European Commission

Bridging continents

Exploring the state-of-play of Nature-based Solutions in the EU and LAC: Building a foundation for collaboration

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Bridging continents: Exploring the state-of-play of Nature-based Solutions in the EU and LAC: Building a foundation for collaboration

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Exploring the state-of-play of Nature-based Solutions in the EU and LAC: Building a foundation for collaboration

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LIST OF ABBREVIATIONS

ACTO	Amazon Cooperation Treaty Organisation
AFD	Agence Française de Développement
CDP	Cassa Depositi e Prestiti
CELAC	Community of Latin American and Caribbean States
CGEE	Center for Management and Strategic Studies
COICA	Coordinating Body of Indigenous Organisations of the Amazon Basin
COP	Conference of the Parties
DG RTD	Directorate-General for Research and Innovation
EBRD	European Bank for Reconstruction and Development
EIB	European Investment Bank
EU	European Union
EU-CELAC	European Union - Community of Latin American and Caribbean States
FAO	Food and Agriculture Organization
GCAPs	Green City Action Plans
GCF	Green Climate Fund
GrCF	Green Cities Framework
GBF	Global Biodiversity Framework
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IADB	Inter-American Development Bank
IICA	Inter-American Institute for Cooperation on Agriculture
IUCN	International Union for Conservation of Nature
LAC	Latin America and the Caribbean
NbS	Nature-based solutions
NBSAPs	National Biodiversity Strategies and Action Plans
NPBs	National Promotional Banks
NDCs	Nationally Determined Contributions
PES	Payment for Ecosystem Services
SDGs	Sustainable Development Goals
SuDS	Sustainable Drainage Systems
UNCBD	United Nations Convention on Biological Diversity
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNEA	United Nations Environment Assembly
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UTM	Urban Transitions Mission
WRI	World Resources Institute
WWF	World Wildlife Fund

EXECUTIVE SUMMARY

Cooperation in research and innovation between the European Union (EU) and Latin America and the Caribbean (LAC) is gaining momentum, with nature-based solutions (NbS) emerging as a central priority. The 2023 EU-CELAC Summit Declaration and the joint communication on the New Agenda to strengthen the EU-LAC partnership highlight the strategic significance of NbS. Furthermore, the EU-CELAC 2021-2023 Strategic Roadmap for Research and Innovation positions NbS as a core element for long-term collaboration. This focus was reinforced when senior officials from both regions, hosted by the European Commission in Brussels in November 2023, called for a bi-regional Policy Dialogue on NbS, and with the first bi-regional NbS conference taking place in Brussels, uniting policymakers, researchers, and stakeholders to explore collaborative solutions to shared environmental challenges.

In this context and in support of policymakers and the NbS community on both sides of the Atlantic, this report has been developed to provide a strategic overview of the current NbS landscape in LAC and Europe and lay the groundwork for future research, bi-directional knowledge-sharing, and collaborative efforts. After a brief introduction to set the scene, Chapter 2 presents an overview of the policy uptake, funding mechanisms, knowledge exchange, and bottom-up initiatives around NbS in both regions and highlights existing EU-LAC collaborations, focusing on research and policy alignment. Chapter 3 then showcases successful NbS applications across various environments, including agricultural, forest, freshwater, marine and coastal, and urban areas and presents several policy instruments which have been successful in supporting these initiatives. Building on past successes and lessons learned, the document illustrates how leveraging regional strengths and addressing shared challenges can foster ongoing cross-regional cooperation and concludes in Chapter 4 with a set of promising pathways for strengthening bi-regional cooperation around NbS.

Aligning with the UNEA-5 definition of NbS, the report emphasises key elements and safeguards around the concept to ensure that these solutions address environmental, social, and economic challenges while enhancing human well-being, biodiversity, and resilience. This executive summary briefly introduces central takeaways from the full report.

State-of-play around NbS in LAC and Europe

In LAC, where approximately 80% of the population resides in urban areas, rapid urbanisation presents challenges for balancing development with nature conservation. This dynamic demands NbS that are both environmentally sustainable and socially inclusive, reflecting the region's unique historical, environmental, and socio-economic context. While NbS projects in LAC might not always be explicitly labelled as such, many align closely with NbS principles, particularly in areas like ecosystem-based adaptation and eco-disaster risk reduction. Governments, development banks, research institutions, and local communities are actively advancing NbS through policies, incentives, and innovative approaches. For NbS to fully realise its potential in LAC, efforts must focus on closing key gaps, such as improving local implementation capacity, fostering inclusive governance, and securing sustainable financing. Respecting the knowledge and rights of Indigenous and traditional communities is also crucial for effective biodiversity conservation and sustainable development.

In Europe, the European Commission has been a strong advocate for NbS, investing over €660 million in research and innovation since 2015 through programmes like Horizon 2020 (2014-2020) and Horizon Europe (2021-2027). The EU's policy framework, including the European Green Deal, the EU Nature Restoration Law, the EU Biodiversity Strategy for 2030, and the EU Adaptation Strategy, integrates NbS into broader efforts to tackle biodiversity

loss, climate change, and disaster risks. However, to unlock the full potential of NbS, Europe needs to set measurable targets at the national level and develop more ambitious initiatives.

Despite notable progress in both regions and numerous successful examples of NbS implementation across diverse urban-rural landscapes, shared challenges persist which threaten the realisation of NbS's full potential. Key barriers include policy and regulatory obstacles, inadequate funding, technical complexities and limits to the integration of diverse knowledge systems into NbS design and implementation. As such, continued collaboration and knowledge-sharing within and between the regions is seen as essential for advancing NbS mainstreaming in policy and practice.

Collaboration pathways for LAC and the EU

While significant action is already being taken in support of NbS across LAC and Europe, further potential exists to increase the scale and impact of these initiatives and improve NbS mainstreaming and design towards enhanced effectiveness. Bi-regional collaboration pathways are one means to achieve these aims, capitalising on the knowledge, evidence, skills, resources and experiences of each region to inspire innovation and action in the other. Potential entry points to do so include boosting advocacy for integrating NbS into policies, securing innovative financing mechanisms, and strengthening practitioner and government capacities through targeted training and knowledge-sharing platforms. The envisioned collaboration pathways are as follows:

- *Sharing knowledge, data, and expertise:* Establishing platforms like the European Oppla, the LAC OICS platform (which has a dedicated pillar for NbS), and the LAC *Naturaleza Transformativa: Soluciones para la biodiversidad y las personas en Latinoamérica* platform can facilitate the exchange of best practices, case studies, and technological innovations. Encouraging joint research projects between LAC and EU partners can address shared challenges and develop innovative solutions relevant to both regions. Collaborative research also builds long-term academic and professional relationships, enhancing NbS implementation capacity.
- *Addressing policy and regulatory barriers:* Mainstreaming NbS across sectoral policies and ensuring it becomes a viable option alongside or in place of traditional grey infrastructure solutions in decision-making processes requires harmonising policies and creating supportive legal frameworks can incentivise NbS adoption and ensure alignment with environmental, social, and economic objectives. Jointly developed regulations can facilitate cross-border initiatives, while incentives such as tax breaks and grants can stimulate investment in NbS projects. Advisory councils with representatives from both regions can guide NbS policy development, ensuring inclusivity and alignment with scientific and local knowledge.
- *Enabling innovative financing mechanisms*, including green bonds and public-private partnerships: Providing essential funding for NbS projects requires leveraging these mechanisms and introducing financial incentives that can attract private sector investment and support sustainable NbS initiatives. Partnerships between the public and private sectors can pool expertise and capital, enabling larger-scale projects and sharing risks and benefits.
- *Engaging local communities in NbS design and implementation:* Ensuring NbS sustainability and effectiveness requires support for community-led initiatives and participatory planning processes, not least to enhance the relevance and success of implemented projects. Training programs and toolkits can build local capacity and promote long-term stewardship.
- *Enhancing multi-level and bi-regional collaborations*, such as city-to-city and country-to-country initiatives: Partnerships between cities in LAC and the EU can promote knowledge exchange and boost the implementation of joint NbS projects

tailored to address local environmental challenges. Broader intercontinental collaborations can harness the strengths of both regions, advancing NbS innovations and influencing global biodiversity and sustainability agendas.

The outlined entry points are envisioned as conversation starters to target action within and between each region. The urgency to pursue these pathways in support of increased NbS uptake is underscored by the upcoming two-year anniversary of the Kunming-Montreal Global Biodiversity Framework. The United Nations Convention on Biological Diversity Conference of the Parties COP16 represents a valuable opportunity to turn the GBF into concrete NbS action. All Parties are encouraged to update their National Biodiversity Strategies and Action Plans in alignment with the GBF, ensuring that NbS are fully integrated and supported at all levels of government for effective implementation.

This ambition can be supported by an ongoing policy dialogue on Nature-based Solutions, acting as a framework within which to organise regular dialogues, joint planning sessions, and coordinated implementation efforts as well as to advocate for the inclusion of NbS in global environmental and development agendas to elevate the importance of NbS, attract further international support and reduce disparities in resource distribution to ensure that the benefits of NbS are equitably shared.

1. Introduction

Cooperation in research and innovation between the European Union (EU) and Latin America and the Caribbean (LAC) is advancing across various levels and topics, with nature-based solutions (NbS) emerging as a key focus. Recognised for their importance in contributing to the Kunming-Montreal Global Biodiversity Framework, the Paris Agreement on climate, and the Sustainable Development Goals (SDGs), NbS are increasingly at the forefront of global, European, and LAC agendas.

Historically, NbS have focused on managing natural resources and enhancing ecosystem functions to reduce habitat loss and increase the provision of ecosystem services. Recently, their role in addressing the climate crisis by mitigating carbon emissions, reducing disaster risks associated with climate-induced hazards, and reversing biodiversity loss has been widely acknowledged with NbS now being formally recognised for their potential to address a broad range of societal challenges. According to the International Union for Conservation of Nature (IUCN), NbS are actions to protect, sustainably manage and restore natural or modified ecosystems, which address societal challenges simultaneously providing human well-being and biodiversity benefits (Cohen-Shacham et al., 2016). They have the potential to address societal challenges: climate change mitigation and adaptation, disaster risk reduction, economic and social development, human health, food security, water security, and reversing environmental degradation and biodiversity loss. As environmental changes increasingly affect food, water, income, and health, NbS provide a crucial solution by addressing these interconnected challenges. Their ability to contribute to multiple development goals simultaneously makes them vital in tackling global crises and ensuring a sustainable future (Dunlop et al.,2024).

While the IUCN definition is widely referenced, the European Commission has also put forward a definition. Recognising the need for a universally agreed definition of NbS, the United Nations Environment Assembly (UNEA) adopted an official definition in 2022 (see Box 1). This definition highlights the key elements and safeguards necessary for ensuring that NbS effectively address social, economic, and environmental challenges while providing benefits for human well-being, biodiversity, and resilience.

UNEA-5 Definition of NbS

The United Nations Environment Assembly,
Acknowledging the need for a multilaterally agreed definition of the concept of nature-based solutions, cognizant of and in harmony with the concept of ecosystem-based approaches, and in the light of concerns about the potential misuse of the concept of nature-based solutions,

1. *Decides* that nature-based solutions are **actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services, resilience and biodiversity benefits**, and recognizes that nature-based solutions:

(a) Respect social and environmental safeguards, in line with the three "Rio conventions" (the Convention on Biological Diversity, the United Nations Convention to Combat Desertification and the United Nations Framework Convention on Climate Change), including such safeguards for local communities and indigenous peoples;

(b) Can be implemented in accordance with local, national and regional circumstances, consistent with the 2030 Agenda for Sustainable Development, and can be managed

adaptively;

(c) Are among the actions that play an essential role in the overall global effort to achieve the Sustainable Development Goals, including by effectively and efficiently addressing major social, economic and environmental challenges, such as biodiversity loss, climate change, land degradation, desertification, food security, disaster risks, urban development, water availability, poverty eradication, inequality and unemployment, as well as social development, sustainable economic development, human health and a broad range of ecosystem services".

Source: UNEA (2022)

Box 1: UNEA-5 definition of nature-based solutions

Political ambitions in both Europe and LAC are underscored by a wealth of experience in NbS design and implementation, with numerous initiatives already underway, as well as significant investments. Despite differing socio-economic contexts and environmental challenges, there is growing momentum to align these efforts, creating opportunities for mutual learning and joint action.

Scaling up NbS to their full potential, however, requires coordinated efforts in both regions. This includes enhancing knowledge and technical capacities, developing innovative financing mechanisms, increasing total investments in NbS, and improving governance frameworks. Strengthened scientific cooperation and capacity building at the multilateral level will be crucial to drive NbS forward in both regions.

In November 2023, senior government officials from EU Member States and LAC countries met in Brussels for a meeting hosted by the European Commission to discuss shared research and innovation priorities. The outcome was a strong call for a bi-regional *Policy Dialogue on NbS*, further reflecting the importance of aligning efforts across both regions. The first bi-regional conference on NbS, organised in June 2024, represented a key moment in fostering long-term cooperation between the regions. Policymakers, researchers, and stakeholders came together to explore opportunities for joint action, aiming to tackle shared environmental challenges.

As this report will show, the activities around NbS in both Europe and LAC are aligned with broader political discussions. The 2023 European Union - Community of Latin American and Caribbean States (EU-CELAC) Summit Declaration and the joint communication on the New Agenda to strengthen the EU-LAC partnership both highlight the importance of NbS as a strategic priority. Additionally, the EU-CELAC Strategic Roadmap for Research and Innovation serves as a foundation for long-term collaboration, incorporating NbS as a key area of focus.

Building on these developments, this paper outlines the state-of-play around NbS in both Europe and LAC (Chapter 2), highlights a variety of NbS initiatives across rural and urban landscapes (Chapter 3), and elaborates collaboration pathways for joint action (Chapter 4). The EU-CELAC Dialogue and the findings of this paper contribute to a shared ambition of fostering cross-regional research, mutual understanding, and cooperation around NbS, benefitting both regions.

2. Nature-based solutions: Current landscape in LAC and Europe

The need to halt and reverse biodiversity loss is recognised as being essential for maintaining human well-being, with the deterioration of nature threatening the survival of countless species and affecting billions of people. The adoption of the Kunming-Montreal Global Biodiversity Framework (the GBF, now also called the Biodiversity Plan) sets global targets to be achieved by 2030, paving the way to a world living in harmony with nature by 2050. With NbS recognised as a critical pathway to contribute to these challenges and combat biodiversity loss (amongst other ambitions), this chapter explores the state-of-play around NbS in the EU and LAC, highlighting region-specific considerations and existing collaboration initiatives. The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), through its scientific assessments, has highlighted the crucial role biodiversity and ecosystem services play in human well-being, thereby guiding the development of NbS as a key strategy for addressing climate adaptation and biodiversity conservation. Aspects such as the framing of NbS discussions, collaboration entry points, policy uptake by national governments and cities, funding mechanisms, and knowledge initiatives related to NbS are elaborated. Finally, existing collaboration initiatives on NbS are presented.

Before going into the details of each region, however, it is important to highlight the emphasis of the globally recognised UNEA-5 definition of NbS on the need to respect social and environmental safeguards, including those for local communities and indigenous peoples, adapt to various situations, address biodiversity loss, climate change, and food security, and stimulate sustainable innovation and scientific research. The European Commission's commitment to these principles is critical for promoting sustainable and resilient societies, helping to counteract historical contexts where past exploitation, particularly in regions like Latin America, has caused lasting challenges. By ensuring NbS initiatives do not facilitate land grabs or marginalise local communities, the EU fosters equitable partnerships that respect local sovereignty and traditional knowledge, supports capacity-building, and involves local stakeholders in project design and governance. This approach not only addresses environmental challenges but also promotes social justice and community empowerment, setting a more nuanced vision to support NbS implementation in other continents.

2.1 Latin America and the Caribbean: State-of-play around NbS

Framing the NbS discussion

Nature is a central part of the LAC regional identity, with a long history of working with nature for its intrinsic value and as a cultural cornerstone, especially for traditional and indigenous practices. These practices have also been used as tools to address various environmental and social challenges. While traditionally not labelled as NbS, their objectives, methods, and outcomes closely align with NbS principles and goals. Examples include ecosystem-based adaptation, eco-disaster risk reduction, integrated ecosystem management, and the adoption of concepts like *Buen Vivir* that emphasises a balanced and respectful relationship between humans and nature, advocating for living in harmony with the environment and opposing the overexploitation of natural resources (Fathuer, 2011) and Bolivia's 'Mother Earth Rights Law' in governmental development plans and discourses.

The LAC territory boasts an extraordinary natural and cultural richness and is amongst the most biodiversity-rich in the world, with over 2,300 key biodiversity areas across more than 3.2 million km² (González & Sabra, 2024) and home to an estimated 42 million indigenous people (World Bank, 2015). These populations bring centuries of stewardship traditions and cultural wisdom around nature and are important actors in natural resource governance and

management (IPBES, 2023). In Ecuador, for example, indigenous peoples and local communities' lands cover 29% of the total land area and 46% percent of the country's total key biodiversity areas (ca. 43,000 km²) (WWF et al, 2021).

At the same time, the region is the second most urbanised globally with 81% of its population residing in urban areas (ECLAC, 2024). Intense urbanisation processes and the spreading of informal settlements across the LAC region have transformed land use and economic activities, leading to a pronounced tension between urban development and nature protection goals. Resultant urban sprawl, ecosystem degradation, and natural resource exploitation compounded by a changing climate have resulted in a heightened vulnerability to natural hazards (e.g. flooding and landslides), infrastructure damage, decreased water quality and quantity (Ozment et al., 2021) and socio-economic inequity. In addition, indigenous populations are also directly impacted by biodiversity loss and its underlying drivers. These trends pose new challenges for land use planning, relating for example to the achievement of inclusive decision-making and governance, just access to generated benefits, and minimising negative trade-offs between competing objectives.

In response to these challenges, sustainable land management, urban planning, and environmental initiatives in the LAC region have increasingly focused on balancing urban development with environmental conservation as a guiding principle since the 1980s (Sili, 2022). Government actions, international agendas, and the urgency of challenges posed by the climate change and biodiversity crises have driven much of this agenda (Von Handelwang, 2005), catalysing innovations and advancements in legal and governance frameworks in areas such as ecosystem-based adaptation, eco-disaster risk reduction, and integrated ecosystem management. There has also been significant progress in adopting NbS principles, even if not labelled as such, and in explicit support for NbS in national political agendas, foreign investments, and local initiatives. Governments have demonstrated a willingness to borrow for NbS projects, and development banks are providing technical assistance grants as well as loans to support NbS action. These investments, which address key regional challenges such as water quantity and quality, urban flooding, coastal flooding and erosion, landslide risk, and river flooding, have resulted in the development of more than 150 NbS projects in the LAC region (Ozment et al., 2021).

While it is important to acknowledge advancements, it is equally crucial to reflect on the possible implications around such investments and be aware of potential power dynamics in play to avoid unintended negative impacts when promoting or implementing NbS.

As NbS originates as a label from the Global North, it is critical to consider local socio-cultural, historical and economic contexts and be aware of the potential challenges around fostering equitable and sustainable development (IUCN, 2020; Marques et al., 2022). One approach of ensuring that NbS meet specific local requirements and incorporate culturally rooted practices is to design a co-creative process involving relevant stakeholder groups and integrating the diverse knowledge systems held across the region in the NbS planning processes (Gobatti, 2021; Marques et al., 2022). Giving space to local perspectives can help challenge the application of global narratives in designing NbS and ensure effective and locally accepted solutions (Kothari et al., 2019). Ethical, social and environmental safeguards can be valuable in this context to ensure that cultural and legislative conditions (e.g. related to collective land ownership) are respected while making space for a diversity of spiritual/religious beliefs and worldviews to be taken into account in the process of co-creating locally attuned NbS, while supporting the integration of diverse stakeholders and understandings of the NbS concept in planning processes.

Entry points for NbS action

This section introduces a selection of key institutions and initiatives at different scales in the LAC region which play a key role in NbS mainstreaming. The focus lies on three primary aspects of the NbS landscape – policy uptake, funding for implementation and knowledge and innovation – to depict the evolving discourse in the region.

Policy Frameworks

National governments

While there is not an overarching LAC-wide policy framework governing NbS or driving the regional research agenda forward, as is the case in the EU, several national policy instruments are promoting the NbS concept. While often not explicitly labelled as 'nature-based solutions' or featured in dedicated policies, the NbS concept is evident through terms such as ecosystem-based adaptation, eco-disaster risk reduction, and integrated ecosystem management and integrated into sectoral or development policies such as adaptation, biodiversity conservation, and sustainable development. Initiatives are often supported by regional organisations, development banks and international cooperation agencies driven by global agendas such as the SDGs, the UN Convention on Biological Diversity (UNCBD), or UN Framework Convention on Climate Change (UNFCCC).

Several national governments in LAC are integrating the NbS-concept into their national environmental policies, particularly those focusing on biodiversity conservation and climate adaptation and mitigation, as well as into broader policy frameworks for protected areas and sustainable development. Leading initiatives encompass integrated water resource management and planning, enhancing ecosystem and community-based adaptation, promoting socio-ecological rehabilitation and productive restoration, and implementing urban and regional sustainable planning strategies such as the creation of areas and strategies for biodiversity conservation in collaboration with productive sectors. These initiatives highlight the region's commitment to adopting NbS principles, showcasing effective collaboration between governments, communities, and various sectors towards achieving environmental and social goals that are key in the region, such as enhancing water security and restoring coastal ecosystems to mitigate erosion and protect local livelihoods. Although a comprehensive overview of national policies supporting NbS is lacking, it is possible to highlight key examples that offer insights into how NbS concepts are being integrated at the national level. These examples, found in Table 1, provide a glimpse into the progress and direction of policy development across different countries.

Argentina

In Argentina, NbS are incorporated into the National Climate Change Adaptation and Mitigation Plan (2022), which includes measures for ecosystem restoration and sustainable land management. The country's NDCs (updated in 2022) highlight the role of NbS in enhancing carbon sinks and protecting biodiversity. Argentina's National Strategy for Biodiversity promotes the integration of NbS in agriculture, forestry, and water management. Additionally, the government supports community-based NbS projects that focus on restoring wetlands, forests, and grasslands, contributing to climate resilience and sustainable development.

Barbados

The National Biodiversity Strategy and Action Plan (NBSAP, 2020) incorporates NbS to conserve marine and terrestrial ecosystems. Barbados' climate policies focus on coral reef restoration and the protection of coastal habitats to mitigate the impacts of climate change and support sustainable tourism.

Brazil

In Brazil, NbS are integrated into national policies and programmes focusing on biodiversity conservation and climate resilience. The National Plan for Adaptation to Climate Change (PNA, 2016) includes strategies for ecosystem restoration and sustainable land management. The Brazilian Forest Code adopted by the law 12651 of 2012, mandates the protection and restoration of native vegetation, promoting NbS through reforestation and sustainable agricultural practices. The country's Nationally Determined Contributions under the Paris Agreement also highlight the role of NbS in mitigating greenhouse gas emissions and enhancing biodiversity. Finally, the Brazilian Green and Resilient Cities Programme (2024) further supports these efforts by incorporating NbS into urban planning. This programme emphasises green infrastructure, urban biodiversity, and climate resilience, creating green spaces, sustainable water management systems, and climate-resilient infrastructures.

Chile

Chile has integrated NbS into its climate and environmental policies through the National Climate Change Adaptation Plan (2017-2022), currently being updated (Ministerio del Medio Ambiente, 2024), and the NDCs (updated in 2020). These frameworks emphasise the restoration of wetlands, forests, and coastal ecosystems to enhance resilience to climate impacts and reduce carbon emissions. The country's National Green Growth Strategy (2014) also supports NbS by promoting sustainable land use and the conservation of biodiversity. Additionally, Chile's efforts to create urban green spaces and restore natural habitats in cities are part of its broader strategy to mitigate climate risks and improve the quality of life for its citizens.

Colombia

Colombia has a robust policy framework supporting NbS, particularly through its National Development Plan (2022-2026) and National Climate Change Policy (2017). The country's Plan Nacional de Adaptación al Cambio Climático (PNACC, 2021-2030) integrates NbS to address climate vulnerabilities and enhance ecosystem services. Colombia's NDCs (updated in 2022) highlight the importance of conserving and restoring ecosystems, such as páramos (high-altitude wetlands) and mangroves, to increase climate resilience and carbon sequestration. The government also promotes NbS through initiatives like Herencia Colombia (2015), which aims to conserve biodiversity and support sustainable livelihoods in protected areas. Currently, the National Planning Department is spearheading a national NbS strategy aimed at developing a report and verification mechanisms for NbS implementation nationwide. This effort aligns with the Ministry of Environment's initiative to establish guidance for NbS implementation.

Costa Rica

Costa Rica is renowned for its commitment to sustainability and biodiversity conservation. The country's NDCs (updated in 2022) highlight the importance of NbS for climate adaptation and mitigation. Costa Rica's Payment for Ecosystem Services (PES, 1997) programme incentivises landowners to conserve forests and restore degraded lands, contributing to carbon sequestration and biodiversity enhancement. Finally, the National Biodiversity Strategy and Action Plan (NBSAP, 2016-2025) also integrates NbS to protect ecosystems and support

sustainable development. Furthermore, initiatives like the National Decarbonisation Plan (2018-2050)emphasise the restoration of ecosystems as part of the country's efforts to achieve carbon neutrality by 2050.

Ecuador

Ecuador's approach to NbS is reflected in its National Climate Change Strategy and National Biodiversity Strategy and Action Plan (NBSAP, 2015-2030). The country's NDCs (2019) focus on reforestation, sustainable agriculture, and the conservation of ecosystems like mangroves and páramos to enhance climate resilience and carbon sequestration. In addition, Ecuador's Socio Bosque Programme (2008) provides financial incentives to landowners for conserving native forests, thereby promoting NbS at the community level. The government also supports NbS through initiatives aimed at restoring degraded lands and protecting water resources, integrating traditional knowledge and local practices into national policies.

Grenada

The Integrated Coastal Zone Management (ICZM, 2019) plan promotes NbS to protect coastal areas from erosion and flooding. Grenada's NDCs (updated in 2020) emphasise the restoration of mangroves and coral reefs as critical components of the country's climate resilience strategy.

Jamaica

In Jamaica, the National Climate Change Policy Framework (updated in 2021) emphasises the use of NbS to enhance resilience to climate impacts, such as hurricanes and sea-level rise. Jamaica's NDCs (updated in 2020) include commitments to mangrove restoration and watershed management to protect coastal communities and biodiversity.

Mexico

In Mexico, the government has incorporated NbS into several national strategies to address climate change and biodiversity loss. The National Climate Change Strategy and the Special Programme on Climate Change (PECC, 2021-2024) emphasise the role of ecosystem-based adaptation and the restoration of natural habitats. Mexico's NDCs (updated in 2022) include commitments to reforestation, forest conservation, and sustainable land use practices. Finally, the National Biodiversity Strategy and Action Plan (NBSAP, 2016-2030) promotes the integration of NbS in urban planning and water management, enhancing resilience to climate impacts while preserving biodiversity.

