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European Biodiversity Partnership

Strategic Research & Innovation Agenda (SRIA)

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Biodiversa+

The European Biodiversity Partnership, Biodiversa+, supports excellent biodiversity research with impact for policy and society. Connecting science, policy and practice for transformative change, Biodiversa+ is part of the European Biodiversity Strategy for 2030, which aims to put Europe's biodiversity on a path to recovery by 2030. Co-funded by the European Commission, Biodiversa+ brings together partners from research funding, research programming and environmental policy across European and associated countries to work on five main objectives:

1. Plan and support research and innovation on biodiversity through a shared strategy, annual joint calls for research projects, and capacity building activities.
2. Set up a network of harmonised schemes to improve monitoring of biodiversity and ecosystem services across Europe.
3. Contribute high-end knowledge for deploying Nature-based Solutions and valuing biodiversity in the private sector.
4. Ensure efficient science-based support for policy-making and implementation in Europe.
5. Strengthen the relevance and impact of pan-European research on biodiversity in a global context.

More information at: www.biodiversa.eu

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List of abbreviations

BBNJ: Biodiversity Beyond National Jurisdiction
CBD: Convention on Biological Diversity
EBOCC: EU Biodiversity Observation Coordination Centre
EC: European Commission
EEA: European Environment Agency
ERA: European Research Area
ERC: European Research Council
EU: European Union
FAIR: Findability, accessibility, interoperability and reusability
GBIF: Global Biodiversity Information Facility
GBO: Global Biodiversity Outlook
IAS: Invasive Alien Species
IPBES: Intergovernmental Science-Policy Platform for Biodiversity and Ecosystem Services
IPCC: Intergovernmental Panel on Climate Change
KBA: Key Biodiversity Area
KCBD: European Knowledge Centre on Biodiversity
KER: Key Exploitable Result
KMGBF: Kunming-Montreal Global Biodiversity Framework
MPA: Marine Protected Areas
NATO: North Atlantic Treaty Organisation
NbS: Nature-based Solutions
NCP: Nature's Contributions to People
NRR: Nature Restoration Regulation
OCTs: Overseas Countries and Territories
ODA: Official Development Assistance
OECM: Other Effective Area-Based Conservation Measures
ORs: Outermost Regions
PA: Protected Areas
PES: Payment for Ecosystem Services
REDD: Reduced Emission from Deforestation and environmental Degradation
R&I: Research and Innovation
SEEA: UN System of Environmental Economic Accounting
SDG: Sustainable Development Goals
SRIA: Strategic Research and Innovation Agenda
UN: United Nations
UNEA: United Nations Environment Assembly
UNEP: United Nations Environment Programme
UNFCCC: United Nations Framework Convention on Climate Change

Foreword

Europe and the rest of the world are experiencing unprecedented biodiversity loss, with existing protected areas and other conservation measures falling short of safeguarding species, habitats, genetic diversity, evolutionary processes, and the ecosystem services they support. The escalating biodiversity crisis is not only about nature, but will have serious consequences for ecosystems, climate, health, economy and society. Biodiversity underpins food and water security, public health, climate resilience, and economic stability. Biodiversity loss therefore represents an unprecedented systemic risk. In view of the multiple anthropogenic drivers and pressures that threaten biodiversity and ecosystem services, it is necessary to combine the economic growth paradigm for competitiveness and security with efforts to develop synergies between nature protection and restoration and economic well-being, building on scientific knowledge and responding to societal needs and business impacts and dependencies on biodiversity to address the risks and opportunities associated with nature loss. **Rescuing biodiversity to safeguard life on earth** has now become one of the greatest challenges of our time. This is essential for achieving a more prosperous, just and equitable world. It will ensure that biodiversity continues to provide the basis for human well-being, equity, economic growth and jobs.

Reports from the Intergovernmental Panel on Climate Change (IPCC 2022), and the European Environment Agency (EEA 2025a) as well as the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES 2024a, 2024b), show that biodiversity loss is accelerating at an unprecedented rate. At the same time, these assessments make clear that urgent and transformative change can still halt and reverse these trends. Such transformation requires the active engagement of all parts of society — governments, citizens, and businesses alike — whose decisions and activities both depend on and shape biodiversity and nature's contributions to people.

The current global polycrisis calls for **holistic approaches**, with greater focus on resilience, safeguards and buffers. The challenge for biodiversity research programmers and funders is therefore to promote research supporting solutions at scale, in complement to research raising the alarm. This requires deep changes in the way we perform research on biodiversity issues, with stronger collaborations between natural sciences and social sciences and humanities, reinforced relationships between scientists and research stakeholders, deeper connection with the private sector, and enhanced international collaborations. Civil society participation (e.g. through citizen science) and **co-production of knowledge with stakeholders** should be brought more centrally into the frame. Profound changes in the design, implementation and evaluation of research programmes, and increased cross-sectoral and cross-border research are also vital. Last but not least, **reinforcing the link between research and policy** can help to understand issues at stake, generate and evaluate policy options and monitor results of policy implementation.

Alongside existing approaches, **new, more systemic paths must therefore be explored and promoted, acknowledging interdependencies and reinforcing synergies between biodiversity, human societies and economies**. In order to rise to this challenge, Europe must fully recognise that biodiversity is a natural heritage to be conserved for future generations, as well as a fundamental asset providing the basis for transitioning towards sustainable social and economic systems. In this context, research priorities should include quantifying and understanding the status and trends of biodiversity and ecosystem services, as well as acting as an early warning system. However, it is also crucial to propose and promote solutions to overcome these issues and strengthen action on the ground.

Against this backdrop, the co-funded European Biodiversity Partnership Biodiversa+ coordinates research programmes between the EU and its Member States and Associated Countries and triggers joint actions. Biodiversa+ mobilises environmental authorities and agencies, ministries and funding organisations, aligning and strengthening biodiversity research and monitoring, while promoting innovation and fostering dialogue among researchers, policymakers and other stakeholders. Building on the successful structuring of the European Research Area for biodiversity initiated by BiodivERsA, it has, since 2005, demonstrated the long-term commitment, openness, innovation capacity and flexibility needed to generate lasting impact. In line with the EU Biodiversity Strategy for 2030, Biodiversa+ plays a key role in strengthening the science–policy–practice interface, mobilising knowledge and innovation to inform evidence-based decision-making and the transformative change required to halt and reverse biodiversity loss.



Between 2021 and 2028, Biodiversa+ implements an ambitious programme that contributes to the vision of the EU Biodiversity Strategy that "by 2050, all of the world's ecosystems will be restored, resilient, and adequately protected", and to the objective of putting Europe's biodiversity on a path to recovery by 2030 (European Commission 2020a). The programme also supports the 8th Environment Action Programme and its long-term objective of ensuring that, by 2050, Europeans live well within planetary boundaries, with biodiversity, ecosystem resilience and human well-being mutually reinforcing one another (European Commission 2022). By placing research and innovation at the heart of biodiversity policy implementation, Biodiversa+ advances knowledge of biodiversity dynamics, strengthens biodiversity monitoring capacities across Europe, supports the development and uptake of Nature-based Solutions, and provides scientific evidence to inform policy and practice. Through these activities, the partnership generates both scientific excellence and tangible societal impact.

In particular, Biodiversa+ contributes to the development of a more integrated and harmonised European biodiversity monitoring landscape, providing the basis for assessing biodiversity changes across Europe and beyond. The partnership also generates knowledge, tools, and methodological approaches to better understand and address the direct and indirect drivers of biodiversity loss. These efforts support policymaking and implementation at the European and global levels, contributing to the objectives of the EU Biodiversity Strategy for 2030, the European Green Deal, and EU climate policies, as well as international biodiversity commitments, while actively informing and supporting IPBES assessments and processes. At the same time, Biodiversa+ promotes research and innovation on biodiversity and Nature-based Solutions, supporting the conservation, restoration and sustainable management of biodiversity, and enhancing European leadership in developing, testing and deploying innovative solutions for nature and society.

We sincerely thank all the Biodiversa+ partners, the European Commission and its services, scientists, research organisations and platforms, as well as policymakers and stakeholders who have contributed to the development and update of this Strategic Research and Innovation Agenda (SRIA). The SRIA forms the basis for all activities of Biodiversa+ to build up a reinforced European Research Area on biodiversity, at the appropriate level within the context of Horizon Europe, while addressing the increasingly pressing environmental and societal challenges that we face today.

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1. Introduction





1.1. The Challenge

In addressing the current global challenges to biodiversity and ecosystem services, this Strategic Research and Innovation Agenda (SRIA) draws extensively on the assessments of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), including its assessments on nexus interlinkages (IPBES 2024a), transformative change (IPBES 2024b), and business and biodiversity (IPBES 2026), reflecting their central relevance for the partnership's research and policy priorities.

Biodiversity, i.e., biological diversity at the genetic, species and ecosystem levels (Convention on Biological Diversity [CBD] 2025), and nature's contributions to people (Diaz et al. 2018) constitute our shared natural heritage. This heritage has inherent value and is fundamental to our health, quality of life, livelihoods, food security, climate resilience and economic prosperity. However, assessments by IPBES (ibid.), the first EU ecosystem assessment (Maes et al. 2020), State of the Nature of the EU (European Commission 2020b), and other global syntheses (Blowes et al. 2019), show that biodiversity is declining globally at rates unprecedented in human history, while the pressures driving this decline continue to intensify. Terrestrial and aquatic ecosystems are already heavily transformed: approximately 75% of the land surface is significantly altered, 66% of ocean areas show increasing cumulative human impacts, and over 85% of wetlands have been lost relative to historical baselines (IPBES 2019).

Growing demand for natural resources, driven by production patterns, population growth, unsustainable consumption and rapid urbanisation, is increasing pressure on ecosystems worldwide. These underlying drivers contribute to the five main direct drivers of biodiversity loss: changes in land and sea use (including freshwater ecosystems), direct exploitation of organisms, climate change, pollution, and invasive alien species (IPBES 2019). Together, these pressures are degrading ecosystems and



undermining the benefits that nature provides, with significant consequences for human well-being, health, economic development and social equity, including an increased risk of zoonotic diseases spilling over into human populations.

In view of the negative trends for biodiversity and the benefits that nature provides to people, there are strong efforts on the European and global scale to counteract the loss of biodiversity. The goals set out in the **Kunming-Montreal Global Biodiversity Framework (KMGBF)** under the **CBD** (2020, 2025), as well as the **European Green Deal**, the **European Union (EU) Biodiversity Strategy for 2030** (European Commission 2020a), and the 8th Environment Action Programme (European Commission 2022), include ambitious targets such as protecting at least 30% of terrestrial, freshwater, coastal and marine ecosystems, and restoring 30% of degraded ecosystems by 2030. The **EU Nature Restoration Regulation** (NRR; European Union 2024a) reinforces these ambitions by introducing legally binding targets, such as implementing restoration measures in at least 20% of the EU's land areas and at least 20% of its sea areas by 2030, and all ecosystems in need of restoration by 2050.

The regulation also emphasises the importance of ecological functional and structural connectivity and investment in green and blue infrastructure.

In addition, an Assessment Report by the Intergovernmental Panel on Climate Change (IPCC 2022) predicts that for an average global warming of 1.5 °C, approximately 6% of insects, 8% of plants, and 4% of vertebrates will lose more than half of their climatically suitable geographic range. At 2 °C warming, these proportions rise to about 18% of insects, 16% of plants, and 8 % of vertebrates. The main causes of biodiversity decline are changes in land and sea use (including freshwater), direct exploitation of organisms, climate change, pollution, and invasive alien species. Therefore, despite progress in nature conservation, current trajectories cannot meet global goals for conserving and sustainably using nature (Perino et al. 2021, Xu et al. 2021). The goals for 2030 and beyond can only be achieved through rapid, systemic and transformative changes across the economic, social, political and technological sectors. These changes must go far beyond incremental adjustments and include a clear shift in views, structures and practices (IPBES 2024b). In light of the fact that the Global Biodiversity Outlook 5 (CBD 2020) concluded that none of the twenty Aichi Biodiversity Targets was fully achieved by the 2020 deadline, and only six were partially met, it is clear that global efforts have fallen short of key biodiversity commitments. Current trends continue to be negative: over 47 000 species are now threatened with extinction, with all major taxonomic groups continuing to decline, and the Red List Index has deteriorated by approximately 12% since 1993 (United Nations 2025). If these shortfalls persist, the continued loss of biodiversity will not only threaten SDG 14 (Life Below Water (marine)), SDG 15 (Life on Land), and SDG 6 (Clean Water and Sanitation (freshwater)), but also undermine interconnected goals. In particular, SDGs 1–3 (No Poverty, Zero Hunger, and Good Health), SDG 11 (Sustainable Cities), and SDG 13 (Climate Action), which all depend on a stable and resilient biosphere (see Figure 1).



Figure 1: A good status of biodiversity is the basis for sustainable development and a prerequisite for achieving the SDG (from Rockström and Sukhdev at 2016 EAT Forum; Azote Images for Stockholm Resilience Centre, Stockholm University).



Biodiversity loss is intertwined with climate change and climate-related risks, creating systemic challenges across productive systems, societies and economies. This SRIA therefore explicitly adopts a nexus perspective linking biodiversity, climate change, water, food, health and productive systems, recognising biodiversity as both a victim of climate change and a critical component of climate mitigation, adaptation and resilience. This approach builds on recent global assessments, including the above mentioned IPBES Thematic Assessment Report on the Interlinkages among Biodiversity, Water, Food and Health (IPBES 2024a), and conceptual and operational frameworks addressing the biodiversity–climate–society nexus (e.g. Pascual et al. 2021).

Addressing climate-related risks to biodiversity, and biodiversity-related risks to societies and economies, is essential for informing transformative, science-based policy and governance responses.

Loss of biodiversity is therefore not only an environmental issue, but also a developmental, economic, security, health, social and ethical one. Growing evidence highlights biodiversity loss and ecosystem degradation as systemic risks with implications for economic stability, human well-being and security. Innovative risk-based perspectives, such as those explored in recent national security assessments (e.g. UK Government 2026), underline how ecosystem collapse can amplify climate risks, food insecurity, health threats and geopolitical instability. Moreover, the Global Risks Report 2025 (World Economic Forum 2025) finds that biodiversity loss and ecosystem collapse now rank as the second most severe risk over a 10-year horizon, underscoring their elevated status among long-term threats to global stability and prosperity (ranked just below extreme weather). Furthermore, the North Atlantic Treaty Organisation (NATO) has identified climate breakdown and biodiversity loss as a primary structural driver with profound consequences for the evolving security environment (NATO ACT 2023). Strengthening the evidence base on biodiversity-related risks is therefore a strategic priority of this SRIA.

This strategic agenda articulates the updated long-term vision of Biodiversa+, defining overarching research themes that will guide our activities over the coming years. It covers all environments (freshwater, marine and terrestrial) and habitats, with a specific focus on European added-value. With this SRIA, the partners of Biodiversa+ and the European Commission share a vision of Europe becoming a global leader in conserving, restoring and managing biodiversity, and developing Nature-based Solutions (NbS) that contribute to its economy, supported by solid science-based knowledge.

The SRIA is aligned with key international and European policy frameworks, including the KMGBF

under the CBD, the Agreement on Biodiversity Beyond National Jurisdiction (BBNJ), the EU Biodiversity Strategy for 2030, and the 8th EU Environment Action Programme which sets out the long-term and priority objectives detailed in the EU Biodiversity Strategy for 2030. It also supports the objectives of the EU Climate Law and its intermediary climate targets, recognising the interdependence between biodiversity protection, nature restoration and climate neutrality.

The current update of the SRIA has been fed by a range of mapping and foresight activities conducted by Biodiversa+ and associated COFUND actions. The work also benefited from advice obtained from the Biodiversa+ Advisory Board (composed of scientific experts and key stakeholders from different sectors), and consultation with the Biodiversa+ partners and the European Commission.

The SRIA identifies three Topical Themes and associated knowledge needs, and two Cross-cutting Themes relevant to all the Topical Themes (Figure 2). As the primary mechanism for implementing the SRIA, Biodiversa+ has launched four multi-annual Flagship Programmes (Annex I). They comprise thematic initiatives that integrate Research and Innovation (R&I) calls, capacity building, stakeholder engagement, and policy support through cross-cutting activities. Details of the activities are specified in consecutive Annual Work Plans.

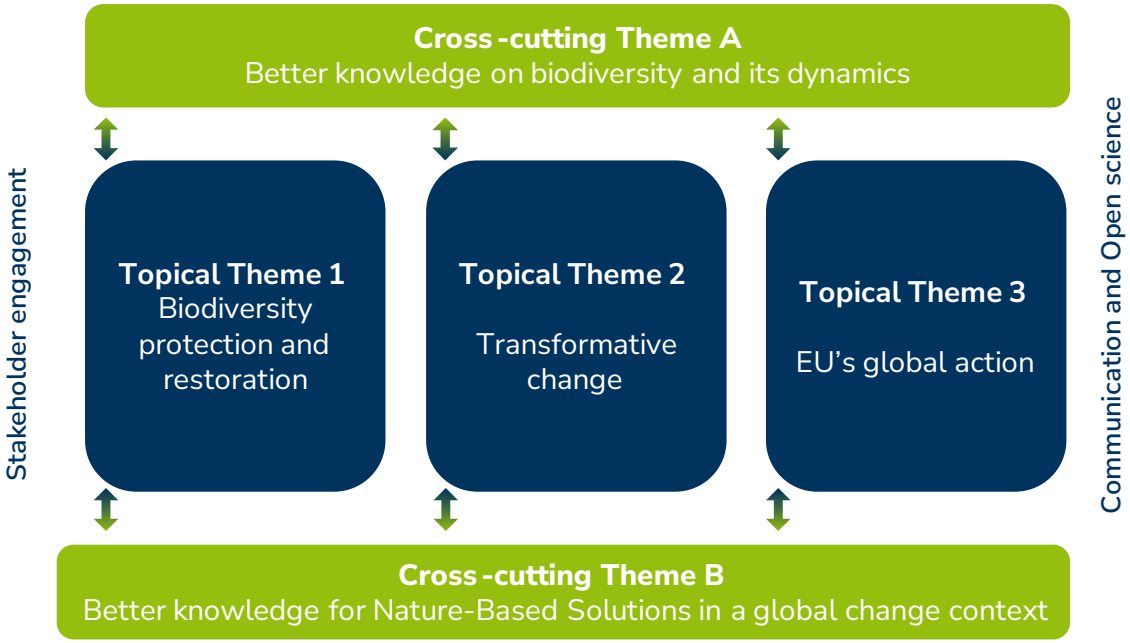
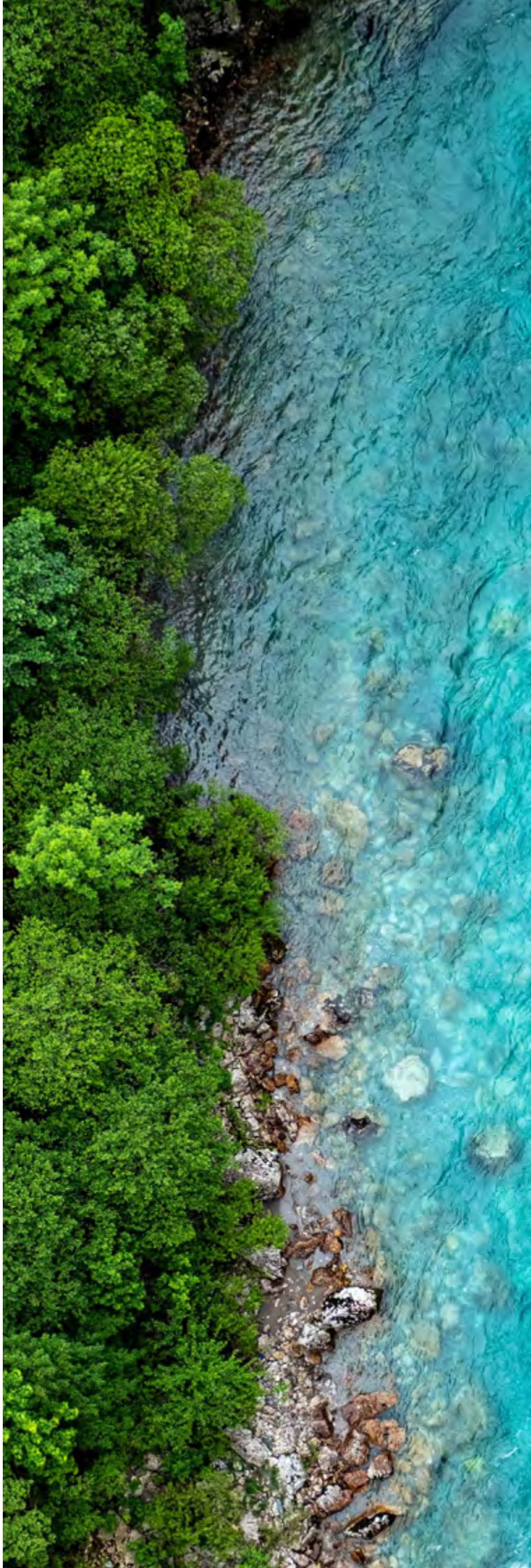


Figure 2. The SRIA identifies three Topical Themes and associated knowledge needs, and two Cross-cutting Themes.

In addition, Biodiversa+ recognises the need to deal with trans-sectoral issues by liaising with well-established entities, other European initiatives (in particular other Partnerships and initiatives under Horizon Europe), key international initiatives, and a broad range of stakeholders – including private sector, managers of natural resources and of protected areas, civil society organisations, and citizens. Biodiversa+ also engages with several Horizon Europe missions, including those related to Soil, Climate, as well as Ocean and waters. By effectively implementing a clear and ambitious SRIA, Biodiversa+ plays a key role in advancing the protection, restoration, sustainable use and valuing of biodiversity for present and future generations. The partnership, co-developed with the European Commission, was a key action under the EU Biodiversity Strategy for 2030 and continues to play a key role in harmonising and implementing R&I agendas and co-funded activities on biodiversity.

