



Policy options for overcoming barriers to wide-scale implementation of nature-based solutions



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Highlights

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- **Nature-based Solutions (NbS) are widely recognised in policy, yet governance barriers continue to prevent their wide-scale implementation.**

- **The brief draws on three demonstration cases addressing urban heat and flooding (City of Valencia, Spain), wildfire risk (Ogliastro historical region, Italy), and gravitational hazards including landslides (Canton Bern, Switzerland).**

- **Cases highlight recurring obstacles, including path dependency and entrenched planning practices, limited NbS-specific expertise and capacity to manage ecological complexity under changing climatic conditions, and challenges related to long-term maintenance and financing.**

- **Addressing these barriers is essential to shift NbS from isolated pilot projects to systematic, large-scale risk reduction, biodiversity conservation and climate adaptation.**

- **Policy options proposed to overcome these challenges converge on improving cross-sectoral coordination, including NbS explicitly in planning and regulatory frameworks, and formalising governance structures that enable sustained collaboration among relevant actors.**

Context: High ambition but fragmented implementation

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Nature-based Solutions (NbS) are increasingly promoted across European policy agendas, including the European Green Deal, the EU Strategy on Adaptation to Climate Change, and the 2030 Biodiversity strategy, as a means to address climate change impacts, biodiversity loss and disaster risks in an integrated and sustainable way. They are particularly relevant in the context of growing climate extremes, where traditional, sector-based approaches reach limitations.

Despite strong policy recognition, NbS implementation on the ground remains uneven, reflecting a persisting gap between policy ambition and implementation (Martin et al., 2025).

This implementation gap is not only driven by a lack of technical solutions or scientific evidence, but reflects persistent governance barriers, including fragmented policy frameworks, unclear institutional responsibilities, limited technical capacity and insufficient long-term financing.

Drawing on three demonstration cases from the HuT project in Spain, Italy and Switzerland, this brief highlights common governance challenges and identifies options to strengthen current policy approaches to overcome NbS barriers.

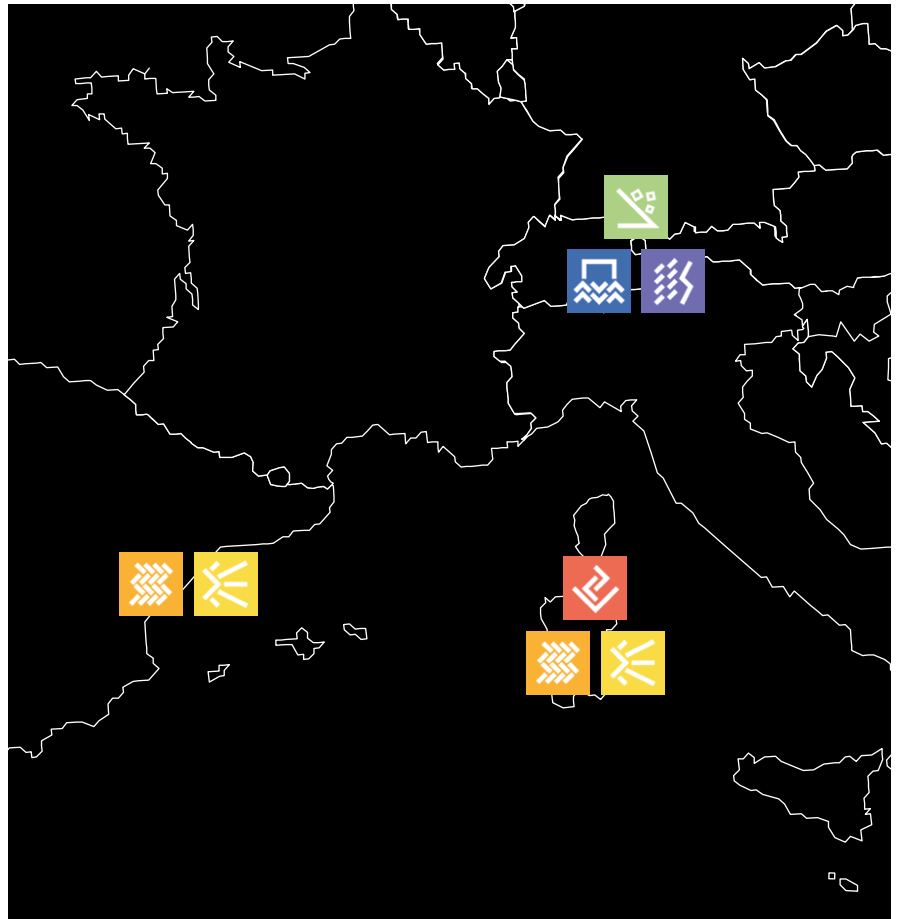
Evidence and analysis

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Case sites

This policy brief draws on research conducted in three contrasting European contexts, each characterised by distinct hazard profiles and governance settings. The analysis builds on findings from the [HuT Deliverable D3.1](#) (see full report for detailed case descriptions and policy context).