Peru

In Peru, NbS are central to national policies addressing climate change and biodiversity conservation. The National Strategy on Climate Change (2015) focuses on ecosystem-based adaptation to improve resilience and reduce vulnerability to climate impacts. Peru's NDCs (updated in 2022) emphasise the restoration of degraded ecosystems, such as forests and wetlands, to enhance carbon sequestration and biodiversity. The country's National Biodiversity Strategy and Action Plan (NBSAP, 2016) includes targets for the conservation and sustainable use of biodiversity, promoting NbS in sectors like agriculture, forestry, and water management. Finally, the "Programa Nacional de Conservación de Bosques (2010) supports the conservation of forests and the livelihoods of indigenous communities, integrating NbS into national development goals.

Table 1: Selection of national policies supporting NbS uptake in LAC.

Cities and other governmental networks

There are a growing number of NbS projects led by local governments in LAC to address diverse issues such as water management, urban and coastal flooding, erosion, and landslide risk. A recent study (Ozment et al., 2021) identified 156 NbS projects across the region, revealing widespread participation and robust government involvement. Remarkably, about 94 percent of these projects involve partnerships with national or local governments. Of these, 30 projects (19%) are led by local governments, including municipalities, cities, and states. Nearly half of these locally led initiatives are self-funded through local tax revenues, demonstrating a strong push from local governments to invest in NbS and their implementation. These projects are often supported by a variety of policy instruments at the municipal level. The Urban Governance Atlas showcases 250 good practice examples of instruments (legislative, economic, knowledge and innovation, and agreement-based) supporting NbS, with 91 examples from the LAC region (see Chapter 3 for examples).

City networks also play a key role in the uptake of NbS and in supporting cities in their NbS ambitions by fostering city-to-city collaboration, providing platforms for sharing best practices and exchanging experiences, supporting cities in accessing funding, and participating in global NbS initiatives. The Urban Nature Programme, for example, is an initiative co-led by the World Bank through its Global Platform for Sustainable Cities (supported by the Global Environment Fund, GEF), the United Nations Environment Programme (UNEP) as part of the UN Decade on Ecosystems Restoration, and ICLEI – Local Governments for Sustainability. The programme has been providing financial and technical assistance to accelerate investments in nature within urban areas. The initiative showcases lighthouse cities that exemplify global leadership and builds a pipeline of ambitious cities intending to leverage green urban infrastructure and NbS to address the impacts of climate change. Key partners include the World Resources Institute (WRI), IUCN, C40 Cities, and the World Business Council for Sustainable Development. The programme is supported by the High-Level Climate Champions. Another example is the CitiesWithNature platform, with over 40 member cities in LAC, that facilitates the exchange of experiences and commitments on biodiversity with other cities worldwide to accelerate NbS implementation in the region. CitiesWithNature has founding partners ICLEI, The Nature Conservancy, and IUCN, along with supporting bodies such as the CBD and other international partners. The platform plays a crucial role, with over 200 cities worldwide, connecting and sharing experiences to enhance urban nature integration and sustainability.

In Brazil, multiple networks are active in the area of NbS, such as the Sustainable Cities Programme, CB27 - Fórum de Secretários de Meio Ambiente das Capitais Brasileiras, Associação Nacional de Órgãos Municipais de Meio Ambiente, Associação Brasileira de Entidades Estaduais de Meio Ambiente, Frente Nacional de Prefeitas e Prefeitos, and Associação Brasileira de Municípios. In Colombia, active networks include: Asocapitales - Asociación Colombiana de Ciudades Capitales, Fedemunicipios – Federación Colombiana de Municipios, and Asocars – Asociación de Corporaciones Autónomas Regionales y de Desarrollo Sostenible. There are also several active networks in Chile, such as Adapt-Chile. Additionally, regional networks like Mercociudades, Latin American Landscape Initiative (LALI) and the Iniciativa de Ciudades Resilientes al Clima facilitate collaboration across the LAC region.

Funding streams

Multilateral Development Banks and intergovernmental initiatives play a crucial role in networking relevant stakeholders and providing access to financing for NbS research and implementation in the LAC region. There has been an increase in funding in recent years for technical cooperation to implement NbS across the region with some organisations, such as

the Inter-American Development Bank (IADB), having invested in NbS-related projects already since 2015. Since 2020, further investments have been prioritised due to the urgency created by the COVID-19 pandemic (Oliver et al., 2021).

Several development banks offer substantial funding and technical support for NbS and the integration of NbS into urban planning, water management and disaster risk reduction activities. The IADB, the Development Bank of Latin America (CAF), and the World Bank, for example, fund projects aligned with climate goals, biodiversity conservation, and sustainable development. These institutions support collaborative governance around NbS by engaging national governments in project design and implementation, ensuring alignment with national development priorities.

Taking the IADB as an example, technical cooperation and funding is provided to national ministries of environment and finance in LAC to establish supportive governance frameworks for NbS investments, particularly from the private sector. Between 2015 and mid-2020, the IADB's Infrastructure and Energy Sector and its Climate Change and Sustainable Development Sector invested $19.73 billion (€18.2 billion) across 162 projects, with 28 of these projects incorporating NbS (IADB, 2020a). NbS-focused initiatives received $813.23 million (€753.3 million). Additionally, the bank managed to work with counterpart contributions with external donors and government counterparts contributed $436.77 million, bringing the total funding for NbS projects to nearly $1.25 billion. These figures encompass overall project resources, including components beyond NbS interventions. The 2020 Mainstreaming Action Plan for Environmental and Social Sustainability (2021–25) outlines formal guidelines to integrate NbS across its portfolio, aligning with broader initiatives in climate action, disaster risk management, and natural capital considerations (Oliver et al., 2021). Funded NbS actions include a diverse array of interventions in the sectors where the bank focuses its work, i.e. the water, housing and urban development, transportation and energy sectors. Table 2 summarises key examples of NbS promoted by the IADB (adapted from Oliver et al., 2021):

Type of investment	Objective	Nature-based solution	Project example
Urban, periurban, and rural water supply	Water security	Forestland, inland wetlands, and riparian areas surrounding water sources can naturally filter biological and chemical impurities, reducing erosion and improving water quality (Browder et al., 2019).	The Tietê River Recovery Project in the state of São Paulo, Brazil, financed the recovery of 36 hectares of riparian buffer zones to decrease erosion and increase water quality (IADB, 2019)..*
Urban drainage	Urban stormwater management	Urban forests, bioswales, and wetlands can help trap urban stormwater runoff to reduce urban flooding. These interventions can also prevent pollutants—including heavy metals, oils, and chemicals—from contaminating downstream water bodies (Wang et al., 2013).	Peru's Comprehensive Storm Drainage Programme in Priority Cities includes NbS, such as permeable pavements and distributed bioretention, alongside grey drainage infrastructure investments (IADB, 2020).

Housing Neighbourhood upgrades Urban land planning and management Urban rehabilitation and heritage Sustainable cities	Urban flood prevention	Green infrastructure solutions, such as urban wetlands, bioswales, green buffer zones, green roofing, permeable pavements, and urban parks increase infiltration of stormwater, reducing impacts of urban flooding (Soz et al., 2016).	After extreme urban flooding events in 2003 and 2007, Santa Fe, Argentina, began to implement green-grey drainage infrastructure interventions, including urban wetlands, urban parks, and bioswales (Maldonado, 2020).
	Coastal flooding protection	Strategic management of coastal ecosystems, including coral and oyster reefs, coastal wetlands, mangrove forests, and sandy beaches and dunes can protect coastal cities against storm surge and coastal erosion (Cunniff & Schwartz, 2015).	Coral reefs in Belize and Jamaica play a vital role in coastal protection, the livelihoods of coastal communities, and the preservation of biodiversity and fragile ecosystems. The Coral Reef Restoration Programme sought to establish a more robust scientific basis to inform decision-making processes regarding the preservation of coral reefs and to enhance their resilience and propagation (IADB, 2013).

Table 2. Examples of IDB project investments in NbS.
All citations except one (*) are taken from Oliver, et al (2021)

Similarly, the World Bank's NbS programme has supported an increasing number of projects since 2018 providing funding and technical support for sustainable land management, urban greening, and climate adaptation projects. These projects often involve restoring natural habitats such as wetlands and forests to enhance their ecological functions and resilience to climate change. The World Bank's involvement ensures that NbS initiatives are well-funded and effectively implemented, aligning with global environmental goals (GWSP et al., 2023). One example of such a project is the Disaster Vulnerability Reduction Project in Jamaica, which aims to strengthen the country's resilience to disaster and climate risk. The World Bank provided approximately €3.5 million to support technical assistance for ecosystem-based adaptation, focusing on studies of the role of mangroves in disaster risk reduction, alongside risk reduction through infrastructure improvements, contingent emergency response and project management (Global Program on NbS for Climate Resilience, n.d.).

Further critical players include the United Nations Development Programme (UNDP) and United Nations Economic Commission for Latin America and the Caribbean. These organisations provide funding and technical assistance for projects that aim to increase climate resilience through ecosystem-based adaptation, develop policy frameworks to mainstream NbS, and promote sustainable economic development. Funded initiatives often involve restoring degraded landscapes, protecting coastal areas, and implementing sustainable agriculture practices that enhance ecosystem services. For example, the UNDP has supported Honduras's efforts to strengthen NbS with a focus on social inclusion in the country's Central Forest Corridor, a project that promotes the natural filtration and regulation of water flows. Financed by the global Adaptation Fund and implemented by the Ministry of Natural Resources and Environment, the project highlights the innovation and leadership of young researchers from the National Autonomous University of Honduras, who have

advanced solutions to the water crisis by integrating different monitoring practices and establishing a water ecology lab (Xilotl, 2023).

Within these large-scale projects, civil society organisations sometimes collaborate with international organisations. The Bioma Amazonico, for example, is part of the Latin American Network of Technical Cooperation in National Parks and Other Protected Areas (Redparques). This initiative is led by FAO and implemented with WWF, IUCN, UNEP, and Redparques. Furthermore, the Latin American and Caribbean Network of Environmental Funds, RedLAC, supports NbS by funding conservation projects and fostering partnerships among environmental funds, NGOs, and community organisations.

A further funding stream is green bonds issued by, for example, national governments and MDBs such as the World Bank. As a type of debt instrument, green bonds allow institutions to raise funds from private investors to support projects aiming to mitigate climate change and support nature conservation (Commonwealth Secretariat, 2021). For example, the World Bank has supported the Espírito Santo Integrated Sustainable Water Management Project in Brazil, which aims to enhance water resource management, promote reforestation, and improve disaster risk management, incorporating NbS to address flooding and erosion, as part of their Green Bonds funding programme (World Bank, 2021; Global Program on NbS for Climate Resilience, n.d.). However, internationally recognised standards for green bonds are still lacking, making the mechanism vulnerable to greenwashing (Commonwealth Secretariat, 2021). This concern aligns with other critiques of private sector investments in NbS, such as those issued by the World Rainforest Movement (2023) on carbon offsets and credits, and criticism of a biodiversity crediting scheme announced by a Brazilian state government that lacks public disclosure of funding selection criteria (Ferraglioni, 2024).

Knowledge initiatives

Research institutes, think tanks, and knowledge initiatives in LAC play a crucial role in increasing the evidence base and knowledge around NbS (such as monitoring their environmental and social impacts) and assessing policy effectiveness. Institutions such as the WRI Latin America, the World Wildlife Fund (WWF) in the Americas, and ICLEI South America, conduct interdisciplinary research, publish findings, and develop guidelines for NbS implementation, often in collaboration with development banks. For instance, the IADB supports initiatives like the WRI NbS Policy Accelerator. The WRI also leads cross-border research in the Amazon Basin, merging climate science with traditional ecological knowledge to promote inclusive and locally tailored NbS approaches.

Across LAC, think tanks, collaborative projects, and research institutes explore NbS potentials in socio-ecological contexts, focusing on biodiversity conservation, nature-based climate solutions, and green urbanisation. Notable institutions include Instituto Humboldt (Colombia), CEBio (Argentina), Iniciativa Climática de México (Mexico), and CATIE (Costa Rica), alongside international organisations like The Nature Conservancy and the Caribbean Natural Resources Institute. These entities significantly contribute to NbS research, from community workshops on forest restoration in Argentina to reef repair training in Mexico. Additionally, Centro Latinoamericano de Investigaciones Agroecológicas studies biodiverse, productive, and resilient agricultural systems based on traditional knowledge and small-scale farming practices, fostering locally adapted NbS strategies in agriculture through transdisciplinary and participatory research.

In Brazil, the Center for Management and Strategic Studies (CGEE) is a key player, providing strategic insights and conducting research that supports NbS development and implementation, focusing on sustainable development and innovation. Notably, CGEE

developed a Brazilian Catalogue for NbS, offering comprehensive information and guidelines for implementing these solutions. Furthermore, CGEE launched the Observatório de Inovação para Soluções Climáticas (OICS), a platform playing a crucial role in tracking and promoting climate and environmental innovations, acting as a knowledge hub for best practices and success stories in NbS across Latin America. Other strong contributors are the Boticário Group Foundation for Nature Protection, Center for Sustainability Studies of Fundação Getulio Vargas, SOS Mata Atlântica, Instituto Internacional para Sustentabilidade, and the Brazilian Platform on Biodiversity and Ecosystem Services.

Several biodiversity-focused research centres across LAC also promote and implement NbS. For instance, the Instituto Nacional de Pesquisas da Amazônia focuses on biodiversity research and ecosystem restoration in the Amazon. The Instituto de Investigaciones de la Amazonía Peruana in Peru works on preserving biodiversity and promoting sustainable development in the Amazon Basin. These centres, along with others like the Centro de Investigaciones en Ecosistemas in Mexico, contribute significantly to the scientific understanding and practical implementation of NbS across various ecosystems in LAC.

Agroforestry study centres are also pivotal in advancing NbS related to sustainable agriculture. Prominent agroforestry centres in LAC include the World Agroforestry Centre, which has regional offices in several LAC countries, and the Brazilian Agricultural Research Corporation, Embrapa. Embrapa's research on integrated crop-livestock-forestry systems demonstrates the benefits of combining agriculture and forestry practices to enhance biodiversity and ecosystem services. Furthermore, the Tropical Agricultural Research and Higher Education Center in Costa Rica and the International Center for Tropical Agriculture in Colombia focus on agroforestry research, promoting biodiversity-friendly crop production and sustainable land-use practices that integrate trees and bushes into agricultural landscapes.

Additionally, the Green Climate Fund (GCF) supports projects aimed at increasing climate resilience through ecosystem-based adaptation. The GCF funds efforts like landscape restoration, coastal protection, and sustainable agriculture, enhancing ecosystem services and climate adaptation. The GCF uses a country-owned partnership approach, offering flexible financing solutions to accelerate transformative climate action, particularly in developing countries.

Bottom-up initiatives

Regional alliances and networks promote NbS in LAC, emphasising community-based approaches and collaborative governance. Civil society organisations, social movements, and citizen activists are instrumental in engaging communities and advocating for sustainable practices. These grassroots efforts are often particularly effective in integrating indigenous knowledge and localised approaches to NbS. The Coordinating Body of Indigenous Organisations of the Amazon Basin (COICA) and other indigenous networks demonstrate how traditional land management practices can enhance biodiversity and resilience. Emphasising the importance of the rainforest for the life and survival of humanity, COICA redefines human-nature relations by advocating for a model of coexistence that prioritises ecological balance and respect for indigenous knowledge. This perspective challenges the economic paradigm of resource extraction and exploitation and instead recognises the rainforest as a vital entity crucial for climate resilience, biodiversity and cultural heritage. By stressing the interdependence between human well-being and ecosystem health, COICA directly and indirectly promotes biodiversity conservation and NbS. These strategies harness natural processes to address environmental challenges such as carbon sequestration and water regulation, fostering a sustainable and resilient future for people and the planet. These

efforts are often supported by collaborative governance models that include local communities, government agencies, and conservation organisations.

Community activists and social movements are also pivotal in driving transformations towards a more balanced relation with nature. For example, the philosophy of *Buen Vivir* or 'Good Life', is at the core of many activist movements and is a complex, Latin American political and academic concept with origins in indigenous cosmology; within which, nature and society are inseparable and the utmost respect for *Pachamama* (Mother Nature) is required to achieve wellbeing and intergenerational sustainability (Chassagne, 2018).

Transnationally, organisations like the World Rainforest Movement, Vía Campesina, and MAELA promote agroecology, food sovereignty, and resistance to large-scale extractive and pollutive industries, based on traditional knowledge, small-scale farming, and a natural-human coexistence. For example, the Amazon Cooperation Treaty Organisation (ACTO) focuses on the sustainable development and conservation of the Amazon Basin, a critical area for biodiversity and climate regulation. It supports NbS projects that aim to restore degraded ecosystems, promote sustainable forest management, and conserve biodiversity. ACTO's initiatives help enhance the resilience of the Amazon rainforest to climate change and other environmental pressures.

2.2 Europe: State-of-play around NbS

Framing the NbS discussion

Europe's biodiversity is increasingly under threat from urbanisation, industrialisation, and the growing impacts of climate change. The 2024 European Climate Risk Assessment, EUCRA, published by the European Environment Agency, highlights how Europe is already contending with more frequent and severe climate-related challenges, including floods, droughts, and heatwaves. These escalating trends threaten ecosystems, human health, and social cohesion, driving public awareness and concern over the need to protect nature and address these risks.

To respond to these challenges, the European Union has taken proactive steps over the past decade, integrating ecosystem-based approaches into its climate and biodiversity strategies. Early initiatives, such as the EU Green Infrastructure Strategy launched in 2013, focused on enhancing ecosystems and biodiversity while supporting climate adaptation and building ecosystem resilience. The European Commission has since also explicitly recognised NbS, mentioning the UNEA-5 definition (UNEA, 2022) on its website to underscore the importance of aligning with local contexts, ensuring equitable benefit distribution, and maintaining ecological integrity.

Since 2015, the Directorate-General for Research and Innovation (DG RTD) has promoted NbS as central to tackling biodiversity loss, climate change, and societal challenges. The EU has made significant investments in research and innovation (R&I) for NbS through programmes like Horizon 2020 and Horizon Europe. Between 2015 and 2023, over 665 million Euros have been allocated to NbS-related projects, addressing urban resilience, water security, ecosystem restoration, and sustainable urban regeneration, among others. These efforts have fostered cross-sectoral collaborations and supported practical tools to scale NbS implementation across both urban and rural areas.

The European Green Deal, adopted in 2019, serves as the EU's overarching policy framework for promoting sustainability, with NbS at its core. Key strategies related to NbS under the Green Deal include the EU Biodiversity Strategy for 2030, which focuses on ecosystem restoration and conservation; the Farm to Fork Strategy, which promotes sustainable agriculture; and the EU Adaptation Strategy, which incorporates NbS to enhance climate resilience. More details on the EU policy framework around NbS are outlined below.

By integrating NbS across policies, research, and financing, Europe is positioning itself to accelerate its planning and implementation. These multifaceted efforts demonstrate the EU's commitment to addressing climate and biodiversity challenges. In the coming years, further action and collaboration will be critical in realising the full potential of NbS, ensuring a resilient and sustainable future for both people and nature.

Entry points for NbS action

This section highlights essential policy frameworks, institutions, and initiatives that play a crucial role in mainstreaming NbS in the European Union. The focus is on three key dimensions that shape the discourse around NbS: policy integration, funding mechanisms, and knowledge and innovation. These aspects are essential for understanding how NbS are being implemented at different scales in Europe.

Policy frameworks

EU policy framework

Europe's approach to NbS is deeply rooted in the European Green Deal, an overarching policy framework designed to promote sustainability and resilience. Central to this framework is the goal of making the EU climate-neutral by 2050, embedding NbS into sectors such as agriculture, forestry, and urban development. This ambitious framework outlines strategies to reduce greenhouse gas emissions, enhance energy efficiency, and foster sustainable economic activities. Key elements include the Climate Law, the Climate Adaptation Strategy, the Biodiversity Strategy for 2030 and its Urban Nature Plans, the Nature Restoration Law, the Forest Strategy, the Farm to Fork Strategy, the Circular Economy Action Plan, the Zero Pollution Action Plan, and the EU Sustainable Finance Strategy, all of which support the planning and implementation of NbS across Europe. By integrating NbS into these sectors, the Green Deal aims to strengthen climate resilience, enhance biodiversity, and promote sustainable and equitable development throughout the EU.

The Green Deal's commitment to NbS is demonstrated by its ambitious targets for ecosystem restoration, biodiversity enhancement, and climate action. These policies promote the restoration of degraded ecosystems, the expansion of urban green spaces, the implementation of sustainable agricultural practices across member states, among others. Supported by robust policy frameworks and financial investments, the EU is leveraging NbS to address a range of environmental, social, and economic challenges.

EU policies also recognise NbS as critical tools for combating biodiversity loss, mitigating climate change, and reducing disaster risks. The European Commission actively engages in policy dialogues and outreach initiatives at both EU and global levels to promote engagement, build a comprehensive knowledge base, and scale up the adoption of NbS.

Additionally, integrating sustainability and NbS into education curricula at all levels is a key aspect of these efforts.

To provide a detailed overview of how specific strategies and laws contribute to NbS planning and implementation, the following Table 3 outlines some of the key components of the EU Green Deal and their roles in promoting NbS.

EU Biodiversity Strategy for 2030

The Biodiversity Strategy for 2030, part of the European Green Deal, emphasises the restoration of ecosystems and the conservation of biodiversity. This strategy includes the newly proposed Nature Restoration Law, which sets legally binding targets for restoring habitats critical for carbon sequestration and climate resilience, such as forests and peatlands. The Biodiversity Strategy aims to halt biodiversity loss, protect natural habitats, and restore ecosystems to their natural state, thereby contributing to the overall goals of the European Green Deal.

EU Urban Nature Plans

Urban Nature Plans encourage cities to adopt NbS like green roofs, urban forests, and sustainable urban drainage systems to enhance urban biodiversity, mitigate heat islands, and improve air quality. These plans are essential for integrating NbS into urban planning, contributing to more resilient and liveable cities. By increasing urban green spaces, these plans also create habitats for various species, thus supporting urban biodiversity.

EU Nature Restoration Law

The Nature Restoration Law, part of the Biodiversity Strategy for 2030, is a significant piece of EU legislation aimed at reversing biodiversity loss and restoring Europe's ecosystems. This law sets legally binding targets for the restoration of degraded habitats, enhancing their capacity to sequester carbon and support climate resilience. It focuses on restoring ecosystems, habitats and species across land and sea areas in order to enable the long-term and sustained recovery of biodiverse and resilient nature, contribute to achieving the EU's climate mitigation and adaptation objectives, and meet international commitments.

EU Forestry Strategy

The Forestry Strategy promotes sustainable forest management practices crucial for maintaining biodiversity, carbon sequestration, and overall ecosystem health. It emphasises the restoration and sustainable management of forests, which are key components of effective NbS. Healthy forests support a wide range of species and provide essential ecosystem services.

EU Farm to Fork Strategy

The Farm to Fork Strategy emphasises sustainable agricultural practices, promoting NbS such as agroforestry, organic farming, and soil health enhancement. It aims to make food systems fair, healthy, and environmentally friendly, contributing to biodiversity and ecosystem services. By promoting sustainable food production and consumption, this strategy supports the resilience and health of ecosystems.

EU Circular Economy Action Plan

The Circular Economy Action Plan promotes sustainable resource use, which can support NbS projects that integrate circular economy principles. By encouraging recycling, reducing waste, and promoting the reuse of materials, this plan helps create a more resource-efficient economy. This reduces the pressure on natural resources, thereby conserving biodiversity by lessening habitat destruction and pollution.

EU Zero Pollution Action Plan
The Zero Pollution Action Plan aims to reduce pollution levels, indirectly supporting NbS by creating healthier environments. By targeting air, water, and soil pollution, this plan fosters ecosystems where NbS can thrive and deliver maximum benefits. Cleaner environments support healthier ecosystems, enhancing biodiversity and allowing NbS to be more effective.
EU Adaptation Strategy
The EU Adaptation Strategy sets out how the European Union can adapt to the unavoidable impacts of climate change and become climate resilient by 2050. The strategy has four main objectives: to make adaptation smarter, swifter and more systemic, and to step up international action on adaptation to climate change. NbS are one of the cross-cutting priorities for a more systemic adaptation. The strategy emphasises how implementing NbS on a larger scale would not only increase climate resilience but also contribute to multiple Green Deal objectives (*paragraph 11. Promoting nature-based solutions for adaptation*).
EU Climate Law
The European Climate Law writes into law the goal set out in the European Green Deal for Europe's economy and society to become climate-neutral by 2050. The law also sets the intermediate target of reducing net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels. The regulation highlights the potential of nature-based solutions to benefit climate change mitigation, adaptation and biodiversity protection. Article 5 on adaptation to climate change requires Member States to adopt and implement national adaptation strategies and plans, considering the Union strategy on adaptation to climate change (see below) and it specifically requires MS to promote nature-based solutions and ecosystem-based adaptation.
EU Sustainable Finance Strategy
The EU Sustainable Finance Strategy and the EU Taxonomy Regulation play a crucial role in supporting the planning and implementation of NbS by directing financial flows toward activities that are environmentally sustainable. The EU Sustainable Finance Strategy aims to align financial and economic systems with the EU's environmental objectives, including climate adaptation and biodiversity conservation and the sustainable use of resources. The EU Taxonomy Regulation is particularly significant for NbS, as it sets the criteria that activities must meet to qualify as sustainable. The adopted Environmental Delegated Act under the Taxonomy Regulation, further promotes NbS in investment, as it defines the technical screening criteria of four other environmental objectives of the Regulation. Overall these policies create a supportive framework for the adoption and scaling of NbS.

Table 3: Key components of the EU Green Deal and their roles in promoting NbS.

National governments

Several EU Member States have developed national strategies and programmes to support NbS. Table 4 provides a selection of these policy instruments.

Austria
In Austria, NbS are integrated into national policies and programmes focusing on biodiversity conservation and climate resilience. ● The Austrian Biodiversity Strategy 2030+ (2022) aims to protect one-third of the country's land, increase organic farming to 35% of agricultural land, and reduce endangered species

by one-third by 2030. This comprehensive strategy underscores the importance of NbS in achieving these targets.

- To support these efforts, the Biodiversity Funds (2022) were established, enhancing legal frameworks, scientific foundations, and public awareness. This fund is essential for implementing the strategy and ensuring long-term sustainability.
- Additionally, Austria's National Adaptation Strategy includes NbS as a key component for climate resilience, emphasising sustainable water management, flood protection, and the restoration of natural habitats.
- Austria's integrated Climate and Energy Strategy #mission2030 focuses on reducing greenhouse gas emissions and increasing renewable energy usage. NbS, such as afforestation and peatland restoration, are included as vital elements to sequester carbon and enhance ecosystem resilience.
- The Austrian Forest Strategy 2020+ emphasises sustainable forest management, protecting biodiversity, and enhancing the role of forests in climate mitigation. NbS are promoted through sustainable forestry practices and forest conservation initiatives.
- The ÖPUL (Austrian Agri-environmental Programme provides financial incentives to farmers who implement environmentally friendly practices, including NbS such as buffer strips, organic farming, and agroforestry. This programme supports biodiversity and promotes sustainable agriculture.
- The National Water Management Plan (NGP) incorporates NbS for water management, focusing on the restoration of rivers and wetlands, sustainable flood management, and improving water quality. These measures enhance ecosystem services and biodiversity.

Czech Republic

In the Czech Republic, NbS are integrated into national policies and programmes focusing on biodiversity conservation and climate resilience.