1.2. Biodiversity status and trends, and their implications for people in Europe

The IPBES Regional Assessment for Europe and Central Asia (IPBES 2018) showed that, like the rest of the world, Europe is experiencing a significant decline in biodiversity, which is having a major impact on the ecosystem services it provides. For example, at least EUR 5-15 billion of the EU's yearly agricultural output is directly attributable to insect pollinators (EEA 2025b). The EU has an extensive legal and policy framework that aims to protect, restore and sustainably manage its natural habitats, species and ecosystems[1], as well as integrate biodiversity across EU policies and instruments[2]. However, the European Environment Agency highlights that the overall state of Europe's terrestrial, freshwater and marine biodiversity is poor and has been deteriorating over recent decades (EEA 2025a). The outlook for biodiversity is negative. Efforts to protect and restore nature require time, while persistent pressures such as over-exploitation, intense land, freshwater and sea use, and pollution remain. This threatens the delivery of ecosystem services, like those linked to the Natura 2000 network, which, by themselves, have been estimated to be worth approximately EUR 200-300 billion per year (Brink et al. 2011). As Parties to the CBD, the EU and its Member States have adopted strategies and action plans aimed at halting and reversing the loss of biodiversity. This includes the European Green Deal and the EU Biodiversity Strategy to 2030, with the recent adoption of the EU NRR.



1. In particular the EU Birds Directive (2009/147/EC), the EU Habitats Directive (92/43/EEC), the EU Water Framework Directive (2000/60/ EC), the EU Marine Strategy Framework Directive (2008/56/EC) and the EU Invasive Alien Species Regulation (Regulation (EU) No 1143/2014)

2. In particular the EU policies in the areas of research and innovation, agriculture, fisheries, climate, energy, transport, regional development, development cooperation and trade

1.3. Impact of the EU on biodiversity beyond its borders

The impact of the EU's agricultural, fisheries, forestry, energy, infrastructure, development and trade policies, and associated investments, on biodiversity outside Europe is often overlooked. Moreover, the environmental and socioeconomic interactions between different regions of the world are dramatically increasing. **Telecoupling, i.e. the environmental and socio-economic interconnections between distant regions of the world, brings about new challenges and opportunities to biodiversity conservation that are of a larger magnitude and faster pace than ever observed before**. Rising demands for biological resources including products from forestry, agriculture, aquaculture and wildlife by high-income and emerging economies – including Europe – and the increasing pressure on area use and ecosystems, pose further challenges. Our understanding of the dynamics and leverage points of this telecoupled world is, however, limited. Better knowledge and evidence-based support to policy could move the EU, individual governments and multinational companies and financial institutions operating across global value chains to adopt more sustainable practices.

These impacts are largely driven by changes in land, freshwater and sea use, deforestation, and climate change. Through telecoupling processes, activities in one region (e.g. the EU) can generate environmental and social consequences in other regions (e.g. Africa or Latin America), including cascade, time-lag, and spillover effects (e.g. Liu et al. 2013). The EU's Corporate Sustainability Due Diligence Directive (European Union 2024b) is an important, albeit limited, step towards addressing these externalised environmental impacts, as it requires companies to uphold environmental standards throughout their supply chains. Nevertheless, considerable challenges remain in monitoring and managing the complex global interconnections underlying these effects.

To address these challenges effectively, biodiversity conservation and research require a transboundary, telecoupled systems approach (Carrasco et al. 2017), integrating trade flows, financial investments and various actors across spatial and institutional scales. For example, the increasing prevalence of invasive alien species is an unintended, yet increasingly important consequence of the trade flows (IPBES 2023). Other EU-driven environmental pressures include extractive activities linked to the energy and digital transitions, which exert multiple and cumulative impacts on terrestrial and aquatic biodiversity, as well as plastic pollution, which poses systemic risks to aquatic ecosystems (Barbarossa et al. 2026; Xu et al. 2024). Against this background, future conservation research must better integrate global interlinkages across trade, finance, and environmental governance in order to design sustainable solutions. European biodiversity research and innovation is well positioned to contribute significantly to the implementation of major international biodiversity agreements by supporting targeted research funding, fostering collaborative partnerships, strengthening capacity building, and promoting knowledge exchange with third countries. Such key international agreements include the KMGBF and the Agreement on BBNJ (United Nations [UN] 2023), which represent a landmark step for the conservation and sustainable use of marine biodiversity beyond national waters.

1.4 Biodiversity: a fundamental asset for Nature-based Solutions to societal challenges

Biodiversity is a common good, and a natural heritage that must be conserved as a moral duty for the benefit of current and future generations. It is also a fundamental asset for Nature-based Solutions (NbS) that address numerous societal challenges, such as climate and water regulation, food quality and security, energy supply, human health and well-being, peace and equity (UN Environment Programme [UNEP] 2021).

The IPBES Nexus Assessment (IPBES 2024a) highlights the need to address biodiversity, health, food production, water and climate in an integrated manner, recognising their deep interconnections. A holistic nexus-based approach enables the maximisation of synergies while explicitly identifying and managing trade-offs across sectors and policy domains. This approach is firmly supported by EU policy frameworks. In particular, the EU Biodiversity Strategy for 2030, the EU Strategy on Adaptation to Climate Change (European Union 2021a) and the European Water Resilience Strategy (European Commission 2025a) emphasise the large-scale deployment of NbS to strengthen climate resilience, secure water resources and reduce disaster risks. The EU NRR also provides an opportunity to support water quantity management and enhance resilience against both droughts and floods with NbS. These strategies underline the importance of restoring the natural sponge function of soils, wetlands, forests and floodplains to enhance water quality and availability, mitigate floods and droughts, and protect biodiversity, including through the promotion of "sponge cities" in urban areas.

Nature-based Solutions are cost-effective, nature-inspired solutions that provide environmental, social and economic benefits, as well as help build resilience. They enhance biodiversity by incorporating diverse natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions (UN Environment Assembly [UNEA] 2022). Critically, NbS must therefore benefit biodiversity and support the delivery of a range of ecosystem services.

As part of the portfolio of possible actions, adequate investment in NbS can help to mitigate and adapt to climate change, reduce disaster risk, improve health, halt land degradation, reinforce the sustainability of businesses and sectors such as agriculture, forestry, fisheries and infrastructures, and improve human well-being and quality of life, including in cities, while simultaneously contributing to the conservation and sustainable use of biodiversity (IPBES 2018, 2019). Therefore, investing in NbS is a crucial and smart strategy, which is necessary to reach the goals of the UN SDGs, the Paris Agreement, the Sendai Framework for Disaster Risk Reduction, and biodiversity strategies at all levels.

NbS provide business and job opportunities, while promoting protection, restoration and sustainable management of ecosystems. By recognising biodiversity as a source of a sustainable economy and sustainable development, NbS can transform environmental and societal challenges into opportunities for innovation and support the simultaneous achievement of environmental, societal and economic policy objectives. However, this cannot be taken for granted, so more research is needed to investigate the relationship between biodiversity and NbS and to explore methods for assessing, developing and deploying NbS on a large scale. There is also a need for a greater understanding of how to effectively assess their potential benefits and drawbacks.



1.5 The business case for biodiversity

Biodiversity is widely undervalued, often considered unimportant, or even disruptive when it comes to economy, trade policy and development decision-making. According to IPBES, current economic and financial systems allocate substantially more resources to economic activities that drive biodiversity loss than to activities that support biodiversity conservation and restoration, reinforcing unsustainable development pathways (IPBES 2024b). Consequently, investment decisions frequently do not consider their potential impact on, or dependencies on, biodiversity, or recognise its potential contribution to achieving desired outcomes.

All societies and economies depend fundamentally on ecosystems and the natural resources and services they provide, and large-scale ecosystem degradation therefore poses systemic risks to economic stability and prosperity (IPBES 2019, Dasgupta 2021). Addressing this challenge requires a shift away from narrow paradigms of economic growth towards a broader concept of a sustainable green economy. The green economy is also recognised as a key driver of future employment, with European Commission initiatives highlighting the importance of investing in green skills and identifying the green transition as one of the economic areas with the strongest job-creation potential (European Commission 2020a).

Beyond risk mitigation, the transition towards nature-positive development offers substantial economic opportunities. Global analyses indicate that a nature-positive transition could generate significant annual business revenues and cost savings by 2030. For example, the World Economic Forum (2026) estimates that investable opportunities linked to a new nature economy could amount to USD 10.1 trillion per year by 2030. This underscores the importance of strategic R&I investments to enable, scale and govern a nature-positive transition that delivers benefits for biodiversity, climate resilience and sustainable economic development.

The IPBES Business and Biodiversity Assessment (IPBES 2026) finds that businesses across sectors both depend on and affect biodiversity and nature's contributions to people, yet prevailing business models still insufficiently account for nature-related dependencies and risks. These risks can include supply chain disruption, regulatory and liability exposure, reputational harm, and productivity impacts, underscoring the need to integrate biodiversity systematically into corporate strategy, enterprise risk management, and investment decision-making processes.

At the same time, the role of biodiversity and natural capital in shaping economic development and long-term prosperity remains under-recognised. The Dasgupta Review on the Economics of Biodiversity (Dasgupta 2021) argues that economic systems often treat nature as an externality, resulting in distorted incentives, misallocated capital, and rising systemic risks. To address this, it is necessary to incorporate natural capital into public and private accounting, reporting, and decision-making, ensuring that nature's value, dependencies, and limits are properly reflected. In this context, the European Commission's Roadmap towards Nature Credits (European Union 2025a) is a key strategic complement, outlining steps to develop high-integrity nature credit approaches that can help mobilise additional private finance for nature-positive outcomes, alongside public funding.

However, the potential for biodiversity to affect, and be affected by, economic development and processes is still largely overlooked (Dasgupta 2021). It is therefore crucial to include natural capital in public and private accounting and reporting systems. In recent years, the importance of biodiversity has been increasingly recognised in the KMGBF and EU policies, highlighting the crucial role that biodiversity plays in the business and financial sectors. Nevertheless, integrating the business environment into the conservation and restoration of biodiversity remains challenging.

The business case should highlight the importance and value of biodiversity and ecosystem services for the private sector, supported by compelling scientific evidence. Widespread acceptance of science-based methodologies for integrating ecosystem services into decision-making processes, valuing biodiversity and characterising the biodiversity footprint of human activities (including guiding businesses on natural capital assessment) will be essential.

Meanwhile, establishing a clear and robust trans-European value chain on biodiversity valorisation could foster recognition of the added value of biodiversity, as well as producing innovation, competitiveness and employment. Furthermore, recent EU policies targeting the private sector, such as the Corporate Sustainability Reporting Directive, the Corporate Sustainability Due Diligence Directive, and the EU Sustainable Finance framework including the EU Taxonomy (European Union 2022, 2024b), emphasise the need to strengthen the capabilities of the business and financial sectors and to disseminate biodiversity-related R&I.

1.6 The need for transformative change

Recent global assessments, including the IPBES Transformative Change Assessment (IPBES 2024b), highlighted that addressing biodiversity loss requires systemic and cross-sectoral transformations that go beyond action on direct drivers alone (Diaz et al. 2019). The IPBES Global Assessment demonstrated that measures targeting the direct drivers of nature's decline are insufficient to halt ongoing biodiversity degradation. Therefore, reversing biodiversity loss requires urgent transformative change that tackles the root causes, including climate change, urbanisation, food and fibre production, and health. These root causes are embedded in interconnected indirect drivers, such as economic, socio-cultural, demographic, political, institutional and technological factors, that shape and reinforce the direct pressures on biodiversity (Figure 3, from IPBES 2024b).

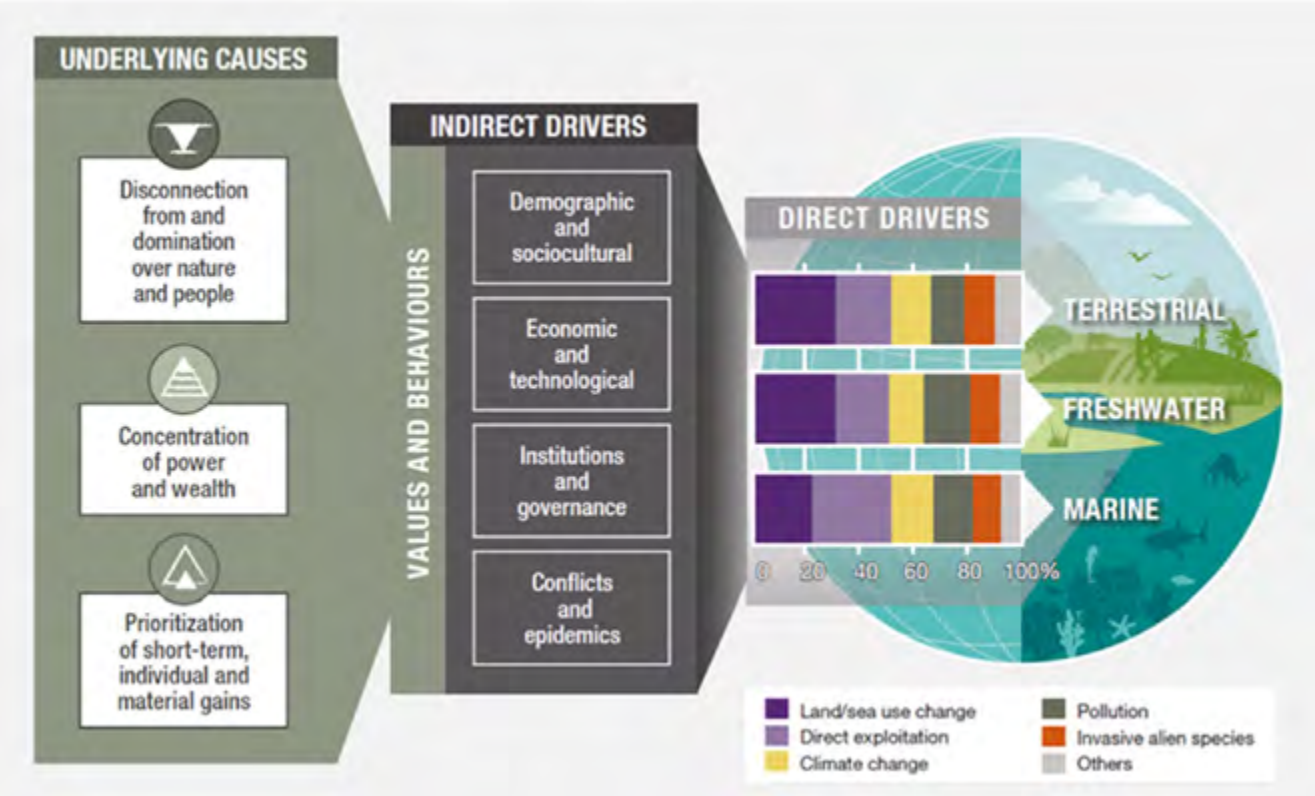


Figure 3. Underlying causes, indirect drivers and direct drivers of biodiversity loss and nature's declines (Figure SPM 1 - IPBES 2024b).

This transformation requires a cross-sectoral approach to ensure policy coherence and effectiveness. It also requires innovative governance approaches that are adaptive (incorporating learning, monitoring and feedback), inclusive (rights-based, reflecting a plurality of views to ensure equity), informed by existing and new evidence, and integrative across systems, jurisdictions and tools. R&I in the field of biodiversity must recognise that ecological, social and technological changes are intertwined and co-evolve, focusing on this alignment and breaking down silos. Priority should also be given to issues such as civil society participation (e.g. citizen science) and the co-production of knowledge with stakeholders. Furthermore, effective communication on biodiversity issues should be promoted to raise awareness of the multiple benefits of biodiversity.



1.7 Heightened political attention amid competing priorities and declining public investment

There is increased political attention regarding the biodiversity crisis, as well as growing competition between policy priorities. Based on the mounting scientific evidence, observations and modelling, the scale and urgency of the biodiversity crisis is becoming increasingly recognised, reaching a level of awareness comparable to that achieved for climate change. The State of the Environment Report for Europe (EEA 2025a) indicated that Europe will not achieve the goals set out in the EU Biodiversity Strategy for 2030 without urgent action over the next ten years to address the alarming rate of biodiversity loss, the increasing impact of climate change, and the overconsumption of natural resources. Since 2022, geopolitical instability, inflationary pressures, and the economic consequences of war have resulted in increasingly restrictive public budgets. In many countries, rising defence spending and economic stimulus measures have offset declining or stagnating investments in research, innovation, climate action, and biodiversity conservation.

At the same time, international development assistance and contributions to multilateral environmental funds have been reduced in several countries, further weakening collective capacity to address global biodiversity loss. These trends underline the urgency of demonstrating the strategic relevance of biodiversity to economic resilience, security, and long-term societal stability.

Biodiversity loss and ecosystem degradation are also having an increasingly significant impact on geopolitics and security. There is emerging evidence that ecosystem collapse can exacerbate food insecurity, economic instability, forced displacement, and the risk of conflicts, thereby affecting national and international security. Consequently, integrating biodiversity considerations into risk assessments and strategic foresight is increasingly recognised as a priority for resilient governance (e.g. NATO ACT 2023, UK Government 2026).

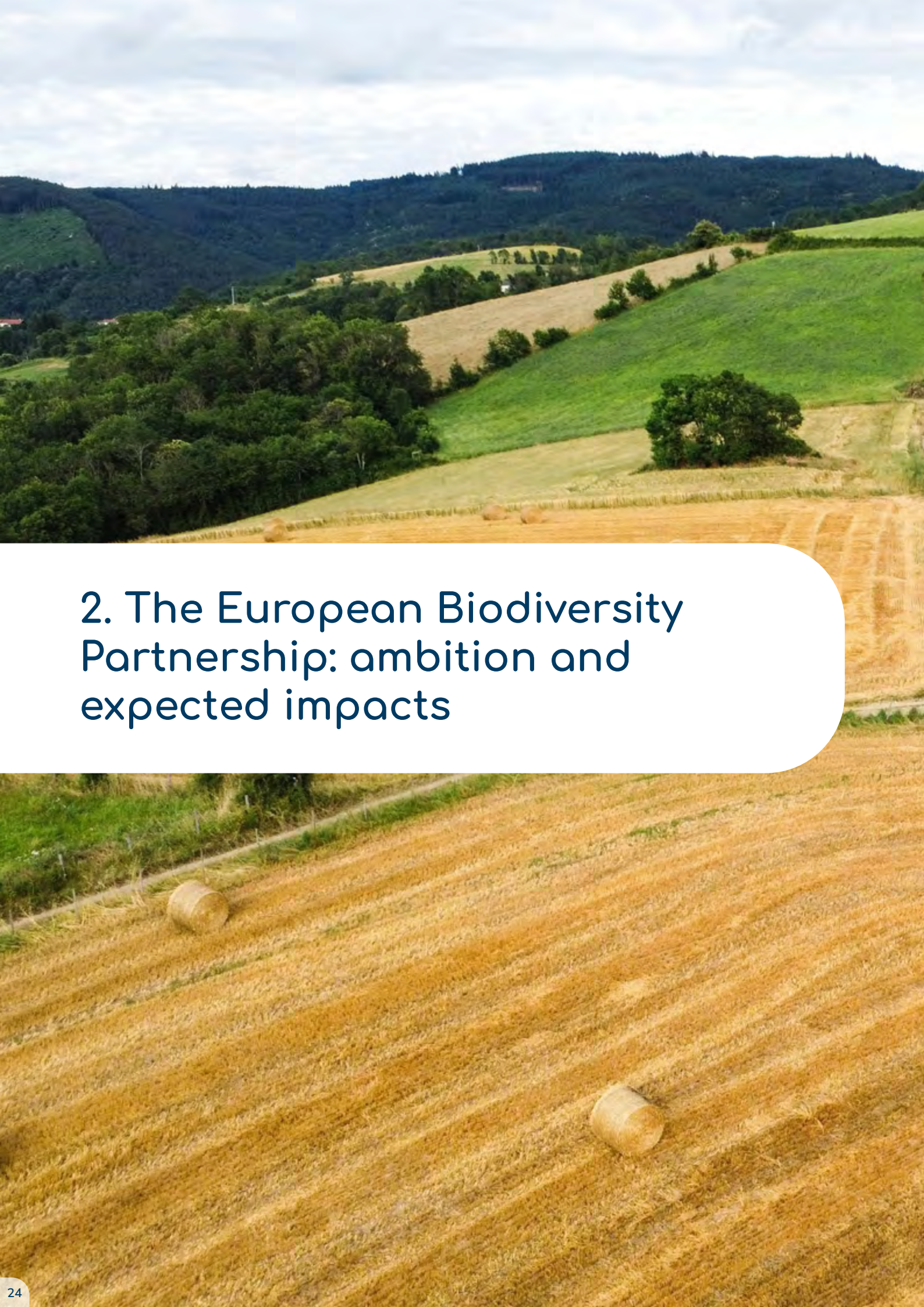
1.8 New needs in terms of biodiversity research

Facing the current biodiversity crisis and its multiple drivers, it is vital to reinforce the science-based knowledge on biodiversity status, dynamics and trends; on the multiple and interacting causes and consequences of biodiversity loss and degradation of ecosystem services; and on levers of action. Moreover, safeguarding biodiversity for future generations requires maintaining ecological conditions and evolutionary processes, such as genetic diversity, population connectivity and ecosystem integrity, that enable species to adapt and ecosystems to function under change. An effective science-policy-practice interface is essential to translate knowledge into cost-effective measures and management options for maintaining and restoring our natural capital while respecting planetary boundaries.

At the same time, future biodiversity research must move beyond incremental advances and build on existing knowledge to address emerging systemic challenges. Priority areas include (i) strengthening the economic evidence base by quantifying linkages between natural capital, productivity, resilience and competitiveness; (ii) advancing next-generation biodiversity intelligence through operational, decision-grade metrics, AI-enabled monitoring and integrated data systems; (iii) accelerating sector-specific transformation pathways through targeted innovation in high-dependency sectors (food, pharmaceutical, manufacturing, energy, etc.); and (iv) enhancing systemic risk and resilience analysis by integrating biodiversity into macroeconomic modelling, stress testing and strategic foresight, including ecosystem tipping points and cascading risks.