- **Valencia (Spain)** faces growing risks from **urban heatwaves and drought**, compounded by **pluvial flooding**. NbS such as **urban green and blue infrastructure** (e.g., parks, green corridors, riverbed restorations) aim to alleviate heat stress, improve water retention and mitigate flooding, primarily under municipal governance.
- The region of **Ogliostra (Italy)** is predominantly affected by **wildfires**, with **drought** exacerbating the risk. NbS here focus on land-based **fire prevention and mitigation** using agro-silvo-pastoral mosaic landscapes, controlled grazing, and preventive silviculture to combine risk reduction with rural livelihood support.
- **Canton Bern (Switzerland)** faces multiple **mountain hazards**, including avalanches, rockfalls, landslides and erosion, as well as floods and droughts. **Protection forests** function as long-term NbS embedded in cantonal and municipal risk reduction frameworks.



Data sources and analysis

The findings draw on stakeholder consultations across the three cases, including 25 semi-structured interviews, workshops and focus group discussions with around 60 stakeholders. Participants included public authorities, practitioners, land managers and other relevant actors, providing grounded insights into recurring governance barriers and practical policy options.

Policy options were evaluated against four criteria: **cost**, **administrative feasibility**, **long-term environmental sustainability**, and **social acceptance**, with input from over 40 stakeholders through interviews, workshops and focus group discussions. This participatory assessment enabled the identification of options that are feasible, broadly supported and scalable within existing governance structures (Brillinger et al., 2022; Mavrot et al., 2025).

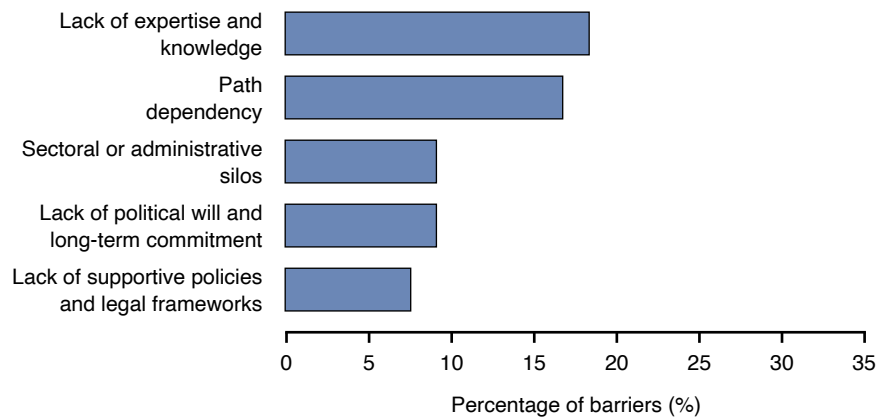
Key governance barriers

Here, we present the most frequently mentioned governance barriers to NbS implementation in the three demonstration cases. While results are context-specific, the recurrence of similar barriers across different territorial and governance contexts points to broader structural challenges that are highly relevant for policymakers.

Valencia (Spain)

Top 5 most frequently mentioned barriers to NbS implementation in Valencia

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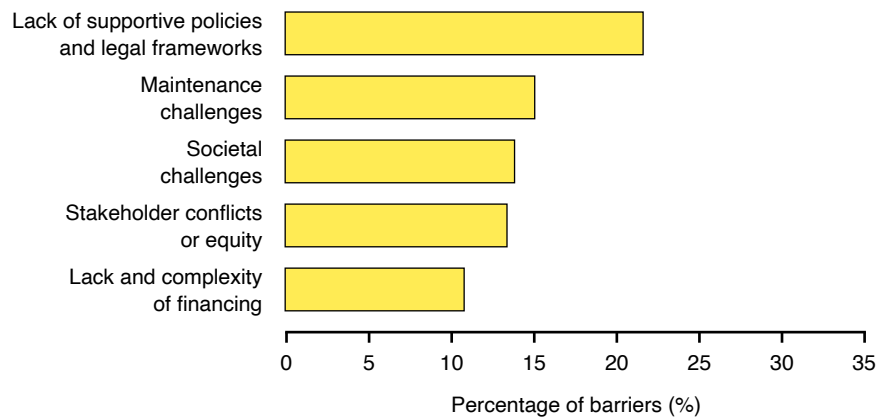