- The National Recovery Plan (NRP) and Recovery and Resilience Plan (RRP) outline the Czech Republic's strategic priorities for sustainable development and biodiversity, leveraging European funds for sustainable development. Examples of projects supported by these plans include:
    - Nature-based Flood Protection in Brno: This project focuses on the Svratka River and aims to restore natural river dynamics, improve water retention, enhance flood resilience, and improve biodiversity.
    - Rainwater Management in Urban Areas: This initiative funds the implementation of rainwater management strategies using techniques like infiltration strips and basins, rain gardens, underground infiltration facilities, drainage systems, underground retention tanks, and green roofs.
    - Water Retention in Forests: Silvicultural measures such as selective thinning, along with creating small water bodies and maintaining forest floor vegetation, help retain water and enhance forest ecosystems.
- The New Green Savings Programme focuses on enhancing environmental sustainability through residential energy efficiency. NbS measures in this programme include green roofs and the planting of trees. These initiatives underscore the importance of NbS in achieving climate resilience and sustainable development in the Czech Republic.

France

In France, NbS are integrated into national policies and programmes focusing on biodiversity conservation and climate resilience.

- The France 2030 Research Programme is managed by the National Research Agency (ANR). With a budget of €44.2 million over nine years (2023-2032), this programme focuses on urban, coastal, and agricultural projects. It involves key academic institutions like INRAE and CNRS, fostering interdisciplinary research and education on NbS.
- France's National Biodiversity Strategy 2030 (SNB3), unveiled in July 2023, outlines 40 measures and 200 actions across four main objectives: reducing pressures on biodiversity, restoring ecosystems, mobilising stakeholders, and strengthening resources. This strategy underscores France's commitment to halting biodiversity loss and reversing ecological degradation by 2030.
- France's National Adaptation Plan integrates NbS as key components for climate resilience. The plan includes measures such as restoring wetlands, enhancing urban green spaces, and promoting sustainable agricultural practices to mitigate the impacts of climate change.
- Funding by the Agence Française de Développement (AFD) supports projects like the ECOPRONAT research programme, focusing on scaling up NbS and large-scale ecological restoration. This funding targets the agricultural and urban sectors.
- France's International Strategy for Water and Sanitation (2020-2030) advocates for integrated water resource management by prioritising sustainable water governance, ensuring the security of water supplies in the context of climate change, and improving sectoral tools and methods.

Germany

- Germany adopted the "Nationale Strategie zur biologischen Vielfalt" (National Strategy on Biological Diversity) in 2007 to halt biodiversity loss and promote sustainable use of biological resources. This comprehensive strategy outlines over 330 targets and 430 measures, including key initiatives such as the National Natural Heritage Program, the Business and Biodiversity Initiative, and the Natural Capital Germany – TEEB DE project. Additionally, the Federal Action Plan on Nature-based Solutions for Climate and Biodiversity, launched in 2023, aims to enhance ecosystem resilience and integrate renewable energy with nature conservation efforts. The updated National Strategy on Biological Diversity 2030 further strengthens these efforts, aligning with the Kunming-Montreal Global Biodiversity Framework to meet ambitious EU biodiversity targets by 2030
- Germany's National Natural Heritage Programme aims to protect significant natural areas by transferring 125,000 hectares of valuable land to federal states, the German Environment Foundation, and environmental groups. These lands are managed to preserve their ecological integrity, support biodiversity, and provide public access for recreation and education.
- The Business and Biodiversity Initiative, started in 2007, encourages companies to incorporate biodiversity conservation into their business strategies. Participants commit to measurable biodiversity protection targets and collaborate with government and NGOs to promote sustainable practices, demonstrating the economic benefits of biodiversity conservation.
- The Natural Capital Germany – TEEB DE project extends the international TEEB initiative, focusing on the economic value of ecosystem services in Germany. It produces reports that highlight the economic, ecological, and cultural benefits of preserving natural capital, aiming to integrate these values into public and private decision-making.
- The German Adaptation Strategy (DAS) encompasses measures to address climate impacts across various sectors, including water management, agriculture, and biodiversity. The strategy promotes the use of NbS to enhance climate resilience, such as restoring floodplains and wetlands, and improving urban green spaces to mitigate heat island effects and manage stormwater.

- The "Aktionsprogramm Natürlicher Klimaschutz" (Action Plan on Nature-based Solutions for Climate and Biodiversity), developed by the BMUV, is part of Germany's strategy to meet climate and biodiversity targets by using NbS for climate adaptation and ecosystem restoration. Adopted on March 29, 2023, it includes 69 measures across ten action fields, focusing on restoring moors, forests, and coastal areas to enhance ecosystem resilience and contribute to climate protection while creating habitats for wildlife and humans.

Hungary

- The National Biodiversity Strategy of Hungary (Nemzeti Biodiverzitás Stratégia) aims to protect and sustainably utilise Hungary's natural resources until 2030. Approved on August 8, 2023, it focuses on creating a network of protected areas, restoring degraded ecosystems, protecting endangered species, and combating invasive alien species. The strategy integrates biodiversity considerations into agriculture, forestry, wildlife management, and water management, promoting green infrastructure development. It also emphasises public awareness, international cooperation, and scientific support for biodiversity conservation.
- The Hungarian NetworkNature Hub, launched in 2022, aims to promote NbS by facilitating knowledge exchange, building partnerships, and addressing local challenges. The Hub serves as a platform for collaboration among governmental, municipal, and civil actors, with a significant financial commitment from the Hungarian government (71 billion HUF for 2021-2027, approximately €180 million). The initiative focuses on enhancing green and blue infrastructure and integrating NbS into national strategies for sustainable development.
- The TeAM HUb Network (Természet-Alapú Megoldások Magyarországi Hálózata) is a Hungarian initiative launched in October 2022 to promote the widespread adoption of NbS across the country. The network provides a platform for sharing national and international knowledge, best practices, and methodologies related to NbS. It aims to foster collaboration among governmental, municipal, professional, and civil actors to enhance biodiversity and develop sustainable, cost-effective environmental solutions. The network supports multi-level cooperation and knowledge exchange to integrate NbS into Hungary's environmental strategies and urban planning efforts
- The LIFE LOGOS 4 WATERS project in Hungary focuses on improving climate adaptation and local water retention through small-scale NbS in various catchments. Running from October 2021 to September 2025, it is led by the Ministry of Interior and involves seven partners. The project aims to mitigate drought, enhance groundwater levels, and improve wetland quality, while fostering municipal collaboration and educational initiatives to raise awareness about natural water retention.

Italy

Italy conservation efforts include legislative measures, the National Biodiversity Strategy, and the creation of protected areas and ecological zones.

- The Italian Hub for Nature-based Solutions, launched in 2023, aims to promote NbS through fostering knowledge exchange, building partnerships, and tackling local environmental challenges. Coordinated by the Terrestrial Ecosystems Research Institute of the National Research Council (CNR-IRET), the Hub serves as a collaborative platform for governmental bodies, municipalities, businesses, and civil society. The initiative focuses on enhancing green and blue infrastructure and integrating NbS into Italy's national strategies for sustainable development and ecological transition.
- The National Biodiversity Strategy 2030 aims to conserve, protect, and promote the country's rich biodiversity and ecosystems. It sets guidelines for restoring terrestrial and marine ecosystems, expanding protected areas, and integrating NbS into national policies. The strategy emphasises the importance of balancing environmental protection with socio-economic needs, involving various stakeholders, and increasing public awareness about biodiversity conservation.

- The Ecological Transition Plan (ETP), led by the Ministry of Ecological Transition, aims for climate neutrality by 2050, prioritising NbS and biodiversity as central components. The plan focuses on restoring and conserving ecosystems, expanding protected areas, and integrating NbS into urban and rural development. Significant investments are directed towards improving waste and water management, promoting sustainable agriculture, and enhancing ecological resilience to climate change. The ETP emphasises a circular economy, renewable energy transition, and pollution reduction, ensuring a balanced approach to environmental, social, and economic sustainability.

The Netherlands

In the Netherlands, NbS are integrated into national policies and programmes focusing on biodiversity conservation and climate resilience.

- The Dutch Government aims to preserve and strengthen the country's natural environment and biodiversity, encompassing a wide variety of plants, animals, and ecosystems. National and international laws protect these areas, with initiatives like the National Ecological Network (NEN) and Natura 2000 enhancing connectivity among nature areas and surrounding farmland.
- The Nature Network Netherlands (Natuurnetwerk Nederland - NNN) is designed to connect and protect nature areas across the Netherlands, enhancing biodiversity and ecosystem resilience. It aims to create a contiguous network of natural spaces by linking these areas with surrounding farmland.
- Conservation of major aquatic ecosystems is a priority, with efforts to safeguard the Waddenzee, Southwestern Delta, IJsselmeer, North Sea, coast, and major rivers. A long-term vision for their conservation is outlined in an exploratory policy paper, targeting sustainability goals up to 2050-2100.
- The Delta Programme is a collaborative governance initiative involving national government, provincial and municipal authorities, water authorities, stakeholder organisations, and the business community. It promotes natural water storage facilities for flood and drought management, greener infrastructure for climate adaptation, and the integration of water and soil management using plants and green spaces to enhance resilience and ecosystem health. Supported by the Delta Fund, with substantial financial contributions from national, provincial, and municipal governments, key partners include Rijkswaterstaat and regional water authorities. Advanced methods and research within the Delta Programme include initiatives like the Sea Level Rise Knowledge Programme and the Pluvial and River Flooding Policy Platform, enhancing knowledge, adapting to climate change, and integrating flood risk management with broader societal goals. By 2050, the Delta Programme aims to provide all primary flood defences with a basic level of protection, ensuring climate resilience and water robustness, with plans extending to 2100 and beyond.
- The Room for the River Programme focuses on flood risk reduction by enhancing river discharge capacity. This programme, implemented between 2007 and 2015 with a budget of €2.3 billion, involves deepening riverbeds, relocating dikes, and lowering floodplains. It promotes sustainable river management by utilising natural dynamics for flood resilience, biodiversity, and recreation, creating multifunctional land uses.

Nordic Countries

A notable initiative is the four-year Nordic programme funded by the Nordic Council of Ministers, which focuses on strengthening cooperation among Nordic countries to implement NbS. This programme supports projects in areas like sustainable land use, wetland restoration, and blue-green infrastructure to reduce greenhouse gas emissions and enhance biodiversity. The NetworkNature Nordic Hub aims to promote NbS in the Nordic region to address environmental challenges. It serves as a collaborative platform for researchers, policymakers, businesses, and public sector entities, facilitating knowledge exchange and fostering partnerships and is administered by Jóna Ólavsdóttir, coordinator of the Nordic Council of Ministers' Nature-based solutions programme. The Hub

supports the implementation and scaling up of NbS through events, webinars, and the sharing of regional case studies, emphasising locally adapted solutions and inclusive governance.

Denmark

- Denmark's National Climate Adaptation Plan emphasises using NbS to enhance resilience against climate impacts like increased rainfall, wind, and higher water levels. Key measures include restoring wetlands to absorb excess rainwater and reduce flooding, afforesting degraded lands to improve soil stability and carbon sequestration, and enhancing urban green spaces to mitigate heat stress and manage stormwater. These initiatives leverage natural ecosystems to provide climate protection and improve biodiversity and ecosystem services.
- Denmark's National Biodiversity Strategy aims to protect 30% of land and sea by 2030, focusing on rewilding and habitat restoration projects. This strategy includes creating new national parks, expanding untouched forests, and establishing large, interconnected natural areas to support biodiversity.
- The National Forest Programme promotes sustainable forestry and aims to increase forest area to 20-25% over 80-100 years, with a goal of 10% of forest areas being managed primarily for biodiversity by 2040.
- The Action Plan for Biodiversity and Nature Conservation in Denmark, initiated in 2004, aims to safeguard biodiversity and preserve natural habitats. Key initiatives include the development of the Natura 2000 network, which protects high-quality natural areas, and promoting sustainable practices in agriculture, forestry, and fisheries.

Finland

- Finland employs various strategies and initiatives incorporating NbS to protect and enhance biodiversity. The National Strategy for Adaptation to Climate Change focuses on the sensitivity of protected areas, ecological connectivity, and carbon sink preservation. The Habitat Type Protection Action Plan and Fish Stock Management Plans ensure sustainable management and restoration of habitats and fish populations. The Action Plan for Species Protection prioritises urgent conservation measures, while the National Strategy for Invasive Alien Species includes monitoring and control measures. Restoration of carbon sinks is investigated to mitigate climate change impacts. Green and blue infrastructure is promoted in land use planning, and the Tourism 4.0 Action Programme funds sustainable nature-based tourism. Research projects examine conservation effectiveness in changing climates, and the Life+ project establishes a seed bank for threatened plants. These initiatives reflect Finland's commitment to leveraging NbS for biodiversity conservation.

Sweden

- Sweden's initial Biodiversity Strategy, approved in 1995, established the foundation for sectoral action plans and evolved into 16 environmental quality objectives aimed at achieving environmental quality within a generation. These objectives, revised in 2010 and reviewed in 2020, integrate biodiversity goals and align with the EU Biodiversity Strategy and the Strategic Plan for Biodiversity. Significant progress has been made in protecting and restoring critical habitats, including old-growth forests, species-rich meadows, wetlands, and marine environments.
- The Swedish Environmental Protection Agency (Naturvårdsverket) has published guidelines that emphasise the use of NbS for climate adaptation. These solutions include creating and restoring wetlands to manage water flows, urban greenery to reduce heat and manage stormwater, and coastal ecosystem restoration to combat erosion and flooding.
- Sweden's National Forestry Programme, adopted in May 2018, aims to balance sustainable forestry practices with economic and environmental goals. The programme emphasises the use of mixed-species forests to enhance ecosystem resilience and biodiversity. Research indicates that specific mixtures, such as spruce-birch in boreal forests and pine-birch in temperate forests, provide better ecosystem services, including higher biodiversity and improved recreational values.

Poland

Poland focuses on safeguarding its rich natural heritage and promoting sustainable development practices to address these issues.

- The Polish National Strategy for Adaptation to Climate Change (NAS 2020) emphasises integrating NbS into policies for water management, agriculture, forestry, and biodiversity from 2013 to 2030. Key actions include sustainable agriculture, protecting biodiversity and forests, adapting coastal zones, and developing early warning systems. The strategy also includes technical projects like flood protection and regulatory changes to support ecosystem resilience and sustainable development.
- Poland's National Biodiversity Strategy and Action Plan (NBSAP) includes comprehensive actions to preserve biodiversity while meeting socio-economic needs. Key actions involve protecting ecosystems, restoring natural habitats, and promoting sustainable agricultural practices. The strategy aligns with EU and global biodiversity goals, supporting sustainable development and conservation efforts across the country. Notable achievements include significant air quality improvements and extensive land protection measures, although challenges like habitat loss and pollution still persist.
- The Climate-friendly Cities initiative, launched in March 2020, aims to improve residents' quality of life and support cities in transforming into climate-friendly and neutral environments through workshops on green infrastructure and biodiversity, development of greening urban policy measures, and financial support for related projects.
- The "Development of Urban Adaptation Plans for 44 Polish Cities" programme aims to enhance climate resilience in Polish cities with over 100,000 inhabitants. It focuses on assessing climate vulnerabilities and developing priority adaptation measures. A key area of intervention is the development of blue-green infrastructure and sustainable rainwater management systems, which play significant roles in reducing flood risks, improving water quality, enhancing biodiversity, and providing recreational opportunities. This comprehensive programme supports Poland's commitments to the Paris Agreement and UN Sustainable Development Goals.
- The National NbS Hub in Wroclaw, Poland, led by the city of Wroclaw, promotes NbS to address environmental challenges like heat stress and flooding. It serves as a platform for collaboration, information exchange, and supporting the adoption of NbS strategies across various sectors. In partnership with three major universities, the Hub facilitates knowledge sharing and fosters partnerships to enhance sustainable development practices.
- The National Fund for Environmental Protection and Water Management (NFOŚiGW) in Poland offers grants and financial support for projects focused on biodiversity, ecosystem restoration, and climate adaptation. These initiatives include the protection and restoration of biological and landscape diversity, green and blue infrastructure in cities, and improving environmental monitoring.

Spain

Spain’s conservation efforts are supported by the Strategic Plan on Natural Heritage and Biodiversity 2030, the Law on Natural Heritage and Biodiversity 42/2007, and various national strategies and actions, with protected areas covering 17.3 million hectares.

- Spain's Law 42/2007 on Natural Heritage and Biodiversity sets the legal framework for the conservation, sustainable use, and restoration of the country's natural heritage and biodiversity, highlighting its importance for social well-being and economic development. It mandates the inclusion of species in the List of Wild Species under Special Protection and the Spanish Catalogue of Threatened Species, prohibiting activities that harm these species or their habitats. The law promotes ecosystem restoration through NbS like coastal restoration to prevent erosion and reforestation to enhance carbon capture. It also encourages voluntary agreements with landowners for protected area management and promotes public participation in conservation efforts.
- Spain's Strategic Plan for Natural Heritage and Biodiversity 2030, approved under Real Decreto 1057/2022, aims to conserve, sustainably use, and restore the country's natural heritage, biodiversity, and geo-diversity. The plan aligns with the UN Convention on

Biological Diversity and addresses key pressures like climate change, pollution, and invasive species. It emphasises ecosystem restoration, including agricultural, forest, aquatic, marine, urban ecosystems, and those degraded by industrial activities, using NbS for climate change mitigation and disaster risk reduction. Specific NbS mentioned include the restoration of coastal areas to prevent erosion, reforestation to enhance carbon capture, and the integration of green infrastructure in urban planning. The plan involves enhancing knowledge, protecting species and habitats, reducing threats, and requires ongoing evaluation with a midterm review in 2026.

- The Ministry for the Ecological Transition and the Demographic Challenge (MITECO) in Spain is leading a €75 million initiative until 2025, funded through the Fundación Biodiversidad and the Dirección General del Agua, as part of Spain's National Recovery and Resilience Plan (PRTR). This initiative supports projects using NbS to restore river ecosystems and enhance urban flood resilience. Selected projects focus on activities such as recovering riparian forests, renaturalising riverbeds, removing invasive species, and stabilising riverbanks with bioengineering. These efforts aim to improve biodiversity and protect urban areas from flooding.
- The National Strategy for Green Infrastructure and Ecological Connectivity and Restoration strategy aims to conserve and restore biodiversity by reducing ecological fragmentation and integrating green infrastructure into various sectoral policies. It focuses on creating a network of natural and semi-natural areas to enhance landscape connectivity and ecosystem services.
- The National Strategy to Combat Desertification, approved by MITECO, includes actions to restore lands affected by desertification, develop pilot projects, and implement sustainable land management practices. It aims to address issues such as soil erosion, water scarcity, and the impacts of climate change on agricultural and forest lands.
- Plan Nacional de Adaptación al Cambio Climático (PNACC): The National Climate Change Adaptation Plan outlines measures to incorporate NbS for climate adaptation. It includes actions to improve water management, enhance urban green spaces, and support biodiversity conservation as part of climate resilience strategies.
- The UrbanByNature Spain hub, based in A Coruña and supported by the University of A Coruña, facilitates the exchange of NbS among Spanish and global cities. The hub focuses on urban regeneration, NbS co-production, integrating NbS into city strategies, and enhancing urban biodiversity and health benefits. It connects municipalities, universities, NGOs, and SMEs to policy opportunities and creates a cooperation network for urban greening. Key partners include the Galician Health Service and various environmental organisations and companies.

Table 4: Selection of national policies supporting NbS uptake in the EU.

Cities and other governmental networks

Given that most European citizens live in cities—a number expected to rise to 80% by 2050—urban areas are pivotal in these discussions. Rapid urbanisation presents significant threats to biodiversity, ecosystems, human health, and social cohesion, making the adoption of NbS critical for sustainable urban futures.

As cities across Europe increasingly embed NbS into their biodiversity, climate, and disaster risk reduction policies, the European Green Deal, as outlined in previous sections, has served as an instrumental policy framework, particularly in driving NbS adoption in cities. The EU Nature Restoration Law includes a specific focus on urban areas (Article 8), pushing for NbS in urban restoration. Local governments are leveraging NbS to tackle urban challenges such as flood management, climate resilience, and ecosystem restoration. Early Horizon 2020 projects have played a key role in raising awareness and fostering collaboration through digital platforms, offering tools that help cities implement NbS effectively. These digital resources assist city authorities, urban planners, and citizens in identifying and tailoring NbS to specific urban needs while aligning with broader SDGs.

In this context, cities and local governments have been at the heart of efforts to promote NbS across Europe. Numerous projects now support urban water management, the development of green infrastructure networks, and efforts to enhance climate resilience. For example, reports like "Nature-based solutions A thematic collection of innovative EU-funded research results (CORDIS, n.d.)" highlight how cities integrate NbS into their policy frameworks through EU-funded NbS programmes, which will be elaborated on further in the section on 'Knowledge Initiatives'. Leading cities like Barcelona, Berlin, and Budapest have prioritised NbS in their biodiversity, climate, and disaster risk reduction strategies, using economic incentives and disincentives to encourage widespread implementation.

The Committee of the Regions (CoR), the EU's assembly of local and regional representatives, plays a crucial role in shaping policies by ensuring local and regional perspectives are integrated into EU decision-making. The CoR advocates for stronger cooperation between regional authorities and the EU on critical issues such as climate change, biodiversity, and sustainable development, recognising that many environmental policies are implemented at the local level. This makes cities and regions pivotal actors in achieving global biodiversity goals, such as those outlined in the GBF. The CoR also supports initiatives like the EU Green City Accord and the EU Green Capital & EU Green Leaf Awards, which encourage cities to integrate NbS with specific goals related to biodiversity, water management, and climate adaptation.

City networks such as ICLEI Europe, EUROCITIES, the European Covenant of Mayors for Climate & Energy and C40 Cities have been instrumental in facilitating city-to-city collaboration, sharing best practices, securing funding, and promoting knowledge exchange. The Urban Nature Program has provided financial and technical assistance to accelerate NbS investments across Europe, while the UrbanByNature programme, a capacity-building initiative, has promoted exchanges among cities, researchers, SMEs, and NGOs, helping build NbS communities across Europe and beyond.

The CitiesWithNature platform, introduced in subchapter 1.1, also includes over 40 European cities and fosters the exchange of experiences and commitments on biodiversity and NbS. Through this initiative, 200 cities are connected globally, sharing knowledge to enhance urban nature integration. The Berlin Urban Nature Pact, initiated by the City of Berlin in 2021, builds on the Edinburgh Declaration and aligns with the Montreal Pledge to accelerate the implementation of the Kunming-Montreal Global Biodiversity Framework, inspiring cities worldwide to halt and reverse biodiversity loss by 2030. With 28 SMART goals focused on biodiversity, water management, soil health, and sustainable agriculture, the Pact was created by cities for cities—signatories commit to measurable targets and report their progress through the CitiesWithNature Action Platform, recognised by the CBD.

This growing collaboration among European cities, facilitated by networks such as Eurocities, ICLEI, and C40 Cities, underscores a strong commitment to using NbS to tackle both urban and non-urban challenges. It reinforces the central role cities play in shaping Europe's sustainable future.

Funding and financing streams

In Europe, NbS projects are receiving increased attention from financial institutions and banks, which look to provide both increased funding and technical assistance. These initiatives aim to enhance climate resilience, biodiversity conservation, and sustainable development. Major financial institutions and National Promotional Banks (NPBs) will play a crucial role not only in providing funding but also in offering expertise to implement and scale projects effectively, if we are to close the nature funding gap.

Financial institutions such as the European Investment Bank (EIB) are crucial in funding large-scale projects. The EIB supports projects incorporating green infrastructure, for example, to mitigate flood risks and improve urban resilience, through the InvestEU Programme. InvestEU includes a Sustainable Infrastructure Window that focuses on financing green infrastructure, biodiversity protection, and climate adaptation projects. By leveraging both public and private investment, this programme supports the implementation of NbS and aligns with the goals of the European Green Deal. The EIB has also published a comprehensive report, "Investing in Nature-based Solutions: State-of-play and way forward for public and private financial measures in Europe", which outlines the challenges in scaling NbS, explores innovative financing tools such as green bonds, and recommends regulatory reforms to enhance investment. This report serves as a key roadmap for aligning financial strategies with the EU's climate and biodiversity goals (EIB, 2023).

NbS projects also receive funding through the European Structural and Investment Funds, particularly via the European Regional Development Fund. These funds target regional projects that integrate NbS into broader socio-economic development plans, supporting local governments and municipalities in implementing sustainable urban planning and disaster risk reduction strategies.

Similarly, National Promotional Banks (NPBs), such as Germany's KfW, France's Agence Française de Développement (AFD), and Italy's Cassa Depositi e Prestiti (CDP), provide substantial funding for NbS projects at national and regional levels. NPBs receive a combination of funding from government capital, EU funds, and bond issuances. These banks support initiatives that integrate NbS into urban planning, water management, and disaster risk reduction.

For instance, KfW has funded projects to restore river ecosystems and enhance floodplain functionality, contributing to biodiversity conservation and flood management. KfW also supports climate adaptation projects that integrate NbS into urban planning. Similarly, AFD promotes sustainable urban development and ecosystem-based adaptation strategies, focusing on restoring natural habitats and enhancing resilience in both urban and rural areas. CDP in Italy finances projects that improve sustainable infrastructure, with a focus on promoting NbS to reduce climate risks, improve water management, and foster green innovation across urban regions.

The European Bank for Reconstruction and Development (EBRD) also enables NbS projects through its Green Cities Framework (GrCF). This framework helps cities address climate challenges while encouraging private-sector investment in sustainable urban infrastructure. A central component of the GrCF is the development of Green City Action Plans (GCAPs), which begin by assessing a city's environmental performance using 35 indicators covering urban challenges like resource efficiency and climate risks. With input from local stakeholders, the city then sets long-term environmental goals (10-15 years) and short-term actions (1-5 years) to achieve these targets.

The EBRD supports these actions through finance, concessional loans, and grants, while cities collaborate with stakeholders to implement the investments. The GCAP process includes monitoring to track progress and adjust actions as needed. By integrating NbS into GCAPs, cities can enhance urban biodiversity, reduce pollution, and improve climate resilience. For example, Tbilisi successfully incorporated NbS into its GCAP, focusing on urban greening, water management, and climate adaptation. This demonstrates the flexibility of GCAPs to meet specific environmental needs while aligning with broader sustainability goals.

Innovative financing mechanisms, such as green bonds and public-private partnerships, are increasingly used to fund large-scale NbS projects in Europe. Green bonds, issued by various European countries and cities, raise capital specifically for environmentally beneficial projects, including NbS. For example, France has become a leader in green bond issuance, reaching €94.7 billion by the end of 2022 to support climate and environmental initiatives, including biodiversity conservation and green infrastructure, according to Eurostat. Additionally, Sweden has been issuing green bonds to fund initiatives such as sustainable water management and the restoration of natural ecosystems, according to the same source. As of 2023, the EU Green Bond Standard has been providing a voluntary framework for issuing green bonds that comply with the EU's sustainability goals, enhancing transparency and accountability for investors. Public-private partnerships also play a critical role, leveraging private investment to scale up NbS initiatives and ensure their long-term sustainability and impact. By pooling resources from both public entities and private companies, these partnerships can significantly increase the scope and ambition of NbS projects across Europe.