In this context, the growing role of artificial intelligence (AI) offers new opportunities to accelerate biodiversity data harmonisation and standardisation, including through automated data integration, pattern recognition and quality control. AI-enabled approaches are particularly relevant for strengthening and preserving taxonomic biodiversity knowledge, where expertise is increasingly scarce and at risk of being lost across generations (e.g. Pollock et al. 2025).

Research is also needed to develop and assess tools and approaches for conservation, restoration and sustainable management, including Nature-based Solutions, to support biodiversity-friendly standards across sectors, and to underpin the ability to measure, communicate and deliver progress towards policy targets. Addressing the interdependent biodiversity-climate crisis requires integrated, cross-disciplinary research across life sciences, earth sciences, social sciences and humanities, together with stakeholder engagement. To achieve this, it is imperative to support excellent research, invest in capacity building and training, and ensure that results are usable for policymakers and practitioners.



2. The European Biodiversity Partnership: ambition and expected impacts



2.1 Previous framework interventions and results

Biodiversity-related Research & Innovation, including basic and applied research, training, infrastructures and demonstrators, have been addressed over successive EU research framework programmes. But the percentage of biodiversity research funding by the European Commission compared to its total expenditures to research has historically fluctuated through the different funding cycles. After a decline in biodiversity funding in the aftermath of the 2008 financial crisis (Goudeseune et al. 2018), a considerable funding effort was made in Horizon 2020, notably in the areas of Nature-based Solutions (Naumann et al. 2020) and ecosystem restoration[3], but also through bottom-up programmes, such as the European Research Council (ERC)[4] to increase that percentage to an estimated 4% of the whole programme.

Under Horizon Europe (2021–2027), this effort has been substantially stepped up, raising the ambition as well as altering budgeting instruments and programmes (e.g. the European Biodiversity Partnership[5]) to deliver on those targets. Where Horizon 2020 saw biodiversity funding in the low single-digit percentages, the EU-wide budgeting for Horizon Europe already aimed to allocate at least **7.5%** of the EU annual budget to biodiversity objectives in **2024**, and to increase this to **10% in 2026 and 2027** (European Commission n.d.). The European Commission's Horizon Europe *Strategic Plan* 2025-2027 explicitly commits to dedicating 10% of Horizon Europe's total budget for 2025-2027 to biodiversity-related topics (European Commission 2024). In the *Cluster 6 Work Programme 2025* ("Food, Bioeconomy, Natural Resources, Agriculture & Environment") the destination "Biodiversity and ecosystem services" is declared to count **100%** toward the biodiversity expenditure target under Horizon Europe (KRPAN Project 2024).

3. EUR 80 million in the 2020 Green Deal call, area 7, topic 1 "Restoring biodiversity and ecosystem services" (https://europa.eu/!MV66fr). Projects awarded in 2021.

4. EU investments in biodiversity-related research during Horizon 2020 are up to EUR 2.6 billion (approximately 4% of the whole programme), as estimated using the OECD Rio markers methodology. This includes basic and applied research, training, infrastructures, ecosystem-based approaches and nature-based solutions.

5. https://doi.org/10.3030/101052342



2.2 Building on previous partnerships and results

Biodiversa+ builds on the efficient structuring of the European Research Area in the domain achieved by BiodivERsA which, from 2005 onwards, has demonstrated the openness, long-term financial commitment and flexibility needed to have the required impact. The network has continuously expanded, from 13 Member States and Associated Countries in 2005 to 81 Ministries, agencies and foundations from 40 countries in Europe and beyond in 2025. Biodiversa+ has supported excellent researchers to deliver academic outputs and research relevant for policy/society and impacts (Lemaitre & Le Roux 2015). In addition, Biodiversa+ has developed an approach allowing concrete and successful participation for many EU-13 Member States and Associated Countries. Biodiversa+ also promotes coherent science-policy/science-society interfacing at all stages of the research process. This approach allows engagement with stakeholders from policy, society and business in the strategic programming, implementation and dissemination of research. Over the years, this has led to close and mutually beneficial collaborations with stakeholders both at the programme level and at individual projects' levels. These collaborations have resulted in impacts for society and decision-making, often based on findings from co-developed research projects. It has also led to fruitful collaborations with private economic actors whose activities depend on natural resources, e.g. farmers, foresters and fishers. Successful collaborations with other private sector actors, especially large businesses, were seen less often and would require additional efforts to further stimulate such collaborations (see Lemaitre & Le Roux 2021 for examples).

Even though Biodiversa+ is only past its midterm and the first funded projects are just starting to end, the Partnership has already had a range of impacts, which include:

- build-up of an ERA, a strong unified, "single borderless market" for research, innovation, and technology on biodiversity across the EU. The number of partners has grown from 39 partners from 25 countries in 2021 to now 81 partners from 40 countries in 2025. In transnational monitoring, a new activity for Biodiversa+, the number of active partners has doubled since the partnership began, growing from 26 partners from 21 countries in 2021 to 56 partners from 36 countries by December 2025;
- key contributions to the development of the R&I agenda on NbS, such as framing the concept in the NbS R&I Roadmap to 2030 (El Harrak & Lemaitre 2023; produced for NetworkNature by Biodiversa+), identifying and harmonising knowledge gaps in the NbS knowledge gaps database (produced for NetworkNature by Biodiversa+), raising awareness of the database through national and international channels, promoting the uptake of NbS project outputs in various repositories, and supporting research by funding 34 projects in the BiodivNBS call;
- supporting the implementation of the KMGBF. Through its various activities, Biodiversa+ supports the implementation of the four KMGBF goals, its numerous targets and indicators, and the Framework's supporting decisions (e.g. the Monitoring Framework) (Sodtke et al. 2025). The Biodiversa+ Global Biodiversity Framework Action Plan (Quinquis et al. 2025) sets out over 25 commitments to support the implementation of the KMGBF, which are categorised into three areas: (1) mainstreaming and capacity-building; (2) knowledge development and exchange; and (3) monitoring and reporting. Biodiversa+ contributions are also reported through the CBD Online Reporting Tool (CBD 2026);
- development of the Biodiversa+ SRIA (Biodiversa+ 2021) with inputs from a broad range of stakeholders and aligned with all key international and European policy frameworks;
- direct support to 138 pan-European R&I projects and 2 576 researchers, with a total investment of EUR 178.9 million across the first four calls: BiodivProtect in 2021 (Biodiversa+ 2023), BiodivMon in 2022 (Biodiversa+ 2024), BiodivNBS in 2023 (Biodiversa+ 2025) and



BiodivTransform in 2024 (Biodiversa+ 2026). This is already similar to the total number of projects by the BiodivERsA consortium in the 13 years previous to Biodiversa+, from 2008 until 2021. While the impact of the research in the projects cannot properly be measured before the first projects have ended, the funded projects have clearly started to communicate their findings, with 246 research publications and over 1300 scientific dissemination activities, presentations and events already reported at the midterm stage of only the first two calls.

- strong contribution to transnational biodiversity monitoring by developing an instrument for monitoring pilot schemes, resulting in nine transnational pilots on various monitoring priorities, funding of 33 projects on 'Improved transnational monitoring of biodiversity and ecosystem change for science and society' in the 2022 BiodivMon call (Biodiversa+ 2024). This is further reinforced by developing BioDash, a digital dashboard built to map biodiversity monitoring programmes across Europe to improve coordination and decision-making. In addition, capacity building activities, harmonisation of methods and building a biodiversity monitoring community of practice is taking place (e.g. production of guides and webinars, and organization of biodiversity monitoring meetings, including the large BioMonWeek meeting which is planned to be a recurring biannual event). These activities involve biodiversity data suppliers and users from an increasing number of countries, with the aim of covering the entire EU and connecting beyond;
- capacity building of researchers for science/society/policy interfacing by updating the Stakeholder Engagement Handbook, the Guide on Policy Relevance and the Citizen Science toolkit, co-organizing summer schools related to science-policy together with Alternet, and offering support to Biodiversa+ funded researchers for stakeholder engagement;
- dissemination and exploitation of research results has been a priority from the start, but will sharply increase in the coming years as more results become available. The newly developed BioAccess database will make results available from not only the six Biodiversa+ calls, but also projects from previous BiodivERsA calls dating back to 2008. The same continuity can be seen in the products designed to support policy-makers (policy briefs, fact sheets, contribution to IPBES assessments), private actors (innovation workshops), and a broad range of stakeholders (through the OPPLA platform). For example, the cumulative number of joint activities feeding into global policy processes, such as IPBES or CBD, has increased from 6 activities in 2023 to 11 in 2025, demonstrating the partnership's contribution to international policy-making. Additionally,



many publications building upon Biodiversa+ funded projects' research outcomes and exploring their relevance to the implementation and monitoring of the KMGBF have been published (e.g. on genetic diversity [Hoban et al. 2025], Key Biodiversity Areas [Spiliopoulou et al. 2026], and the 30x30 target [Jung et al. 2024]). Biodiversa+ participates in the review process of IPBES assessments – by providing factsheets developed on the results of BiodivHealth-funded projects. Findings from 'METRODIVER' project on Marine Protected Areas (MPAs), and from 'DiMoC' and 'Dr Forest' projects on biodiversity-human health linkages were cited in the IPBES Nexus Assessment (IPBES 2024a). Biodiversa+ has produced 9 policy briefs (on top of the ones previously developed by BiodivERsA), based on previous calls, such as BiodivHealth (2018-2019), BiodivClim (2019-2020) and BiodivRestore (2020-2021), illustrating the importance of having the capacity to convert project outputs into concrete, actionable solutions after projects have ended. Many more products are expected as the current Biodiversa+ projects will be completed between 2026 and 2031, including summaries of the outputs of the projects funded under each R&I call.

In addition, the Partnership will continue to build on the efficient networking and collaboration achieved during past years with partners like the European Knowledge Centre on Biodiversity (KCBD), NetworkNature, Global Biodiversity Information Facility (GBIF), EEA, Alternet, BioAgora, CO-OP4CBD, RESPIN, ECA Network and many others. The results of the close collaboration with the recently concluded EuropaBON (the European Biodiversity Observation Network) action continue to support the development of new methods and indicators for biodiversity and ecosystem services monitoring and wider uptake of the results. Close collaboration on this topic continues with the European Parliament's preparatory action for the EU Biodiversity Observation Coordination Centre (EBOCC), originally proposed by EuropaBON (2025).

Biodiversa+ thus continues to build on previous successful joint programming and new cooperation, further widening the scope of members and reinforcing the link with policy makers and stakeholders, including collaboration with the private sector and citizens. During the remaining years until 2028, the partnership will further increase synergies with other European partnerships and existing initiatives, tools and mechanisms, in order to move Europe towards sustainable development pathways, building on and contributing to healthy and biologically diverse ecosystems.



2.3 Ambition and Expected impacts

The members of the Partnership are committed to the **Global 2050 Vision** of 'Living in harmony with nature' adopted under the Convention on Biological Diversity, and the **corresponding EU vision** that, by 2050, biodiversity and its benefits to people will be protected, valued and restored (European Commission 2020a). **Long-term Goals** (General objectives) that add up to this 2050 Vision include (Figure 4):

- No net ecosystem loss by 2030, decreased species extinction risk, increased species and genetic diversity, and strengthened ecosystem restoration and recovery in support of EU Biodiversity Strategy for 2030;
- Deployment of Nature-based Solutions at adequate scale to contribute to people's needs across Europe;
- Good biodiversity status is fully acknowledged as the basis for sustainable development and a green economy, and the EU leadership will be recognised in this context.

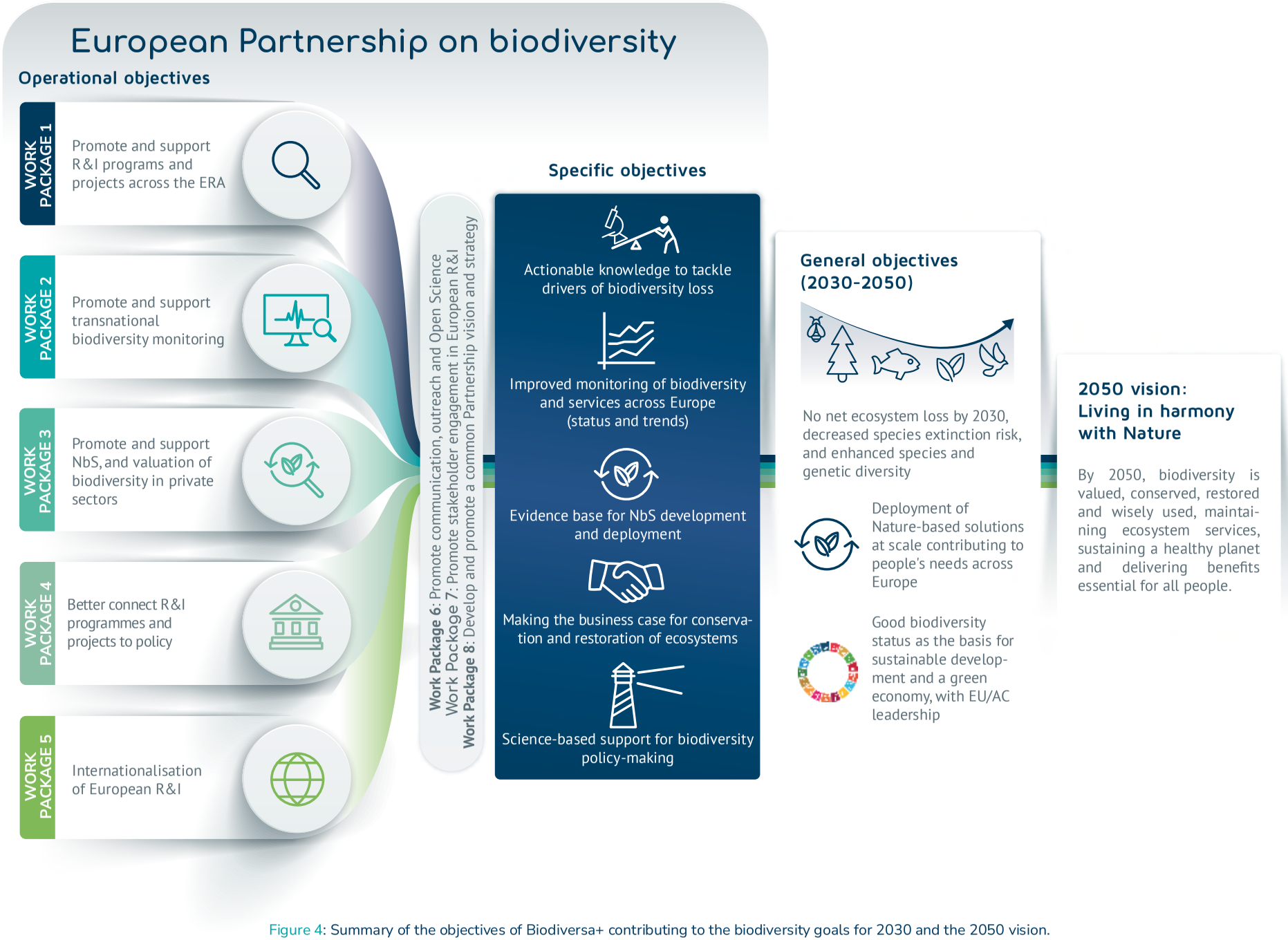


Figure 4: Summary of the objectives of Biodiversa+ contributing to the biodiversity goals for 2030 and the 2050 vision.

To achieve the general objectives, Biodiversa+ will support the contribution of R&I to the EU Biodiversity strategy to 2030, which aims to put Europe's biodiversity on a path to recovery by 2030 for the benefit of climate and people. The Partnership will do this by focusing on five **Specific Objectives** (**SO**; Figure 4) to be delivered by 2030 along which impact will be generated:

1. **Produce actionable knowledge** to tackle the direct and indirect drivers of biodiversity loss and ecosystem degradation, i.e., knowledge on biodiversity status and dynamics, on drivers, pressures, impacts and responses, on trade-offs and synergies between multiple drivers of biodiversity change, and on teleconnections between world regions, along with assessment of novel tools and approaches to biodiversity/ecosystem conservation and restoration.

2. **Improved monitoring of biodiversity and ecosystem services** across Europe (status and trends). The aim is to establish a transnational network of harmonised biodiversity monitoring schemes, building on the work of existing national/regional monitoring schemes and various initiatives (such as EuropaBON, SELINA, the Monitoring and Assessment subgroup of the European Biodiversity Platform), addressing major priorities, tightly linked to the R&I ecosystem while informing efficiently the policy arena. Close collaborations are foreseen with, amongst others, GBIF, JRC/EC Knowledge Center for Biodiversity, and the European Environment Agency (See also Annex II which provides an overview of the Partnership's potential engagement landscape). In addition, the monitoring objective will support the development and use of approaches to assess ecosystem restoration progress, recovery trajectories and the effectiveness of restoration actions, thereby contributing to the monitoring needs emerging from the Nature Restoration Regulation and related policy frameworks.

3. **Expand and improve the evidence base, accelerate development and wide deployment of Nature-based Solutions (NbS)**, and assess the efficiency and cost-effectiveness of NbS against conventional solutions to meet societal challenges across Europe in a sustainable and resilient way, while enhancing biodiversity and supporting ecosystem restoration, climate resilience and adaptation objectives. The Partnership will, as a core activity, promote the deployment and uptake of type 1 NbS which are largely based on conservation and restoration, as well as the deployment and uptake of NbS from type 2 and type 3 based on higher levels of intervention on ecosystems (Eggermont et al. 2015) [6]. In this endeavour, Biodiversa+ engages with other European partnerships (see Chapter 6) and collaborates with NetworkNature, which clusters and connects more than 100 EU-funded R&I projects on NbS.

4. **Making the business case for biodiversity**, by contributing science-based methodologies and standards to account for and value ecosystem services and the natural capital, and to assess the dependency and impact of businesses on biodiversity. Contributing to platforms for dialogue and demonstrating how adequately valuing and mainstreaming biodiversity and ecosystem services into practices can make a difference in the way these sectors contribute to protect and restore biodiversity, aligning with existing efforts and the UN System of Environmental Economic Accounting. Biodiversa+ is engaged with the EU Business and Biodiversity Platform fostering dialogue between businesses, policymakers, and experts to promote biodiversity-friendly corporate practices.

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6. Typology according to Eggermont et al. (2015). (id)
Type 1: No or minimal interventions in ecosystems, with the objectives of maintaining or improving the delivery of a range of ES both inside and outside of these conserved ecosystems; Type 2: management approaches that develop sustainable and multifunctional ecosystems and landscapes, with intermediate levels of intervention; Type 3: managing ecosystems in very extensive ways or even creating new ecosystems

5. **Science-based support for EU, Member States and associated countries policy-making**, including for strengthening environmental policies and laws, and improving cross-sectoral links with other European sectoral policies. More generally, R&I will be better linked to the policy arena (national, EU and international), providing input into policy making and improving the assessment of policy efficiency. This includes supporting the implementation and assessment of biodiversity restoration-related policy frameworks, notably the Nature Restoration Regulation and, where relevant, the EU Climate Law. For this, close collaborations are also foreseen with the EU KCBD, its Science Service currently being set up by BioAgora, and the European Environment Agency. Close alignment with the EU Biodiversity Platform will be ensured.

The two first Specific Objectives recognise the key role of knowledge and data from natural and social sciences to tackle the biodiversity crisis. The last three Specific Objectives are needed because good monitoring of biodiversity status and trends and good knowledge of drivers will not be sufficient to tackle the biodiversity crisis. The vision here is that halting the trend of biodiversity loss and inducing transformative changes in economy and society, for the sake of biodiversity and synergies with climate change action and ecosystem services, will also require coordinated investment of R&I in NbS, tighter links between R&I and public and private actors, and better science-based support to policy makers. As such, the Partnership contributes directly to the Horizon Europe Cluster 6 Destination 'Biodiversity and Ecosystem Services', specifically to expected impact #28 'Putting biodiversity on a path to recovery, and protecting and restoring ecosystems and their services'.





3. Topical Themes and Cross-cutting Themes of the SRIA



Biodiversa+ aims to promote the contribution of R&I to the EU Biodiversity Strategy for 2030, and the Kunming-Montreal Global Biodiversity Framework more generally. This translates into this SRIA which is organised around three non-mutually exclusive Topical Themes suitable for designing and implementing programmes, joint calls, mobility schemes, networking, capacity building, and other joint activities (Figure 5).