In the City of Valencia, where NbS such as urban green and blue infrastructure are promoted to address heatwaves, drought and pluvial flooding, governance barriers primarily relate to institutional and technical capacity. The most prominent governance barrier is **lack of expertise and knowledge**, particularly for the design and long-term maintenance of NbS measures. **Path dependency** was reflected in the continued prioritisation of established grey infrastructure solutions within planning procedures, technical standards and procurement practices, which favour familiar engineering approaches over newer NbS alternatives. Additional barriers include **administrative silos** and fragmented responsibilities across municipal departments, such as planning, parks and risk management. This is compounded by a **lack of political will and long-term commitment**, especially where NbS require sustained maintenance budgets beyond political cycles. Finally, **lack of supportive policies and legal frameworks** constrains systematic uptake, as NbS are not yet consistently embedded in binding municipal planning instruments.

Ogliestra (Italy)

Top 5 most frequently mentioned barriers to NbS implementation in the province of Ogliestra

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In the former province of Ogliestra, NbS, such as agro-silvo-pastoral mosaics, prescribed grazing, and preventive silviculture, are used to mitigate wildfire risk. Yet, barriers to their wider implementation largely stem from the **lack of supportive policy and legal frameworks**,

Top 5 most frequently mentioned barriers to NbS implementation in canton Bern

ecological complexity and fragmented governance arrangements. While the specific configuration of barriers differs across cases, their cumulative effect is to slow the transition from pilot projects to systematic, long-term NbS implementation.

Policy options and their evaluation

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Across the cases, urgent action is needed to address the vast and varied barriers that hamper NbS implementation. Here, we present a selection of the three most relevant policy options for each case, derived from the policy options identified in the [HuT D3.1: Innovative policy/governance enablers for multi-risk DRR](#). Each of these policy options were additionally ranked across 4 feasibility criteria.

NbS for drought, heat and floods in Valencia

1. Develop a technical manual for NbS

Develop a technical manual to provide consistent, quality assured guidance across sectors. The manual would guide the design, implementation, maintenance and evaluation of NbS, and should be co-developed by a multidisciplinary group of professionals (e.g., urban planners, engineers, ecologists, architects) and periodically updated. Institutionalising the manual as a reference framework would help integrate ecological, social, economic, and technical considerations, support adaptive learning, and improve consistency and quality across NbS projects.

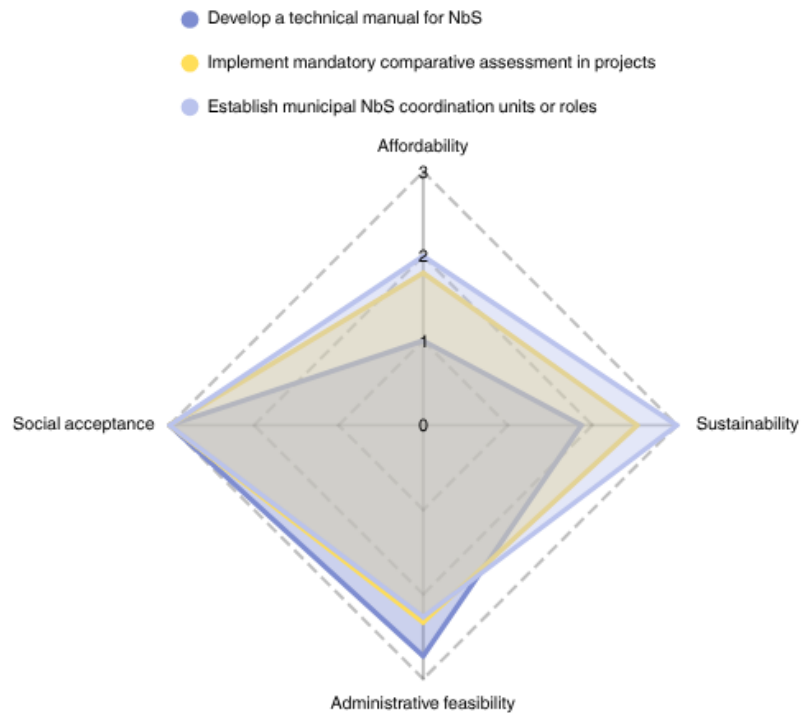
2. Implement mandatory comparative assessment in projects