However, despite an increased interest in NbS from financial institutions and banks, as well as the private sector more generally, it should be noted that public funding continues to dominate investment in nature-based solutions, and only 3% of the projects identified in the EIB report, included private sector financing that covers more than 50% of a project's total cost (EIB, 2023). There is often a lack of clear financial incentives and standardised metrics to evaluate the economic benefits of NbS, making it difficult for private investors to assess potential returns. Additionally, the perceived risks associated with environmental projects can deter private investment, especially in a landscape where immediate financial gains are prioritised. Overall, attracting private finance for NbS in Europe remains a significant challenge.

Knowledge initiatives

NbS interventions across Europe have benefited from public funding at various levels—EU, national, regional, and local. A significant portion of this funding has been allocated by DG RTD through the Horizon 2020 (2014–2020) and Horizon Europe (2021–2027) programmes. Since the launch of Horizon 2020, over €665 million has been invested in NbS research and innovation, supporting 76 projects, involving 1,391 partners across 71 countries (see Figure 1). These investments have primarily focused on NbS in urban environments, addressing issues such as climate resilience, water security, inclusive urban regeneration, nature conservation and restoration, health and well-being, and air quality.

Beyond urban areas, NbS projects are tackling climate resilience across diverse ecosystems, including freshwater, marine, coastal, and mountain environments, addressing societal challenges like disaster risk reduction and maintaining healthy and productive soils. Investments have also been directed towards nature protection and restoration within the trans-European ecological network, covering freshwater, marine, coastal, and forest ecosystems. Furthermore, cross-cutting projects explore the nature-positive economy, finance and insurance, education, inclusion and co-governance, socio-political aspects, and health and well-being. Ongoing projects aim to reverse biodiversity loss, promote nature-positive economies, and demonstrate sustainable water management and climate resilience solutions (European Commission, 2021)[1].

[1] Most Horizon Europe NbS projects have been funded through Cluster 6: Food, Bioeconomy, Natural Resources, Agriculture and Environment. However, significant investment has also come from the EU Missions. The infographic cited here (European Commission, 2023) offers an overview of projects as of December 2023 and cannot be considered exhaustive.

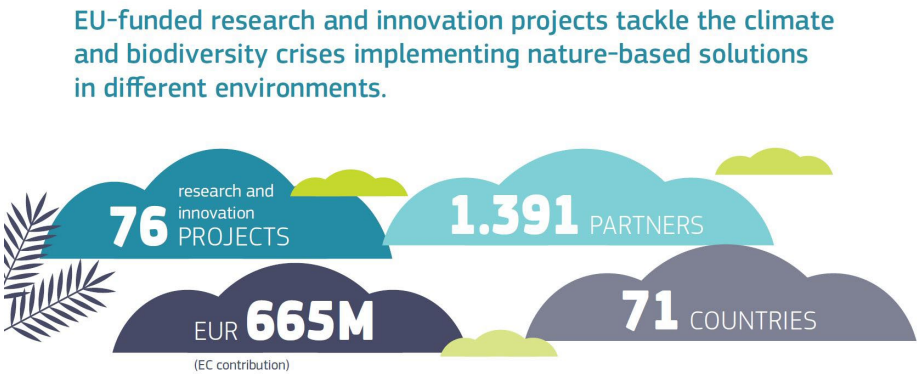

Figure 1: Infographic with EU-funded NbS research projects to tackle the climate and biodiversity crises. *Source: European Commission (2023)*

NetworkNature plays a crucial role as a knowledge broker and information hub, strengthening the European research and innovation NbS community. It supports EU-funded R&I NbS projects by providing collaboration opportunities and dissemination services. The projects collaborate through different thematic NbS Task Forces facilitated by NetworkNature, such as Data and Knowledge Sharing, Integrated Assessment Framework, Finance and Business Models for NbS in a Nature-Positive Economy, NbS Communicators, NbS Education, and Co-creation and Governance. The European Biodiversity Partnership (BIODIVERSA+) further connects science, policy, and practice to drive transformative change in biodiversity and NbS deployment (BIODIVERSA+, 2022). Additionally, Oppla, an open-source platform, serves as a valuable resource by offering practical information, case studies, and tools to support NbS practitioners across Europe.

Among the 76 NbS projects, two EU-LAC initiatives—CONEXUS and INTERLACE—stand out for their focus on nature protection and restoration. These will be discussed in detail in subsection 2.3 of this chapter. Promoting NbS globally through EU-funded (or co-funded) projects requires mindful engagement with historical contexts, particularly in Latin America and the Caribbean, where past exploitation has left lasting challenges. The EU strives to build equitable partnerships that respect local sovereignty, honour traditional knowledge, support capacity-building, and engage local stakeholders in project design and governance.

Across Europe, various institutions—including universities, think tanks, research centres, and NGOs—explore the potential of NbS to tackle socio-ecological challenges. Their focus ranges from biodiversity conservation and climate adaptation to sustainable urbanisation. Notable institutions include the European Environment Agency, European Biodiversity Knowledge Centre, Potsdam Institute for Climate Impact Research, Stockholm Environment Institute, IUCN Europe, Nature Conservancy Europe, Euro-Mediterranean Center on Climate Change, Society for Ecological Restoration Europe, German Centre for Integrative Biodiversity Research, Ecologic Institute, ICLEI Europe, and The Nature of Cities Europe. International organisations like WWF and the European Biodiversity Partnership also contribute significantly.

Collaboration is key to advancing NbS in Europe. Institutions often form partnerships with each other and with international entities to enhance research and implementation. EU-funded projects, particularly under Horizon Europe, bring together a diverse array of stakeholders—academic, governmental, and private sector—to work on sustainability-

focused NbS initiatives. These projects foster the exchange of best practices and drive innovation.

Biodiversity knowledge centres further support these efforts by promoting the preservation of biodiversity across the continent. They serve as hubs for research, information, and collaboration. The Kew Gardens also leads extensive research on plant and fungal biodiversity, while the Helmholtz Centre for Environmental Research focuses on ecosystem services. The European Soil Data Centre supports research and policy development related to soil biodiversity and health. Institutions like the French National Research Institute for Agriculture, Food and the Environment, INRAE, and the Spanish National Research Council make substantial contributions to ecosystem research.

These institutions' activities align closely with the EU 2030 Biodiversity Strategy and the Nature Restoration Law. Some provide essential training and capacity-building programmes to assist local authorities in creating effective and inclusive Urban Nature Plans, supporting the EU's 2030 Vision for Biodiversity and the Nature Restoration Law. By fostering integrated approaches to NbS, these institutions enhance Europe's leadership in developing and implementing nature-based strategies. Through collaboration, cutting-edge research, and alignment with key policy frameworks, they strengthen the continent's resilience and sustainability.

Bottom-up initiatives

In Europe, grassroots initiatives and community-based movements play a critical role in advancing NbS. These efforts emphasise local engagement, sustainable practices, and the integration of traditional knowledge with innovative approaches.

Numerous regional alliances and community networks across Europe foster the development and implementation of NbS. For instance, organisations like the European Environmental Bureau and Friends of the Earth Europe promote grassroots environmental actions that align with broader EU sustainability goals. These organisations work closely with local communities to develop and advocate for NbS that enhance biodiversity, improve urban environments, and mitigate climate impacts.

Both traditional and indigenous knowledge play a role in European NbS initiatives. Projects like the Paludiculture initiative in Mecklenburg-West Pomerania, Germany, demonstrate how restoring peatlands through traditional land management practices can sequester carbon and enhance biodiversity. In northern Europe, the Sámi people’s traditional reindeer herding practices illustrate how Indigenous knowledge contributes to sustainable land use and biodiversity conservation, particularly in Arctic and sub-Arctic ecosystems. These efforts not only protect local biodiversity but also help mitigate climate impacts.

Community activists and social movements are important drivers of NbS projects. Influential figures such as Anja Kollmuss (Switzerland), known for her work in climate education and policy, and Dirk Vansintjan (Belgium), a leader in the community energy movement, have significantly contributed to the promotion and implementation of NbS at the grassroots level. These leaders inspire and mobilise local communities to adopt sustainable practices and advocate for environmental justice.

For effective policy integration, it is crucial to include NbS in regional policy dialogues and environmental forums. The European Commission's support for initiatives like the European Climate Pact encourages citizen engagement in climate action, fostering a collaborative environment for scaling NbS across the continent.

2.3 Examples of ongoing EU-LAC and global collaborations

EU-LAC research and innovation projects

International research projects can serve to enhance intergovernmental cooperation on NbS. The EU research & innovation funding programmes are a key tool to facilitate cross-border collaborations in the field. Two examples are the Horizon 2020 INTERLACE and CONEXUS projects, which were funded under the call 'Strengthening international cooperation on sustainable urbanisation: NbS for restoration and rehabilitation of urban ecosystems, with a specific focus on EU-CELAC collaboration'.

The INTERLACE project works on restoring and connecting urban ecosystems across cities in Europe and Latin America, fostering participatory engagement to co-produce policy instruments and develop decision support systems for cost-effective restorative NbS. Responding to challenges identified in its six partner cities (Granollers, Spain; Envigado, Colombia; Kraków Metropolis, Poland; Chemnitz, Germany; Portoviejo, Ecuador; and CBIMA, Costa Rica), the project has developed a variety of tools and resources, focusing on collaboration and guidance on how to account for cultural, ethical and gender considerations, education, policy and governance, and planning and assessment. Guidance has been created, for example, on different strategies to engage communities, schools and other stakeholder groups, including a module for designing NbS that has been introduced into the Minecraft game and used in schools across the EU and LAC regions. Further major outcomes from the project are an assessment framework for NbS that can be adapted for use globally and is currently being turned into a book, as well as a database of good practice tools for the design and implementation of NbS, including factsheets for 10 tools. The project team has also developed the Urban Governance Atlas, an interactive online database of 250 policy instruments supporting NbS from across the world, and a related scientific publication entitled "Transforming ambition into action to catalyse nature-based solutions: Insights from 250 good practice policy instruments". Amongst other products, INTERLACE also produced an overview of policy instruments enabling restorative NbS with business case examples and drafted a peer learning note on urban ecosystem restoration & NbS.

As its central legacy, the project has developed a Latin American-focused online NbS repository called *Naturaleza Transformativa: : Soluciones para la biodiversidad y las personas en Latinoamérica* (Transformative Nature: Solutions for biodiversity and people in Latin America), to complement the European-focused Oppla repository and increase the sharing of resources and building of capacities around NbS in the region. INTERLACE has also created a EU-LAC focused community of practice around NbS called CitiesTalkNature to foster exchange between cities and developed an agile guidance framework to guide the co-development of impactful, user-driven products in research and practice.

Another project focusing on the LAC region is the CONEXUS project, which facilitates NbS in many Life-Labs, such as the Santiago Life-Lab in Chile. This lab implements the 'Stgo+ Green Infrastructure Plan' to address air quality, flood management, and social segregation, serving as a model for other cities. The project has also produced various research outputs, including guidance on "Nature-Based Solutions for Climate Resilient Cities, Perspectives and Experiences from Latin America (UNEP, 2023)," which explores the implementation and impact of NbS in Latin American cities. It also features a Step-by-Step Guide on "Capturing the Values and Making the Business Case for Nature-Based Solutions (Konijnendijk et al., 2024)", providing instructions on how to communicate the economic and non-monetary benefits of NbS to build a comprehensive valorisation case, securing support and funding for NbS initiatives. Aligned with this topic, CONEXUS has produced a paper on the "Valuation of Urban Nature-Based Solutions in Latin American and European Cities (Wild et al., 2024),"

which highlights that current NbS impact assessment guidelines often fail to fully address the valuation of urban interventions. The study suggests that monetary valuations of NbS should be complemented by other forms of impact assessment.

CONEXUS also published an "Action Framework for the Participatory Assessment of NbS (Van der Jagt et al., 2023)," offering a structured approach to evaluating NbS in urban settings. Other significant contributions include research on "Supporting NbS via Nature-Based Thinking (Mercado et al. 2024)," which investigates how this approach supports NbS implementation across Europe and Latin America. Additionally, the project produced the "Guiding Principles for Co-Learning Framework and Handbook (Duarte & Shepherdson, 2023)," providing guidelines for collaborative learning in NbS contexts, a study "Towards Adaptive Governance of Urban Nature-Based Solutions in Europe and Latin America (Kauark-Fontes et al. 2023a)", and as article on the "Integration of NbS in Local Policy and Planning (Kauark-Fontes et al., 2023b)" with case studies from cities like Barcelona, Lisbon, and Turin. It has also produced essays such as "Bridging Worlds — Decolonising Nature-based Solutions Education (Franco Steier, 2024a)", which explores the integration of decolonial approaches into NbS education, emphasising the importance of indigenous and marginalised knowledge systems and advocating for a more just and inclusive framework in NbS professional training. In this regard, the project has contributed to "Crafting Future-Ready NbS Curricula (Franco Steier, 2024b)," based on results from workshops focused on developing NbS-related curricula. Additionally, the project produced "Monitoring and assessment in the context of governance of nature-based solutions. Shared challenges and opportunities in CELAC and EU cities (Van Lierop et al., 2024)" and a "CONEXUS Policy Briefs Series" was produced, offering insights and recommendations on the application and impact of urban NbS in cities across Latin America and Europe.

Apart from these two international EU-CELAC research projects, the Horizon 2020 programme has also supported several additional projects that further facilitate research cooperation on NbS between the two regions, such as Urban Nature Labs (UNaLab), Connecting Nature, CLEVER Cities, EdiCitNet, EuPOLIS, FutureMARES, MULTISOURCE, NICE, PONDERFUL, SINCERE, URBAN GreenUP, CLEARING HOUSE, and GoNaturePositive!.

Other EU-LAC and global collaborations

Beyond these specific EU-CELAC research projects, national development agencies such as the Agence Française de Développement are contributing to NbS research in LAC. For instance, the ENSLAC project (Enabling Nature-Based Solutions Scale-up in Latin American Cities) focuses on analysing mechanisms that facilitate the scaling-up of NbS in cities across Peru, Colombia, and Ecuador.

Although it focuses on Brazil rather than the entire LAC region, the EU–Brazil Sector Dialogue on Nature-based Solutions has facilitated collaboration through knowledge exchange and joint projects. Since 2015, the European Commission and Brazil's Ministry of Science, Technology, Innovation, and Communication have worked together to explore NbS opportunities. Their joint report highlighted Brazil's rich biodiversity—particularly in the Amazon, Cerrado, and Atlantic Rainforest—as a unique asset for addressing challenges such as water management, urban heat islands, and coastal erosion. The findings underscore that NbS are not only effective in tackling environmental issues but also represent smart investments that enhance quality of life and foster a more sustainable, nature-connected economy. This dialogue has helped both regions co-create research agendas, share best practices, and shape policies that integrate NbS into Brazilian public policy, driving further collaboration.

Another initiative that could offer an entry point for cooperation on NbS is the EU-LAC Foundation. Created in 2010, it facilitates bi-regional policy dialogue between the European Union and Latin America and the Caribbean. While its primary mission is to enhance cooperation across sectors, there is significant potential to integrate NbS into its work. For example, the Foundation could drive policies encouraging the inclusion of NbS in academic curricula and research, fostering innovation in areas such as biodiversity enhancement, ecosystem restoration, and climate resilience. Similarly, it could inform the Joint Initiative on Research and Innovation on prioritising NbS to drive innovation in ecosystem restoration and climate resilience. By facilitating policy dialogues focused on NbS, the Foundation could also support discussions on sustainable agriculture, urban green spaces, and the incorporation of indigenous knowledge in environmental conservation. This multilateral cooperation could empower women to lead NbS initiatives, ensuring more inclusive and equitable outcomes, while advancing biodiversity conservation and climate action across both regions.

On a global scale, UNEP's Intergovernmental Consultations on NbS (UNEP, n.d.) provided a crucial platform for collaboration. These consultations, which began in May 2023 with a virtual global meeting, aimed to compile best practices, assess technical tools, and identify sustainable investment options to support member states in implementing NbS effectively. The process continued with regional discussions in June and July and culminated in an in-person meeting in Nairobi from 9-13 October 2023. These consultations were designed to be inclusive, regionally balanced, and focused on transparency and gender equity. Key outcomes from these consultations included several recommendations: creating a repository of good practice examples and a database of national NbS policy instruments to support the development of effective strategies. The consultations also highlighted the need for tools to measure the costs and benefits of NbS, which would enhance implementation efforts. Additionally, participants advocated for establishing regional or national information hubs to share lessons, standards, and guidelines on NbS, ensuring that countries could benefit from collective experiences. A crucial recommendation was enhancing coordination with Multilateral Environmental Agreements to ensure NbS alignment across various international frameworks. These recommendations played a part in UNEP's broader efforts to embed NbS as a key component of sustainable development. They aimed to assist countries in incorporating these solutions into national policies, thus fostering resilient ecosystems and societies that can better adapt to environmental challenges.

Finally, transnational organisations like WWF, IUCN, and the Nature-based Solutions Initiative at the University of Oxford provide platforms for knowledge exchange and capacity building on NbS. The Nature-based Solutions Initiative hosts global events and offers an interactive platform showcasing best practices from around the world. In June 2024, the "Growing Positive Change" event brought together over 800 experts, including South American representatives, to discuss NbS as a key tool for addressing climate change and biodiversity loss. The initiative promotes knowledge sharing, particularly in regions vulnerable to climate change, like Latin America.

By encouraging best practices and cross-regional dialogues, these organisations help ensure NbS strategies are implemented globally, fostering resilience in ecosystems and communities while tackling pressing environmental challenges. Collectively, these efforts support the integration of NbS into policies worldwide, empowering local communities to lead sustainable solutions.

Global funding streams

There are also global funding streams that can be utilised for the implementation of NbS, providing crucial resources to both LAC and the EU. These financial mechanisms usually have a broader funding palette, supporting projects that address climate change, biodiversity loss, and urban resilience.

Among the most prominent global funding streams is the Global Environment Facility (GEF), which finances projects worldwide, to combat environmental degradation and promote sustainable development. The GEF supports initiatives focused on biodiversity conservation, land degradation, and climate resilience. By funding NbS, it helps implement projects that restore ecosystems, improve urban resilience, and promote sustainable land use.

The Biodiversity Finance Initiative (BIOFIN), led by UNEP, also plays a crucial role in mobilising resources for biodiversity conservation. BIOFIN supports governments in both developing and developed regions to design and implement financing solutions that enhance the protection of biodiversity. This initiative emphasises the importance of integrating NbS into national and regional development strategies, demonstrating the value of sustainable urban planning and ecosystem restoration.

Another global fund that can support NbS projects is the Land Degradation Neutrality (LDN) Fund. This impact investment fund focuses on land restoration efforts across the globe, aiming to achieve land degradation neutrality by promoting sustainable land management. The LDN Fund backs projects that align with NbS, such as reforestation, agroforestry, and ecosystem rehabilitation, benefiting both the Global South and the Global North alike.

The International Climate Initiative (IKI), funded by the German government, is another key player in the global financing landscape. IKI supports NbS projects that address climate change and biodiversity loss in regions around the world, including Europe. Through funding innovative approaches to climate adaptation and biodiversity conservation, IKI helps regions integrate NbS into urban planning and infrastructure, fostering resilience against climate risks.

These global funding streams provide essential resources for NbS projects, enabling regions worldwide to adopt nature-based approaches to address climate, biodiversity, and societal challenges. As cities and regions continue to seek sustainable and scalable solutions, leveraging these financial mechanisms will be crucial for unlocking the full potential of NbS.

3. NbS across urban-rural landscapes in LAC and the EU

NbS are being implemented across a diversity of landscapes in LAC and Europe across urban, peri-urban and rural areas, helping to address a number of societal and environmental challenges. It's relevant that they be applied in tandem with measures that reduce pressure on land like changes to food, dietary, and agricultural systems; otherwise, land use conflicts may arise (WWF, 2020). Policy frameworks play an important role in this context, acting as barriers or enablers to the uptake and impact of NbS. As such, this chapter introduces NbS that have been implemented within diverse landscapes, namely: agricultural, forest, coastal and marine, freshwater, and urban ecosystems as well as NbS for tackling broader social challenges. Each landscape is illustrated with case studies and a selection of policy

instruments supporting NbS adoption, stemming from the Urban Governance Atlas (UGA) (see Box 2).

Box 2: Types of policy instruments supporting nature-based solutions

- ***Legislative regulatory and strategic instruments:*** Governments apply principles to influence actor behaviour. Requirements can either be prohibitive, prescriptive or voluntary. These can be binding (e.g. laws or regulations) or non-binding to set a vision and strategic goals (e.g. strategies).
- ***Knowledge communication and innovation instruments:*** influence market mechanisms through e.g. disincentives, incentives, payments, subsidies, financing mechanisms and market-based instruments. Compliance often has a more voluntary character.
- ***Economic and fiscal instruments:*** Government and/or involved actors jointly and voluntarily decide to behave in a certain way. They often arise from a shared agenda, mostly consisting of both public as well as private actors. Often the agreements reached between the parties are fixed in a covenant code or agreement.
- ***Agreement based and cooperative instruments:*** Try to influence behaviour through disseminating information to actors on certain issues or involving (novel) actors in critical processes in innovative ways in the hope that this will inspire voluntary behavioural changes.

Source: Urban Governance Atlas (Davis & Burgos, 2022)

3.1 Agricultural ecosystems

Sustainable agriculture is an integrated approach to farming that aims to meet current food and textile needs without compromising the ability of future generations to meet theirs. This method promotes environmental health, economic viability, social equity, and the conservation of biodiversity. Biodiversity is crucial for food security and nutrition, underpinning ecosystem services essential to agriculture, including pollination, pest control, nutrient cycling, and soil fertility. The FAO emphasises the need to conserve and sustainably use biodiversity to ensure resilient food systems and improve nutrition (FAO, 2019). For example, diverse crop genetic resources can enhance production levels and nutritional diversity across different agro-ecological conditions (FAO, 2024).

Agroecology is a central aspect of sustainable agriculture, integrating ecological principles into farming systems. It enhances biodiversity, improves soil health, and increases resilience to climate change through practices like polycultures, agroforestry, and conservation agriculture (GIZ, 2020). Similarly, Syntropic Agriculture, developed by Ernst Götsch, focuses on restoring ecological balance and productivity in degraded lands. It creates diverse, self-sustaining ecosystems that mimic natural processes by incorporating a mix of trees, shrubs, and plants to enhance biodiversity and maintain a continuous canopy for soil protection and moisture retention. This method emphasises minimal soil disturbance and dynamic succession, promoting natural growth cycles (Götsch, 2020).

While syntropic farming and agroecology share similarities in their goals and principles, they have distinct focuses. Syntropic farming is a specific method within agroecology, emphasising dynamic ecological succession and continuous canopy cover. In contrast,

agroecology is a broader discipline incorporating ecological, social, and economic aspects to design sustainable farming systems. Agroecology includes various practices, such as integrating local knowledge and considering social dimensions like equity and community involvement (GIZ, 2020).

The benefits of sustainable agriculture are extensive. Environmentally, it reduces greenhouse gas emissions, conserves biodiversity, and improves soil and water health. Economically, it supports resilient farming systems capable of withstanding market and climate fluctuations. Socially, it promotes rural development, food security, and healthier diets. NbS are integral to achieving sustainable agriculture. The UNFCCC Climate Champions highlight that NbS, including agroecology and regenerative farming, can sequester carbon, restore ecosystems, and provide multiple co-benefits for biodiversity and human well-being. By implementing NbS, agriculture can play a pivotal role in climate adaptation and mitigation, enhancing ecosystem resilience and supporting sustainable livelihoods (UNFCCC, n.d.).

Examples of successful implementation worldwide include agroecological methods improving soil fertility and crop yields in Latin America, supported by the Inter-American Institute for Cooperation on Agriculture (IICA), and conservation agriculture enhancing food security and resilience in Africa, as documented by the FAO (FAO, 2020). IICA supports agricultural development and rural well-being in the Americas, focusing on areas such as food security, climate resilience, and sustainable development.

In Europe, the European Commission's Directorate-General for Agriculture and Rural Development (DG AGRI) plays a significant role in promoting agricultural practices through the Common Agricultural Policy (CAP). However, the CAP has historically supported traditional farming practices that often prioritise productivity over sustainability. While recent reforms have introduced measures to encourage NbS and more sustainable farming practices, most CAP funds still support conventional agriculture, which can undermine efforts to achieve sustainability goals (European Commission, 2020; ECA, 2021).

Despite the recognised benefits, investments in switching to sustainable agriculture remain insufficient. Yet, sustainable agriculture is increasingly seen as crucial for future food production and healthy diets, ensuring farming practices benefit people and the planet. By integrating ecological principles and innovative methods like agroecology and syntropic agriculture, farming systems can become more resilient and productive.

Case studies

LAC: Olhos d'Agua Syntropic Agriculture, Transforming Degraded Lands into Thriving Ecosystems through Innovative Farming

Source: © Irina Ukrainets # 830632828, 2024. Stock.Adobe.com

LAC: Olhos d'Agua Syntropic Agriculture, Transforming Degraded Lands into Thriving Ecosystems through Innovative Farming

NbS types: Agroforestry, reforestation, soil restoration, water management, biodiversity conservation.

Specific measures: Transformed 120 hectares of degraded land, increased biodiversity comparable to untouched rainforest, planted diverse polyculture systems including mahogany, citrus, and cocoa trees, implemented regular pruning to enhance soil fertility and moisture retention, restored soil health, and increased rainfall.

Location: Bahia, Brazil

Timeline: Ongoing since 1984

Main objective: Restore degraded lands into lush, productive ecosystems using syntropic agriculture, thereby enhancing biodiversity, mitigating climate change through carbon sequestration, and promoting sustainable food production. The project also aims to engage and educate local communities in sustainable farming practices, fostering environmental stewardship and improving agricultural methods. This holistic approach addresses deforestation, soil degradation, and climate change while ensuring food security and supporting local livelihoods.

Context and background: The project is situated in Brazil, a country experiencing severe deforestation, particularly in the Atlantic rainforest and the Amazon. The widespread clearing of forests for agriculture and livestock has led to significant biodiversity loss, soil degradation, and climate disruption. This environmental crisis is exacerbated by monoculture farming practices and extensive land use for cattle ranching and soy cultivation. The project seeks to address these issues by applying syntropic agriculture techniques to restore degraded lands, enhance biodiversity, and promote sustainable food systems, thereby offering a viable solution to Brazil's pressing environmental challenges.

Lead/driving force: The project is guided by Ernst Götsch's principles of syntropic agriculture, with additional support from local farmers, community leaders, international organisations, and government initiatives promoting sustainable agriculture and ecological restoration.

Key stakeholders: Key stakeholders include local farmers, community members, international organisations (such as FAO and UNDP), the Brazilian government, private sector contributors, and philanthropic donors.

Community engagement:
The project involved local farmers and communities in transforming degraded lands into productive agroforestry systems. Through workshops, courses, and direct involvement in farming activities, the project educates and empowers local communities on the principles of syntropic agriculture. This approach not only improves local agricultural practices but also fosters a deeper connection between the community and the environment.

Funding sources: The project has received funding from a variety of sources, including international organisations like the FAO and UNDP, which support sustainable agricultural practices and environmental restoration projects. The Brazilian government has also provided grants and subsidies aimed at promoting agroforestry and combating deforestation. Additionally, private sector contributions and philanthropic donations have played a role, alongside community support and crowdfunding initiatives.