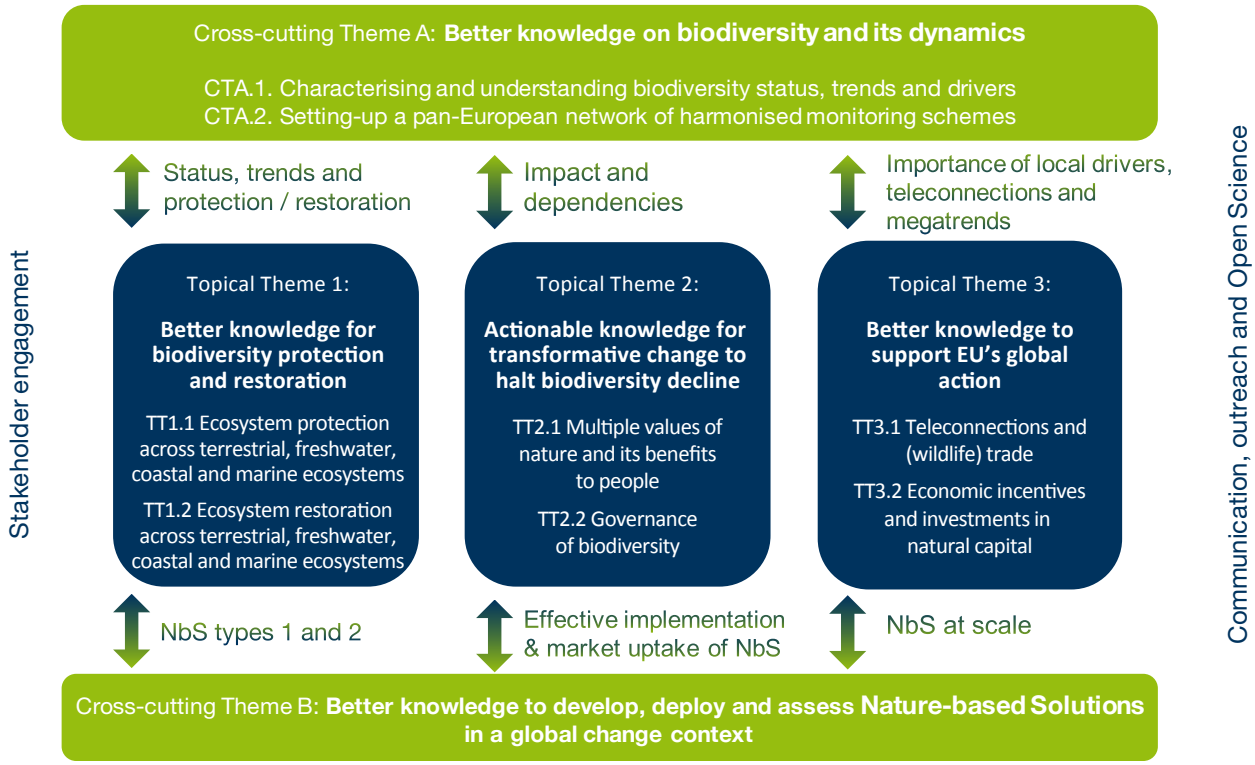


Figure 5: Overview of the Topical and Cross-cutting Themes that structure the Strategic Research & Innovation Agenda of the European Biodiversity Partnership.

The three **Topical Themes**:

- closely align with the core themes of the EU Biodiversity Strategy to 2030, and the theory of change of the KMGBF;
- are action oriented, with high societal impact;
- are ground breaking for science;
- are of urgency for policy and management at the European and international levels;
- are comprehensive for building the overall SRIA of the Partnership, and complementary for promoting synergies between sectors, actors and policies;
- are complementary and synergetic to priorities in the Horizon Europe Work Programme, including relevant European Partnerships and Missions;
- will support any EU's reflection for a long-term biodiversity R&I agenda, and other R&I agendas on relevant topics currently under development (e.g., agriculture, forestry and food; water and ocean).

The Topical Themes are complemented by two **Cross-cutting Themes** that are relevant to all the Topical Themes (Figure 5).

All themes are supported by enabling approaches/ leverage points including stakeholder engagement, and communication, outreach and open science to maximise impact for society and policy. Each theme is further detailed below, including rationale, how they relate with one another, expected impact, how they align with the EU Biodiversity Strategy for 2030, and underlying key knowledge needs. Addressing those implies considering, building on, and/or engaging with various actors and other initiatives. An overview of this potential engagement landscape for each (sub-)theme is provided in Annex II.



TOPICAL THEME 1

Better knowledge for biodiversity protection and restoration

Rationale

Protecting and restoring biodiversity and well-functioning ecosystems are key to boost resilience of the EU's economy and societies to future threats (IPBES 2020). The EU has legal frameworks, strategies and action plans to protect and restore habitats and species. However, this framework is not comprehensive, protection has been incomplete, restoration has been small-scale, and the implementation and enforcement of the legislation have been insufficient. Indeed, biodiversity continues to be eroded in Europe and worldwide (EEA 2025a, Hu et al. 2025). The EU is showing ambition to reverse biodiversity loss, lead the world by example and by action, and build on the headline ambition to ensure that by 2050 all of the world's ecosystems are restored, resilient, and adequately protected. Yet, protecting and restoring nature needs more than regulation alone. The EU Biodiversity Strategy requests urgent upscaling of restoration efforts for damaged ecosystems at sea and on land (including freshwater) to reverse biodiversity loss and to reinforce ecosystem services. The Strategy also highlights the importance of setting up ecological corridors, and of promoting and supporting investments in green and blue infrastructure. Protecting and restoring biodiversity requires, among others, more effective and integrative biodiversity management, establishing regional and national restoration plans, and reinforcement of implementation and legislation supported by a solid evidence-base. It also requires stronger recognition of the role, responsibilities, and dependencies of the private sector which should be involved in biodiversity protection and restoration to lower its impacts. In this context, and recognising that different rationales and paths for biodiversity conservation exist (Figure 6), fundamental inputs are expected from the research and knowledge community to deepen our understanding of the drivers of biodiversity dynamics. In addition, research should provide science-based guidance to actions and policies aiming at biodiversity protection and restoration while reconciling conservation and sustainable use of biodiversity and ecosystem services, and help the rigorous assessments of their outcomes.

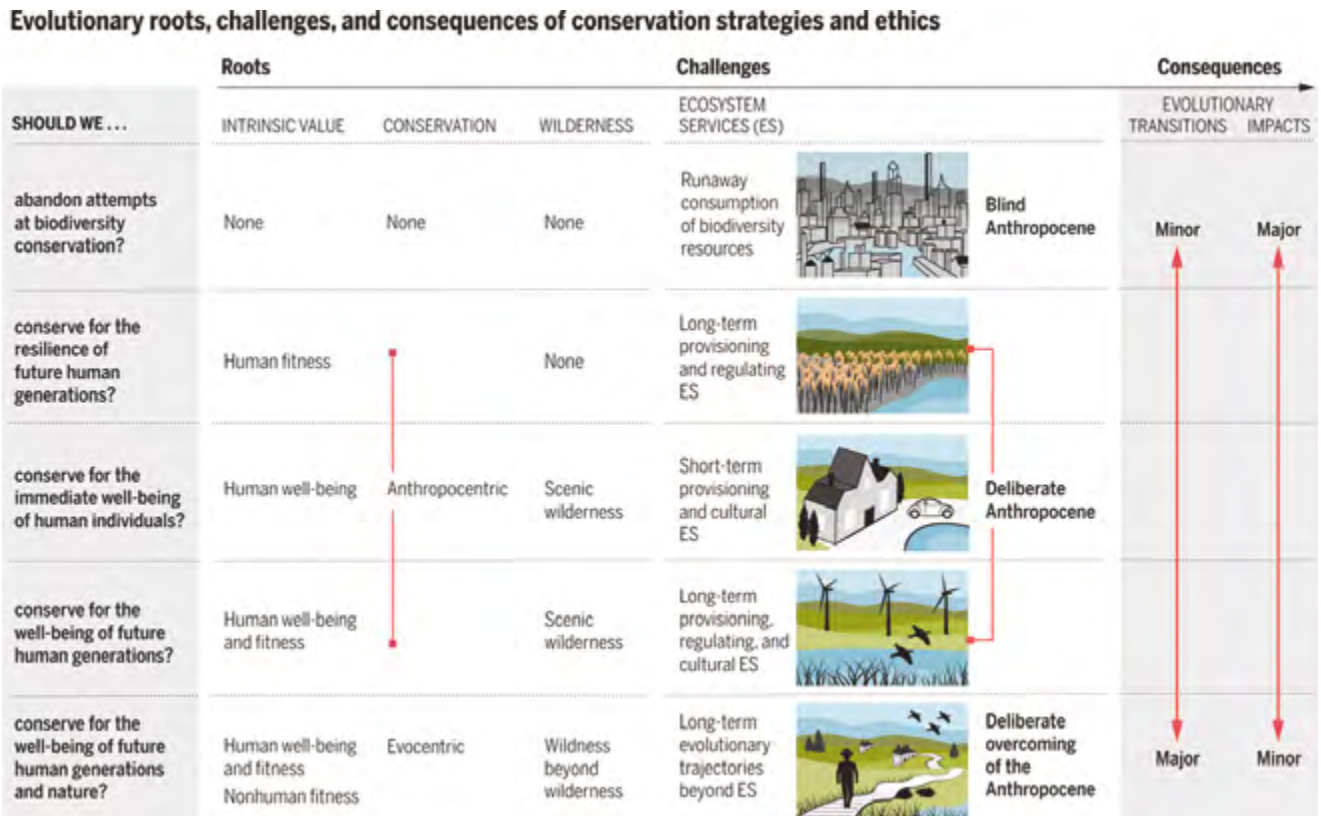


Figure 6. Different rationales and paths for biodiversity conservation exist. They are associated with different challenges and consequences for humans and non-humans (after Sarrazin & Lecomte 2016). This calls for a renewed research effort for clarifying and possibly seeking to expand the scope of choice available to policymakers, ultimately integrating scientific knowledge with stakeholders concerns in the form of alternative possible courses of action.

Links to other Themes

Topical Theme 1 is linked to developing, assessing and deploying Nature-based Solutions (Cross-cutting Theme B) as nature protection and nature restoration can sometimes be driven by the objective to deliver benefits, such as climate regulation and adaptation, water regulation, soil health, pollination and disaster prevention and protection. Nevertheless, biodiversity has an intrinsic value independent of human use, and species and ecosystems possess an inherent right to exist. In addition, protecting and restoring biodiversity also implies ensuring that ecological and evolutionary processes per se are maintained, explaining the importance of Topical Theme 1. The efficiency of biodiversity protection and restoration, as well as equity (i.e. a fair distribution of costs and benefits of the final outcome of the protection and restoration interventions), however requires transformative action by different sectors and actors. In particular, a better valuation of biodiversity and ecosystem services by these sectors and actors along with more adequate governance systems are needed (Topical Theme 2). Given the EU's influence on biodiversity outside Europe, it also requires the scaling up of protection and restoration actions and investments beyond the EU borders (Topical Theme 3). Finally, and most importantly, assessing the outcomes of protection and restoration actions and policies also requires advances in monitoring biodiversity and ecosystem conditions. Although the EU's Mapping and Assessment of Ecosystems and their Services (Maes et al. 2020) initiative has made methodological progress in comprehensively mapping, monitoring, assessing and achieving good ecosystem condition, significant data gaps remain, particularly with regard to the status and trends of biodiversity itself (EEA 2025a; Cross-cutting Theme A). The need to improve and harmonise monitoring methods and data collection will only increase in the coming years, due to global commitments, EU legislation such as the Nature Restoration Regulation (NRR), as well as the needs of decision-makers in the public and private sectors. In 2025, a tender was launched for a European Parliament preparatory action project for the EBOCC. Regardless of whether such a biodiversity observation and conservation centre is eventually established or not, it is clear that methods must be developed to collect biodiversity data from across Europe in a way that provides policymakers and other stakeholders with a detailed, regularly updated overview of the state of biodiversity in Europe, with the aim of restoring and protecting our ecosystems.

Expected impacts

The Partnership activities under this theme allow for more coherent protection and restoration plans, including spatial planning of sea and landscapes, accounting for ecological, economic and social considerations in a global change context. It generates important scientific breakthroughs about our understanding of the biotic and abiotic determinants (and their interactions) of biodiversity dynamics depending on protection and restoration approaches. It further provides actionable knowledge for scaling-up protection and restoration approaches. It also continues to reinforce our capacity to identify and analyse the synergies and trade-offs between the diverse benefits of protection and restoration actions, as well as between different stakeholders. This knowledge will be used to analyse different options to distribute the costs and benefits of protection and restoration (including cost of inaction), and avoid simplistic one-size-fits-all approaches that neglect local complexity, heterogeneity and dynamics.

The activities implemented under this theme aim to support EU environmental policy for biodiversity, supporting the objectives of the EU Biodiversity Strategy for 2030, the Soil Thematic Strategy (European Commission 2021a), the EU Forest Strategy for 2030 (European Commission 2021b), the revised EU pollinators initiative (European Commission 2023), the EU Climate Adaptation

Strategy (European Union 2021a), the Water Resilience Strategy (European Commission 2025a), the Ocean Pact (European Commission 2025b). The activities also aim to support the implementation of related legislation, including the Birds and Habitats Directives (European Union 1992, 2009), the NRR (European Union 2024a), the Soil Monitoring Law (European Union 2025b) the EU Water Framework Directive (European Union 2000) the Marine Strategy Framework Directive (European Union 2008), as well as the EU Deforestation Regulation (European Union 2023) and the EU Climate law (European Union 2021b). The activities are also expected to speed up actions under the UN Decade on Ecosystem Restoration (2021-2030), as well as the UN Decade of Ocean Science for Sustainable Development (2021-2030).

This will also help to protect and restore nature in the EU and its outermost regions (ORs), as well as in Overseas Countries and Territories (OCTs). In addition to reversing biodiversity loss, this would lead to increased ecosystem resilience and sustained delivery of ecosystem services, providing benefits for society and the economy. R&I could help scale up these solutions and integrate them into governance, investment and policy support landscapes. It would also generate knowledge on how restoration of structure, function and connectivity can benefit biodiversity and climate change, bringing this information to the attention of UN programmes and the IPBES and IPCC processes.

Finally, activities under this theme (in connection with Cross-cutting Theme B) will help to bring nature back to agricultural land, providing healthy food and diverse diets while maintaining productivity, increase soil fertility and reduce the footprint of food production. Similarly, it aims to support the protection and restoration of biodiversity in cities and in green and blue urban ecosystems.



Topical sub-theme 1.1: Ecosystem protection across terrestrial, freshwater, coastal and marine ecosystems

Link with the EU Biodiversity Strategy 2030, which commits to:

» protect at least 30% of land and 30% of sea; with 10% of EU land and 10% of EU sea under strict protection, including all remaining EU primary and old-grown forests;

» establish a truly coherent Trans-European Nature Network;

» improve and widen the network of protected areas, define clear protection objectives and measures, and monitor them appropriately;

» agree on a definition of, and map and monitor, all the EU's remaining primary and old growth forests for their strict protection.

Major knowledge needs include (non-exclusive list):

» Basic research and actionable knowledge to safeguard species, genetic and ecosystem diversity, considering the different roots, challenges, and consequences associated to different conservation strategies and ethics (Sarrazin & Lecomte 2016) and recognizing that some taxonomic groups, environments and dimensions of biodiversity (e.g. genetic and functional diversity, along with evolutionary processes) still need to be better accounted for in protection approaches;

» Knowledge to support better implementation of landscape and seascape approaches (e.g. biosphere reserve concept) for reconciling biodiversity protection and pressures from cross-sectoral competing and interacting land, freshwater and sea uses (e.g. agriculture, forestry, urbanisation, fishing, infrastructure building, energy, tourism, etc.);

» Knowledge to develop criteria for identifying/designating additional priority conservation areas on land and at sea (including PAs and MPAs), establishing effective and resilient ecological networks, enhancing species-based protection and preserving genetic diversity while taking into account trade-offs as well as local complexity and heterogeneity;

» Identification of the role and effectiveness of existing types of PAs, Other Effective area-based Conservation Measures (OECMs; IUCN 2019) and other targeted conservation measures (e.g. for genetic diversity, individual species, or ecological function) in achieving bold conservation targets. Consideration of OECMs provides an opportunity to formally recognise and support areas delivering conservation outcomes outside of protected areas);

» Identification of most effective models of establishing and implementing protected areas in a European context, including appropriate financial and administrative instruments. This includes modelling the contribution of PAs as NbS to global challenges, food and water resilience and security, and human health and well-being and their long-term socio-ecological benefits;

» Assessing the effectiveness of approaches and governance types related to PAs, MPAs, OECMs and other management approaches (link with Topical sub-theme 2.2.). Governance strategies adopted for nature protection can vary widely, embracing community management as well as centrally controlled, state-run protected areas and private property regimes. The CBD encourages devolution of management responsibilities and emphasises adaptive management (i.e., regular biodiversity monitoring to enable "learning through doing") to complement protected-area governance;



- Research to maximise the biodiversity potential of terrestrial, freshwater and marine habitats also outside PAs, and support a nature inclusive and positive transition, to ensure an effective ecological network delivering on ecosystem services (incl. potential for carbon sequestration, pollination, groundwater recharge, soil fertility, etc.), as well as on evolutionary and functional components of biodiversity;

- Quantifying the importance of effective structural and functional connectivity both on land (including freshwater) and sea to ensure that distribution and exchanges of organisms, non-living material, and natural processes (including energy flows and disturbances effects) that are key to biodiversity persistence across ecosystems are unimpeded. This includes protecting habitat connectivity (allowing for species migration and preventing genetic isolation), supporting design of ecological corridors (planning of green and blue infrastructures), and development of criteria for a true Trans-European Nature Network;

- Understanding and promoting the complementary role of Key Biodiversity Areas (KBAs, i.e. areas significantly contributing to global persistence of biodiversity) and other mechanisms (e.g. private PAs, OECMs, Indigenous and Community Conserved Areas) in conservation planning and management, and their link to existing protection schemes such as Natura2000;

- Developing methodological guidance for identifying KBAs and using the KBA standard (IUCN 2020a) and for managing, restoring and protecting a KBA;

- Integrating development issues including human rights and social safeguards issues in biodiversity protection; ensuring a broad scale spectrum approach (e.g. through OECMs, Areas of Connectivity Conservation and similar non-traditional conservation tools) (link with Topical subtheme 2.2.);

» Comparative analysis of current PAs management approaches: what does and does not work in terms of protection under a range of governance types and management categories and with different incentives and interventions. This includes science-based guidance with regard to what "counts" towards any expanded conservation target (link with Topical sub-theme 2.2.). This also includes institutional, cultural and socioeconomic contexts and perceptions of biodiversity protection;

» Assessing the economic contributions of protected and conserved areas to local, regional, and indigenous economies, and to develop broader economic and socio-economic metrics and incentive systems that better support biodiversity and ecosystem protection;

» Knowledge on status, trends and ecological role of carbon-rich ecosystems (primary and old growth forests, peatlands, grasslands, wetlands, mangroves and seagrass meadows) important for achieving the 10% target of EU land and 10% of EU sea under strict protection (link with Cross-cutting Theme A). This also includes data on their carbon sequestration potential;

» The conservation community increasingly faces the challenge of climate change. Species distributions may change rapidly and in fairly complex ways, and biodiversity in current conserved areas may have to adapt and possibly be relocated to compensate for climate change effects. Further, conservation will be sustainable also in the medium and long term if there is room for ecological and evolutionary processes allowing for adaptation. Through modelling and scenario development, researchers could guide conservation area managers, policy makers and other stakeholders to anticipate the effect of climate change;

» Another major challenge faced by the conservation community is emerging pathogens and invasive alien species. Research is needed on understanding how these threats interact and jointly affect biodiversity, particularly under climate change. Key knowledge gaps include predicting future spread and impacts, improving early detection and surveillance, and identifying the ecological factors that increase ecosystem resistance or vulnerability. There is also a need for better understanding the long-term effectiveness of management interventions. Generating actionable knowledge would strengthen the scientific basis for biodiversity conservation and support more proactive and effective management strategies.

» Conservation strategies like assisted migration, land sharing versus land sparing, and rewilding or not rewilding, still require proper knowledge basis and evidence-based assessment, including costs versus benefits assessments. Solutions for cryopreservation and ex-situ methods to preserve genetic resources will also be required. Their evaluation and integration to other strategies (spatial plans, economic development plan, etc.), as well as research on where and how such approaches contribute to positive biodiversity outcomes in a global change context is needed (including scenario studies);

» Building on the nexus approach for biodiversity and its interlinkages with water, food, health, and climate change, knowledge is needed on how biodiversity and ecological processes respond to cross-sectoral interacting pressures. Evidence for success of the Nexus approach on delivering biodiversity-positive outcomes remains limited;

» Understanding and mitigating ecological and social trade-offs associated with biodiversity conservation measures (e.g. ecological corridors and protected areas), including human-wildlife conflicts, unequal distribution of costs and benefits, and impacts across spatial, temporal, and social scales, while identifying pathways towards win-win outcomes.



Topical sub-theme 1.2: Ecosystem restoration across land, freshwater, coastal and marine ecosystems

Link with the EU Biodiversity Strategy for 2030 and the Nature Restoration Regulation, which commit to:

- bring nature back to agricultural and forest land and restore the good environmental status of marine and coastal ecosystems. This includes reversing the decline of pollinators, addressing land take and restoring soil, improving forest health and resilience, re-building carbon-rich ecosystems, safeguarding fish spawning and nursery areas, restoring priority species and habitats in all ecosystems, greening urban and peri-urban areas, reducing pollution (including pesticides and fertilisers), and addressing invasive alien species.

- by 2030, restore significant areas of degraded and carbon-rich ecosystems; ensure that habitats and species show no deterioration in conservation status and trends; and that at least 30% reach favourable conservation status or at least show a positive trend.

- to this end, the EU Nature Restoration Regulation sets the Union target of the restoration of at least 20% of terrestrial, freshwater, coastal and marine ecosystems areas by 2030, and of all ecosystems in need of restoration by 2050. On habitats deemed in poor condition, as listed in the regulation, member states will take measures to restore at least 30% by 2030, at least 60% by 2040 and at least 90% by 2050. Specific restoration targets are also set for pollinating insects, forest ecosystems, urban ecosystems, agricultural ecosystems and for river connectivity.

