and evaluation of NBS initiatives.

◯ Partially equipped: We have some tools and resources but lack a complete system for monitoring and evaluating all aspects of our NBS initiatives effectively.

◯ Minimally equipped: We have very basic tools and resources, which are insufficient for comprehensive monitoring and evaluation of NBS initiatives.

◯ Not equipped: We currently do not have the necessary tools, resources, or systems in place to monitor and evaluate NBS initiatives.

◯ Planning to develop: We do not have adequate tools and resources at the moment but are in the planning stages to develop and implement systems for monitoring and evaluating NBS initiatives.

◯ Not relevant: We do not think it is within our remit to carry out monitoring and evaluation.

◯ Planning to outsource: We will not be carrying out any monitoring or evaluation but a third party will be implementing it.

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