Budget: non-applicable

LAC: Olhos d'Agua Syntropic Agriculture, Transforming Degraded Lands into Thriving Ecosystems through Innovative Farming

Environmental impact: The project has significantly enhanced biodiversity by creating complex, multi-layered ecosystems that mimic natural forest structures, increasing ecosystem resilience. These methods have transformed barren and degraded lands into lush, productive forests by planting a diverse mix of trees, shrubs, and plants, leading to notable improvements in soil health and increased rainfall. Additionally, the project promotes carbon sequestration through extensive tree planting and maintaining carbon-rich soils, helping mitigate climate change by reducing atmospheric CO_2 levels. By eliminating the need for artificial fertilisers and irrigation, the project also reduces energy consumption and environmental externalities, further decreasing its environmental impact.

Social impact: From 1993 to 2018, syntropic agriculture practices were adopted by over 4,000 farmers, 3,500 families, and nearly 2,000 individuals in Brazil, Portugal, Spain, Hawaii, and Surinam, fostering sustainable farming and community resilience.

Economic impact: By avoiding costly synthetic inputs and improving crop yields, the project demonstrates the economic benefits of sustainable farming practices. Farmers achieve higher productivity and better-quality produce with lower input costs, while also enabling more humane working conditions.

Success factors: Key elements contributing to the success of the Olhos D'Agua Farm included strong collaboration between local farmers, community engagement through workshops and courses, support from environmental organisations, and the effective application of syntropic agriculture principles.

Challenges and mitigation: The Olhos D'Agua Farm faced several challenges, including degraded soil, climate variability, pest and disease management, community scepticism, and financial constraints. To address these, the project employed syntropic agriculture techniques, planted diverse and drought-resistant species, and promoted biodiversity for natural pest control. Community engagement was fostered through education, workshops, and demonstrations, which helped overcome initial scepticism. Financial support was secured from environmental organisations and grants aimed at sustainable agriculture. These comprehensive strategies ensured the farm's successful transformation and long-term sustainability.

Sources: Götsch, E. (2020). "Syntropic Agriculture: Principles and practices." Retrieved from Agenda Gotsch and https://agendagotsch.com/en/

Europe: Herdade do Freixo do Meio Project, A Model of Sustainable Agroforestry and Community Engagement

Images provided by Sociedade Agrícola do Freixo do Meio, Lda. Source: https://www.arc2020.eu/letter-from-the-farm-welcome-to-the-herdade/

Europe: Herdade do Freixo do Meio Project, A Model of Sustainable Agroforestry and Community Engagement

NbS types: Agroforestry, permaculture, and organic farming.

Specific measures: The project integrates trees, crops, and livestock in agroforestry systems, planting thousands of native cork and holm oaks. It follows permaculture design principles and practises organic farming, avoiding synthetic pesticides and fertilisers. The holistic management of livestock enhances soil health and biodiversity. Additionally, the project offers educational programmes and workshops for local communities to promote sustainable agricultural practices.

Location: Alentejo, Portugal.

Timeline: Ongoing since 1997.

Main objective: To promote environmental sustainability, enhance biodiversity, and foster social equity through agroecological practices, local food production, and community engagement.

Context and background: Herdade do Freixo do Meio is a 600-hectare community farm located in the Alentejo region, a traditionally agricultural area facing challenges such as soil degradation, biodiversity loss, and climate variability. The project, run by a cooperative, aims to address these issues by integrating traditional farming knowledge with modern sustainable practices, inspired by the ancient agroforestry system of “montado”.

Lead/driving force: The project is led by Alfredo Sendim and the cooperative managing the community farm.

Key stakeholders: Local farmers, community members, environmental organisations, educational institutions, government bodies, and consumers of the farm's products.

Community engagement: Educational programmes and workshops, involving local communities in participatory agriculture initiatives. Public events and training sessions to raise awareness about sustainable farming practices. By engaging in cooperative business models, the project ensures that local stakeholders are actively involved and benefit from their sustainable practices. This approach fosters a strong connection between the community and the environment, promoting long-term ecological and social sustainability.

Funding sources: The project is funded through European Union grants, national and regional government funding, private donations, and partnerships with environmental organisations. Additionally, income is generated from the sale of farm products.

Budget: Specific budget details are not provided.

Environmental impact: The project significantly improves soil health and structure through agroforestry and organic practices. It enhances biodiversity by restoring native species and creating diverse ecosystems. Additionally, it increases carbon sequestration and improves water management, boosting resilience against climate change.

Social impact: The project promotes social equity and community involvement through educational opportunities and cooperative models. It improves local food systems and sustainable living practices while enhancing knowledge and skills among local farmers and community members.

Europe: Herdade do Freixo do Meio Project, A Model of Sustainable Agroforestry and Community Engagement

Economic impact: The project increases agricultural productivity and resilience, leading to more stable incomes for local farmers. It achieves cost savings by reducing reliance on synthetic inputs and gains economic benefits from diversified farming practices and sustainable land use.

Success factors: Strong stakeholder collaboration, effective community engagement and education, the application of integrated sustainable farming practices, support from environmental organisations and government bodies, and visionary leadership committed to sustainability.

Challenges and mitigation: The project addresses climate variability by planting drought-resistant species and implementing efficient water management practices. Financial constraints are mitigated through securing grants, government support, and private donations. Community resistance is overcome by continuous education, engagement, and demonstrating the benefits of sustainable practices.

Sources: https://freixodomeio.pt/en/homepage-en/ and https://www.arc2020.eu/letter-from-the-farm-welcome-to-the-herdade/

Supportive policy instruments

Agreement-based or cooperative instruments

LAC: Owls' community food garden
Location: São Paulo, Brazil. **Timeline:** 2012.

Image by Tiago Freitas. Source: https://data.europa.eu/doi/10.2777/569867

Brief description:
In São Paulo, nature is mainly confined to peripheral parks, while agriculture is situated far from urban areas. This instrument aims to transform lawns into productive landscapes by integrating food production into cities, restoring natural water cycles and using permaculture and agroecology principles.

Lead: Non-governmental actors (grass roots movement)

Highlights:

- **Bottom-up:** Starting as an urban gardening movement that gained traction through social media, the initiative now has over 80,000 members and is supported by the municipal government.
- **Multi-functional NbS:** The instrument fosters community and nutrition learning, while agroforestry NbS restore soil and water sources, stabilising slopes and preventing erosion.
- **Effective:** The food garden has helped thousands shift to a sustainable lifestyle through local food planting and education, with volunteers managing the garden and learning from each other.

Further information: https://data.europa.eu/doi/10.2777/569867

Economic and fiscal instruments

EU: Green Roof Subsidy

Location: Rotterdam, the Netherlands. **Timeline:** 2008.

Image by CHUTTERSNAP, Unsplash. Source: https://unsplash.com/de/@chuttersnap

Brief description:
Citizens in Rotterdam can apply for a subsidy to cover the costs of installing multifunctional green roofs with greenery, gardens, water retention systems and solar panels. The city uses a colour-coded system to classify the roofs based on their functions (biodiversity, water storage, energy, social functions, mobility, residential and technical) and encourages combinations of these functions to maximise environmental, social and climate benefits.

Lead: Municipal government

Highlights:
- **Multi-functional NbS:** The initiative aims to improve water retention, heat absorption and building durability, and to create new spaces for gardening and food production.
- **Comprehensive:** To qualify for the subsidies, applicants are required to select plants that are particularly beneficial to biodiversity, including both native and non-native species.
- **Innovative**: The initiative is complemented by a set of awareness campaigns and events, e.g. the Rooftop Days festival and the Rooftop Walk for citizens.

Further information: https://interlace-hub.com/green-roof-subsidy-rotterdam

Knowledge, communication, and innovation instruments

LAC: Agroforestry Field Schools

Location: Ecuadorian Amazon, Ecuador. **Timeline:** 2019.

Image by Gabriel Jimenez, Unsplash. Source: https://unsplash.com

Brief description:
The initiative aims to transition agricultural production of commodities such as coffee, cocoa, oil palm and livestock to sustainable and deforestation-free systems through Agroforestry Field Schools (ECA). It builds the capacity of local producers, promotes sustainable practices and integrates gender and intercultural perspectives to ensure the participation of women and indigenous communities, while adapting to local conditions and overcoming language and literacy barriers.

Lead: Government bodies

Highlights:

- **Effective:** By 2022, 419 ECAs had been implemented, supporting over 8,000 producers (45% of whom were women) as they transitioned to a more environmentally friendly agricultural production.
- **Local knowledge**: The initiative incorporates local and ancestral knowledge systems into the curricula of the ECAs to enhance the resilience of local ecosystems and communities to climate change.
- **Multi-functional NbS:** The instrument promotes sustainable, deforestation-free agricultural systems that conserve the Amazon, enhance biodiversity, mitigate greenhouse gases, and include local and indigenous communities in line with Ecuador's REDD+ strategy.

Further information: https://www.proamazonia.org/wp-content/uploads/2024/04/fortalecimiento.pdf

Legislative, regulatory, and strategic instruments

EU: Palou Strategic Plan - Mimosa Programme
Location: Granollers, Spain. **Timeline:** 2021 to 2023.

Image by V. Planas, image provided by INTERLACE, Horizon 2020 project.

Source: https://interlace-hub.com/palou-strategic-plan-la-mimosa-program

Brief description:
The Palou Strategic Plan outlines a 10-year vision for integrating agriculture with the city, with a focus on increasing production, promoting agroecological methods and strengthening local supply chains. Developed through a year-long, participatory process, it includes initiatives like the “La Mimosa” programme to improve access to organic products for vulnerable families, thereby supporting Granollers' green economy and preserving its rural space.

Lead: Public sector institution

Highlights:

- **Social cohesion:** Aside from enhancing local and agroecological food production and marketing, the instrument aims to raise awareness about local products and peri-urban agriculture and launch a pilot initiative to improve access to healthy food for vulnerable populations.
- **Participation**: The Strategic Plan was developed with input from 25 local representatives, representing a cross-section of the community, including politicians, farmers, neighbourhood associations and restaurants.
- **Long-term effective:** The instrument defines the long-term vision of an agricultural area in relation to the city, covering a 10-year period.

Further information: https://interlace-hub.com/palou-strategic-plan-la-mimosa-program

3.2 Forest ecosystems

Forests, covering about 31% of the Earth's land area, play a crucial role in maintaining global ecological balance. They serve as significant carbon sinks, regulate water cycles, and support an immense diversity of life, highlighting their importance for biodiversity (FAO, 2020). Beyond their intrinsic value, forests are increasingly recognised for their role in integrated environmental management, encompassing not only forestry but also water management and other related aspects. This integrated approach is vital for addressing complex environmental challenges and fostering resilience (IUCN, 2021).

Forests contribute to climate regulation by absorbing carbon dioxide, mitigating the impacts of climate change (IPCC, 2019a). They also support water management by maintaining watershed health, preventing soil erosion, and regulating water flow (UNEP, 2022). These functions are particularly important in the context of growing climate variability and urban expansion, where forest ecosystems can help manage water resources, reduce flood risks, and enhance water quality (European Commission, 2021).

Moreover, forest-related NbS extend beyond traditional forestry to include innovative practices that integrate forest management with other environmental objectives. These practices can involve the restoration of riparian forests to improve water quality, the creation of buffer zones to protect water bodies from agricultural runoff, and the management of urban forests to reduce heat stress and enhance urban resilience (IUCN, 2021). Such integrated approaches are crucial for achieving broader environmental and socio-economic goals, including climate adaptation, biodiversity conservation, and sustainable development (UNEP, 2022).

Integrated forest management involves multiple aspects, including conservation, restoration, and sustainable use of forest resources. It takes into account the interplay between forests and other environmental systems such as wetlands and riparian zones. For instance,

reforestation and afforestation projects not only aim to restore forest cover but also to enhance water quality and regulate hydrological cycles (ETIFOR, 2023). This approach helps in managing both water and forest resources more effectively, demonstrating the interconnectedness of these natural systems (Faivre et al., 2024).

The EU-funded CLEARING HOUSE project focused on tree-based green infrastructure, termed Urban Forests as NbS (UF-NBS), including peri-urban forests, forested parks, and trees in public and private spaces. UF-NbS provide ecosystem services such as enhancing biodiversity, offering recreational spaces, improving air quality, and moderating the urban heat island effect. The project analysed and developed the potential of UF-NbS to enhance city resilience against ecological, socio-economic, and well-being challenges (Davies et al., 2024).

Case studies

LAC: Costa Rican Payment for Ecosystem Services (PES) Programme: Accelerating Forest Conservation

Source: © fotogurmespb # 704225103, 2024. Stock.Adobe.com

NbS types: Watershed Management; Reforestation; Agroforestry; Forest Conservation; Mangrove Restoration.

Specific measures: Forest conservation involves protecting existing forests through economic incentives, preventing deforestation, and promoting biodiversity. Reforestation and agroforestry efforts include planting native tree species and integrating agroforestry practices to restore degraded lands and enhance ecosystem services. Watershed management focuses on protecting and restoring watersheds to improve water quality and availability for agricultural and domestic use. Mangrove restoration extends conservation efforts to mangrove ecosystems, linking terrestrial and marine environments. Biodiversity certificates are introduced for estates that protect forest biodiversity, incentivising broader conservation efforts.

Location: Costa Rica, nationwide, including forested areas, watersheds, and mangrove ecosystems.

Timeline: Started informally in the 1990s. Created by law in 1996. Ongoing.

Main objective: The primary objective of the PES programme is to promote forest conservation, reforestation, and agroforestry, improve water quality, and support sustainable

Context and background: Costa Rica's PES programme, managed by Fondo Nacional para el Financiamiento Forestal (FONAFIFO), aims to reverse deforestation and promote afforestation

LAC: Costa Rican Payment for Ecosystem Services (PES) Programme: Accelerating Forest Conservation

land management by compensating landowners, including indigenous communities, for preserving and restoring forest ecosystems.

through economic incentives. The programme marked a shift towards greener environmental legislation by recognising the ecosystem services that forests provide. This legal framework established the structure for securing funding, managing the programme, and determining eligibility for participation. The government-led initiative bundles four main ecosystem services: carbon sequestration, biodiversity protection, water regulation, and landscape beauty. It offers direct cash transfers to private landowners through 5-year contracts for forest protection, reforestation, sustainable forest management, and agroforestry. Based on 'conservation gap' analysis, it targets forests at risk and improves connectivity via biological corridors. Prioritising indigenous communities, the programme uses a filter for applications from low-development areas.

Lead/driving force: FONAFIFO, supported by the Ministry of Environment and Energy, local governments, private sector partners, and international organisations.

Community engagement: Educational programmes raise awareness and educate communities on the importance of ecosystem services and conservation. Participatory projects involve local and indigenous communities in conservation efforts, ensuring they benefit from PES. Workshops and training provide instruction on sustainable land management practices and the benefits of PES.

Key stakeholders: Local communities, indigenous populations, landowners, government agencies, environmental organisations, and international donors.

Funding sources: Funding sources include a fossil fuel tax, national government funds, international grants and donations, and private sector contributions. Its legal foundations allow it to access a variety of funds, from government allocations to deals with the private sector (national and international). Despite this, the programme remains oversubscribed and under-funded**.**

Budget: The annual budget varies, but the programme has steadily expanded its financial base. For instance, in recent years, the programme has managed to increase its conservation coverage from 40,000 hectares to 182,000 hectares annually.

Environmental impact: Forest cover has increased to 57%, with significant recovery from a low of 21% in the 1980s. Protection and restoration efforts have led to greater biodiversity and healthier ecosystems. Watershed management and forest conservation have improved water quality and availability.

Social impact: The inclusion of untitled lands in the PES scheme has benefited indigenous populations and landholders without formal property rights. Local communities are actively involved in conservation efforts, receiving economic benefits and support for sustainable practices. Increased knowledge and capacity for sustainable land and water management among residents.

Economic impact: Landowners and communities receive financial compensation for conservation efforts, supporting livelihoods and promoting sustainable land use. Employment opportunities have been created in reforestation,

LAC: Costa Rican Payment for Ecosystem Services (PES) Programme: Accelerating Forest Conservation

Success factors: The fossil fuel tax provides a stable and substantial funding source for PES. Strong environmental laws support the implementation and expansion of PES. Active participation from local and indigenous communities ensures the success and sustainability of conservation efforts. The programme has enabled afforestation efforts to expand conservation coverage from 40,000 hectares to 182,000 hectares annually. The programme uses preference criteria to allocate contracts, published annually as ways to target participants and reach their objectives. This introduces flexibility in the design and the ability to take feedback.

agroforestry, and ecosystem management projects.

Challenges and mitigation: Land tenure issues have been addressed by including untitled lands in the PES scheme, benefiting landholders without formal property rights. Funding consistency is ensured through diverse national and international sources. Efforts to enhance ecosystem resilience and adaptive capacity through NbS tackle climate change challenges. While most landowners are better off than those without land, protection contracts can exclude those relying on land for livelihoods. Increasing land prices reduce PES competitiveness where forests are most at risk. PES needs stronger collaboration with other mechanisms and regulations and better targeting to change behaviour effectively.

Sources: https://www.iied.org/sites/default/files/pdfs/migrate/G04272.pdf and https://unfccc.int/climate-action/momentum-for-change/financing-for-climate-friendly-investment/payments-for-environmental-services-program and https://www.efdinitiative.org/news/costa-ricas-payment-ecosystem-services-scheme-has-been-evaluated

Europe: LIFE+ Project in the River Miera, Restoring Forests along a River in Spain

Images provided by Miera, LIFE project. Source: https://interlace-hub.com/green-system-public-spaces-portoviejo-ecuador

NbS types: Reforestation, Peatland Restoration, Coastal and Estuarine Restoration, Species-specific Habitat Improvement.

Specific measures: 59,081 native trees planted (e.g. Alnus glutinosa, Fraxinus excelsior, Fagus sylvatica) increasing wooded area by 62 hectares; Forest fire protection through silvopasture management with Carranzana sheep; Removed invasive species (Baccharis halimifolia, Cortaderia selloana, Oenothera, Robinia pseudoacacia); Installed fish passages created refuges for otters and salmons and established new populations of Woodwardia radicans; Rehabilitated peat bogs.

Europe: LIFE+ Project in the River Miera, Restoring Forests along a River in Spain

Location: Spain, Miera Valley, Cantabria

Timeline: July 2014 - December 2018

Main objective: Improve the conservation status of habitats and species in the Miera River basin, in the North of Spain. This involves restoring and managing natural habitats such as peat bogs, dunes, montane and riparian forests, as well as enhancing biodiversity through the reintroduction of native species and the removal of invasive species. The project also aims to raise awareness and involve local communities in the conservation efforts.

Context and background: The Project aims to restore and conserve 9 habitats across the river's 41-kilometre course, targeting areas within the Natura 2000 network. The project addresses forest fires, severe environmental degradation due to human pressure and intensive livestock and biodiversity loss. It also tackles issues stemming from habitat fragmentation and promotes sustainable land management practices and aims to enhance ecosystem resilience. Funded by the EU's LIFE Programme and supported by regional bodies, the project also emphasises community involvement through education and awareness initiatives.

Lead/driving force: Fundación Naturaleza y Hombre

Key stakeholders: Government of Cantabria's Department of Environment and Social Policy, the public company MARE, and various local municipalities and landowners (26 agreements).

Community engagement: Local communities participate through educational programmes, workshops, reforestation activities, and invasive species removal, promoting local stewardship and awareness of environmental conservation.

Funding sources: EU LIFE Programme, MARE, Fundación Naturaleza y Hombre, Department of Environment and Social Policy (Government of Cantabria)

Budget: Total Eligible Budget: 1,650,105 €, EU Contribution: 825,052 €

Environmental impact: The project restored various ecosystems, including 4 hectares of peat bogs, 100 hectares of young forests, and improved riparian and dune habitats. More examples are a firebreak of 6,461m length, the elimination of 71 tons of invasive species and the cleaning of wastes in 58 hectares and 14 km of riverbank.

Economic impact: Enhanced natural landscapes attract more visitors, boosting local tourism. Improved recreational areas can increase the length of visitor stays and spending, benefiting local economies.

Social impact: Community engagement through long-term land stewardship agreements and extensive public awareness campaigns fostered local participation and support for conservation efforts. Examples include explanatory panels, workshops, social media engagement and talks.

Success factors: Key elements contributing to the success of the LIFE Miera Project included strong collaboration between Fundación Naturaleza y Hombre, regional authorities, and the community.

Challenges and mitigation: Further challenges included fires in forest regeneration areas, overuse of livestock in sensitive areas, pollution from slurries and sewage. These issues were mitigated through measures like controlled burning, fencing to prevent livestock entry and pollution control initiatives. Recreational and

Europe: LIFE+ Project in the River Miera, Restoring Forests along a River in Spain

touristic pressures, as well as intensive livestock practices, were managed by promoting sustainable land use and increasing public awareness.

Sources: https://webgate.ec.europa.eu/life/publicWebsite/project/LIFE13-NAT-ES-000899/biodiversity-conservation-in-river-miera and https://fnyh.org/life-nature-conservacion-de-la-biodiversidad-en-el-rio-miera/

Supportive policy instruments

Agreement-based or cooperative instruments

LAC: Public-private collaboration for an urban ecological belt
Location: Guatemala City, Guatemala. **Timeline:** 1995.

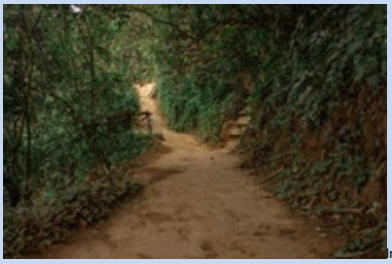

Image by Sara_i Eu, Unsplash. Source: https://unsplash.com/de/@sara_i

Brief description:
The initiative in Guatemala City creates a system of protected natural areas to enhance environmental services, improve residents' quality of life, and become a central aspect of the city's identity. As part of the urban land-use plan, it addresses challenges such as inequality, urban sprawl, and landslide risk through NbS, aiming to protect more than 5,000 hectares of forest and to provide multiple ecosystem services such as recreation, erosion control and air/ water purification.

Lead: Non-governmental actors (foundation)

Highlights:

- **Public-private cooperation:** The initiative demonstrates how foundations can effectively establish restoration initiatives that are integrated with city policies and urban planning and collaborate with private landowners.
- **Inclusive:** The initiative engaged citizens through ecological tours and campaigns, created jobs and business opportunities for small family businesses, promoted social reintegration for at-risk youth and increased public safety in disadvantaged neighbourhoods
- **Effective:** Ecological connectivity and quality of life have been improved by protecting ravines, establishing natural reserves and creating more than 200 parks that support diverse species and provide various public benefits.

Further information: https://interlace-hub.com/public-private-collaboration-urban-ecological-belt-guatemala-city

Economic and fiscal instruments

LAC: Socio Bosque Programme
Location: Ecuador. **Timeline:** 2008.


Image by Andres Medina, Unsplash. Source: https://unsplash.com/de/@kiyoshi_jpg

Brief description:
The instrument offers financial incentives to low-income private and communal landowners to encourage the voluntary protection of native forests and vegetation and aims to conserve 3.6 million hectares and reduce high deforestation rates. Implemented in six provinces, the initiative also improves climate change adaptation and disaster resilience by maintaining essential forest ecosystem services, while promoting poverty alleviation, particularly for indigenous communities.

Lead: Government body

Highlights:

- **Participation:** Local communities are integral to the programme, participating in consultations and monitoring, and submitting annual review reports.
- **Multi-functional NbS:** The instrument has successfully reduced deforestation, restored forest cover, supported rural development and contributed to poverty reduction.
- **Long-term effective:** By 2016, the programme had secured 2,800 20-year agreements with municipalities and individuals, thereby safeguarding over 1.5 million hectares of native forest.

Further information: https://interlace-hub.com/socio-bosque-program-ecuador

Knowledge, communication, and innovation instruments

EU: Little wilderness subsidy
Location: Flemish region, Belgium. **Timeline:** 2019.

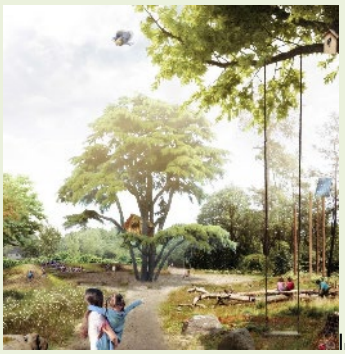
Image provided by INTERLACE, Horizon 2020 project.
Source: https://interlace-hub.com/little-wilderness-subsidy-flanders

Brief description:
The Little Wilderness initiative provides subsidies for cities to create small urban wilderness areas using endemic species, inspired by the 'Tiny Forests' concept. Designed for exploration and education, these nature patches aim to connect communities with nature, promoting sustainability, social cohesion and well-being.

Lead: Government body

Highlights:

- **Social cohesion:** Residents initiated and now maintain "little wildernesses" for community interaction and children's play, with local schools actively involved in their maintenance and educational use.
- **Innovative:** The initiative aims to reconnect people with nature and educate them about the benefits of nature through interactive elements such as edible plants, camera traps and picnic areas.

Further information: https://interlace-hub.com/little-wilderness-subsidy-flanders

Legislative, regulatory, and strategic instruments

EU: Mountain Forest Initiative
Location: Bavaria, Germany. **Timeline:** 2008.


Image by ChiemSeherin, Pixabay.
Source: https://pixabay.com/de/photos/landschaft-wald-herbst-wandern-3776969/

Brief description:
The Mountain Forest Initiative is a climate change adaptation programme that aims to restore the protective functions of vulnerable alpine forests in Bavaria, Germany. It is a collaborative effort between local forest agencies and other stakeholders. The programme focuses on high-risk areas to implement adaptation measures such as silvicultural practices and the creation of nature reserves.

Lead: Government body

Highlights:

- **Public-private cooperation:** The initiative engaged local stakeholders, including private forest owners and public authorities, to achieve its goals and promote a sense of ownership.
- **Long-term effective:** The initiative improved climate hazard resilience and natural disaster response through enhanced water and habitat management, increased flood protection and expanded green spaces.
- **Co-design:** A working group comprising alpine forest offices was established to recommend implementation guidelines and propose adjustments to forest subsidies.
- **Inclusive:** Local residents can participate in citizen science, using and installing nesting boxes and camera traps.

Further information: https://interlace-hub.com/bavarian-mountain-forest-initiative

3.3 Coastal and marine ecosystems

Coastal and marine ecosystems cover approximately 72% of the Earth's surface and are crucial for maintaining the planet's ecological balance as well as safeguarding biodiversity and ensuring human well-being. These ecosystems provide essential services, including oxygen production, food supply, climate regulation, and habitat for a significant portion of global biodiversity (Bindoff et al., 2019). Beyond their inherent ecological value, coastal and marine ecosystems support the livelihoods and well-being of millions of people globally.

Over three billion people depend on marine and coastal biodiversity for their livelihoods, with the majority residing in developing countries (CBD, 2022). For one billion people, the ocean is the primary source of protein and thus vital in improving food security (CBD, 2022; Gilby et al, 2018). The fisheries sector, particularly artisanal fishing, employs over 200 million people worldwide (CBD, 2022). Currently, 40% of the world's population lives within 100 kilometres of the sea, a proportion that continues to increase (UN, 2017).