Major knowledge needs include (non-exclusive list):

- science-based definition of what constitutes a “favourable ecological condition” and “good ecosystem/biodiversity status”, “free-flowing rivers” and “natural functions of the related floodplains” as well as for concepts like “closer-to-nature forest management” introduced by EU Biodiversity Strategy 2030. There is a need for coherent and operational restoration targets, while accounting for shifting baselines and integrating ecological, cultural and social contexts;

- development of indicators to characterise the effectiveness of different restoration methodologies and assess restoration progress (including values) and long-term success in terms of ecosystem functioning, integrity, and connectivity;

- monitoring the efficacy, efficiency and effectiveness of restoration/previous restoration projects and providing evidence-base to satisfactory levels of nature restoration;

- identification and assessment of restoration opportunities, potential and priorities in different types of (degraded) ecosystems (marine, terrestrial, freshwater);

- better understanding of the possibilities and methods for meaningful and effective scaling and transferability of nature restoration efforts from local success to larger scales (landscape, regional, global, etc.) with varying socio-economic and environmental contexts;

- how can the EU support ecosystem restoration globally, what metrics should be used and how should areas be prioritised for support (link with Topical sub-theme 3.2.);

- predictive modelling, anticipatory strategic

foresight based on policy-learning, and development of novel restoration approaches and methods (including experimental approaches with high risk tolerance and open-ended restoration efforts such as rewilding) to ensure long-term sustainability of restored species, habitats and ecosystems, including resilience to climate change and other pressures;

» understanding interconnected land-freshwater-coastal-marine (source-to-sea) ecosystem degradation and the effects they have on one-another's biodiversity, ecosystem services, climate regulation, human health, and the prevalence and transmission of infectious diseases.;

» assessing the cumulative and cascading effect of human activities (mining, dredging, infrastructure development, river barriers and dams, shipping, fishing practices) on biodiversity, ecosystem functioning, climate resilience, and the delivery of ecosystem functioning;

» studying the impact of multiple interacting drivers of biodiversity loss beyond land, watercourse and seascape degradations, such as pollution, pesticide inputs, nutrient loading, sound and light pollution, overexploitation, hunting and fishing;

» understanding the social and environmental interactions, feedbacks and systemic risks between ecosystem degradation, poverty, culture and behaviours, climate change, conflict and migration, with particular attention to how these dynamics influence ecosystem resilience, social equity, and sustainable development outcomes;

» understanding the importance of ecosystem interaction, ecological processes, and biocontrol mechanisms to help upscale low-input and regenerative production systems capable of restoring biodiversity while maintaining just food and energy security, resilience to climate change, and other ecosystem services. This includes agroecology (IEEP 2020a), organic farming, biodiversity-friendly aquaculture and fisheries, agroforestry and sustainable forest management, environmentally sustainable hydropower management, and integrated soil stewardship (link with Cross-cutting Theme B);

» improving knowledge and tools to support the design, governance, management and planning of urban and peri-urban green and blue areas that fully integrate biodiversity restoration while optimising ecosystem services, climate resilience, public health and social inclusion benefits (link with Cross-cutting Theme B);

» analysing the trade-offs and synergies between recreational use, biodiversity protection and restoration, climate mitigation, and human well-being in urban and peri-urban blue-green areas, to support equitable and multifunctional management strategies;

» analysing the relative importance of various enabling conditions for avoiding, reducing and reversing ecosystem degradation in different social, cultural, economic and governance contexts;

» investigating role and impact of functional and structural connectivity on biodiversity restoration, ecological and evolutionary processes, and ecosystem integrity at multiple levels (e.g. genetic, population, species, communities), aspects (e.g., taxonomic and functional diversity, phenotypic traits);

» investigating from a genomic perspective the success of captive populations when reintroduced in the wild.



TOPICAL THEME 2

Actionable knowledge for transformative change to halt biodiversity decline

Rationale

Recent flagship reports, such as the IPBES Assessment report on transformative change (IPBES 2024b) and the 17th Global Horizon Scan by Sutherland et al. (2026), highlight the need for transformative change to halt and reverse nature's accelerating decline, and demonstrate that biodiversity challenges cut widely across societal sectors and disciplines. There is, however, insufficient actionable knowledge on the potential and challenges arising from transitions focused on biodiversity.

Transformative change is defined by IPBES as a "fundamental system-wide reorganisation across technological, economic and social factors, including paradigms, goals and values needed for the conservation and sustainable use of biodiversity" (IPBES 2019, 2024b). Transformative change means shifting away from 'business as usual' through nature conservation and restoration (Topical Theme 1), deployment of Nature-based Solutions (Cross-cutting Theme B) and tackling the drivers and root causes of biodiversity loss through an integrated whole-of-society approach. Doing so implies accounting for the multiple values of nature, environmental-economic accounting, and reinforcing biodiversity governance (the core of Topical Theme 2), also promoting sustainable supply chains and greening trade (Topical Theme 3).

Many overarching reports and publications on transformative change or closely related topics have been published since the publication of the initial SRIA, and in parallel to the activities implemented during the first years of the partnership. The recent progress and developed framework on transformative change are progressively integrated within the partnership activities, but they may not be fully reflected in how the partnership and its vision were initially framed.

The IPBES Transformative Change Assessment (2024b) provides a framework for transformative change composed of three dimensions, namely: (1) the structural (or systemic) dimension which focuses on formal systems shaping society (regulations, policies, etc.); (2) the relational (or social) dimension which accounts for relationships (and power) among people, organisations and institutions; and (3) the personal (or cultural) dimension which includes the individual and collective visions, values and worldviews.

The integration of biodiversity considerations into market transactions, planning processes, investment decisions, and financial systems is a key component of transforming economic systems for nature and equity. Therefore, the development of monetary valuation of biodiversity and ecosystem services, so that societies can eventually put a price on what they value so highly but protect so poorly, can help businesses to evaluate both their impacts and dependencies on biodiversity, while informing investors and the (re)insurance sectors about biodiversity-related risks, opportunities and transition pathways (IPBES 2026).

However, transformative change requires going beyond the sole monetary valuation of biodiversity. Ecosystem services vary across national and local boundaries, for example regarding mitigation of droughts and floods, groundwater recharge, climate regulation, coast and soil erosion prevention (Swiss Re Institute, 2020), and water filtration, as well as services provided in the form of recreational, aesthetic or cultural values. Furthermore, the IPBES Values Assessment (IPBES 2022) highlighted that both monetary and non-monetary valuation approaches of biodiversity constitute complementary representations of Nature's multiple values. It emphasised the importance of recognising this plurality of values, including instrumental values associated with nature's contribution to people, intrinsic values recognising nature's worth independent of human use, and relational values related to people's perception and relationships with nature, places, communities and future generations. Asking which ones of these values are recognised, included, excluded, privileged or marginalised in decisions, and how trade-offs are negotiated across different groups of people is particularly relevant for ensuring that governance systems can support biodiversity

recovery while being inclusive, accountable and adaptive. There is an urgent need for the research community to collaborate with stakeholders and decision makers to co-develop approaches that can better integrate diverse knowledge systems, including scientific, Indigenous and local knowledge, and support decision-making processes that are transparent, legitimate and socially inclusive. This perspective is consistent with recent recommendations from the European Group on Ethics in Science and New Technologies, which emphasises the need for R&I and policymaking to account for the intrinsic value of nature alongside economic and societal considerations (European Commission 2026).

Recognising and accounting for plurality is also essential for shifting societal views and values. This includes understanding how different value systems shape biodiversity-related behaviours, dominant narratives, policies and institutional arrangements, and how alternative visions of desirable futures can motivate and guide transformative change leading to biodiversity positive outcomes. This is particularly important when exploring pathways towards societies in which human well-being, social equity, and biodiversity protection and regeneration are pursued as mutually reinforcing objectives.

Another key element to generating transformative change to halt biodiversity decline is increasing the effectiveness of governance strategies that successfully address and mitigate impacts of unsustainable human activities on biodiversity. Such approaches could help the elaboration of policies aiming at the right balance between nature conservation and socio-economic development (including land management, spatial planning and development of economic activities). This is particularly key in sectors with the greatest impacts on biodiversity.

Finally, caution must be given regarding the values and importance given to biodiversity across various and changing societal contexts and political trends. Biodiversity must remain a core priority within political agendas.



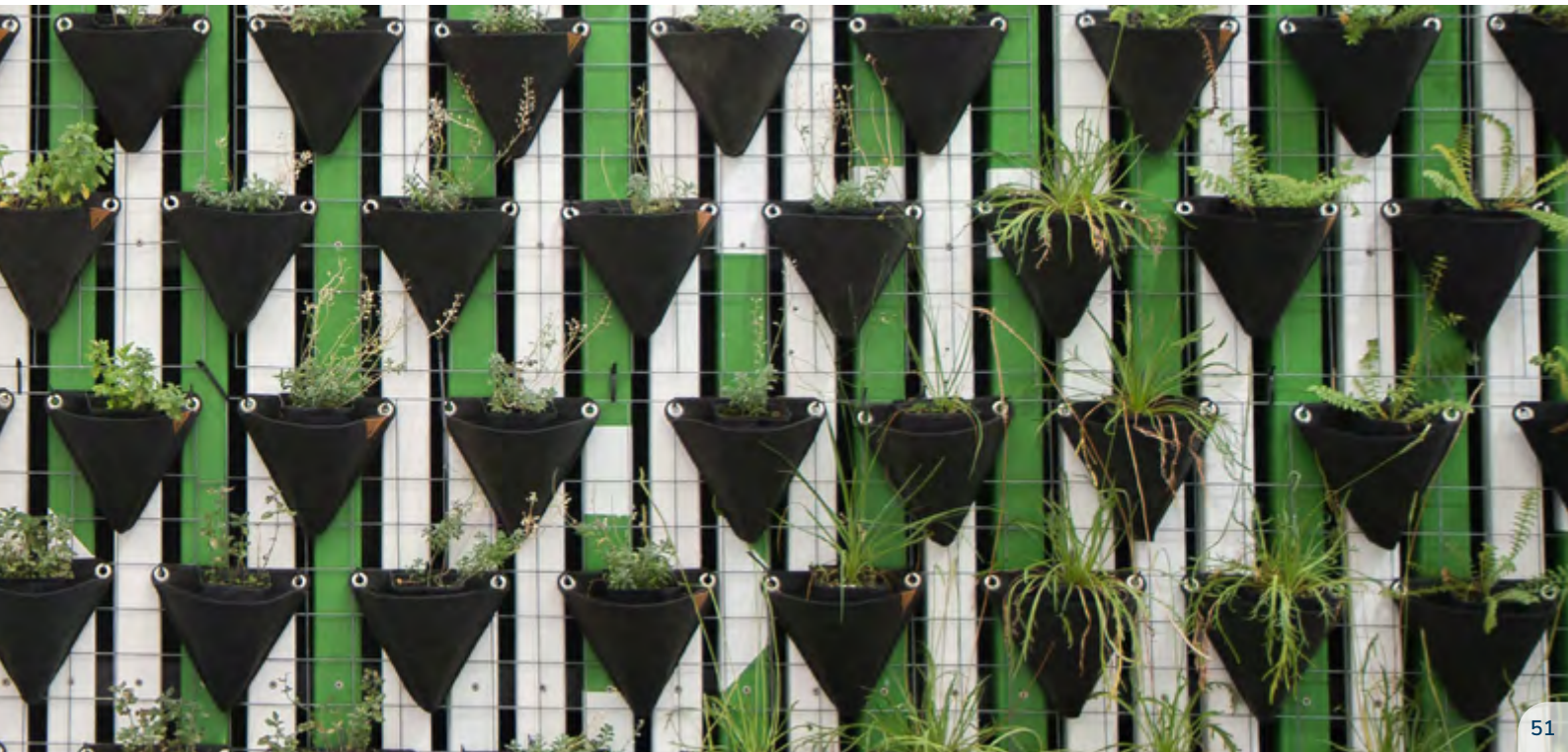
Expected impacts

This theme aims to transform the way we impact biodiversity by initiating transformative processes and behavioural changes among various stakeholders. Research and innovation (R&I) will focus on developing tools, methodologies and frameworks, Examples include a more holistic valuation of biodiversity and ecosystem services, as well as adequate governance systems that are integrative, inclusive, informed and adaptive. This work can help integrate the use of natural capital accounting into corporate decision-making processes and link natural capital management to commercial success. It will also guide the prioritisation of actions for businesses within their value chains and extend the effective application of the mitigation hierarchy.

Valuation will also help to assess and monitor the cost-effectiveness and economic viability of Nature-based Solutions (NbS) to meet multiple benefits (environmental, social and economic), and as such it can also contribute to a greater promotion of investments in NbS and to speed up market uptake (link with Cross-cutting Theme B). It can also promote greater engagement of the insurance sector in NbS markets and NbS funding.

R&I under this theme also helps to develop empirically justified governance strategies that improve synergies between nature conservation schemes and the management of human-altered environments, proposing options that offer different benefits for biodiversity and people. It also helps to achieve a more coherent spatial planning of sea- and landscapes (link with Topical Theme 1), accounting for ecological, economic and societal considerations in a global (particularly climate) change context. It helps to identify synergies between global and local values and to negotiate trade-offs where the two cannot be reconciled, and the distribution of the costs and benefits of conservation. As such, it provides the knowledge base needed to start investing in building biodiversity assets, by making the economic case and linking biodiversity to agendas that matter (e.g. poverty reduction, social justice, security and climate change).

In sum, this theme helps to identify and design multiple transformation pathways and actions towards nature-positive, resilient and equitable visions and goals, assess their effectiveness, expand them to multiple areas of the economy and society, and identify and realise diverse co-benefits in an efficient manner.



Topical sub-theme 2.1: The multiple values of nature and its benefits to people

Link with the EU Biodiversity Strategy 2030, which acknowledges that:

- all parts of the economy and society will have to play their role in halting biodiversity loss. Industry and business have an impact on nature, but they also produce the important innovations, partnerships and expertise that can help to address biodiversity loss;
- particular attention should be paid to measures that incentivise and eliminate barriers for the take-up of Nature-based Solutions as these can lead to significant business and employment opportunities in various sectors while enhancing biodiversity;
- the economic and social cost of inaction would be huge and highly detrimental to human well-being.

Major knowledge needs include (non-exclusive list):

- development and improvement of methodologies and tools to capture different values of ecosystem services and biodiversity, and to describe different conceptualizations of value and of the relationship between biodiversity and human well-being. Research is still needed to test and compare existing monetary and non-monetary valuation methods. Indicators beyond monetary estimates should be developed as needed and tested, which can give estimates of the value and attitudes (including of local and indigenous communities) towards biodiversity. It is also needed to study valuation methods for NbS that can help assess their effectiveness in terms of societal, economic and environmental assets. The focus should be on addressing clear gaps, on accounting for ethical issues, on practical use of tools, and areas where real value added could be obtained. For instance, knowledge and assessment of co-benefits is currently still a gap, and costing and valuation of adaptation benefits is largely lacking;
- Co-development among societal actors of nature-positive visions and goals, and multiple pathways and actions towards these, with inclusion of both major and marginalised actors and stakeholders. Investigation of human-nature connectedness, extinction of experience (loss of human-nature interactions), and relational values;
- Identifying trade-offs and co-benefits of different goals, developing means to reconcile conflicts around biodiversity and nature's contributions to people, and evaluating trade-offs on a temporal scale while levelling short- versus long-term needs in the context of sustainable development initiatives and emerging policies;
- a framework for valuing changes in biodiversity, as well as applications for ecological compensation;
- further development of existing practical and implementable natural capital accounting approaches and tools (e.g., that can ultimately be used in companies and the banking sector; but also in the public sector). This should guide assessments at a landscape or seascape scale, focusing on developing methods to reflect cumulative impacts and variations in environmental quality, social needs and value preferences. Research should explore the impact that the valuation of ecosystem services has on sustainable development, including the design and effectiveness of avoidance/mitigation/compensation mechanisms that could be applied in the case of new developments (also link with Topical Themes 1 and 3);
- development of science-based targets providing a framework and a process for business to align

their individual sustainability actions with globally agreed environmental goals;

» focus on non-monetary valuation of ecosystem services is needed, as it does not yet constitute a formalised methodological field. As such, it often applies coarse and arbitrary indicators and produces results whose accuracy and reliability are hard to judge or difficult to operationalise. To increase the applicability of non-monetary valuation, it is necessary to clarify the boundaries and the terminology of the field, and address considerations with regard to the context-specificity of non-monetary techniques;

» quantification of the environmental impacts of products, or supply and value chains, business models or organisations based on Life Cycle Assessment (LCA) methods;

» quantification of cost of inaction, and thus understanding and seizing the economic risks of deteriorating biodiversity and ecosystem services;

» assessment of the cost-effectiveness and economic viability of NbS to meet multiple benefits (environmental, social and economic) (link to Cross-cutting Theme B). More specifically, decision-makers face an increased number of tools and approaches, and research can help critically compare these tools and help science-based choices by policy-makers for adapted and contextualised legislation and regulation;

» standardised natural capital accounting practices;

» practice- and evidence-based knowledge as well as identification of incentives for businesses is needed to guide prioritisation of investments, to better assess their impact on the long term, and avoid finance flows potentially harmful to biodiversity. Such knowledge is also needed to stimulate the uptake of innovative financing instruments and mechanisms (such as economic instruments, green bonds, impact investment, blended finance) (link to Topical subtheme 3.1.);

» expand transformative actions to multiple and new areas and across all sectors of economy and society, and define ways to overcome barriers and transform economic sectors remaining greatly detrimental to biodiversity. This may include analysis of economic paradigms, practices and financial models to identify potential change agents and to enable social dynamics for nature-positive outcomes while safeguarding social and ecological boundaries;

» knowledge base to better link biodiversity to societal agendas related to poverty reduction, social and environmental justice, security and climate change;

» develop methodologies to assess legislative impact on biodiversity;

» identify the combinations of policies, incentives, governance approaches, societal engagement processes, decision-support tools, and vision to enable business transformation supporting biodiversity across sectors, places, and communities.

Topical sub-theme 2.2: Governance of Biodiversity

Link with the EU Biodiversity Strategy 2030, which acknowledges that:

» environmental legislation to tackle the drivers of biodiversity loss relies on proper implementation and enforcement. Over the last 30 years, the EU has put in place a solid legislative framework to protect and restore its natural capital. However, there are still legislative gaps, in particular for agricultural, forest and urban ecosystems, as well as for energy and infrastructure projects, and implementation on the ground is lagging behind. This is having dramatic consequences on biodiversity and comes with a substantial economic cost;

» proper governance approaches will be a prerequisite for successful development and deployment of NbS (Cross-cutting Theme B) at relevant scales and for addressing the needs of different categories of stakeholders;

» biodiversity is relevant to the achievement of the SDGs, including those related to human rights, gender, health, education, and conflict sensitivity.

Major knowledge needs include (non-exclusive list):

» analysis of the performance of different governance systems in supporting ecosystem services, resource sustainability and biodiversity. Studies directed at specific regions or natural resources are needed to guide local adaptation strategies, while broader-scale investigations are crucial to plan regional strategies for the use of natural resources. Research should help answer the following questions: Which factors determine governance strategies that foster resilience, sustainable management of biodiversity and an equitable distribution of ecosystem services among social actors? How do local institutional arrangements facilitate awareness raising, social learning and effective management of biodiversity? What is the diversity of interactions between society and ecosystem components and their influence on participation and decision-making?

» What are the impacts of stakeholder engagement on the efficiency of decision-making for management measures? Especially lessons learnt from failures and less successful cases are relevant in this context;

» study of the interplay between national and international development of laws, and between environmental protection and sustainable use laws and governance systems, to identify obstacles and opportunities for improved implementation;

» analysis of options to better articulate regional, national and European policies, and account for the specificities of biodiversity status and development needs locally. Addressing the relation between global processes (e.g. globalisation, climate change, financial controls) and local (regional and national) consequences will also be needed because local governance, in many cases, will hardly grasp or respond to global pressures/threats (link with Topical Theme 3);

» study of ways to better articulate governance strategies across sectors and policies, and to better integrate needs and knowledge of local actors;

» development of participatory tools and methods to incorporate short-term interests within long-term frameworks, improve our capacity to cope with uncertainties, and integrate local and scientific knowledge on biodiversity for collective and adaptive decision-making;

» support to the development of policies and governance systems aiming at particular balances between nature protection and socio-economic development (including land management and the development of economic activities); this includes analysis of how making NbS sustainable through adequate engagement with, and support by stakeholders and citizens (link with Cross-cutting Theme B). In particular, urbanisation creates new challenges for biodiversity conservation and NbS implementation, and for supportive policy frameworks to mainstream biodiversity and NbS in public authorities;

» analysis of which impacts may be possible to offset, and whether proposed offsets are technically feasible as part of the avoidance/mitigation/compensation hierarchy. Ecological knowledge would particularly be needed on implications of offsetting in particular habitats; use of multipliers; timescale required to restore habitats to functioning ecosystems and ensure no net loss; and how to capture spatial mixes of habitats in biodiversity offset design;

» analysis of economic and social instruments to promote effective conservation. Examples include waste-trading schemes, eco-labelling, creation of knowledge networks, and public payment for maintenance of certain ecosystem services, for example through Reduced Emission from Deforestation and environmental Degradation (REDD);

» identification of leverage points, where change in approach/intervention is highly likely to affect the end results strongly;

» evaluation of the effectiveness of different schemes and models for Payment for Ecosystem Services (PES), particularly the trade-offs that arise between policy goals, the integration of multiple values in PES, data on the profiles of PES participants and long-term monitoring of relational and behavioural implications of participation;

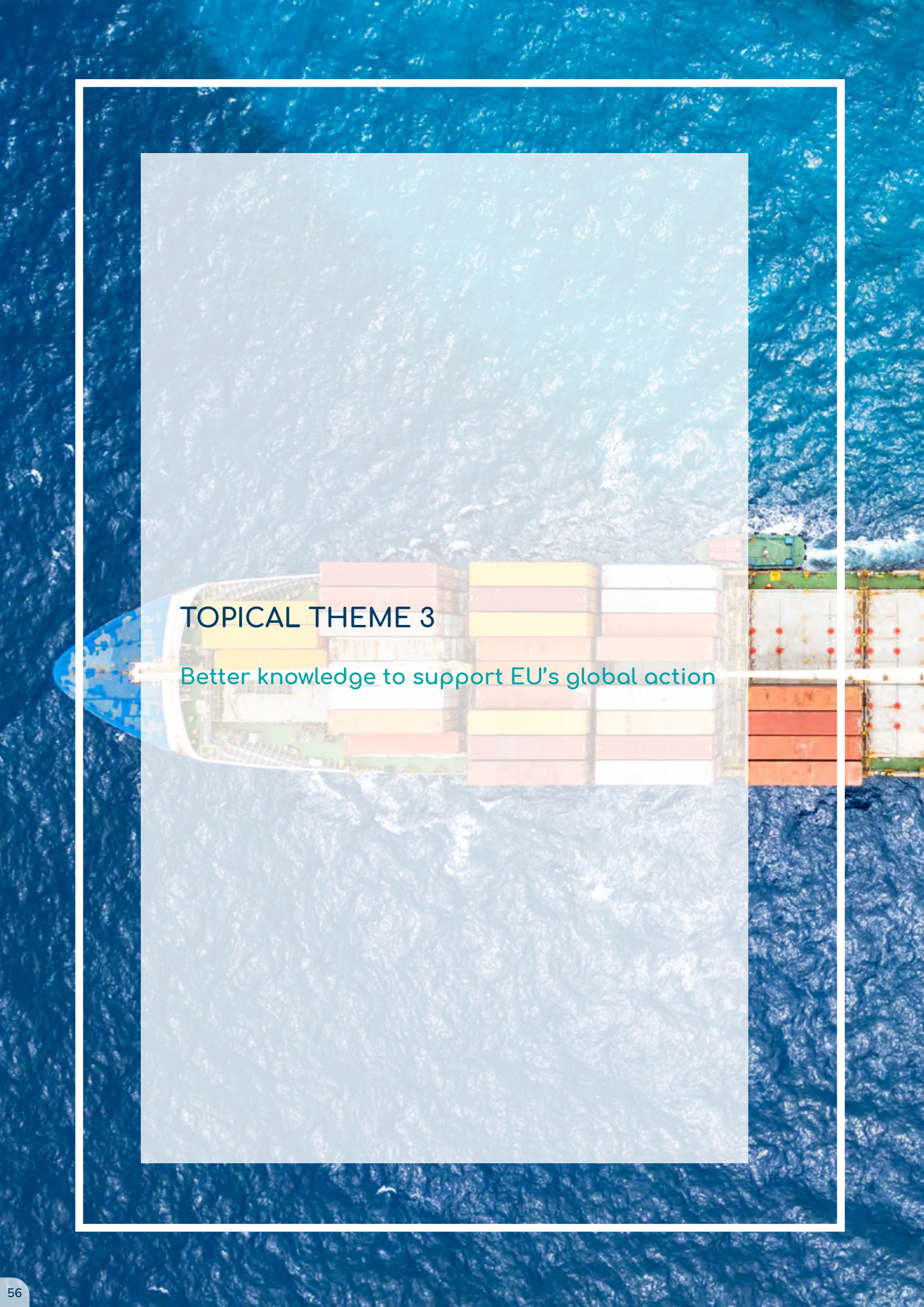
» strengthened knowledge base for rights-based approaches in conservation;

» social-ecological systems analysis of the interactions and dynamics associated with biodiversity in social–ecological systems to move beyond analysing and measuring the problem towards the generation of science-based, context-specific pathways towards halting biodiversity loss;

» expand the understanding of governance to also include markets, incentives (and disincentives) and alternative management systems for biodiversity conservation (e.g. co-management, community-based management, private management);

» contributions of behavioural economics in fine-tuning biodiversity conservation interventions.