Require all major infrastructure projects to undertake comparative assessments of grey, hybrid and nature-based alternatives. These assessments should incorporate ecosystem services analysis, climate adaptation and biodiversity considerations,

multi-hazard analysis, and long-term maintenance costs to support evidence-based decision-making. This approach would ensure that project choices are based on performance, sustainability, climate resilience and nature-positive outcomes, rather than on established practices or institutional inertia.

3. Establish municipal NbS coordination units or roles

Create a dedicated centralised coordination unit or focal role within the municipal administration to strengthen cross-departmental collaboration and NbS planning, implementation and long-term maintenance. By clarifying responsibilities and addressing fragmented governance structures and limited technical capacity, such a unit would enable more coherent action across departments. For example, improving coordination between Parks and Gardens and education authorities would allow school spaces to function as urban climate shelters.



Evaluation of policy options in Valencia

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The above figure depicts the results of the evaluated policies. Establishing municipal NbS coordination units or roles was perceived as the most feasible option overall. Implementing mandatory comparative assessments also scored comparatively highly, particularly for sustainability and administrative feasibility.

Developing a technical manual was associated with very high social acceptance and administrative feasibility and comparatively low perceived costs, but lower sustainability ratings relative to the other options.

Enhanced management of wildfires in Ogliastra

1. Develop integrated fire-smart strategies

Develop integrated fire-smart land management strategies that combine silviculture, prescribed grazing and traditional agroforestry practices to address key wildfire risk drivers. By managing ecosystems to reduce hazard exposure while enhancing ecological functions, these strategies constitute NbS for wildfire risk management. Such approaches would reduce fuel loads while increasing landscape heterogeneity, biodiversity and socio-ecological resilience, aligning wildfire prevention objectives with rural livelihoods and long-term land stewardship.

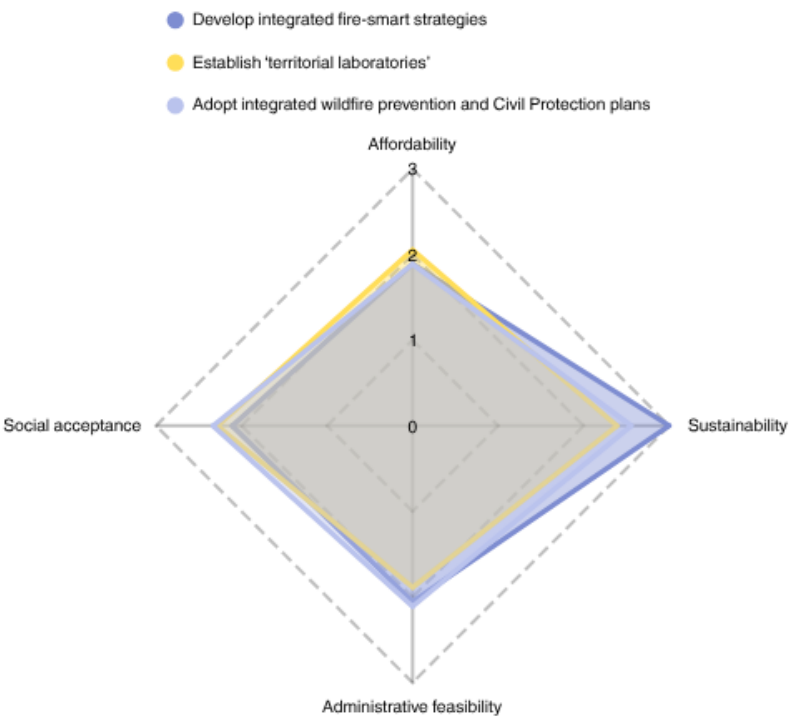
2. Establish 'territorial laboratories' for dialogue and inclusive governance

Establish permanent territorial laboratories as inclusive governance platforms where local authorities, forest managers, farmers, community representatives, insurers, financial stakeholders (e.g., banks, funding agencies) and civil society jointly co-design wildfire risk reduction strategies.

These platforms would improve cross-sectoral and multi-level coordination, integrate local and traditional knowledge, and support collective action in contexts characterised by fragmented land ownership and limited institutional capacity.