Coastal and marine ecosystems are critical for climate regulation, sequestering and storing large amounts of carbon, known as "blue carbon," which helps mitigate climate change (IPCC, 2019b; Lovelock & Duarte, 2019). They protect communities and infrastructure achieving risk reduction and boosting coastal adaptation by reducing the impact of storm surges and wave energy, which erode and destabilise coastlines (Donatti et al. 2022). These protective benefits are critical for mitigating coastal hazards and enhancing community resilience which is increasingly important in the face of rising sea levels and more frequent extreme weather events (O'Leary et al. 2023; Menéndez et al. 2020; European Commission, 2021). Coral reefs, for instance, can reduce non-storm wave heights by 70%, salt marshes by 72%, and mangroves by 31% (Beck et al., 2018). These ecosystems also enhance water quality by filtering pollutants and sediments, thereby supporting marine life and human health. Additionally, they provide valuable recreational spaces, offering opportunities for activities such as swimming, fishing, and boating, which contribute to human well-being and local economies.

Coastal valuation studies in the Caribbean have positively influenced decision-making, highlighting the importance of investing in coastal ecosystems (Waite et al., 2015; Silver et al., 2019; Arkema et al., 2015). Recent research estimated that coral reefs off the coast of Quintana Roo, Mexico, provide flood protection for 4,600 people and reduce flood damages by $42 million annually (Reguero et al., 2018). Such studies have led to the establishment of protected areas through mechanisms like user fees and the development of coastal zone management plans. An example is the Mesoamerican Reef Fund, established in 2004, aimed at conserving and restoring marine ecosystems in Belize, Guatemala, Honduras, and Mexico (MAR Fund, 2021).

Despite their importance, coastal and marine ecosystems face severe degradation due to overexploitation and other direct threats (IPBES, 2019). Intensive use, particularly in coastal waters near urban and industrial centres, exacerbates these pressures. Climate change further impacts these ecosystems through ocean warming, acidification, and oxygen depletion, affecting marine environments globally and locally (Lu et al., 2018). Over 60% of the world's coral reefs are threatened, 25-50% are already destroyed (UN, 2022). 20-35% of the world's mangroves have already disappeared, although the rate of loss has more than halved over the last three decades (Polidoro et al., 2010; FAO, 2020). Latin American countries, with their extensive coastlines along the Atlantic and Pacific Oceans, host some of the world's most biodiverse marine ecosystems. However, these also face significant threats from overfishing, pollution, and climate change. For example, coral reefs in the Caribbean and mangroves along the Pacific coast are under severe stress. An integrated approach is essential for addressing these complex challenges and fostering resilience (O'Leary et al. 2023).

Marine and coastal NbS integrate marine management with broader environmental and socio-economic objectives, addressing societal challenges while enhancing biodiversity. These innovative practices encompass the conservation, restoration, and sustainable use of marine resources, aiming to improve ecosystem services, health, and resilience. NbS offer crucial co-benefits such as climate mitigation and adaptation, biodiversity conservation, and human well-being (Donatti et al. 2022). For instance, restoring coral reefs not only boosts biodiversity but also protects shorelines and supports fisheries. Similarly, restoring vegetated coastal ecosystems like mangroves and managing seagrass meadows enhance coastal protection, improve water quality, and provide critical habitats for fish and invertebrates (Waltham et al., 2020). Additionally, creating marine protected areas benefits local communities by preserving fish stocks and promoting sustainable livelihoods (Arkema et al., 2024).

The potential of marine and coastal NbS to deliver multiple benefits to society is increasingly recognised in national, EU, and global policies (EEA, 2023). The Ramsar Convention, for example, promotes the conservation and sustainable use of wetlands and has published an Addendum to the UNDP Pathway for Increasing NbS in NDCs, focusing on the important role of wetlands as NbS. On an EU level, the EU Marine Strategy Framework Directive supports the restoration of seagrass meadows and oyster reefs to enhance marine biodiversity and protect coastlines from erosion. Integrated coastal and marine management highlights the crucial interplay with terrestrial and freshwater habitats, underscoring multifaceted benefits for environmental health and socio-economic resilience (Faivre et al., 2017). The EU Adaptation Strategy emphasises the need to promote NbS for enhanced coastal defence and reduced risk of algal blooms, as well as to provide benefits such as carbon sequestration, tourism opportunities, and biodiversity conservation and restoration while maintaining healthy and resilient oceans.

LAC: Ecosystem-based approaches through a ridge-to-reef approach in Port Salut, Haiti

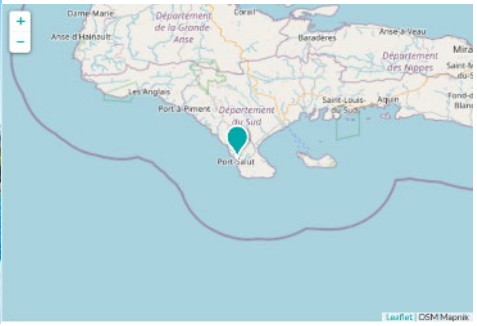

Image by Hannah Gibbs, Oppla. Source: https://oppla.eu/casestudy/24399, Map provided by https://leafletjs.com/

NbS types: Coral-reefs restoration; Green spaces management and reforestation; Multi-functional nature-based watershed management and Ecosystem Restoration, Establishing NbS for coastal resilience

Specific measures: The project measures include re-vegetation efforts and sustainable vetiver farming to mitigate upland erosion and inland flooding, complemented by tree planting along riverbeds. Coastal revegetation serves as natural buffers against coastal hazards like storm surges, safeguarding local infrastructure and communities. The project promotes sustainable and resilient fisheries, equipping fishers with life-saving skills and enabling offshore fishing to protect coastal environments. Furthermore, the project emphasises capacity building for NbS implementation at local and national levels, alongside advocacy for marine protected areas management, fostering comprehensive coastal zone management strategies covering the entire landscape from the hills to the sea.

Location: Port Salut, Haiti

Timeline: 2012 to 2016

Main objective: The project aimed to demonstrate how ecosystem-based measures could mitigate climate hazards and reduce vulnerabilities in Haiti through a ridge to reef approach.

Context and background: Haiti faces significant challenges due to frequent hurricanes and storms, leading to severe economic consequences and environmental degradation. Heavy rainfall causes storm surges, coastal and inland flooding, and erosion, particularly in Port Salut, where unsustainable practices exacerbate these issues. Fishers face regular threats to their safety and income due to storms and the deteriorating marine ecosystem, which is further stressed by coastal flooding and sedimentation. Upstream, unsustainable farming and landscape degradation harm both the environment and the livelihoods of farmers who rely on it. The region's ecosystems, including mangroves, coral reefs, and tropical forests, are under threat from these compounded challenges.

LAC: Ecosystem-based approaches through a ridge-to-reef approach in Port Salut, Haiti

Lead/driving force: United Nations Environment Programme (UNEP)

Key stakeholders: European Commission; Ministry of Environment of Haiti; Ministry of Interior and Territorial Communities; Ministry of Planning; Ministry of Tourism and other National Government Ministries; Platform for Improving Artisanal Fisheries and Integrated Development (PADI), Audubon Society of Haiti; Reef Check; Natural Resources Stewardship Circle; Botanical Gardens of Les Cayes; Ayitika.of Vetiver Producers of Port Salut and Arniquet; Municipality of Port Salut; Marine Fishers Association of Port Salut; Cooperative of Vetiver Producers of Port Salut and Arniquet; Fédération d'Organisations pour le Développement de Port Salut.

Community engagement: The project engages the community through re-vegetation efforts and sustainable vetiver farming to reduce erosion and flooding, alongside tree planting along riverbeds. Coastal re-vegetation creates natural buffers against storm surges, protecting local infrastructure. The project also enhances fishers skills for safer, more sustainable practices and promotes capacity building on ecosystem-based approaches at local and national levels. Additionally, it advocates for marine protected areas and comprehensive coastal management from the hills to the sea and included community-based organisations in the project implementation.

Funding sources: UNEP

Budget: 275,000 Euros

Environmental impact: The project has significantly impacted coastal and marine environments through a thorough baseline assessment that guided the selection of effective interventions. A tree nursery was established to support reforestation efforts, resulting in the successful reforestation of 141 hectares vulnerable to coastal hazards. This initiative included the planting of 54,065 fruit and forestry trees, alongside 36,300 mangroves and sea grape trees, which enhance biodiversity, stabilise shorelines, and improve ecosystem resilience. These measures collectively contribute to restoring vital habitats and mitigating the adverse effects of coastal hazards, promoting a healthier and more sustainable marine environment.

Social impact: The project had significant social impact, including training 150 people in coastal species nursery management, establishing sustainable vetiver farms on 6.5 hectares, and raising awareness among 129 people. A participatory action plan for the Port Salut fishing community was developed with input from 51 individuals. The project also influenced the designation of Port Salut as one of Haiti's first marine protected areas Additionally, a disaster preparedness plan was implemented for local fishers.

Economic impact: Municipal cash-for-work scheme promoted through community-led collection of solid waste along the coast to reduce marine litter and obstruction of waterways. Boat repair and fleet improvement (7 motors, 10 sailboats, 15 sails), enabling local fishers to head further out to sea and reduce fishing pressure on nearshore ecosystems.

Success factors: The project success was driven by strong ownership from residents and government authorities, with a focus on empowering community-based organisations of vetiver farmers and fishers. The project's impact was recognised internationally, in forums such as the World Parks Congress and the Sendai Conference. The government and the communities are now better equipped for coastal re-vegetation and ecosystem rehabilitation.

Challenges and mitigation: UNEP built partnerships with various Ministries, to support integrated coastal zone management. The process of participatory dialogues between local authorities and stakeholders enhanced civil society's involvement in municipal planning while giving the Municipal Government a more visible role in coastal zone management. However sustained capacity development is still needed.

Sources: UNEP. (2016). Coastal Partners: Applying ecosystem-based disaster risk reduction (Eco-DRR) through a ridge-to-reef approach in Port Salut, Haiti.

Europe: Safe Islands for Seabirds, an Azorean Conservation Initiative

Images provided by Safe Island for Seabirds, LIFE project. Source: https://webgate.ec.europa.eu/life/publicWebsite/project/LIFE07-NAT-P-000649/safe-islands-for-seabirds-initiating-the-restoration-of-seabird-driven-ecosystems-in-the-azores

NbS types: Control and eradication of invasive alien species (IAS), habitat restoration.

Specific measures: Controlling and eradicating invasive species with an operational plan for invasive mammals. A pest-free fence was installed to protect seabird colonies. Habitat restoration also involved planting native ones. To support seabirds, 400 artificial nests were created, with sound and decoys to attract nesting pairs. Additionally, 150 recycling bins were distributed on Corvo Island, and 70% of domestic cats were sterilised and microchipped to reduce their impact on wildlife. The project also achieved the first translocation of Cory's shearwater chicks to encourage future colonisation of the biological reserve.

Location: Corvo Island and Vila Franca do Campo Islet (VFCI) in São Miguel Island, Azores.

Timeline: The LIFE Project ran from 2009-2012. The After-LIFE action plan was implemented from 2015 to 2016 and continued through subsequent activities.

Main objective: To conserve seabird colonies through habitat restoration, control and eradication of invasive alien species, and ongoing community engagement and education.

Context and background: Seabird populations in the Azores were threatened by invasive alien species and habitat degradation. The Safe Islands for Seabirds project aimed to address these issues by restoring natural habitats, implementing innovative conservation techniques, and engaging the local community in ongoing conservation efforts.

Lead/driving force: The Safe Islands for Seabirds project was led by SPEA, with support from DRAM and funding from the LIFE Programme of the European Commission.

Key Stakeholders: Local communities, conservation organisations, government agencies, donors.

Community engagement: 113 educational and awareness-raising activities completed with

1,835 participants, representing 4% of the local population. These activities aimed to educate the community about seabird conservation and the importance of protecting natural habitats.

Funding sources: The project was funded through a combination of government support (DRAM), contributions from SPEA, and donations from private individuals, as well as the LIFE Programme of the European Commission.

Budget: Total investment of €1,057,761, with €507,118 provided by the EU LIFE Programme.

Environmental impact: The project significantly enhanced seabird habitats by restoring native ecosystems and controlling invasive species. A comprehensive eradication plan for invasive mammals was implemented, including the sterilisation and microchipping of 70% of domestic cats to minimise their impact on wildlife. The project also controlled the spread of invasive Arundo Donax on 1.35 hectares of Vila Franca do Campo Islet. On Corvo Island, a 12-hectare Altitude Biological Reserve (RBA) was established, protected by electric fencing to safeguard endemic plants. Similarly, the Corvo Biological Reserve (RBC) was equipped with a predator-proof fence, which successfully eradicated invasive mammals and controlled invasive plants across 95% of the area. Additionally, a greenhouse was built, and over 23,000 native and endemic plants were introduced across Corvo Island and Vila Franca do Campo Islet to further restore the local flora. To bolster seabird populations, 400 artificial nests were installed, complemented by sound emissions and decoys to attract nesting pairs. A key milestone of the project was the first-ever translocation of Cory's shearwater chicks, aimed at promoting future colonisation of the RBC. These efforts were coupled with environmental awareness campaigns, including the distribution of 150 recycling bins and waste treatment initiatives, resulting in a healthier environment for seabird colonies and improved biodiversity on the islands.

Social Impact: The project enhanced community awareness and education regarding seabird conservation. Monthly environmental education activities were conducted with all classes of the Mouzinho da Silveira Basic and Secondary School (EBSMS). Various environmental awareness and volunteer activities were promoted to the entire population of Corvo. Additionally, the "Honeymoon in Corvo" website and live streaming from a Cory's shearwater nest on Corvo Island reached viewers in 71 countries and attracted 25,000 followers. The SOS Cory's shearwater campaign, in collaboration with the island's Natural Park, resulted in the ringing of over 800 juveniles between 2009-2012 by SPEA technicians.

Economic Impact: The project's economic impact includes job creation related to habitat restoration and maintenance activities. Increased awareness and engagement in conservation efforts may also boost local tourism, as visitors come to see the thriving seabird colonies and restored natural habitats. Additionally, the organisation of the "I Workshop on Entrepreneurship and Sustainable Tourism on Corvo Island" aimed to promote sustainable economic opportunities linked to conservation efforts.

Success factors: Key success factors for the project included the implementation of innovative solutions such as the pest-free fence and effective habitat restoration techniques. Strong community engagement and ongoing educational efforts were also crucial, ensuring local support and participation in conservation activities. The continuity of the project through the After-LIFE action plan and the involvement of dedicated stakeholders were essential in

Challenges and mitigation: Managing invasive alien species has required ongoing efforts and monitoring. Ensuring sustainable funding for long-term maintenance and educational activities was also essential. Mitigation efforts included regular maintenance of restored areas, continuous community engagement, and seeking diverse funding sources to support the project's longevity. Specific challenges, such as damage to the pest-proof fence due to storms and oxidation, were addressed through repairs and

Europe: Safe Islands for Seabirds, an Azorean Conservation Initiative

maintaining momentum and achieving long-term conservation goals.

re-evaluation of the structure. The establishment of a neutering protocol for cats, supported by the presence of a full-time veterinarian on the island, was crucial in controlling the impact of predators on seabird colonies.

Sources: https://www.spea.pt/wp-content/uploads/2020/05/Relatorio-final_AfterLIFE-ilhas-santuario-aves-marinhas_2013-2018_compressed.pdf and https://panorama.solutions/en/solution/safe-island-seabirds and https://webgate.ec.europa.eu/life/publicWebsite/project/LIFE07-NAT-P-000649/safe-islands-for-seabirds-initiating-the-restoration-of-seabird-driven-ecosystems-in-the-azores

Supportive policy instruments

Agreement-based or cooperative instruments

LAC: Valdivian Coastal Reserve
Location: Valdivia, Chile. **Timeline:** 2003.

Image by bobseattle, Pixabay. Source: https://pixabay.com/de/photos/nat%C3%BCrliche-lizard-wald-4182058/

Brief description:
The Valdivian Coastal Reserve, situated in a global biodiversity hotspot, preserves rare and unique species, including critically endangered wildlife and ancient trees, playing a crucial role in climate change mitigation. Through a public-private partnership, it safeguards 150,000 acres of temperate rainforests, promotes sustainable management, and implements key projects like forest carbon offsetting, large-scale ecological restoration, and marine conservation.

Lead: Non-governmental actors (think tank)

Highlights:

- **Public-private cooperation:** The Valdivian Coastal Reserve is a community-driven conservation initiative that exemplifies a new public-private model by donating nearly 25,500 acres to create the Alerce Coastal National Park.
- **Inclusive:** The initiative provides new livelihood opportunities for the local communities (ecotourism, women-led businesses, native tree nurseries, traceable fisheries).
- **Innovative:** The designated areas encompass 150,000 acres of millenary temperate rainforests and represent the first public-private collaboration in Chile for a joint conservation management plan.

Further information:
https://www.nature.org/content/dam/tnc/nature/en/documents/ValdivianCoastalReservefactsheetENG.pdf

Economic and fiscal instruments

LAC: Quintana Roo Reef Protection
Location: Quintana Roo, Mexico. **Timeline:** 2018.


Image by Spencer Watson, Unsplash. Source: https://unsplash.com/de/@thebrownspy

Brief description:
The instrument protects approximately 100 miles of coastline in Mexico as part of the Mesoamerican Barrier Reef, the second largest in the world. Since 1980, this reef has suffered significant damage, prompting a collaborative insurance and restoration effort involving local property owners, the regional government and a specialised trust fund.

Lead: Non-governmental actors (think tank)

Highlights:

- **Innovative:** The initiative was a pioneering parametric insurance for rapid coral reef restoration based on hurricane wind speeds.
- **Public-private cooperation:** The funding structure leverages both public and private sources, with an ongoing commitment to adapt and expand the model for other ecosystems.
- **Effective:** The insurance model ensures swift funds for reef recovery, minimising damage and economic impact from storms.

Further information: https://legacy.greenfinanceinstitute.com/gfihive/case-studies/quintana-roo-reef-protection-parametric-insurance/#

Knowledge, communication, and innovation instruments

EU: Surfers as coastal defenders
Location: Le Havre, France. **Timeline:** 2019.


Image by Naja Bertolt Jensen, Source: https://unsplash.com/de/fotos/fischschwarm-im-wasser-BJUoZu0mpt0

Brief description:
The Dollemard cliffs in Le Havre, Normandy, have been threatened by a nearby coastal landfill containing 400,000 tons of waste, which is leaching into the environment and worsened by the impacts of climate change (intensifying storms and rising sea levels). Advocacy efforts by civil society and the local community have secured funding to excavate the landfill and restore the area without harming the coastline.

Lead: Non-governmental actors (civil society)

Highlights:

- **Bottom-Up:** The Dollemard case highlights the influence of local communities and advocates in driving political change, serving as a model for others facing environmental degradation.
- **Multifunctional NbS:** Excavating the landfill will not only protect nature, but also improve the health of local residents, divers and surfers by removing hazardous materials such as asbestos.
- **Effective**: In response to civil society efforts, the city has secured €900,000 from various sources to excavate the landfill and restore the area to good ecological condition.

Further information: https://panorama.solutions/en/solution/surfers-coastal-defenders-dollemard-landfill

Legislative, regulatory, and strategic instruments

EU: HELCOM
Location: Baltic sea area (Denmark, Estonia, the European Union, Finland, Germany, Latvia, Lithuania, Poland, Russia, and Sweden). **Timeline:** 1974.


Image by Mats Westerbom.
Source: https://helcom.fi/action-areas/species-and-biotopes/

Brief description:
The Helsinki Convention addresses environmental issues caused by industrialisation and pollution and aims to protect marine habitats and biodiversity. Updated in 1992 and extended to ten parties, it covers the entire Baltic Sea region and has been amended regularly to align with evolving international environmental standards.

Lead: Intergovernmental organisation

Highlights:

- **Participation**: Regular meetings and continuous assessments ensure active involvement of all stakeholders in monitoring and conservation efforts.
- **Long-term effective**: Established monitoring programmes since 1979 provide essential data for evaluating environmental trends and progress.
- **Knowledge sharing**: The production and update of biodiversity-related Baltic Sea Environment Fact Sheets facilitate the dissemination of vital information.

Further information: https://helcom.fi/

3.4 Freshwater ecosystems

Water is essential for life, underpinning a wide range of ecosystem services, including supporting biodiversity, regulating climate, and purifying water. The European Environment Agency (EEA) emphasises the need for sustainable water management to enhance the resilience of water systems against the impacts of climate change and human activities (EEA, 2020). Sustainable practices include efficient water use, protecting water sources, and restoring aquatic ecosystems to maintain their natural functions and biodiversity.

Sustainable water management is an integrated approach that aims to ensure the availability and quality of water for current and future generations. This approach incorporates various strategies, including the management of surface water, groundwater, and rainwater to optimise the use and conservation of water resources. It promotes environmental health, economic viability, social equity, and biodiversity conservation. Effective water management is crucial for supporting ecosystems, agriculture, industry, and domestic use, thereby playing a vital role in maintaining human health and environmental sustainability.

NbS are integral to sustainable water management, particularly through the application of Sustainable Drainage Systems (SuDS). SuDS use natural processes and ecosystems to address water-related challenges, including stormwater management, flood prevention, and water purification. These solutions range from protecting and restoring wetlands to implementing green infrastructure in urban areas. According to UN Water, NbS, including SuDS, can enhance water availability, improve water quality, and reduce the risks associated with water-related disasters (UN Water, 2018). By integrating NbS into water management strategies, we can create more resilient and adaptive water systems.

NbS are also highly effective when used to complement grey infrastructure (traditional engineered systems such as concrete channels, pipes, and water treatment plants). Combining green and grey infrastructure allows for a more comprehensive approach to water management. Green infrastructure helps to alleviate pressure on grey systems by managing water at the source, reducing runoff, and improving water quality through natural filtration processes. For instance, green roofs, permeable pavements, and rain gardens absorb and slow down stormwater, reducing the need for larger, more expensive grey infrastructure solutions. This complementarity enhances flood control, water purification, and overall

system resilience while delivering additional benefits like improved biodiversity, urban cooling, and recreational spaces.

SuDS as rain gardens, and permeable pavement are core components of a sustainable water management approach. These infrastructures help to manage stormwater, reduce urban heat islands, and improve air quality. The EEA reports that SuDS can reduce the pressure on conventional water management systems and enhance the resilience of urban areas to climate change. Specifically, they play a crucial role in flood management by absorbing excess rainfall and reducing runoff (EEA, 2021).

One key aspect of sustainable water management is the protection and restoration of wetlands. Wetlands act as natural water filters, trapping pollutants and sediments, and providing habitats for a diverse range of species. They also play a crucial role in regulating water flow and reducing the impacts of floods and droughts. The International Water Association (IWA) highlights that wetland technologies, often used in SuDS, are powerful tools in sustainable water treatment, providing effective solutions for water purification and ecosystem restoration (IWA, 2020).

Sustainable water management also involves efficient water use in agriculture, which is the largest consumer of freshwater globally. Practices such as drip irrigation, rainwater harvesting, and the use of drought-resistant crops can significantly reduce water consumption in agriculture. The Food and Agriculture Organisation (FAO) underscores the importance of adopting water-efficient technologies and practices to ensure the sustainability of water resources for agriculture (FAO, 2021).

Watersheds are an important planning unit in sustainable water management. Managing water resources at the watershed level allows for a comprehensive approach that considers all the interlinked components of the hydrological cycle. This approach helps in addressing the cumulative impacts of various land uses and ensuring the sustainable use of water resources across the entire watershed (EEA, 2020). NbS, when implemented within watersheds, offer a holistic approach to sustainable water management, and can address water quality, quantity and ecosystem health, contributing to long-term resilience and sustainability.

Moreover, sustainable water management is closely linked to the concept of sustainable landscapes. Integrated landscape management considers the complex interactions between water, land use, and biodiversity. It seeks to balance competing demands and enhance ecosystem services through holistic planning and management approaches (UNCCD, 2024). By adopting landscape-level approaches, including SuDS and the integration of green and grey infrastructure, sustainable water management can contribute to broader goals of ecosystem restoration and biodiversity conservation.

The issue of drought is particularly critical in sustainable water management, as droughts exacerbate water scarcity, reduce agricultural productivity, and put stress on ecosystems. Integrating NbS like wetland restoration, alongside measures such as rainwater harvesting and SuDS, can mitigate the impacts of drought by enhancing water storage capacity and maintaining essential ecosystem functions during dry periods. In addition, efficient water use and management practices are crucial for building resilience against drought conditions, ensuring water availability across sectors, and supporting biodiversity.

By incorporating NbS into water management strategies, we can improve the sustainability and resilience of water systems, for example through water quality management, flood and drought mitigation and ground water recharge. This comprehensive approach integrates

various aspects of environmental management, including forestry, agriculture, and urban planning. Demonstrating the interaction between water management and these ecological processes reveals the extensive benefits of NbS and SuDS. Integrated methods that address multiple environmental facets show how water management connects with other essential areas, such as land use and ecosystem health, creating cohesive and sustainable solutions. Elements like watershed protection, biodiversity, and climate resilience underscore the broader impacts of water management initiatives on ecosystem health and resource management.

Case studies

LAC: Aquafondo, A Case of Integrated Water Management in Peru

Source: © Smn Jlt # 796702599, 2024. Stock.Adobe.com

NbS types: Watershed Management, Reforestation, Agroforestry, Wetland Restoration, Rainwater Harvesting.

Specific measures: The project integrates reforestation and agroforestry by planting native tree species and incorporating systems to stabilise soils, reduce erosion, and enhance water infiltration. Wetland restoration revives high-altitude wetlands to improve water storage and maintain water flows during dry periods. Rainwater harvesting systems capture and store rainwater for agricultural and domestic use. Sustainable agriculture practices include water-efficient irrigation techniques and promoting drought-resistant crops to reduce water consumption. Community engagement involves conducting educational programmes and workshops to raise awareness and involve local communities in water management practices.

Location: The watersheds supplying Lima and Callao, including the Rimac, Chillón, and Lurín rivers, in Peru.

Timeline: Ongoing since 2011.

Main objective: The main objective of Aquafondo is to enhance water availability and quality for Lima and Callao by implementing integrated water management practices that incorporate NbS. This involves protecting and restoring critical ecosystems, promoting sustainable agricultural practices, and engaging local communities in water stewardship.

Context and background: Aquafondo, the Water Fund for Lima and Callao, is a public-private initiative in Peru designed to ensure water security and sustainable water management. The Lima and Callao regions are particularly vulnerable to water scarcity due to rapid urbanisation, climate change, and over-extraction of water resources.

LAC: Aquafondo, A Case of Integrated Water Management in Peru

Lead/Driving Force: Aquafondo is led by a coalition of public and private partners, including the Nature Conservancy, the Peruvian National Water Authority, local governments, and private sector stakeholders.

Key Stakeholders: Local communities, farmers, environmental organisations, government agencies, private companies.

Community engagement: The project conducts educational programmes to train local communities in sustainable water management and conservation practices. Participatory projects involve local stakeholders in planning and implementing water management initiatives. Additionally, awareness campaigns promote the importance of water conservation through media and community outreach efforts.

Funding sources: Public funds from local and national governments, private sector contributions, international grants, and donations.

Budget: The budget for Aquafondo varies annually based on the funding from different sources. For example, in 2019, the budget was approximately $1.2 million. Detailed financial reports are available through the project's annual publications.

Environmental impact: The project enhances biodiversity by increasing plant and animal diversity through habitat restoration and conservation efforts. It improves water quality through natural filtration provided by restored ecosystems. Additionally, it increases carbon sequestration through reforestation and agroforestry initiatives.