TOPICAL THEME 3

Better knowledge to support EU's global action

Rationale

The EU's agricultural, energy, and trade policies have long impacted biodiversity beyond its borders, for example, through demand for soy from Brazil, coffee from South America, or cocoa from West Africa. These impacts, primarily driven by land-use change (including deforestation) and climate change, complicate conservation efforts worldwide (IPBES 2019).

In December 2022, the EU adopted the Corporate Sustainability Due Diligence Directive to address such externalised impacts, thereby requiring companies to comply with environmental standards throughout their supply chains. While this directive represents progress, challenges remain, particularly with regard to tracking the complex global effects and interactions of land use change, over-exploitation of natural resources, transport, environmental pollution, and biological invasions. These long-distance interactions are referred to as 'telecoupling', a conceptual framework for understanding how activities in one location can lead to environmental and social consequences elsewhere (Liu et al. 2013).

Telecoupling manifests through various interconnected effects:

- **Cascade and cross-scale effects**: Local events, such as crop failure due to drought, can affect global markets and lead to rising food prices in other places (Baird & Fox 2025, Paitan & Verburg 2019, Franzke et al. 2013). Access to and influence over the management of ecosystem services are structured by cross-scale social relations among actors. For example, decisions taken at local scales are often shaped by actors at larger scales (Martín-López et al. 2019).
- **Time-lag effects**: it can take years or decades for the impacts to become apparent (Liu et al. 2013).
- **Induced / spillover effects**: Economic or ecological consequences extend beyond the original area. For instance, an increase in soybean production can alter the consumption habits of agricultural workers, thereby influencing the local economy and land use (Altieri & Pengue 2005, Glidden et al. 2021).
- **Feedback effects**: Initial impacts can reinforce themselves. For example, China's domestic soybean production has not kept pace with the country's growing demand, leading to a significant rise in soybean imports from Brazil, accelerating deforestation there (Liu et al. 2013).

Effective biodiversity research must therefore adopt a telecoupled systems approach (Carrasco et al. 2017), taking into account trade flows, financial investments, and actors (e.g. agribusinesses or consumers) at various spatial and institutional scales. For example, Europe's nature conservation efforts may lead to agricultural intensification in other countries, thereby undermining global sustainability (Martínez-Valderrama 2021). In a telecoupled world, it is possible to identify systems of importers and exporters trading, for example, agricultural products, wildlife products, and timber, as well as investments by financial actors such as shareholders and multinational agribusinesses (Liu et al. 2013). The increasing local occurrence of invasive alien species is an increasingly important side effect of the trade flows (IPBES 2023). One potential solution to address the impacts of telecoupling could be to incorporate telecoupling into future landscape planning (Huang et al. 2021).

Further examples of telecoupling effects as a result of EU economic interests include the mining of rare earth elements (Yin et al. 2024, Carpenter et al. 2015, Oliveira et al. 2017) and widespread artisanal gold mining which often involves the use of mercury, resulting in severe ecological consequences and adversely affecting biodiversity hotspots in the countries of origin. As the consumption of plastic products continues to rise in Europe, future biodiversity research must also address the complex issue of plastic pollution and its various sources (Azevedo-Santos et al. 2021). Intensification of land use and over-exploitation are often accompanied by increased environmental pollution, leading to unsustainable resource management (Kolawole & Iyiola 2023). Research must therefore investigate the associated impacts on the environment and

biodiversity, and propose approaches to mitigate these impacts.

Future conservation research must consider these global interconnections in terms of policy, planning, and science, in order to design sustainable solutions that prevent harm from simply being shifted elsewhere. Scientific cooperation is essential for the global implementation of the KMGBF.

However, implementing the KMGBF presents considerable challenges, particularly for developing countries, including least-developed countries and Small Island Developing States. These challenges are not limited to financial constraints but also include significant shortcomings in scientific and institutional capacities. Key GBF targets, such as Target 1 (conserving 30 percent of land and marine areas by 2030), Target 13 (ensuring equitable access to and benefit-sharing from genetic resources), and Target 20 (strengthening capacities for planning, research, monitoring, and implementation), highlight the importance of robust scientific infrastructure (CBD 2025). The Technical and Scientific Support Centres recently developed by CBD will help to build the capacity of CBD parties to implement the KMGBF targets.

The EU can advance the GBF's objectives significantly beyond its borders by providing targeted research funding and capacity building, and by facilitating knowledge exchange with third countries. Initiatives such as Erasmus+ and Twinning foster sustainable scientific infrastructure and long-term partnerships in developing countries, thereby supporting the development of qualified experts that are crucial for the GBF's effective implementation.

Many biodiversity-rich developing countries, most notably least-developed countries and Small Island Developing States lack essential scientific infrastructure components such as species databases, effective monitoring systems, and facilities to support environmental research. These gaps make international scientific cooperation indispensable. Such cooperation contributes to the long-term success of the GBF by building scientific expertise and sustainable research systems. The EU contributes to this effort through decades of biodiversity research and collaboration, notably via Horizon Europe, which will allocate over EUR 95 billion to global biodiversity initiatives between 2021 and 2027 (European Commission 2025c).

These efforts are complemented by Biodiversa+, which since 2021 has been promoting scientific cooperation with partners in Africa, North and South America, Asia and the Pacific. Further efforts have been made by projects such as EuropaBON, which aimed to establish standardised biodiversity monitoring systems that are compatible with global platforms such as GEO BON. Such standardisation is essential for producing comparable international data and guiding coordinated action to protect biodiversity (EuropaBON 2025).

Crucially, scientific cooperation must evolve beyond purely technocratic models. The co-production of knowledge that integrates local, traditional, and especially indigenous knowledge systems, is essential for inclusive and context-specific biodiversity governance. The EU actively supports such integrative approaches through initiatives like EKLIPSE, which fosters dialogue between science, policymakers, and civil society. The EU strongly supports and actively engages also with IPBES, which promotes the inclusion of diverse knowledge systems into biodiversity management.

The above examples demonstrate that the EU is taking action to regulate environmental impacts along supply chains and support global biodiversity conservation. Trade policy can actively support and be part of the ecological transition. It is therefore of paramount importance that the impact of trade agreements on biodiversity is carefully assessed, that biodiversity provisions of existing and new agreements are strengthened, that measures are put in place to avoid or minimise the access of products associated with terrestrial freshwater and marine ecosystem degradation to the EU market, while promoting biodiversity-friendly imports and

value chains. Despite EU trade policy putting a great emphasis on trade being a vehicle for sustainable development, the available evidence demonstrates that a net positive contribution of the EU trade to sustainable development, i.e. going beyond the economic sphere and addressing also environmental and social aspects, has yet to be achieved (IEEP 2020b). Furthermore, research to address illegal and unsustainable legal wildlife trade and its drivers should be strengthened, enabling governments to better meet their obligations under the Sustainable Development Goals (SDG) and international conventions (Esmail et al. 2019), and help avoid the emergence of pandemics (IPBES 2020). Sustainable, legal and equitable wildlife trade can be a powerful solution for meeting the twin challenges of enhancing rural and coastal livelihoods while conserving biodiversity and ecosystems. For communities empowered by effective and equitable governance systems, the benefits arising from trading wildlife products can catalyse community investments in nature conservation, law enforcement and stewardship of wildlife.

Moreover, experience from around the world suggests that preserving biodiversity requires environmental issues to be at the heart of economic and financial decision-making. The effective implementation of the KMGBF therefore requires governments and the private sector to increase biodiversity financing and reduce financing that harms biodiversity (OECD 2020). Clearly, biodiversity finance must be increased, for example, to improve the coverage and effectiveness of protected area networks, to restore degraded ecosystems, and to mainstream biodiversity concerns across sectors.

However, practice- and evidence-based knowledge is needed to guide the prioritisation of these financial flows and better assess their long-term impact. Such knowledge is also needed to encourage the adoption of innovative financing instruments and mechanisms, such as economic instruments, including corporate biodiversity reporting, green bonds, impact investment and joint public and private sector funding. This is particularly pertinent for financial flows in developing countries, which are often hotspots of biodiversity. Development cooperation providers are increasingly using their aid to target environmental synergies and co-benefits (Drutschinin & Casado-Asensio 2014). Official Development Assistance (ODA) can also leverage other sources of biodiversity financing such as environmental fiscal reforms, markets for green products, payments for ecosystem services, biodiversity offsets, and conservation trust funds.



Expected impacts

This theme will deepen our understanding of the relationship between biodiversity loss and production and consumption patterns, shedding light on the economic and social processes underlying environmental issues on a global scale. It will highlight the root causes of global biodiversity loss, and the role of various sectors in nature conservation through their sectoral activities, as well as the role of the general public through their lifestyles. This theme can also help to scale up the range of policy instruments for biodiversity, as well as designing appropriate economic incentives to ensure that biodiversity is better reflected in producer and consumer awareness and decision-making, including the effects of telecoupling.

R&I under this theme will also provide guidance on adjusting trade agreements in order to avoid negative impacts on biodiversity and ecosystem services, as well as on external policies and programmes. In this way, it can contribute to successfully achieving various United Nations (UN) Sustainable Development Goals (SDGs), that directly relate to biodiversity conservation, e.g. SDG 15 'Life on Land', SDG 14 'Life Below Water (marine)' and SDG 6 'Clean Water and Sanitation (freshwater)'. This will also contribute to achieving other, interconnected, goals, including those related to poverty alleviation, sustainable agriculture, food security and diverse diets, forestry and fisheries, planetary health, economic development, peace and security, and climate change mitigation and adaptation.

Finally, R&I under this theme can help to evaluate the effectiveness of biodiversity finance flows, quantify finance flows to biodiversity and ecosystem services at the global scale, and provide guidance for prioritising investments, including ODA.

Topical sub-theme 3.1: Teleconnections and (wildlife) trade

Link with the EU Biodiversity Strategy 2030, which acknowledges that:

- while it will be essential that the EU protects and restores biodiversity within its own borders, the vast majority of global biodiversity loss lies in the tropics and the oceans, but is also heavily impacted by EU policies. For example, even though forest cover is currently increasing within the EU, about 10% of global deforestation is directly related to EU trade and consumption. The EU therefore has a responsibility to reverse the negative impacts of its trade and consumption patterns on biodiversity, including through increased investments to protect and restore biodiversity in partner countries (cf. link with Topical Theme 1; and Topical subtheme 3.2.);
- trade policy will actively support, and be part of the ecological transition;
- efforts to reduce wildlife trade and consumption can help to prevent possible future diseases and pandemics;
- efforts to support sustainable and biodiversity-friendly food and product chains could help to counteract the decline of biodiversity.

Major knowledge needs include (non-exclusive list):

- developing models that can identify the potential detrimental effects of telecoupling on biodiversity, such as cascading, time-lag, spillover and feedback effects. Similarly, we need to understand how conservation/restoration interventions can create undesirable telecoupled market feedbacks and spillover effects;

- analysing ways to enhance the traceability of businesses' environmental impacts by developing models that can link remote sensing data on land use with businesses and their procurement decisions;
- investigating the extent to which the locally increasing occurrence of invasive alien species represents a potentially significant side effect of the trade flows and how this might influence telecoupling effects;
- studying how, e.g. voluntary certification schemes, incentives to encourage deforestation-free supply chains, establishing payments for ecosystem services, and certification in key agricultural commodities can be used to obtain positive biodiversity outcomes;
- developing methods to internalise the biodiversity (and social) costs of unsustainable production practices in commodity prices, and to allocate these costs across the various stages of production, processing and consumption within a product's life cycle;
- analysing which biodiversity conservation measures can contribute to cost-effectively changing the social norms of affluent consumers (including young people) who drive demand for wildlife and agricultural products and thus deforestation, for example by increasing the visibility of harmful environmental practices and introducing policy interventions and sanctions;
- Investigating how biodiversity conservation measures aimed at influencing telecoupling forces can best be integrated with existing on-the-ground measures at a landscape level. Integrating multiple scales and approaches, from global to local, is necessary to realise the potential incentives and changes generated by telecoupling;
- assessing the role of food consumption in the EU in the current biodiversity decline;
- characterising the ecological footprint of products and activities, including life-cycle approaches and natural capital accounting (link with Topical Theme 2);
- analysing the impact of trade agreements on biodiversity, not only on forests, but other habitat types too;
- investigating the impacts of illegal and legal wildlife trade on wild populations. Limited knowledge can lead to interventions based on unsubstantiated assumptions. A better understanding of the interactions between land use change, resource exploitation and biodiversity decline is needed. Little is known about the factors affecting illegal wildlife trade, how they interact and, crucially, how they are changing as a result of policy interventions, technological changes and external drivers;
- analysing the impact of telecoupling dynamics on the relationship between biodiversity and human rights, as well as the relationship between biodiversity and the traditional cultural practices of indigenous communities.
- investigating how awareness of telecoupling effects might influence consumer behavior and willingness to pay for products from sustainable and biodiversity-friendly product chains;
- developing further instruments that could help regulate environmental impacts along supply chains and support global biodiversity conservation;
- improving the effectiveness of existing biodiversity governance instruments that take complex global interdependencies into account.

Topical sub-theme 3.2: Economic incentives and investments in natural capital

Link with the EU Biodiversity Strategy 2030, which acknowledges that:

- natural capital investment offers high economic multiplier effects and positive climate impacts;
- delivering on the Kunming-Montreal Global Biodiversity Framework requires greater cooperation with partners, increased support and financing for developing countries, and phasing out of subsidies harmful to biodiversity;
- investing in nature protection and restoration, both within and beyond Europe's borders, is essential for sustainable economic development and cooperation.

Major knowledge needs include (non-exclusive list):

- development and application of approaches to elucidate the impacts of investments from major development banks and aid donors in low income countries (which are often biodiversity hotspots), and making such investments deforestation- and biodiversity-proof; research is needed to reduce or mitigate the impacts of these investments on biodiversity;
- Identifying the world's most important areas for biodiversity protection, including (terrestrial) protected areas (PAs), marine protected areas (MPAs) and key biodiversity areas (KBAs), and assessing risks and financial requirements to ensure their continued management and protection (link to Topical Theme 1). These areas are of global importance, but are often located in low-income countries where technical capacity and financial resources are largely lacking. Research programmers and funders (along with aid donors) should work with relevant researchers and stakeholders (including decision-makers) to identify the most significant knowledge gaps in relation to the Kunming-Montreal Global Biodiversity Framework targets and develop strategies to address these gaps, including through innovative financial mechanisms;
- research into how the EU can support the protection and restoration of ecosystems globally, including which metrics should be used and how areas should be prioritised for support;
- research into how green bonds, high-integrity nature credits, certificates and other mechanisms can most effectively fund conservation and restoration projects, as well as how their efficacy can be assessed and ensured;
- analysis of investments in climate action and other solutions in partner countries: In particular, research into the extent to which biodiversity co-benefits are already being realised or taken into account, and/or the extent to which investments by donors could also result in biodiversity co-benefits;
- research to understand and tackle the persistence of subsidies that harm biodiversity and encourage unsustainable land, freshwater and sea use and management in the agriculture and fisheries sectors, as well as through international trade rules.


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CROSS-CUTTING THEME A

Better knowledge on biodiversity and its dynamics

Rationale

Understanding biological diversity in terms of processes by which ecosystems and their components function, be it at ecosystem, species, population or genetic levels, is critical to informing sustainable use of biodiversity and safeguarding it. Biological diversity continually evolves and changes in response to biotic and abiotic fluctuations and other environmental pressures, according to assembly rules, evolutionary forces and biotic and abiotic drivers. It is thus necessary to record in time and space (i.e. benchmark) its status and, subsequently, monitor that status in order to identify changes, assess underlying mechanisms, and develop scenarios. In this context, recording both biodiversity status and a range of variables acting as proximal and distal drivers for biodiversity changes (land use and management, climate, exploitation levels, biological invasions, pollution, governance systems at stake) is of paramount importance.

Literature reviews on biodiversity changes and recent assessments, such as the IPBES assessment for Europe and Central Asia (IPBES 2018), the Global Assessment report (IPBES 2019), the Pollination Assessment (IPBES 2016), the Invasive Alien Species Assessment (IPBES 2023), the Global Biodiversity Outlook 5 (CBD 2020), the FAO State of Knowledge of Soil Biodiversity (FAO 2020) and the State of the Europe's Environment (EEA 2025a) are confirming that information on biodiversity trends is biased towards some taxonomic groups and some environments, and that important dimensions of biodiversity (e.g. genetic and functional diversity) still remain to be properly studied. Furthermore, the EU State of Nature Report 2020 (European Commission 2020b), the EU ecosystem assessment (Maes et al. 2020), the State of the Europe's Environment 2025 (EEA 2025a) and the JRC report towards the second EU wide ecosystem assessment (Paracchini et al. 2026) identify a series of knowledge gaps that include the need for a better characterization of the status of many habitats and species, the actual contribution of the Natura 2000 network to conservation status, and more generally the assessment of the health and condition of ecosystems.

In addition, while many efforts have been made to monitor components of European biodiversity, including well established networks to survey populations of common birds and butterflies that deliver on indicators used by policy makers, major knowledge gaps remain for many taxonomic and functional groups. It is also needed to increase the coverage of biodiversity monitoring schemes, to make the best use of traditional and emerging/new methodologies for monitoring, and to harmonise monitoring methods and protocols, variables and databases, as well as indicators across countries and regions. All in all, it is thus necessary to establish a pan-European, transnational network of harmonised monitoring schemes that is able to efficiently inform policy makers and monitor the implementation of legislation, including the NRR, by measuring and analysing biodiversity changes across Europe. This will require biodiversity monitoring at a larger scale than ever before, with higher precision and increased coverage of habitats and environments and with data being provided timely, openly and readily understandable. Based on EU priorities and national priorities from the participating countries, Biodiversa+ has identified a list of priorities (Basille et al. 2025) to better support research, society and policy needs that guide the Partnership's activities in promoting and supporting transnational biodiversity monitoring. It is also vital that monitoring remains consistent over time to allow for the detection of slow and gradual changes. Monitoring schemes must therefore be set up with long-term sustainability of funding and organisation in mind. Particular efforts must also be made to support, maintain, digitise and harmonise existing long-term monitoring schemes, many of which have unique and valuable datasets. Cost-effectiveness is paramount in this endeavour, combining traditional biodiversity field monitoring with emerging novel technologies, such as automated sensors, eDNA, unmanned remote sensing and AI, as well as participatory citizen science. These efforts should build on a solid foundation of existing national, regional and pan-European infrastructure and monitoring networks and facilities but will also require new governance structures and infrastructure development.

In many European countries, however, biodiversity monitoring remains fragmented: biodiversity data collection is driven mostly by national or sub-national policy needs and implemented using different approaches, usually developed independently and based on the specific context. Data is often not made available to, or usable by the broader monitoring community, due to limited incentives or insufficient resources to make FAIR data available and a lack of methodological and technical interoperability. Strengthening national coherence and effective governance of biodiversity monitoring helps to maximise the use of existing data, and allows for identification of critical gaps in monitoring, improving data quality and comparability. It is a prerequisite for transnational coordination at the European level, by means of peer learning, capacity building and alignment of monitoring approaches. This will greatly improve data availability and usability for EU-level biodiversity assessments and analyses.