3. Adopt specific wildfire prevention and Civil Protection plans integrated with forest and territorial (land-use) planning

Adopt and strengthen Anti-Incendio Boschivo (AIB) wildfire prevention plans, ensuring their integration with Civil Protection plans and forest and territorial (land-use) planning instruments. Improved alignment across planning frameworks would enhance coherence among prevention, preparedness, and land management and support the systematic integration of NbS-compatible measures into wildfire risk governance.



Evaluation of policy options in Ogliastro
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Development of integrated fire-smart strategies received the highest sustainability score, alongside moderate feasibility, social acceptance and perceived costs. Integrated wildfire prevention and Civil Protection plans were rated comparatively evenly across all criteria.

Establishing territorial laboratories for dialogue and inclusive governance was associated with lower administrative feasibility and comparatively higher perceived costs, although it received moderate scores for sustainability and social acceptance.

Strengthening protective forests in Canton Bern

1. Strengthen the biodiversity and climate nexus

Strengthen recognition of biodiversity–climate interactions and their implications for forest resilience within existing policy frameworks, including Forest Management Plans, NaiS and PROTECT guidelines.

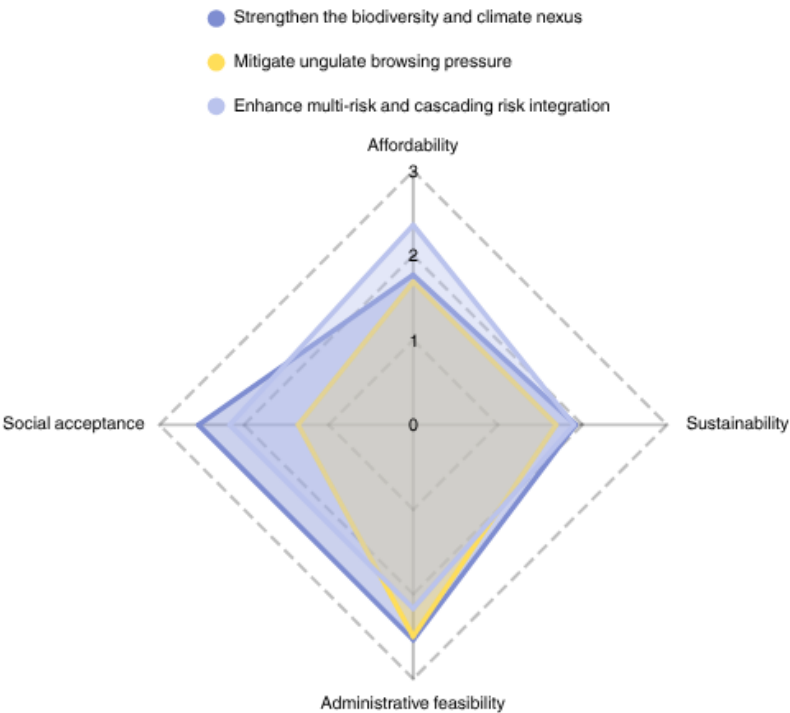
This includes promoting adaptive silviculture practices such as mixed-species planting and assisted migration, alongside biodiversity-enhancing measures such as deadwood retention and invasive species management. Better integration of these considerations would support the long-term protective function of forests under changing climatic conditions.

2. Mitigate ungulate browsing pressure

Mandate regional game management plans that explicitly include ecological carrying capacity targets and adapt hunting quotas accordingly. Addressing ungulate browsing pressure is essential to support forest regeneration, maintain species diversity, and ensure the continued effectiveness of protection forests as NbS for hazard mitigation.

3. Enhance multi-risk and cascading risk integration

Establish a dedicated multi-risk focal point (e.g., within the Office for Forests and Natural Hazards, AWN) to coordinate and liaise between natural hazard management, forestry, biodiversity and spatial planning units. Strengthening cross-sectoral coordination would improve the identification and management of interacting and cascading risks, and support more coherent and integrated decision-making.



Evaluation of policy options in canton Bern

The evaluation indicates that strengthening the biodiversity–climate nexus within existing policy frameworks ranks highest overall. Establishing a multi-risk coordination focal point received similarly strong ratings for ecological sustainability and acceptance, though it was associated with higher perceived costs. In contrast, mandating regional wildlife management plans was characterised by lower social acceptance scores, despite high ratings for ecological sustainability.

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