Economic impact: The project improves agricultural productivity through better water management and sustainable farming practices. It achieves cost savings by reducing expenses associated with water scarcity and treatment through natural filtration and storage solutions. Additionally, it creates employment opportunities in ecosystem restoration and sustainable agriculture projects**.**

Social impact: Improving water access for local communities and agricultural use. The project empowers communities by increasing involvement and ownership of water management initiatives. Additionally, it provides educational benefits by enhancing knowledge and capacity for sustainable water practices among residents.

Success factors: The project benefits from strong multi-sector collaboration, fostering effective partnerships between public, private, and community stakeholders. It employs comprehensive planning, integrating approaches that consider the entire watershed and various environmental aspects. Additionally, it ensures active participation and support from local communities.

Challenges and mitigation: The project addresses climate variability through resilient water management practices like wetland restoration and rainwater harvesting. It ensures funding consistency by diversifying sources and securing long-term commitments from partners. Continuous community engagement, education, and demonstrating the benefits of sustainable practices help achieve community buy-in.

Sources: https://aquafondo.org.pe/ and https://interlace-hub.com/water-fund-lima-and-callao-aquafondo

Europe: The Drava River Basin LIFE Project, Restoring Ecological Integrity, and Enhancing Biodiversity in Croatia

Images provided by DravaLife, LIFE project. Source: https://www.drava-life.hr/en/multimedia/photo-gallery/

NbS types: River Restoration, Habitat Creation, Integrated River Management.

Specific measures: Restoration of natural river dynamics to reinstate sediment transport and floodplain processes that have been disrupted. Further, habitat creation and enhancement, involving the development and restoration of floodplains, wetlands, and riverine environments. Additionally, sustainable land management practices are employed for long term ecological benefits.

Location: Croatia, Drava River (river basin and tributaries).

Timeline: 01.12.2015 - 30.11.2024

Main objective: The restoration of the Drava River's ecological integrity. This involves improving biodiversity, enhancing habitat connectivity, and reinstating natural river processes that support a healthy and resilient ecosystem. Expected results include for instance acquiring 40.8 ha for river restoration, reducing bird disturbances and increasing their populations, restoring 1 km riverbanks and 12 km side-arms, increasing awareness of Natura 2000 and improving 306 ha of floodplain forest.

Context and background: The Drava River, a significant Danube tributary, has experienced alterations due to human activities such as the construction of 22 hydropower plants in Austria, Slovenia, and Croatia and floodplain modifications. These changes have negatively impacted the river's natural processes and biodiversity. The Drava Life project was initiated to counteract these effects and restore the river's ecological health, aiming to return it to a more natural state.

Lead/Driving Force: Croatian Ministry of Economy and Sustainable Development, with significant involvement from various national and local organisations. The Ministry coordinates the project's implementation and ensures alignment with national environmental policies.

Community engagement: Community engagement is a critical component of the Drava Life project. The initiative includes public consultations and workshops to involve residents in the restoration process and raise awareness about the importance of river conservation. Educational programmes are also implemented to promote understanding and involvement in the project's activities.

Key Stakeholders: The project involves a diverse range of stakeholders, including local communities living near the river, environmental NGOs that focus on conservation and river management, and government agencies such as the Croatian Ministry of Economy and Sustainable Development. Additionally,

scientific/ academic institutions contribute research and expertise to support the restoration efforts.

Funding sources: The project is primarily funded by the EU LIFE Programme, which supports environmental and conservation projects across Europe. Funding also comes from the Croatian government and contributions from various partner organisations involved in the project.

Budget : Total Eligible Budget: 4,592,898 €, EU Contribution: 2,755,739 €

Environmental Impact: The project significantly enhances the ecological status of the Drava by restoring key natural features and habitats. This includes creating 13 hectares of new dynamic river zones with gravel, sand, and steep riverbanks, which are crucial for various species. The project promotes biodiversity by supporting endangered species such as the little tern and sandpiper. The project also focuses on groundwater replenishment, ensuring that the restored habitats help stabilise and elevate groundwater levels, crucial for resilience against climate change impacts.

Social Impact: The project enhances local communities' well-being by improving recreational opportunities and fostering environmental awareness. It establishes educational centres, paths, and information boards along the Drava to connect locals with nature and highlight the importance of biodiversity. The project also reduces human disturbance to riverine birds by implementing visitor guidance systems, fostering harmonious coexistence between humans and nature.

Economic impact: The project offers significant benefits through improved flood protection and increased tourism potential. Restoring natural habitats and side-arms mitigates flood risks, preventing costly damage to infrastructure and agricultural lands. The project also enhances the Drava River's recreational value, attracting tourists for activities such as fishing, swimming and simply being in nature.

Success factors: Firstly, strong inter-sectoral cooperation between public institutions, NGOs, and local governments ensures coordinated and comprehensive river management efforts. This collaboration is exemplified by the partnership between Hrvatske Vode (Croatian Waters), WWF Austria, and regional nature protection institutions. Secondly, the project's holistic approach integrates habitat restoration with flood protection, demonstrating that ecological and infrastructural goals can be simultaneously achieved. Thirdly, extensive community engagement through educational programmes, exhibitions, and awareness campaigns fosters local support and involvement in conservation efforts. Lastly, the project's adherence to EU directives and alignment with Natura 2000 objectives provide a robust regulatory framework that underpins its initiatives.

Challenges and mitigation: The project faces several challenges, including regulatory barriers, funding limitations, and potential conflicts among stakeholders. To mitigate these issues, the project emphasises strong collaboration and clear communication among all partners, ensuring that goals are aligned, and efforts are synergised. Addressing funding limitations, the project effectively utilises EU LIFE programme funds and seeks additional financial support through grants and partnerships. Technical challenges, such as the complexity of habitat restoration and flood protection integration, are tackled by employing innovative, environmentally friendly methods and continuous monitoring to adapt strategies as needed. Furthermore, by engaging local communities and raising awareness, the project mitigates resistance and promotes collective ownership of conservation efforts.

Europe: The Drava River Basin LIFE Project, Restoring Ecological Integrity, and Enhancing Biodiversity in Croatia

Sources: https://webgate.ec.europa.eu/life/publicWebsite/project/LIFE14-NAT-HR-000115/drava-life-integrated-river-management and https://www.drava-life.hr/ and https://www.wwfadria.org/?328372/DRAVA-LIFE-project-presented-at-LIFE-Info-Day-in-Zagreb

Supportive policy instruments

Agreement-based or cooperative instruments

LAC: Restoration plan for the Angachilla Wetland
Location: Valdivia, Chile. **Timeline:** 2007.

Image provided by INTERLACE, Horizon 2020 project.
Source: https://interlace-hub.com/restoration-plan-angachilla-wetland-valdivia-chile

Brief description:
In 2007, the community of Villa Claro de Luna initiated a wetland restoration plan for the Angachilla estuary, collaborating with NGOs to clean up and restore the area, which had become a clandestine garbage dump. To date, the estuary serves as a public green space, offering recreational opportunities and relief from urban heat for the residents.

Lead: Citizen/community group (neighbourhood association)

Highlights:

- **Bottom-up and involvement of local stakeholders:** The initiative was driven by neighbourhood residents caring for their immediate environment.
- **Sustainable in the long-term:** In 2015, the initiative managed to receive support from the municipal government and in 2022, the estuary was declared a nature reserve.

Further information: https://interlace-hub.com/restoration-plan-angachilla-wetland-valdivia-chile

Economic and fiscal instruments

EU: Subsidy scheme to support rainwater management installations
Location: Bratislava, Slovakia. **Timeline:** 2016.


Image by medvedkudajlabku.sk, image provided by INTERLACE, Horizon 2020 project. Source: https://interlace-hub.com/subsidy-scheme-support-rainwater-management-installations-bratislava

Brief description:
Bratislava launched a subsidy scheme to encourage private organisations, households, and homeowners to install rainwater management systems to enhance resilience against increased rainfall and to prevent pluvial floods. This initiative supports the city's climate adaptation strategy by funding Sustainable Urban Drainage Systems - water reservoirs, rain gardens, and green roofs.

Lead: Municipal government

Highlights:

- **Effective:** More than 1,000 households and building owners in Bratislava have applied for a subsidy covering up to 50% of implementation costs, along with project consultancy.
- **Multifunctional NbS:** The initiative contributes to better water management, climate change adaptation and reducing urban heat (green roofs).
- **Lessons learned:** The amount of the subsidy might need to be adjusted to the average cost of the measure to keep users motivated to apply.

Further information:
https://interlace-hub.com/subsidy-scheme-support-rainwater-management-installations-bratislavav

Knowledge, communication, and innovation instruments

LAC: Water Dialogues for participatory urban water management
Location: Panama City, Panama. **Timeline:** 2015.


Image by Franklin Canelon, Unsplash. Source: https://unsplash.com/de/@franklincanelon

Brief description:
The Water Dialogues served as an innovative instrument to enable exchange between different stakeholder groups and to rebuild trust among flood-affected communities. The process fostered collaborative discussions that led to an action plan combining structural and NbS to reduce flood risks and enhance long-term water management in the area.

Lead: Municipal government

Highlights:

- **Participation:** The Dialogues highlight the importance of adopting an inclusive and participatory approach when developing measures to mitigate flood risks in densely populated areas.
- **Effective**: The initiative was able to shift the discourse from blaming others to a constructive process of identifying the root causes of flood risk and taking collective action.
- **International cooperation:** Upon request by the municipality, Dutch experts in disaster risk reduction carried out a scoping mission and provided tailored recommendations.

Further information: https://interlace-hub.com/water-dialogues-participatory-urban-water-management-panama-city

Legislative, regulatory, and strategic instruments

EU: Cloudburst Management Plan
Location: Copenhagen, Denmark. **Timeline:** 2012.

Image by Atelier Dreiseitl, image provided by INTERLACE, Horizon 2020 project.
Source: https://interlace-hub.com/cloudburst-management-plan-copenhagen

Brief description:
The Cloudburst Management Plan is a 20-year strategy designed to mitigate the impact of extreme rainfall by addressing flooding risks in high-risk and development areas. Funded by the city and the private sector, the plan integrates cost-effective NbS, such as green spaces and canals, with essential piping and tunnels in areas where ground drainage is not feasible**.**

Lead: Municipal government

Highlights:

- **Sustainable in the long-term:** 300 projects are scheduled to be initiated over a 20-year period to implement the plan.
- **Innovative:** The Plan promotes shared adaptation responsibilities among Copenhagen's city administration, citizens, private actors and local businesses, with resources and support available through city offices and the private sector.
- **Participation**: The initiative was developed collaboratively with neighbouring municipalities, utility companies and other stakeholders to address extreme rainfall through coordinated infrastructure and public engagement.

Further information: https://interlace-hub.com/cloudburst-management-plan-copenhagen

3.5 Urban environment

Cities, which are home to 57% of the global population, are also the primary places where people interact with nature (IUCN, n.d). They consume 75% of the world's natural resources, generate three-quarters of global greenhouse gas emissions, and produce half of the planet's waste (IUCN, n.d.). Additionally, urban areas contribute 80% of global GDP and hold significant potential to enhance quality of life (WWF, 2021). At the same time, urban areas face increasing challenges related to climate change and biodiversity loss, exacerbated by rapid urbanisation. Effective city planning and design are increasingly critical to addressing climate impacts such as floods and heatwaves, as well as social challenges like public health stress, poverty, and inequality (Kabisch et al., 2016). In this context, NbS can offer valuable tools to tackle these issues, enabling cities to explore innovative approaches that foster transformative change and support the achievement of the SDGs (Bush et al., 2019).

Urban NbS encompass a range of processes and functions aimed at addressing environmental challenges and enhancing the quality of urban life. These solutions can be applied across various scales and ecosystems, as demonstrated in the case studies presented already in this chapter.

City-wide NbS encompass the restoration or renaturation of rivers, wetlands, and urban forests, which offer significant biodiversity and recreational benefits but require more extensive space (Skrydstrup et al., 2022). Additionally, other NbS strategies include terracing to manage runoff, constructed wetlands for water storage, and stream renaturation to slow water flows. Increasing green spaces helps mitigate urban heat, while linear tree canopies and green corridors strengthen biodiversity networks. These interventions collectively reduce flood damage, alleviate heat stress, and enhance recreational opportunities through expanded green spaces (Jongman et al., 2021). Further place-specific NbS, such as green roofs and facades, private gardens, retention basins, rainwater ponds, and green water squares, are being implemented in buildings, streets, and public spaces to address targeted environmental challenges (Jongman et al., 2021). These NbS can be effective in increasing stormwater retention, mitigating air, water, and soil contamination, and reducing urban heat through shading. Additionally, they can be designed to enhance local infrastructure and build stronger connections among urban stakeholders, ultimately contributing to more sustainable and inclusive urban environments (Li et al., 2021).

Despite the growing interest from cities in adopting NbS to address climate change, enhance societal well-being, and protect biodiversity, significant barriers threaten progress. Sarabi et al. (2020) highlight several challenges, including political reluctance for long-term commitments, which, combined with low public awareness and support, often hinders efforts. Resistance to traditional solutions, alongside siloed departmental thinking, further complicates implementation, while conflicts between short-term planning priorities and long-term NbS goals, coupled with inadequate policy and legal frameworks, add to the complexity. In addition, the lack of standardised design practices, high perceived costs, and uncertainties surrounding NbS tend to deter action, while limited financial resources, complexities in property ownership, and spatial constraints for suitable implementation sites exacerbate these issues. Yet, despite these challenges existing in both LAC and European cities, additional research, knowledge sharing, and capacity building both within and between the regions can help to develop solutions that overcome these challenges, and which are effectively adapted to local contexts.

Case studies

LAC: Green spaces system of Portoviejo, Ecuador

Images provided by INTERLACE, Horizon 2020 project. Source: https://interlace-hub.com/green-system-public-spaces-portoviejo-ecuador

NbS types: Parks and (semi) natural urban green spaces, green areas for water management and urban flood risk protection, wetland.

Specific Measures: Specific measures within the green spaces system include the creation of parks like "Las Vegas" and "La Rotonda," strategically located to provide significant ecosystem services and act as biological corridors for local wildlife. These parks feature structured urban designs with internal zoning that not only attract residents but also support biodiversity, hosting species such as birds, iguanas, and squirrels. Moreover, the system employs the Urban Green Index to quantify urban benefits, striving to achieve a target of 14 m2 of green space per inhabitant.

Location: Portoviejo, Ecuador

Timeline: 2016 to 2035

Main Objective: The primary objective of the green spaces system is to safeguard Portoviejo's natural heritage and enhance urban ecological functions using NbS. This initiative aims to establish new public spaces that connect the city with its surrounding landscapes, thereby protecting ecological, cultural, and scenic values. By revitalising degraded ecosystems impacted by irregular human settlements, the system contributes to mitigating the impacts of climate related events and Its eco-efficient designs underpin a sustainable urban development approach, promoting disaster resilience and enhancing overall urban quality.

Context and Background: This initiative addresses disaster risks in the Portoviejo River basin caused by deforestation, poor agricultural practices, and construction in vulnerable areas. The system of green spaces is an integral part of the "Plan Portoviejo 2035," a multi-scale urban planning instrument developed by the Directorate of Urban and Territorial Planning of the Autonomous Government of the Municipality of Portoviejo.

Lead/Driving Force: Directorate of Urban and Territorial Planning of the Autonomous Government of the Municipality of Portoviejo
Key Stakeholders: Portoparques

Community Engagement:
During the formulation of the Plan, citizens were actively involved in discussions about existing urban systems and the planned green and public spaces for the city. This engagement ensured that community input was integrated into the development process. Once the park was built, the community played a crucial role in making it a vibrant hub of educational, recreational, and

cultural activities. This active participation has made the green spaces a central element of the city's identity, fostering a strong sense of ownership and pride among residents.

Funding Sources: Central Government, local institutions and support from non-governmental organisations.

Budget: 5 000 000€ - 10 000 000€
*The budget indicated above corresponds to this park, these funds only covered the execution of the work, while the management and maintenance is done through the public company Portoparques.

Environmental Impact: By 2024, the implementation of two major parks and 19 local-scale parks has significantly increased the green index from 0.84 m² per inhabitant in 2014 to 3 m² per inhabitant by 2022. This expansion of green spaces has not only enhanced the city's ecological footprint but also effectively managed flood risks, as demonstrated by the success of Las Vegas Park during severe weather events in 2017.

Social Impact: Las Vegas and La Rotonda parks are the most representative public spaces in the city, offering significant social impacts. Las Vegas Park accommodates many users with its diverse public spaces and features a natural wetland that citizens can visit without compromising its ecological value. La Rotonda Park, abundant with trees, serves as a major entertainment hub, providing an inclusive space where inhabitants engage in a variety of safe and recreational activities. These parks foster social cohesion and community involvement, enhancing the quality of life for all residents.

Economic Impact: The network of green spaces has significant economic impacts by preventing urban flooding, thereby reducing the need for public funds allocated to disaster response and infrastructure repairs. Although a cost-benefit analysis has not yet been conducted, the proactive flood management provided by these green spaces is anticipated to result in substantial savings and economic benefits for the city.

Success Factors: The green system of public spaces in Portoviejo has several success factors. Long-term planning aims to implement 246 green spaces at metropolitan, city, and neighbourhood scales as outlined in the Portoviejo 2035 Plan, targeting an urban green index of 14 m² per inhabitant by 2035. The project incorporates multi-scalar green space designs using NbS to enhance city resilience and improve residents' quality of life. Local government efforts to foster community ownership have been pivotal, promoting recreational and cultural activities such as dance classes and art projects that unite people around these public spaces.

Challenges and Mitigation:
The green spaces project faces several challenges, including the need to address growing disaster risks in the Portoviejo River basin caused by deforestation, poor agricultural practices, and construction in vulnerable areas. Prioritising riverbank conservation and risk reduction through land use is essential. Informal urban settlements complicate long-term goals, as land tenure issues and resettlement of vulnerable families require local authority resources and community involvement to prevent forced displacement or gentrification. Additionally, changes in local and regional governments can impact project continuity and the ability to connect key biodiverse ecosystems. Managing private interests and land ownership is also challenging, as balancing green space

LAC: Green spaces system of Portoviejo, Ecuador

prioritisation with urban development pressures is complex in a growing city.

Sources: https://interlace-hub.com/green-system-public-spaces-portoviejo-ecuador and https://www.researchgate.net/publication/372085397_La_participacion_ciudadana_en_la_estrategia_de_desarrollo_Portoviejo_2035

Europe: Basel Green Roof Strategy: Pioneering Urban Biodiversity and Climate Resilience through Green Roofs

Source: © Evelien # 690789367, 2024. Stock.Adobe.com

NbS types: Green Roofs; Biodiversity Enhancement; Climate Adaptation.

Specific measures: The strategy mandated green roofs for all new buildings with flat roofs, enforced by Basel's Building and Construction Law, ensuring green roofs become standard in new constructions. The project recommends a substrate layer of at least 12 cm, composed of regional soil types such as humus-rich topsoil and sandy subsoil to support plant growth. The roofs are usually planted with native Swiss wildflower seed mixes, tailored to local biodiversity needs. These green roofs help reduce energy consumption by providing natural insulation, lower urban temperatures, and reduce water runoff by up to 20%, aiding in flood management. Additionally, the roofs are designed to support diverse species, including 175 plant species, 80 beetle species, and 40 spider species. The subsidies helped offset installation costs, making green roofs more accessible to developers and property owners. The strategy also included biodiversity guidelines to maximise ecological benefits.

Location: Basel, Switzerland.

Timeline: 1970s: Early experiments; 1996-1998: first phase with 80,000 m² of green; 2005-2007: Additional 40,000 m², enhancing insulation on flat roofs. Today: Approximately 40% of roof surfaces in Basel are covered by green roofs.

Main objective: The Basel Green Roof Strategy aims to significantly increase green roofs across the city, enhancing biodiversity by creating habitats for plants and animals. It improves climate resilience by mitigating the urban heat island effect, managing stormwater runoff, and improving air quality. The strategy also supports sustainable development by integrating green

Context and background: Basel's green roof initiatives began with pilot projects in the 1970s. The first large-scale campaign in 1996, motivated by the EU Year of Nature Conservation, aimed to mainstream green roofs. Legislative support through the Building and Construction Law and subsequent financial incentives were pivotal.

infrastructure into city planning, boosting energy efficiency and aesthetic appeal.

Lead/driving force: The Basel-Stadt Government through the Building and Construction Law. Also support from local environmental agencies and research institutions like the Zurich University of Applied Sciences.

Key stakeholders: The Basel-Stadt Government is central, enacting legislation and providing financial incentives to support green roof implementation. Local developers and architects integrate green roof designs into buildings, making them a standard feature in Basel's urban landscape. Environmental organisations advocate for sustainable practices and provide ecological insights, aligning green roof initiatives with broader environmental goals. Research institutions, such as the Zurich University of Applied Sciences (ZHAW), offer valuable research and data, ensuring designs maximise biodiversity and environmental benefits. This collaboration ensures the strategy's success and sustainability.

Community engagement:
Public Awareness Campaigns educate the public about the benefits of green roofs, fostering community support. Workshops and training programmes for developers, architects, and contractors improve skills and knowledge in green roof installation and maintenance. Community Involvement in specific green roof projects encourages a sense of ownership and active participation among residents.

Funding sources: Basel-Stadt Government; Subsidies provided during the green roof campaigns.

Budget: 1996-1998: ~ 0.9 million € 2005-2007: ~ 1.3 million €.

Environmental impact: Increased urban biodiversity as green roofs provide habitats for various species, improving ecological diversity. Improved air quality through vegetation filtering pollutants. Enhanced stormwater management by absorbing rainwater, reducing runoff, and mitigating flooding. Mitigation of the urban heat island effect with green roofs providing insulation and cooling through evapotranspiration.

Economic impact: Increased property values due to the aesthetic and environmental benefits of green roofs. Energy savings through improved insulation, reducing costs for heating and cooling. Job creation in construction, horticulture, and maintenance through the green roof initiative.

Social impact: Enhanced urban aesthetics by improving the visual appeal of buildings and the cityscape. Creation of recreational spaces with roof gardens for relaxation and community activities. Contribution to well-being and health with increased green spaces supporting mental health and residents' well-being.

Success factors: Legislative support through strong laws requiring green roofs on new buildings. Financial incentives that offset the costs of green roof installation. Effective public engagement campaigns to raise awareness and

Challenges and mitigation:
Initial resistance from some developers was mitigated by providing financial incentives and demonstrating long-term benefits. Technical challenges in green roof installation were

Europe: Basel Green Roof Strategy: Pioneering Urban Biodiversity and Climate Resilience through Green Roofs

involve the community. Collaboration between government, researchers, and the private sector ensures comprehensive and long-term implementation.

addressed through training programmes and best practice guidelines for developers, architects, and contractors.

Sources: https://climate-adapt.eea.europa.eu/de/metadata/case-studies/green-roofs-in-basel-switzerland-combining-mitigation-and-adaptation-measures-1 and
https://www.greenroofs.com/2021/11/10/how-basel-switzerland-jumpstarted-a-green-roof-revolution-in-europe/ and
https://www.stadtgaertnerei.bs.ch/mein-garten/baugesuche/gebaeudebegruenung.html and
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Supportive policy instruments

Agreement-based or cooperative instruments
Table

EU: Nature Fabric Planning (Natuurweefselplanning)

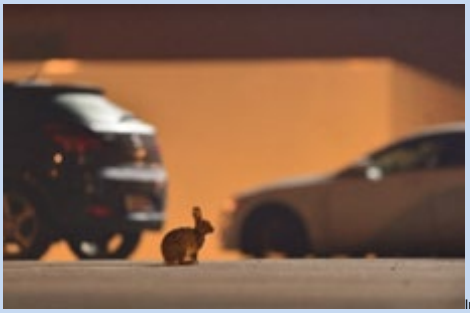
Image by Y. Adams (Vilda), image provided by INTERLACE, Horizon 2020 project. Source: https://interlace-hub.com/nature-fabric-planning-natuurweefselplanning-flanders

Location: Flemish region, Belgium.
Timeline: 2020.

Brief description:
The voluntary process is designed to enhance biodiversity and urban quality of life by integrating green, blue and grey elements through collaborative decision-making. This instrument encourages local coalitions with government agencies to jointly manage and develop neighbourhoods across an extended period of time, with the aim of promoting community well-being, biodiversity and sustainable urban practices.

Lead: Multi-stakeholder (municipal governments, regional government bodies, research institutes)

Highlights:

- **Co-creation:** The instrument is developed through a collaborative and iterative process that integrates existing knowledge from urban nature projects, emphasising democratic participation in co-creating urban green spaces.
- **Innovative:** The instrument assesses potential challenges and opportunities for transforming traditional nature management practices through a co-creation approach.
- **Sustainable in the long-term:** The local coalitions guide neighbourhood development and management for 24 years, establishing a long-term vision and goals for socio-ecological progress and area-specific nature objectives.

Further information: https://interlace-hub.com/nature-fabric-planning-natuurweefselplanning-flanders

Economic and fiscal instruments

LAC: Recovery of wetlands - Decrees 304 of 2020 and 152 of 2021
Location: Villavicencio, Colombia. **Timeline:** 2015.


Image by Felipe Villegas, image provided by INTERLACE, Horizon 2020 project.
Source: https://interlace-hub.com/recovery-wetlands-villavicencio-decrees-304-2020-and-152-2021

Brief description:
The Decree 304 of 2020, created a broad inter-institutional committee that carried out a diagnosis of six (6) wetlands, identifying their problems and management potential. Subsequently, the adoption of the Decree 152 of 2021**,** fosters collaboration between the construction sector and urban biodiversity conservation by creating a framework that allows increased building density in exchange for protecting environmental areas on private property. The decree ensures that protected wetlands benefit from enhanced development rights, focusing on ecological and sustainability criteria.

Lead: Municipal government

Highlights:

- **Social cohesion:** NGOs and environmental leaders in the city have become crucial partners with property owners in monitoring and managing their properties.
- **Multi-functional NbS**: The initiative supports various services including climate regulation, water management, disaster protection and recreation.
- **Innovative**: The instrument fosters collaboration between the construction sector and urban biodiversity conservation by recognising builders as essential contributors.

Further information: https://interlace-hub.com/recovery-wetlands-villavicencio-decrees-304-2020-and-152-2021

Knowledge, communication, and innovation instruments

EU: 24 hours for biodiversity with citizen science
Location: Seine-Saint-Denis, France. **Timeline:** 2010.


Image by Le Groupe des élus socialistes, image provided by INTERLACE, Horizon 2020 project.
Source: https://interlace-hub.com/24-hours-biodiversity-citizen-science-seine-saint-denis

Brief description:
Once a year, locals can engage in activities such as nature walks, scientific inventories and workshops to explore biodiversity and participatory science. The event includes species censuses, artistic displays and educational activities such as bird and butterfly watching, culminating in a summary of findings during a "25th hour" session.

Lead: Municipal government and government bodies

Highlights:

- **Long-term effective:** The initiative has been running for almost fifteen years with a large number of participants and projects.
- **Inclusive:** The goal of this initiative is to unite the public, environmentalists, NGOs, scientists and artists to address urban biodiversity issues and showcase the natural heritage of Seine-Saint-Denis.
- **Potential to be replicated:** The model has already been adopted by other French cities, including Rennes, Missilac, Odonat and Brière.