A strong link between biodiversity monitoring and the monitoring of ecosystem services, particularly those linked to biodiversity (e.g. pollination or health issues), is needed in order to assess the implications of changes in biodiversity. Furthermore, a strong link between biodiversity monitoring and the monitoring of drivers is required to identify threats and potential actionable levers.

Expected impacts

Understanding biodiversity change and decline, and addressing their main drivers through data-driven science, integrated multidisciplinary knowledge, new tools, models and scenarios, will inform choice for conservation and restoration policy alternatives and will help assessing the success or failure of conservation policies and regulations (e.g. the EU Habitats Directive's Articles 10, 17 and 18; Nature Restoration Regulation) and revisiting them in face of global change (link to Topical Theme 1). This will have a positive impact on European biodiversity per se, both as natural heritage and as natural capital that underpins human well-being and sustainability.

R&I under this theme will enable regional and international biodiversity discovery initiatives. In addition to knowledge breakthroughs, this will contribute to promote innovation in mainland Europe and in the EU's outermost regions and overseas countries and territories (ORs and OCTs), through the discovery of new taxa, genes, functions and bioproducts, and by feeding biomimicry approaches. Projects funded by Biodiversa+ under this theme are developing and validating monitoring methods for currently under-monitored components of biodiversity, and promoting the harmonisation of tools across the full monitoring and data value chain, from protocols and analytical approaches to interoperable and shared databases. This theme will also facilitate modelling and prediction of the effects of global change on biodiversity. These effects can be direct, such as changes in species range and metabolic rate, or indirect, such as coral bleaching or the introduction of invasive alien species. Ultimately, these effects also include cascading socioeconomic consequences for key sectors such as agriculture, health, (agro-)forestry, energy, aquaculture, and fisheries. It will help us to anticipate the arrival of pathogens, disease vectors and invasive species, while assisting in the eradication or control of alien species that have already become established and demonstrated an impact.

Genotyping and phenotyping wild species can be of interest for a range of sectors linked to cultivated plants, livestock, aquaculture and cultivated micro-organisms. For instance, for many aquacultural and agricultural species, we need characterization of wild individuals for important traits, since the wild relatives can act as a valuable source of genetic material for existing breeding and selection programmes and conservation schemes. Similarly, seed production is required for native plant species and ecotypes, e.g. in the context of deployment of urban Nature-based Solutions and new forestry schemes.



This theme will enable the characterization of the biodiversity footprint of human activities in mainland Europe, as well as in ORs and OCTs, by building on existing field monitoring and making full use of new approaches and tools, such as those offered by AI, remote sensing and eDNA. Biodiversity dynamics will be correlated with environmental changes as assessed by earth observation programmes, such as Copernicus and relevant research infrastructures. Plausible future dynamics will be explored through scenario analysis. As we are considering the 2030 horizon and beyond, the activities will encompass both policy/management-driven science (i.e. according to issues already identified in the policy and management arena), as well as more bottom-up science which can propose innovative policy/management options and address issues that are not well defined today. With regard to the latter, Biodiversa+ will promote the use of the latest and upcoming developments, such as new statistical methods (e.g., the Bayesian approach, which can efficiently process higher volumes of data and study nonlinear relations of interest). Other key needs are better coordination between earth observation and in-situ monitoring to optimise ground truthing (also in anticipation of the upcoming increase in resolution of the next generation of space missions and the additional products becoming available such as those relating to photosynthesis and biomass), as well as better coordination between space missions to optimally use the multiple optical data bands and different forms of remote sensing (e.g. imaging spectroscopy, SAR and LIDAR).

In addition, and according to these objectives, an important intended impact of this theme will be the support to building a network of coherent and harmonised monitoring schemes across Europe. By doing so, this theme will provide the empirical backbone for assessments of biodiversity status and trends, help define favourable conservation conditions and enable evidence-based evaluation of biodiversity policies and actions across Europe.

Cross-cutting Sub-theme A.1. Characterising and understanding biodiversity status, trends and drivers

Link with the EU Biodiversity Strategy 2030, that commits to:

» no deterioration in conservation trends and status of all protected habitat and species listed under the Birds and Habitat Directives by 2030;

» ensure that at least 30% of species and habitats not currently in favourable status are back in that category by 2030 or show a strong positive trend;

» set legally binding EU nature restoration targets to restore degraded ecosystems as part of the EU Nature Restoration Regulation;

» putting in place a new European biodiversity governance framework, with a monitoring and review mechanism, based on a set of agreed indicators.

Major knowledge needs include (non-exclusive list):

» better characterization of all biodiversity dimensions and their trends in Europe, accounting for the different organisation levels (functional, genetic and taxonomic) in all compartments (below and above ground, freshwater and marine). Efforts are particularly needed to study lesser-known organism groups (such as microbes and arthropods), environments, compartments (such as soils and the deep sea) and dimensions (such as functional diversity and food webs). This is also true of threatened species, biodiversity-rich areas and hotspots that remain uncharacterised in some parts of mainland Europe and OCTs and ORs. Thus, it has major implications for conservation and sustainable management decisions. This is particularly needed to determine what constitutes a “favourable ecological condition” and “good conservation status”, better guide conservation strategies and management, including the development of Nature Restoration Plans by national governments, and provide new opportunities for innovation. For instance, bioprospection of new genes, functions and natural substances harboured by aquatic and terrestrial organisms – including microorganisms – can offer great economic opportunities;

» definition of operational metrics, e.g., of genetic, functional and cultural diversity; of evolutionary potential; and of the level of interactions within and between communities and ecosystems (link to Cross-cutting Theme A.2). Regarding cultural diversity, there is a need to explore how local and indigenous knowledge (related to biodiversity and to social and economic costs and benefits of both use and conservation of biodiversity) can contribute to activities that improve the biodiversity status in Europe, and development of participatory tools;

» characterise the threats to all aspects of biodiversity, including functional diversity, in a global change context: this includes the effects of climate change, land use change, overexploitation, pollution, (re)emerging pathogens, and biological invasions. It requires downscaling climate models to adequate levels, for which small regions, islands and archipelagos provide excellent case-studies (e.g. ORs / OCTs). A particular attention should be paid to potential impacts of synthetic biology, and of pollutants including new/emerging ones like endocrine disruptors, microplastics and engineered nanoparticles, which have been argued as one pressing issue for the fate of biological diversity in the future. Long-term (possibly transgeneration), cumulative effects on specific taxonomic groups and ecological communities are not yet well understood and deserve further attention.



Research identifying phase-shift thresholds of direct and indirect stressors is urgently needed, in particular to guide decisions over limits to extractive activities, such as fishing or logging. Specific threats to animal breeds and plant varieties should also be better understood to guide efficient strategies to conserve and manage genetic resources and their wild relatives;

» knowledge is particularly needed on the effects of multiple stressors and extreme events. This includes understanding the impact of climate change in combination with context-specific drivers on biodiversity and ecosystem services, especially with respect to tipping points and planetary boundaries (IPBES 2018);

» it is also essential to better include social sciences and humanities in the field of biodiversity management to understand the roots of our interactions with non-humans and how social factors (beliefs, value systems, culture, markets, policy, demographics) evolve and determine decision making process and choices for nature conservation and sustainable exploitation (IPBES 2022; link to Topical Theme 1, and 2);

» role of adaptation in a global change context. Climate, land use, ecosystems, infrastructures, and human societies are all being transformed simultaneously. On-going research has developed a basic understanding of the potential consequences of these concurrent changes, but important uncertainties persist, especially at geographical and time scales relevant to adaptation processes and adoption and use of options for limiting impacts and seizing opportunities. Research should better characterise the sources of flexibility and transformability for species, populations, ecosystems and social-ecological systems, in the face of global change. This should include studies on phenotypic plasticity, evolution, behaviour and migration, reshuffling of biological assemblages, and the dynamics of strategies, knowledge and practices, as well as the relative roles of these different flexibility sources at a range of spatial and temporal scales. Research should also study how indigenous peoples and local communities in Europe seek to adapt to environmental changes by exploring holistic solutions able to increase their response capacity and resilience to a broad range of perturbations. Drawing upon different knowledge systems, including

indigenous and local knowledge, is appropriate. Stakeholder diversity is therefore a source of resilience, to which citizen science may make an important contribution. Research could be used to propose indicators of adaptation potential. This research is also needed to develop scenarios of biodiversity and a new generation of integrated tools for providing quality-controlled, usable information for near-term decisions with long-term implications;

» knowledge will also have to be reinforced regarding how biodiversity changes imply changes in ecosystem functioning, and ecosystem goods and services and human well-being in different sectors (agriculture, aquaculture & forestry; energy; health, including recreational outdoor activities; etc.). This requires analysing how biodiversity relates or contributes to the maintenance and delivery of such services and their resilience to climate change and disturbances. It also requires better knowledge on the cascading effects of direct, indirect and emerging drivers of change, separately and in combination and interaction, on biodiversity, ecosystem function and ecosystem services (at all relevant scales); and provision of methodologies to predict such effects. This includes analysing the importance of breed/variety selection and the utility of locally-adapted genetic resources and species for the delivery of multiple services in agricultural areas and adaptation/mitigation capacity to climate change, invasive alien species and pathogens;

» knowledge on the impacts of pesticides/fertilisers on biodiversity, ecosystem condition and ecosystem services, and guiding criteria and thresholds for the authorization and use of pesticides/fertilisers;

» indicators on the global extent and consequences of biotic homogenization, including genetic homogenization;

» research into re-using existing datasets and information from biological collections will be very useful for performing meta-analyses on the dynamics of biodiversity and ecosystem services, as well as their drivers;

» all this science-based knowledge will help with the integrated impact assessments of (cumulated) direct and indirect stressors on ecosystem processes and services, and assessment of resilience to cumulative pressures;

» comprehensive description of European wildlife genomes, including those of wild relatives of domesticated breeds, to support the preservation of European ecosystems and their biodiversity.



Cross-cutting Sub-theme A.2. Setting up a Pan-European network of harmonised monitoring schemes

Link with the EU Biodiversity Strategy 2030, that commits to:

» no deterioration in conservation trends and status of all protected habitat and species, as listed under the Birds and Habitat Directives, by 2030;

» ensure that at least 30% of species and habitats not currently in favourable status are back in that category by 2030 or show a strong positive trend.

Major knowledge needs include (non-exclusive list):

» Development, validation and harmonisation of operationalised protocols and methods used for monitoring biodiversity & ecosystems (including ecosystem services directly linked to biodiversity) across Europe, and harmonisation of methods for assessing the state of biodiversity/ecosystems, building on the results of the EuropaBON project;

» harmonisation of data format and interoperability for the exchange of data at a transnational level (Hardisty et al. 2019);

» improvement of the coverage and representativeness of monitoring schemes. This includes increasing the number of reference sites/points, as well as utilising and harmonising existing and new monitoring schemes, programmes, infrastructures and data repositories in Europe, in a joint effort to calibrate assessments and compare the efficiency of measures. More monitoring efforts should be devoted to lesser-known ecosystems, e.g. soils, calcareous grasslands, Arctic systems, seabeds, as well as genetic diversity, biodiversity-pressure relationships, etc. This would allow the creation and support of a joint European network of long-term biodiversity monitoring schemes, aiming for an evaluation of trends across land and aquatic habitats, taxa, and functional groups; Biodiversa+ has set up an incubator to propose and initiate pilots to trial transnational monitoring on a sub-set of the shared priorities (Biodiversa+ pilots; Box 1). These pilots allow for small scale trials of novel technologies, harmonisation of protocols and data management between countries, lowering the threshold for implementation on a larger scale, either as a whole or in part(s) via integration of the results in existing national monitoring programmes. While not originally developed for lesser-known ecosystems or taxa this incubator would be an excellent tool to stimulate the development of such monitoring programmes.

» Improve both national and transnational coordination of biodiversity monitoring to enable the build-up of a transnational European network of monitoring schemes. Biodiversa+ has contributed to that in several ways, by working on finding shared priorities among the partners and by developing the concept of Thematic Hubs, expert-driven communities centred around specific biodiversity domains (Silva del Pozo, 2025). These Thematic Hubs would help to develop and harmonise biodiversity monitoring for their specific domain and connect to National Biodiversity Monitoring Coordination Centres (NBMCCs) and an overarching EU Biodiversity Observation Coordination Centre (EBOCC) to support effective transnational monitoring and connect to policy (Lipsanen et al. 2026). In addition, Biodiversa+ is developing 'BioDash', a digital dashboard that will enable mapping and monitoring of available national monitoring data/metadata, in close collaboration with other initiatives in this area;

» Improved understanding and structuring of financial mechanisms required to sustain long-term biodiversity monitoring, including governance and coordination arrangements for harmonised

methods and data sharing at European scale, and identification of monitoring schemes for which a European-level coordination provides the greatest added value.

» Guiding and prioritising aspects of monitoring schemes to better inform policy makers and other stakeholders. This requires monitoring methods to evaluate the efficiency of public policies and actions on the ground taken by public authorities and other (including private) actors (link to Topical Theme 2, and Cross-cutting Theme B) to protect or restore biodiversity. All dimensions of biodiversity (taxonomic groups, functional groups, ecosystem services directly linked to biodiversity) could be considered when prioritising. For instance, monitoring efforts could help understand agriculture, pollution and climate change impacts on pollinators and evaluating the effectiveness of management and adaptation options for securing pollination under future conditions (in relation with the EU pollinator initiative);

» Development and deployment of new technologies and approaches (such as eDNA and other molecular biology-based approaches, mobile sensing technology, remote sensing through satellites, airborne campaigns and/or drones, acoustics, camera traps, etc.) whose potential is increasingly being explored by biodiversity research and monitoring activities, including in the Biodiversa+ monitoring pilots. This requires the development, transfer and operational use at a transnational level of these new monitoring tools/ approaches, including better use of emerging technologies and algorithms to process this new type of information (for instance AI, machine learning, deep-learning). Biodiversa is trialling this in transnational monitoring pilots on Automated Biodiversity Monitoring Systems (ABMS) and Invasive Alien Species (IAS), setting up pipelines to go from collected images from camera traps and recorded sounds to automated recognition of species.

» A major goal here is to share knowledge on these new approaches (including need for harmonisation, see above) and facilitate the use of common laboratories and infrastructures, such as the eLTER Research Infrastructure, in which several Biodiversa+ partners already participate. Biodiversa+ stimulates this by, for instance, creating a roadmap for novel technologies and approaches (Ramilo-Henry et al. 2024) and by organizing workshops and webinars on the topic.

» In recent years advanced initiatives to monitor all species-level biodiversity by DNA barcoding and metagenomics have been developed, as well as genetic diversity within a broad selection of species in Europe. Understanding the relationship between genetic diversity and historical land use and land cover in specific geographical areas could inform restoration activities (link to Topical Theme 1).

» Promote the contribution of citizens and NGOs to monitoring programmes through citizen science. Citizen science has not yet delivered its full potential, both in terms of possible research impact and public engagement and raising awareness of biodiversity among citizens. In addition, the uptake of monitoring information and data by policy makers and other relevant stakeholders (e.g. private sector) should be facilitated;

» Definition of common indicators to communicate the results of biodiversity monitoring. This takes into consideration ongoing work in the context of the Convention on Biological Diversity, Essential Biodiversity Variables (EBVs) that support regional and global synthesis, and System of Environmental Economic Accounting Ecosystem Accounting (SEEA) indicators that can integrate biodiversity values into economic systems. This requires an agreement on shared science-based references and harmonised indicators across European countries, in order to enable comparisons between countries, inform public policy and communicate with citizens;

» Demonstrate the usefulness of monitoring data in decision-making processes, in both the public and private sectors, notably for reporting on the implementation of the KMGBF, the EU Biodiversity Strategy for 2030, the Nature Restoration

Regulation, the Habitats Directive, the invasive alien species regulation, and ecosystem accounting;

» Demonstrate the use of monitoring data in the private sector, for instance for sustainability indicators.

BOX 1 - THE BIODIVERSA+ PILOT INCUBATOR

Biodiversa+ pilots are implementation-oriented actions that test the practical foundations needed to connect national monitoring schemes in harmonised transnational networks.

Priorities. Biodiversa+ uses a stable but periodically reviewed set of monitoring priorities as a frame for action. For 2025-2028, it retained 12 thematic priorities plus transversal activities, reflecting decision relevance, actionability, monitoring gaps, transnational need, complementarity with existing initiatives and Biodiversa+ added value. Invasive alien species (IAS) is one such priority; the IAS pilot tests one specific response within it.

Pilot incubation and selection. Through the incubator, dedicated proposal groups turn broad priorities into candidate pilots. Using a common framework, they assess methodological readiness, complementarity with existing initiatives, transnational added value, risks and potential uptake, and develop workplans and budgets. Biodiversa+ partners evaluate the proposals, and the General Assembly selects pilots based on strategic relevance, feasibility, partner participation, and expected contribution to harmonised monitoring.

Execution and learning: the IAS example. Each pilot tests whether a common monitoring approach can work across diverse national settings and produce comparable results, while revealing barriers to wider adoption. Launched in 2023, the IAS pilot brought together initially ten, and later eleven, active partner organisations to test vehicle-mounted cameras for invasive plants and automated camera traps for moths. Implementation exposed barriers including decentralised procurement, equipment reliability, the transfer of large data volumes and inconsistent metadata. Partners addressed these barriers collectively through repeated testing, troubleshooting and adaptation.

Outputs and transferable value. Products differ between pilots, but they provide similar building blocks for scale-up: a community of participating organisations, refined protocols, interoperable data arrangements, strengthened capacity, and evidence on costs and coordination requirements. For IAS, these building blocks include improvements to equipment and software, shared operational guidance, adapted data-collection procedures, more robust processing pipelines, image-recognition models and initial occurrence data. Adding a partner in 2024 also demonstrated the system's ability to expand geographically. The IAS pilot's 2025-2027 extension is further testing implementation options, including applications along railways and waterways, refining protocols and cost estimates, preparing interoperable occurrence-data flows to GBIF and EASIN, and developing workflows to translate monitoring data into EBV-based products.

Towards lasting coordination. The resulting approaches, operational evidence and participating community can support the thematic hubs workstrand, which explores durable topic-specific coordination between national schemes, and wider efforts to establish transnational monitoring networks. Lessons also feed back into subsequent incubator cycles, strengthening the design and implementation of future pilots.



CROSS-CUTTING THEME B

Better knowledge to develop, deploy and assess Nature-based Solutions in a global change context

Rationale

Nature-based Solutions (NbS) are solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience. Such solutions bring more diverse nature and natural features and processes into cities, landscapes and seascapes, through locally, resource-efficient and systemic interventions. NbS must therefore benefit biodiversity and support the delivery of a range of ecosystem services (European Commission 2025b, IUCN 2020b, UNEA-5 2024). Although different stakeholders view NbS from different perspectives, they have the potential to transform environmental and societal challenges into innovation opportunities, including by turning natural capital into a source for green growth and sustainable development (European Commission 2015), whilst also taking into account concerns of citizens and institutions. NbS are thus seen as sustainable measures that simultaneously meet environmental, societal and economic objectives and should help maintain and enhance natural capital. NbS already form a substantial part of the indicators reported by countries under the 2015 Paris Agreement, highlighting the strong link between the biodiversity and climate crises. NbS are playing an increasingly important role in encouraging governments, institutions, businesses, and citizens to develop innovative approaches for integrating natural capital into policies and planning, while supporting the preservation and enhancement of biodiversity and human well-being.

EU policies and legal instruments strongly encourage the increased use of NbS. The EU Strategy on Adaptation to Climate Change (European Union 2021a) seeks to enhance climate resilience and maintain healthy water systems, oceans and soils by scaling up the implementation of NbS. The strategy also seeks to increase the supply of clean, fresh water and reduce the risk of flooding by restoring the sponge-like function of soils and implementing NbS on land. The EU Nature Restoration Regulation (European Union 2024a) provides an opportunity to support the management of water quantity and enhance resilience against both droughts and floods through the use of NbS. The European Water Resilience Strategy (European Commission 2025a) aims to ensure that, on its way back to the sea, freshwater is naturally stored in soils, forests, wetlands, floodplains, and other ecosystems. The strategy recognises the importance of restoring the 'sponge function' of our landscapes to replenish groundwater reserves and protect biodiversity. In urban areas, the strategy promotes the concept of 'sponge cities' and water management using NbS to absorb and release water in a controlled manner.

Despite the benefits of this concept (Eggermont et al. 2015), innovation with nature and the uptake of marketable NbS strongly depend on a solid knowledge base, and the engagement of relevant networks and stakeholder groups from policy, business and practice. A great deal of knowledge and practical experience already exists, and many NbS are known or have been developed. Yet, they often remain under-deployed, and technical solutions are often still being considered as the main options for tackling societal challenges, while adaptive management frameworks for NbS are often lacking. NbS are still rare in full-scale practice. Therefore, scientists, policymakers, practitioners and other stakeholders need to join forces in order to support the systemic transition to a sustainable future enabled by NbS, in which economic, social and environmental needs are balanced.

Identifying and implementing NbS will require documenting and analysing the possible synergies and trade-offs between multiple ecosystem services, between ecosystem services and biodiversity, and between the views of multiple stakeholders. In addition, stakeholders and policymakers must be mindful of the complexities and uncertainties surrounding NbS. When implementing Nature-based Solutions, it should be compulsory to assess the associated risks. Any potential maladaptation, particularly when NbS are intended to adapt to climate change, must be identified and quantified. Alternative solutions must also be considered in terms of their



potential long-term impact on the environment, taking into account future changes. Otherwise, NbS could create more problems than they solve (e. g., species introduced for pest control can become invasive, if the necessary controls are lacking).

Specific work on the different types of NbS[7], which are particularly important for biodiversity conservation and restoration, could be carried out at the intersection with Topical Theme 1. Specific work to close existing knowledge gaps regarding whether and how NbS can mitigate the drivers of biodiversity loss, and to support the effective implementation of NbS, market uptake, and contribution to just transformative change could be carried out at the intersection with Topical Theme 2. Upscaling NbS could be carried out at the intersection with Topical Theme 3.