Further information: https://interlace-hub.com/24-hours-biodiversity-citizen-science-seine-saint-denis

Legislative, regulatory, and strategic instruments
Table

LAC: Guardians of the Hills
Location: Portoviejo, Ecuador. **Timeline:** 2022.


Image provided by INTERLACE, Horizon 2020 project.
Source: https://interlace-hub.com/guardians-hills-portoviejo-ecuador

Brief description:
The urban planning initiative builds a network of residents to monitor and report informal or unregulated interventions that increase landslide risks. This system enables the municipality to quickly address these risks and implement ecosystem restoration, including reforestation and designating La Tomatera hill as a protected zone to curb urban sprawl and preserve biodiversity.

Lead: Municipal government

Highlights:

- **Local involvement:** To report and address risks such as landslides, a network of voluntary residents of the concerned neighbourhoods is built.
- **Social cohesion and community-building:** The guardians primarily focus on reforestation and engaging in community efforts such as weeding, slope stabilisation and planting native species.
- **Effective:** Success is based on building a collective sense of responsibility among the residents, enhancing their capacity to address environmental challenges and fostering resilience.

Further information: https://interlace-hub.com/guardians-hills-portoviejo-ecuador

3.6 Addressing societal challenges across ecosystems

The interconnected relationship between nature and society is crucial in addressing global crises, as a single NbS intervention can contribute to multiple developmental goals during times when converging global crises threaten society's existence. The European Commission identifies a range of key societal challenges that NbS can tackle, including coastal resilience, green infrastructure, sustainable urban development, water management, food security and agriculture, biodiversity conservation and restoration, and health and well-being. These challenges underscore the diverse potential of NbS, which also includes supporting economic livelihoods through sustainable fisheries, creating decent work for local communities via eco-tourism, enhancing agricultural yields, promoting social well-being and human health, and building resilience to food and water insecurity.

Both the LAC and EU regions benefit from tailoring NbS to their specific contexts. In the EU, the focus is on integrating green infrastructure into urban areas and managing climate impacts. In LAC, the emphasis extends to managing informal settlements, enhancing disaster resilience, and leveraging community involvement. Collaborative efforts involving governments, local communities, and other stakeholders are essential for successfully implementing these solutions, promoting local engagement, addressing socio-environmental vulnerabilities, and contributing to sustainable development. Moreover, by continuing to share knowledge and good practices, the EU and LAC can inspire each other through a creative planning and implementation of NbS. The EU's experience with integrating NbS into urban planning can provide valuable insights for LAC cities facing rapid urbanisation, while LAC's community-led and traditional practices offer innovative approaches that can inspire NbS initiatives in the EU to tackle diverse societal challenges.

LAC: Sustainable Favela Network, Empowering Resilient Communities through Innovation and Collaboration

Images provided by CatComm. Source: https://catcomm.org/sustainable-favela-network/

NbS types: Green Infrastructure, Forestation, Water Management, Climate Adaptation and Resilience.

Specific measures: Community gardens, urban agriculture, green roofs and walls, agroforestry, sewage treatment bio-system, flood management, heat island mitigation, collective action projects in nature.

Location: Brazil, Rio de Janeiro's favelas.

Timeline: Ongoing since 2017

Main objective: To harness and enhance natural systems within favelas to promote socio-environmental sustainability, resilience to climate change, and the efficient use of resources while showcasing these solutions as models for broader urban contexts.

Context and background: The Sustainable Favela Network is a grassroots network to recognise, strengthen, and multiply sustainable initiatives across Rio de Janeiro's favelas, ultimately realising the potential of favelas as part of a sustainable urban future. This approach aims to address the unique challenges of informal settlements through sustainable practices that leverage local environmental and social assets.

Lead/driving force: Catalytic Communities (CatComm).

Key stakeholders: Favela residents, community organisers, environmental NGOs, academic institutions, local and international donors, municipal and federal government agencies.

Community engagement: Resident organisers establish and manage NbS projects, sharing their knowledge by providing one another with training, and advocating to scale their successful initiatives. Residents design green infrastructure, hold sustainability workshops, and lead eco-friendly initiatives.

Funding sources: Grants from the Heinrich Böll Foundation Brazil, Brazilian Institute for Climate and Society (iCS), Climateworks Foundation and re:arc; international individual donors; partnerships with local and international NGOs, and support from academic and media partners.

Budget: Varies by project; specific budgets are detailed in individual project reports and funding applications.

Environmental Impact: Enhanced urban green spaces, improved water management, reduced urban heat island effect, increased biodiversity, and better waste management contributing to a healthier urban ecosystem.

Social Impact: Increased community cohesion and empowerment, improved quality of life through better access to green spaces and sustainable services, preservation and celebration of local cultural practices, and stronger local networks.

LAC: Sustainable Favela Network, Empowering Resilient Communities through Innovation and Collaboration

Economic impact: Reduced energy costs and increased economic opportunities through sustainable development practices, contributing to the overall economic resilience of the favelas.

Success factors: Success in implementing NbS within the Sustainable Favela Network hinges on key elements. Community-based initiatives ensure solutions meet local needs and foster ownership. Centring local knowledge guarantees relevance and effectiveness of interventions. Collaborative networks with partners enable knowledge sharing and replication. Adaptability, inherent to favela practices, allows projects to evolve based on feedback and changing conditions. Visibility and collective advocacy raise awareness, attract support, and inspire similar initiatives.

Challenges and mitigation: Community organisers in favelas are the most critical social actors in Rio de Janeiro, given their role in addressing real-time, daily injustices. Historic chronic inequality limits the ability of Brazilian society and officials to adequately recognize and support favela innovation, including NbS, even while so many solutions have been developed on-the-ground. Engagement with public officials by favela organisers responsible for these solutions requires a slow build-up which must occur only after a number of other achievements are established internally within the network (exchanges, trainings, infrastructure build-outs, research and communication), so as to avoid co-optation of local organisers and their wasted time, given a political reality of very low effectuation.

Sources: https://catcomm.org/sustainable-favela-network/ and https://www.favelasustentavel.org/about

Europe: Co-City Project in Turin, Italy, A Collaborative Urban Commons Initiative

Images provided by Urban Maestro, Horizon 2020 project.
Source: https://urbanmaestro.org/wp-content/uploads/2020/09/urban-maestro_co-city-torino_g-ferrero-a-zanasi.pdf

NbS types: Urban green spaces are mentioned. This initiative focuses on repurposing abandoned and degraded areas into urban commons. Among the six main categories identified, one

Specific measures: The Co-City Project implemented several specific measures to transform neglected public spaces into vibrant community hubs. The project began by

Europe: Co-City Project in Turin, Italy, A Collaborative Urban Commons Initiative

focuses on the care of green areas and public spaces, aiming to improve the quality of urban green areas through the adoption, restoration, and maintenance of parks, playgrounds, and small portions of urban vegetation in public spaces, squares, streets, etc. In fact, most proposals from the community are concerning the care of green areas and public spaces, which according to the report are also the most inclusive in terms of openness of participation to the activities foreseen.

Location: Turin, Italy

Main objective: To counteract poverty and socio-spatial polarisation through the collaborative management of urban commons and care of urban green areas.

Lead/Driving Force: Led by the City of Turin with the University of Turin offering research and expertise in law and urban planning. The Cascina Roccafranca Foundation and the Network of Neighbourhood Houses played key roles in community outreach and engagement. These entities collaborated, pooling their resources and knowledge to ensure the project's success.

Key Stakeholders: A diverse group of stakeholders was involved in the project, including residents, community groups, NGOs, and public authorities. The co-design and management of urban spaces were actively undertaken by residents and community groups through the Pacts of Collaboration. Community initiatives were supported, and the co-design process was facilitated by NGOs and informal groups. Oversight was provided by public authorities, including city officials, ensuring that identifying underused or dismissed urban areas, including public buildings and green spaces, that could be regenerated through community efforts. Pacts of Collaboration were established between the city and residents, defining shared responsibilities and management roles. These pacts facilitated the creation of community gardens, green pathways, and urban forests, enhancing the urban environment and providing accessible green spaces for all. Educational workshops and training sessions on sustainable gardening, urban agriculture, and environmental stewardship were conducted to equip residents with the skills and knowledge needed to maintain these green spaces.

Timeline: March 2017 - February 2020

Context and background: The project was launched under the Urban Innovative Actions (UIA) programme, targeting urban poverty and socio-spatial polarisation in Turin. Co-City builds on the 2016 City Regulation on collaboration between citizens and the City of Turin, which promotes the care, shared management, and regeneration of urban commons. This regulation marked a significant shift in public administration, recognising citizens as active change-makers rather than just service recipients. The project aimed to test and refine this collaborative approach by involving residents in the co-design and co-governance of urban spaces, transforming them into valuable community assets.

Community engagement: Community engagement was a cornerstone of the Co-City Project. The initiative began with extensive outreach to identify interested citizens and community groups willing to participate in the regeneration of urban spaces. Through public calls and workshops, residents were invited to propose projects and collaborate on the co-design of green spaces. The Pacts of Collaboration formalised these partnerships, ensuring that residents had a say in the management and maintenance of the spaces. Educational workshops and training sessions were also provided to empower residents with the skills needed to sustain these green initiatives.

the project was aligned with broader urban planning and development goals.

Funding sources: The project was primarily funded through the Urban Innovative Actions (UIA) initiative of the European Regional Development Fund (ERDF). This funding was essential for covering the costs of public works, providing equipment, and implementing various community initiatives. The support from the UIA programme was instrumental in helping the project achieve its goals and ensuring its long-term sustainability.

Budget: Total project budget € 5.157.36,95 – ERDF fund rate 80%

Environmental Impact: The environmental impact of the Co-City Project, while beneficial, was moderate. The regeneration of underused public spaces into green areas provided localised environmental benefits. The creation of community gardens and green pathways offered some habitats for local flora and fauna. However, the overall impact on the city's broader environmental challenges remains incremental and primarily localised.

Social Impact: The social impact of the project was profound. By involving residents in the co-governance of urban spaces, the initiative fostered social cohesion and empowered marginalised communities. Access to green spaces improved mental and physical health, providing opportunities for exercise, relaxation, and social interaction. The project strengthened community bonds, creating a shared sense of ownership and responsibility for the urban environment.

Economic impact: The Co-City Project also had positive economic impacts. The regeneration of public spaces created job opportunities in urban greening, maintenance, and community project management. These jobs supported local economies and contributed to community resilience.

Success factors: Strong community engagement and participatory governance were critical in ensuring that the project met the needs and preferences of residents. Effective collaboration between public authorities, NGOs, and community groups facilitated the smooth implementation of the project. The comprehensive educational and social programmes empowered residents with the skills and knowledge needed to sustain the green initiatives.

Challenges and mitigation: The project faced resistance to the collaborative governance model, which was mitigated through community outreach and education. Long-term sustainability was ensured by securing ongoing funding and support from local authorities and stakeholders. Coordinating multiple stakeholders and managing diverse activities were addressed through clear communication, defined roles, and a structured co-design. Involving biodiversity and NbS experts could have broadened the environmental impact.

Sources: https://www.torinoeuprojects.it/en/cocity/ and https://www.uia-initiative.eu/en/uia-cities/turin and http://www.comune.torino.it/benicomuni/bm~doc/d-2-3-2_final-evaluation_report.pdf

Supportive policy instruments

Agreement-based or cooperative instruments

EU: Tempelhofer Feld development and maintenance plan
Location: Berlin, Germany. **Timeline:** 2016.


Image by abbilder, licensed under CC BY 2.0, Flickr.
Source: https://www.flickr.com/photos/abbilder/29415274968

Brief description:
The instrument outlines guidelines for the conservation of a 300-hectare area of a former airport. Created with input from various stakeholders, including citizens, it focuses on preserving biodiversity, establishing community gardens and promoting civic engagement through a structured participation model that includes regular meetings and workshops.

Lead: Citizens (referendum)

Highlights:

- **Bottom-up:** The instrument was established through a citizen-driven referendum, where 739,124 Berliners voted in favour of maintaining the open space.
- **Participation:** Berlin citizens, the municipal government and a private company developed the plan, which promotes civic engagement and cooperation through a three-pillar model of regular public meetings and workshops.
- **Multifunctional NbS:** The project creates community gardens and nature reserves and establishes temporary wildlife sanctuaries, aiming to conserve grassland and biodiversity while promoting leisure and environmental education.

Further information:
https://interlace-hub.com/tempelhofer-feld-development-and-maintenance-plan-berlin

Economic and fiscal instruments

LAC: More Women More Nature Programme
Location: Costa Rica. **Timeline:** 2020.


Image provided by INTERLACE, Horizon 2020 project.
Source: https://interlace-hub.com/more-women-more-nature-program

Brief description:
The +Women +Nature initiative provides financial support to women involved in activities such as sustainable tourism, agriculture, and conservation, aiming to mitigate the economic impact of the COVID-19 pandemic. The instrument is pioneering the integration of gender equality and environmental sustainability in Latin America and the Caribbean.
Lead: Government body and international organisation
Highlights:

- **Long-term effective:** The instrument offers a fiduciary guarantee, a ten-year term and a fixed annual interest rate of 4% for projects that promote the empowerment of women in biodiversity management.
- **Multi-functional NbS:** Addressing climate change, biodiversity loss and institutional gaps regarding gender equality, the instrument promotes multi-functional NbS and improves community and national well-being.
- **Comprehensive:** The instrument supports women in sustainable tourism, reforestation, forest conservation, sustainable agriculture and livestock, responsible fishing, beekeeping and natural product manufacturing, aiming to improve the economic development and quality of life in rural areas.

Further information: https://interlace-hub.com/more-women-more-nature-program

Knowledge, communication, and innovation instruments

LAC: Green roofs and façades plan for elementary schools

Location: El Vigía, Venezuela. **Timeline:** 2019.


Map image © 2024 Apple Inc., accessed via Satellites.pro. Source: https://satellites.pro

Brief description:
In El Vigía, students experience discomfort due to high temperatures and humidity, which affects their learning experience. To address this, a local university proposed the use of green roofs, façades and bioclimatic techniques such as cross-ventilation to improve classroom conditions, involving the

educational community and municipal authorities in the process.

Lead: Universities

Highlights:

- **Well-being:** Green roofs and façades have a positive impact on student behaviour, thermal comfort and acoustic insulation in educational spaces, while promoting environmental education and awareness among students and staff.
- **Multi-stakeholder:** Implementation requires collaboration between the local and national government, education authorities, parent and community representatives and civil society.
- **Effective**: Due to unreliable electricity supply, artificial air conditioning is impractical, making NbS such as green roofs and façades the most viable, economically and environmentally friendly options.

Further information: https://interlace-hub.com/green-roofs-and-fa%C3%A7ades-plan-elementary-schools-ciudad-del-vig%C3%ADa

Legislative, regulatory, and strategic instruments

EU: Urban Allotment Garden Programme
Location: Lisbon, Portugal. **Timeline:** 2011.

Image by nit.pt, image provided by INTERLACE, Horizon 2020 project.
Source: https://interlace-hub.com/urban-allotment-garden-programme-lisbon

Brief description:
The initiative transforms vacant lots and degraded parks into community-managed allotment gardens. These gardens support local biodiversity, improve soil health, and mitigate urban heat, while promoting organic farming practices and offering public green spaces.

Lead: Municipal government

Highlights:

- **Inclusive**: Plots are prioritised for the unemployed, elderly and low-income residents. However, the parks are open to everyone for recreation.
- **Multi-functional NbS**: The instrument enhances local biodiversity, soil fertility and urban health, combats heat islands, improves drainage and sequesters CO2, while promoting organic practices, indigenous plants and educational use.
- **Effective**: By 2020, the city established 20 urban allotment parks with 750 allotments, providing a variety of environmental, social and economic benefits.

Further information: https://interlace-hub.com/urban-allotment-garden-programme-lisbon

4. Collaboration pathways for LAC and the EU

The potential to increase EU-LAC bi-directional learning and exchange on NbS is immense, holding promise for increasing NbS mainstreaming in policy and practice in both regions. Shared challenges that could be addressed through collaboration include, for example, policy and regulatory obstacles, inadequate funding, and technical complexities associated with NbS. To address these gaps, it is crucial to bolster advocacy for the integration of NbS into relevant policies and planning frameworks, secure innovative financing mechanisms, and strengthen the capacity of practitioners and governments through targeted training and knowledge-sharing platforms.

This chapter responds to these needs and builds on the presented state-of-play around NbS in the EU and LAC regions (including existing collaborations) to identify strategic entry points and pathways for leveraging future collaboration to scale up NbS action and impact. Implementing these strategies require a commitment to continuous learning and adaptation, presenting a unique opportunity to lead global NbS efforts through collaborative, strategic, and inclusive approaches. By harnessing their respective strengths and experiences in addressing common challenges, the LAC and EU regions can collaboratively increase their capacities, knowledge base and engagement around NbS. The first pathway, focusing on research, monitoring and knowledge sharing, is seen as being foundational and a prerequisite to successfully achieve the subsequent pathways.

4.1 Research, monitoring and knowledge sharing

Sharing knowledge, data and expertise is vital for the effective deployment of NbS. Collaboration among academic institutions, research organisations, and industry experts can foster innovation and improve the design and effectiveness of NbS. Establishing platforms and networks to facilitate the exchange of best practices, case studies, monitoring frameworks, and technological innovations related to NbS can enhance learning and capacity building. These platforms can serve as repositories for data, research findings, and practical tools that practitioners in both regions can access and utilise. Existing regional examples include the Oppla platform, which is the EU repository of NbS and serves as a knowledge marketplace bringing together the latest thinking and evidence on natural capital, ecosystem services and NbS, and the CELAC-focused counterpart *Naturaleza Transformativa: Soluciones para la biodiversidad y las personas en Latinoamérica* (Transformative nature: Solutions for biodiversity and people in Latin America) as well as the LAC OICS platform, which has a dedicated pillar for NbS.

Encouraging joint research projects between LAC and the EU can advance the science and practice of NbS. Collaborative research can address shared challenges, such as climate change impacts and biodiversity loss, and develop innovative solutions that are applicable in both regions. Research partnerships can also foster long-term academic and professional relationships, enhancing the overall capacity for NbS implementation. Hosting events that bring together stakeholders from both regions to disseminate information, share experiences, and build capacity can strengthen the knowledge base and promote best practices. These events can facilitate networking, collaboration, and the exchange of ideas, leading to more effective and innovative NbS projects.

Existing bi-regional collaboration mechanisms, such as the 'EU-CELAC Joint Initiative on Research and Innovation,' can serve to jointly review shared priorities in research and

innovation. Coordinated by the European Commission on the EU side and by the CELAC Pro-Tempore Presidency on the LAC side, this initiative is now anchored in regular policy dialogues held at the level of senior government officials from the EU and LAC countries. In its most recent meeting in 2023, the initiative emphasised the importance of strengthening cooperation on NbS. This increased focus will also be integrated into the bi-regional 'Strategic Roadmap.' Furthermore, this dialogue complements numerous bilateral NbS projects and initiatives between EU Member States and LAC countries.

4.2 Policy integration and alignment

Addressing policy and regulatory barriers that hinder the implementation of NbS in both regions is needed alongside joint efforts to harmonise policies, streamline regulations, and create supportive legal frameworks to incentivise the widespread adoption of NbS across LAC and the EU and ensure that environmental, social, and economic objectives are aligned. **Jointly developed regulations, standards, and guidelines can ensure consistency and comparability and facilitate cross-border initiatives and projects that address transnational environmental challenges**. In addition, incentives such as tax breaks, subsidies, and grants can stimulate investment in NbS projects within each country and region at different scales (see section 4.3).

Establishing joint governance mechanisms is key to making collaboration between regions more effective and sustainable in the long-term. These mechanisms ensure that policies are both inclusive and informed by scientific and local knowledge from both regions. A practical approach is the formation of **advisory councils**, which can guide decision-makers and facilitate knowledge sharing across different levels. Through collaboration in these councils, stakeholders can jointly identify priority action areas, create shared guidelines, and develop principles to advance NbS initiatives. By involving representatives from government agencies, policymakers, academia, the private sector, and civil society from both LAC and the EU, these councils help ensure that NbS policies are comprehensive and address the shared needs and priorities of both regions, ultimately fostering deeper cross-regional cooperation.

When developing joint guidelines and informing national and regional policies, it is essential to integrate environmental, economic, and social objectives to maximise the benefits of NbS. Cross-sectoral policies that encompass areas like urban planning, agriculture, water management, and disaster risk reduction can help create synergies, ensuring a holistic approach to NbS. In this collaboration, both regions should also remain mindful of their diverse ecological, social, cultural and economic contexts, ensuring that joint guidelines are flexible enough to accommodate local needs while fostering shared objectives. By aligning these sectors and considering regional specificities, policies can promote more resilient and sustainable outcomes for communities across both LAC and the EU.

4.3 (Innovative) financing mechanisms

Developing innovative financing mechanisms and leveraging resources from both LAC and the EU can ensure that NbS projects and related research and exchange initiatives have the necessary funding to succeed. Collaborative funding initiatives, such as green bonds and public-private partnerships, can unlock significant financial resources. Additionally, establishing financial incentives and subsidies and sustainability-linked or impact-linked loans can encourage private sector participation and attract investments from both regions. These financial instruments can be designed to support projects that deliver measurable

environmental and social benefits, making them attractive to investors interested in sustainability.

Engaging the private sector and establishing partnerships with the public sectors in LAC and the EU can leverage additional funding and resources for NbS projects. This can enable the pooling of expertise, technology, and capital, enabling larger-scale projects and enhancing their impact. Forums such as the EU-LAC business roundtables are one example of a potential starting point to encourage private sector investment in NbS. Furthermore, sharing experiences around and encouraging good practice public-private partnerships also help share risks and benefits, making investments in NbS more viable. The introduction of tax incentives and subsidies in both regions, inspired by real world practices that have been successful across both regions, can encourage businesses and individuals to invest in NbS. These financial incentives can lower the cost of implementing NbS projects, making them more attractive and feasible. Examples include tax credits for companies that invest in ecosystem restoration or subsidies for farmers who adopt sustainable agricultural practices.

Bi-regional collaboration should also encompass discussions and strategic decision-making around joint funding priorities and opportunities. Aligning funding strategies and identifying shared financial priorities can help ensure that resources are directed towards high-impact, strategic areas relevant within and across both regions. Furthermore, engaging in coordinated dialogue with major funders and funding instruments active in fostering NbS action, such as the EIB, IADB and the Global Gateway Investment Agenda with e.g. a pillar on green transition will help tap available resources, streamline funding processes, address regional needs more effectively, and support the successful implementation of NbS across both LAC and the EU.

4.4 Community engagement and participation

Engaging local communities and grassroots organisations in the design, planning, implementation and maintenance of NbS is key to ensuring their sustainability and effectiveness as they garner strong local support and respond to local needs and contexts. Empowering citizens to actively participate in NbS planning and implementation, whether through grassroots initiatives or co-governance approaches integrated into governmental planning processes, and supporting community-led NbS initiatives with grants and technical assistance can foster a sense of ownership and can reduce long-term management and monitoring costs. These initiatives not only serve as demonstration models, showcasing the benefits of NbS to inspire and equip other communities to adapt the good practices to their local contexts, but also ensure that the implemented NbS are locally appropriate and more broadly accepted than top-down alternatives. Participatory planning processes, involving workshops, community meetings, and other forums, allow local stakeholders to contribute their knowledge and priorities, enhancing the relevance and success of NbS projects.

Yet further good practice examples, reflections on lessons learned and capacity building resources are needed to optimise these processes and empower local action. The **creation of joint training programmes and toolkits** can build local capacity and promote long-term stewardship of NbS in both the LAC and EU regions. Training programs equip practitioners with the necessary skills and knowledge for successful implementation, while toolkits provide practical guidance and resources to support ongoing initiatives.

In addition, fostering the development of bi-regional **dialogue spaces focused on the importance of intercultural collaboration and the recognition of diverse types of knowledge** in NbS decision-making processes can be highly beneficial. These spaces can facilitate critical discussions on how to effectively involve communities as key actors,

providing them with opportunities to apply for funding and actively participate in joint initiatives.

4.5 Multi-level and bi-regional collaborations and partnerships

Finally, enhancing multi-level and bi-regional collaborations, including city-to-city exchanges, country-to-country initiatives, and continent-to-continent collaborations can significantly boost the implementation and up-scaling of NbS. This can involve, for example, **establishing and promoting partnerships and fostering bilateral initiatives between cities and countries in LAC and the EU** to share experiences, best practices, and innovative NbS solutions. Concretely, city twining can be used to facilitate knowledge exchange and collaborative projects tailored to urban environments, while country-to-country collaborations can include joint policy development, funding mechanisms, and technical cooperation. By learning from each other's successes and challenges, cities and national governments can implement more effective NbS strategies, leverage national resources and expertise, and foster synergies that enhance the impact of respective NbS projects.

Encouraging broader intercontinental collaborations can also serve to leverage the strengths of both LAC and the EU. This can involve large-scale projects, policy harmonisation, and joint advocacy at international forums. By working together at a continental level, LAC and the EU can influence global environmental agendas and drive significant progress in NbS implementation. Concretely, for example, this could involve participation in the Urban Transitions Mission (UTM) to accelerate urban transitions towards sustainability in both regions. The UTM aims to engage decision-makers at every level of government to prioritise climate-neutral and net-zero pathways, facilitated by clean energy and systemic innovation. By aligning efforts under the UTM, LAC and the EU can share knowledge, resources, and strategies to achieve urban sustainability goals.

4.6 Concluding thoughts

As highlighted throughout this document, significant action is already being taken in support of NbS across the LAC and EU regions. However, further potential exists to increase the scale and impact of these initiatives and improve NbS mainstreaming and design towards enhanced effectiveness. Bi-regional collaboration pathways are one means to achieve these aims, capitalising on the knowledge, evidence, skills, resources and experiences of each region to inspire innovation and action in the other.

The urgency to pursue these pathways in support of increased NbS uptake is underscored by the upcoming two-year anniversary of the Kunming-Montreal Global Biodiversity Framework. The United Nations Convention on Biological Diversity Conference of the Parties COP16 represents a valuable opportunity to turn the GBF into concrete NbS action. All Parties are encouraged to update their NBSAPs in alignment with the GBF, ensuring that NbS are fully integrated and supported at all levels of government for effective implementation.

The outlined entry points are thus envisioned as conversation starters to target action within and between each region and to be supported by the continuation of the EU-LAC Policy Dialogue on Nature-based Solutions. This initiative holds significant potential to serve as a framework within which to organise regular dialogues, joint planning sessions, and coordinated implementation efforts and to advocate for the inclusion of NbS in global environmental and development agendas to elevate the importance of NbS, attract further international support and reduce disparities in resource distribution to ensure that the benefits of NbS are equitably shared.

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Cooperation between the EU and CELAC on research and innovation is increasingly focusing on Nature-based Solutions (NbS). The EU-CELAC Summit Declaration and the 2021-2023 Strategic Roadmap emphasise NbS as a key area for long-term collaboration. In 2023, a bi-regional Policy Dialogue and the first bi-regional NbS conference in Brussels brought together policymakers and experts to address shared environmental challenges. This report provides an overview of the NbS landscape in LAC and Europe, highlighting existing collaborations, successful applications, and policies. It underscores the importance of knowledge-sharing, inclusive governance, and sustainable financing in advancing NbS implementation. Key pathways for collaboration include strengthening policy frameworks, fostering innovative financing, and engaging local communities.

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