Expected impacts

This research will expand the knowledge base required for a nature-based transition in Europe and improve our understanding of the interrelations between biodiversity, health, food, soil, water and climate. It will provide evidence to stakeholders, decision-makers, policymakers, practitioners and the public with evidence of the multiple benefits, cost-effectiveness and economic viability of NbS for addressing societal challenges. It will also raise awareness that the economy and nature are not mutually exclusive, in line with the bio-economy view, but with a more systemic, complementary approach that seeks solutions to reinforce the sustainability of European societies and their activities while preserving European biodiversity and natural capital. The result will be better use of available knowledge for informed decision-making, innovative solutions, and more effective deployment and market uptake. Furthermore, R&I will support the development of more robust and integrated NbS for climate change adaptation, and disaster risk reduction at local, regional, national and European levels. This will contribute to the EU Sendai Framework and the EU Strategy on Adaptation to Climate Change (European Commission 2021c). Ultimately, all of this will promote European leadership on NbS at the international level.

7. Typology according to Eggermont et al. (2015). (id)
Type 1: No or minimal interventions in ecosystems, with the objectives of maintaining or improving the delivery of a range of ES both inside and outside of these conserved ecosystems; Type 2: management approaches that develop sustainable and multifunctional ecosystems and landscapes, with intermediate levels of intervention; Type 3: managing ecosystems in very extensive ways or even creating new ecosystems

Link with the EU Biodiversity Strategy 2030, which acknowledges that:

» NbS are a highly effective means of combatting climate change, health threats and other disasters;

» NbS are pivotal in safeguarding EU and global water resilience, food security and diverse diets.

Major knowledge needs include (non-exclusive list):

» Studying the role that biodiversity plays, or could play, in NbS, and identifying important aspects of biodiversity. To develop NbS, a better understanding of the relationships between biodiversity, ecosystem functions and ecosystem services is required. Research should therefore focus more than previously on the efficiency and resilience properties of systems. Genetic resources, as well as species and community diversity, should be explored as tools for NbS to promote adaptation and sustainability. Indeed, genetic diversity and resources offer a great potential for developing and scaling up NbS to tackle major societal challenges such as climate change regulation and mitigation, and multifunctional and sustainable agriculture and forestry (link with Topical Theme 1). More generally, mobilising the research community working on ecological engineering (Barot et al. 2012) will be key to developing NbS, given that natural ecological processes and human interventions are closely intertwined for many types of NbS;

» analysing how Nature-based Solutions can provide intelligent alternatives to, and complement, technical solutions for tackling major challenges such as the restoration of degraded ecosystems, climate change adaptation and mitigation, disaster risk reduction and disaster preparedness, sustainable urbanisation and agriculture, and, more generally, improving the resilience of ecosystems, communities and societies. There is an increasing need for knowledge to inform the development of NbSs, e.g. to enhance the insurance value of ecosystems, restore degraded ecosystems and re-naturalise environments dominated by humans (e.g. cities, European Commission 2015), increase carbon storage and sequestration, and improve the sustainability of the food, fibre and/or energy production systems (link with Topical Theme 1). An even more important issue evaluating the effectiveness of various NbS through a scientific assessment of their economic, social, and environmental benefits and costs, while also addressing the timescale and geographical scale of these benefits and costs. This requires the generation of the knowledge needed to monitor NbS, evaluate their outcomes, assess complexities and uncertainties, and guide risk assessments (including the challenges associated with the introduction of alien species and the creation of new ecosystems, Hobbs et al. 2014). The knowledge on NbS should be transferable, and not limited to case studies;

» evaluating how scaling up NbS can support biodiversity conservation and restoration (link to Topical Theme 1). The ethical issues associated with the growing ability of humans to transform nature should also be explored. Additionally, research should explore the extent to which the reactive “conserve/restore to solve current problems” approaches should be complemented by more proactive “conserve for future adaptation needs” approaches;

» analysing the synergies and trade-offs between the social, environmental and economic goals associated with NbS. A systemic approach is required when conducting research into NbS, taking into account the views of multiple stakeholders and combining the social, economic and environmental perspectives necessary for preparing a truly sustainable future. This will help to identify NbS that offer maximised synergies, while analysing the inherent trade-offs and identifying and quantifying potential maladaptation and mal-mitigation of particular solutions;

» identifying which approaches and governance systems can reinforce the capacity to innovate with NbS, develop and deploy them on a large scale, and overcome some trade-offs (link to Topical Theme 2). It is important to analyse the drivers, correlates and incentives that could hinder or facilitate the implementation of proposed NbS. This includes analysing supportive policies and policy frameworks, as well as political and social resistance to change at relevant levels. The consistency of different policies and approaches to integrated spatial planning and the efficient deployment of NbS (e.g., the integration of NbS and green and blue infrastructures) should be assessed. It will also be necessary to raise awareness among stakeholders and explore participatory ways to share and translate lessons learned on NbS, including principles and standards. However, tools need to be improved in order to achieve "sustainability-by-design". These tools can also be used to evaluate the efficiency and efficacy of NbS;

» setting up a knowledge base for the development, deployment and assessment of NbS, including in urban and peri-urban contexts, to help realise the full potential of the Urban Greening Plans proposed by cities across Europe;

» analysing the potential use of NbS to tackle the emergence of zoonotic diseases, and on their benefits for public health. This requires a better understanding of the relationship between biodiversity and infectious diseases, as well as how ecosystem changes and biodiversity loss may affect the ecology of disease/vector organisms and the dynamics of pathogen-host interactions. Tropical and subtropical Outermost Regions (ORs) and Overseas Countries and Territories (OCTs) are particularly relevant locations in which to study the impact of climate change on such interactions, as their weather conditions resemble those that are expected to occur in mainland Europe as a result of climate change. Research could focus on ecosystem health risks or services, or both, and should go further than has been done before by helping to further identify at-risk areas and develop recommendations for mitigating the risks;

» improving our understanding of the causes of zoonotic and epidemic outbreaks and designing science-based, systemic solutions to prevent such outbreaks. Research can also support the establishment of early warning systems for epidemic outbreaks by, for example, examining sentinel species in conjunction with modelling approaches (link Cross-cutting theme A);

» generating knowledge to operationalise the EU's commitment to enhancing its support for global efforts to implement the OneHealth approach. Further study and analysis of the existing science would inform how support should best be prioritised and deployed.





4. Creating and measuring impact



Biodiversa+ addresses a broad range of biodiversity issues, most of which are deeply entwined with the actions and decisions of societal and policy actors. Therefore, activities for Topical and Cross-cutting Themes are being implemented in a collaborative and inclusive way by involving stakeholders at all relevant levels and sectors (first enabling approach), and by continuously communicating and increasing accessibility to knowledge and data (second enabling approach).

While we fully recognise the role of nature/environmental education for the sustainable and equitable use of biodiversity and its conservation, and for better connecting (new) audiences to nature, educational activities *sensu stricto* do not fall within the scope of Biodiversa+. Still, we will ensure that our activities produce knowledge products and other outcomes that can be taken up in educational programmes, as well as capacity building activities that will strengthen the capacity of young scientists and policy experts in evidence-based policymaking. Moreover, environmental education will be reinforced through the Partnership's investment in citizen science (see 4.2).

4.1 Evaluating and monitoring the impact of the Partnership

The progress of Biodiversa+ towards reaching the main objectives presented in this SRIA are surveyed by the Partnership members, along with the Partnership's Advisory Board, and by the European Commission, in order to implement necessary adjustments to our activities.

In order to properly promote and track the impact of projects funded through the Biodiversa+ calls, as well as the Partnership as a whole, an Impact Framework has been implemented. This framework is based on the concepts used in a Theory of Change, as for example described by the Centre for Theory of Change.

A **Theory of Change** is a comprehensive description and illustration of how and why a desired change is expected to happen in a particular context. It encourages critical thinking about how a project's activities can lead to the desired impact, and identifies the necessary stakeholders and resources. This method uses the envisioned (societal) impact as a starting point, reasoning backwards to determine the required behavioural changes (**Outcomes**) and the necessary knowledge (**Outputs**) to achieve them. The resulting logical chain from knowledge to impact is called an 'Impact Pathway' and is shown in Figure 7, which also illustrates the expanding group of stakeholders which potentially could be affected.

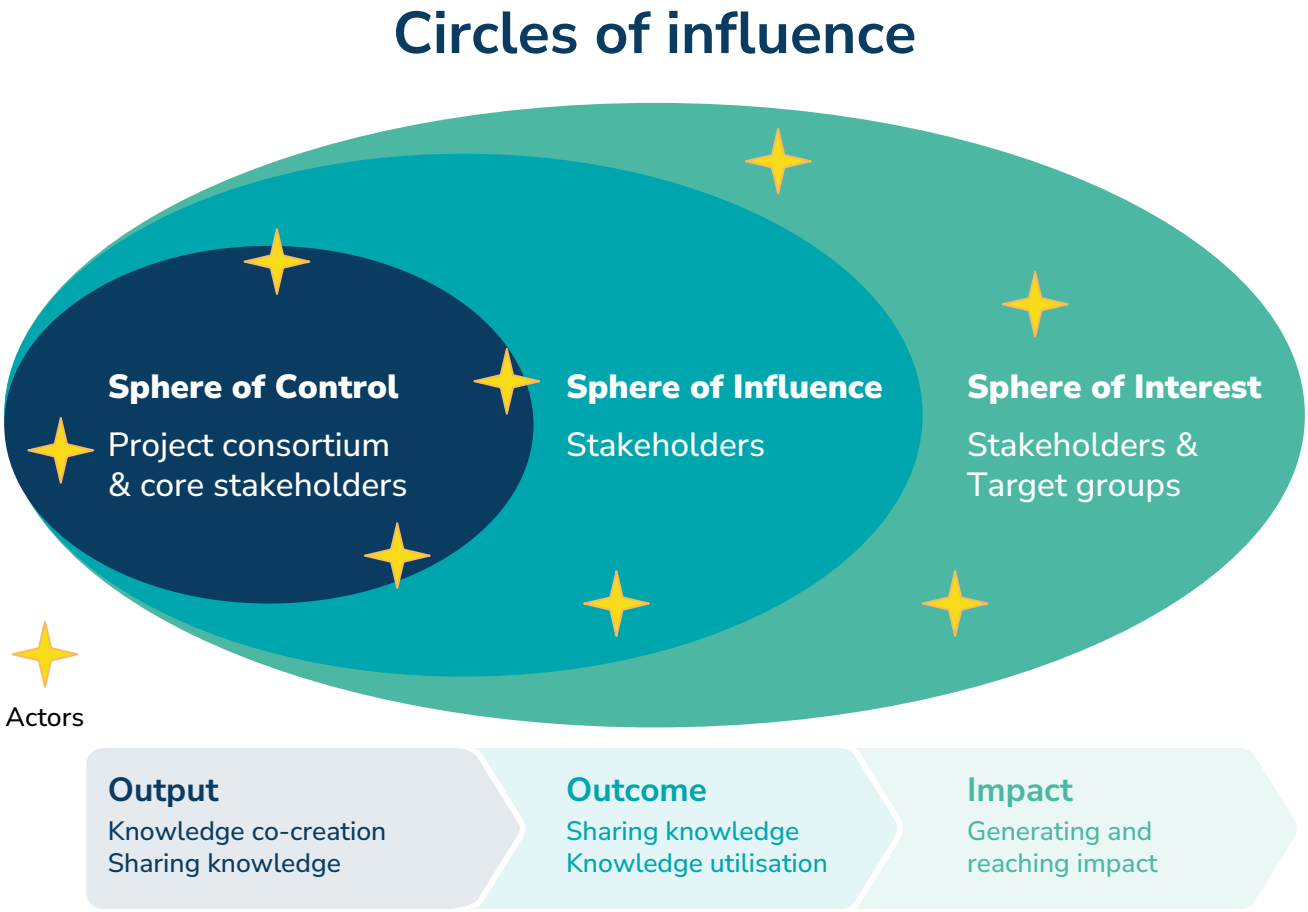


Figure 7: Concept of circles of influence from the research project perspective, and related pathways to impact. The gradient goes from direct influence by the project (sphere of control), to more indirect and elusive influence on a wider group of stakeholders (sphere of influence), to other actors not directly engaged by the project (sphere of interest). Figure from the Dutch Research Council (NWO), based on Belcher & Halliwell (2021)

Key terms from this framework, as used by Biodiversa+, are defined below:

Outputs are the direct and immediate insights developed by a research project or programme. Examples of common quantitative indicators to evaluate output can be:

- For science: research papers, theses, data, lectures and presentations at scientific conferences, etc.
- For policy and/or society: policy briefs, press releases, training, decision support tools, presentation in a stakeholder forum, etc.

Outputs can also be shared in non-traditional ways, like original creative works, recorded or rendered works or public exhibitions.

Outcomes are changes in behaviour, relationships, actions, or activities of scientists or stakeholders from policy or practice, as a result of access to and use of project outputs. They are shorter-term, expected and measurable products of outputs and activities; (first) steps that should lead to longer-term and more widespread impacts. Researchers should specify desired, and realistic, outcomes for science, society and/or policy, but these are limited by their nature to the first two circles of influence. Outcomes should start during the project but may continue after the end of the project.

Examples are: policymakers using insights in new policy development, managers using new toolkits, local communities adopting NbS solutions.

Quantitative indicators of outcomes relate to the traceable use of project outputs (e.g. paper citation index, number of policy brief downloads) as well as more qualitative indicators (e.g. description of steps taken towards desired outcomes including scientific and stakeholder engagement activities).

Impact is defined as the changes in economic, environmental and socio-cultural conditions that a project or programme aims to achieve, building on its outputs and outcomes. The actual impact is often long-term, occurring after the project ends. As it is long-term and difficult to attribute, there are no quantitative indicators.

The **Impact Pathway** is a narrative that describes the envisaged route to Impact and should clearly describe the uncertainties and the assumptions made when formulating the different steps. To enable monitoring and evaluation of the process possible, quantitative indicators are formulated for Outputs and Outcomes.



4.1.1. Framework to promote and track the impact of funded projects

Coordinating and developing activities for impact

The overall thinking behind the promotion of Biodiversa+ science-society and science-policy interfacing in funded projects is based on the concepts shown in Figure 8. Activities that Biodiversa+ implements to support and promote projects in achieving impact can be organised around three main phases during a project's lifetime: **co-development** (prior to selection for funding), **co-implementation** (during the project) and **co-dissemination** (during/after the project).

Tracking outputs, outcomes and impact of funded projects

The impacts of funded projects will be tracked based on two key elements:

1. Relevant data from funded projects. Based on the concepts and definitions presented above a Biodiversa+ projects' indicators framework was developed and incorporated into reporting templates for funded projects. Annex II shows the list of indicators measured for the Biodiversa+ calls, with outputs, outcomes and impact, stakeholder engagement and societal and policy relevance among them.

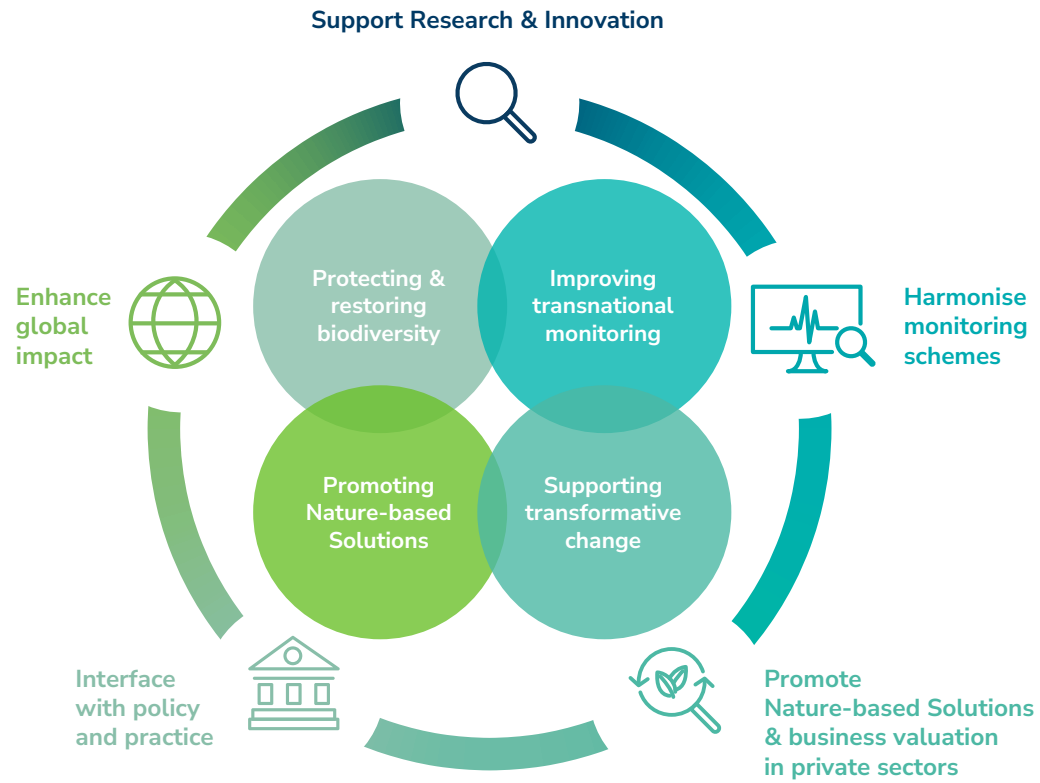
2. Follow up and analysis of projects' outcomes and impacts, based on the initial outputs reported. Types of indicators used in such analyses by Biodiversa, including past calls, are summarised in Figure 9.

Combining the data used for tracking projects outputs, outcomes and impacts in WP1 with the framework to promote and track impact of funded projects above will allow the continued use of current Biodiversa indicators and analyses. This will provide a solid basis for pursuing and further developing the analysis and promotion of the outputs, outcomes and impacts of funded projects. It will also allow for continuity in analyses and data by enabling comparison with previous Biodiversa calls, an analysis of which can be found in the Biodiversa achievements 2008-2021 leaflet (Blery et al. 2021).



4.1.2. Framework to promote and track impact of the Partnership

The performance of Biodiversa+ as a whole is analysed using the same Impact framework as that used for the projects. Figure 8 illustrates that logic, where activities performed within the Partnership result in new knowledge in different forms, i.e. results from projects, insights from the monitoring pilots, mapping reports etc. When these results are adopted by stakeholders, they contribute to outcomes, which are the first steps towards longer-term and more widespread impact — the desired societal impact of the Partnership.



Outputs

- Calls & projects
- Monitoring pilots
- Mapping/foresight reports
- CS Guides & training
- Syntheses & briefs

Outcomes

- Use of knowledge and tools from projects
- Uptake of foresight findings & framing of key concepts
- Better integration of SHE, transdisciplinarity and society/policy interface in projects
- Use of knowledge syntheses and briefs in decision-making

Impact

- Rescuing biodiversity to safeguard life on earth
- Living in harmony with Nature in 2050

Figure 8: Presentation of the logic towards achieving impact in the Partnership, with Flagship Programmes as thematic areas that use the portfolio of Biodiversa+ activities (see Annex I).

On the Partnership level, aggregated indicators are mostly used to track progress. These are collected from all funded projects in a call, from all different calls, from the monitoring pilots etc. Some of the resulting quantitative indicators for outputs and outcomes are used to report on Key Performance Indicators (KPIs), as agreed with the EC, for example the Indicators for the performance of Biodiversa+, published in Biennial monitoring reports (European Commission: Directorate-General for Research and Innovation 2024). The latest report is the BMR2024, with updates expected in 2026 and 2028.

While quantitative indicators are an important way to measure progress in projects or the Partnership as a whole, they often do not capture the whole story. Qualitative indicators are therefore used in addition to measure outcomes, and in particular, the expected Impact(s). Impacts are challenging to capture for two reasons: firstly, societal or policy change usually becomes apparent long after the project has ended, and, secondly, it is generally influenced by many separate projects and other activities, making attribution very difficult. One of those qualitative indicators is the production of "success stories" within WP6 (Communication), relating successful examples of how the Partnership's activities or funded research project's outcomes have resulted in wider socio-economic or political impacts and changes.

As part of our Impact framework, the Partnership will develop an **exploitation strategy** for the remaining period until 2028 and including the transition phase towards FP10. This strategy will describe how our Impact framework will facilitate the use of our rapidly growing stream of outputs and the new knowledge generated in Biodiversa+ activities to bring about actual changes in society and achieve the desired societal impact. A central role in this strategy is reserved for stakeholders, who co-create the new knowledge, help identify the potentially most interesting findings, the Key Exploitable Results (KERs), and help translate those to bring about actual changes in society. Stakeholders and scientists should collaborate to inform and support science (new advances in the field), policymakers (support for (new) policies), the private sector (prototypes, new products, less environmental damage) and/or other relevant societal actors.

A distinctive feature of Biodiversa+ is the direct involvement of environmental authorities, ministries and implementation agencies alongside research funders. These organisations are both Partners and stakeholders in the sense that Biodiversa+ outputs are directly relevant for their own internal processes. The Partnership will therefore continue to promote internal pathways for uptake, encouraging partners to systematically evaluate Biodiversa+ outputs, tools and recommendations and consider them for use in their own policy, monitoring and implementation activities where relevant and appropriate. This creates a unique opportunity to accelerate the translation of research results into practice.

4.2. Stakeholder Engagement

Link with the EU Biodiversity Strategy 2030, which acknowledges that:

- An 'integrated' and 'whole-of-society' approach should be adopted for the implementation of the EU Biodiversity Strategy for 2030, with the participation of all stakeholders throughout;
- Enabling transformative change requires all relevant actors to take co-responsibility for and co-ownership of, meeting the EU's biodiversity commitments;
- Special emphasis should be placed on contributions from Indigenous Peoples and Local Communities, particularly those who depend on and steward biodiversity directly. Attention should also be directed toward engaging women, youth, and other groups that are typically underrepresented in biodiversity decision-making and research processes;
- The formulation and implementation of national restoration plans, as required by the Nature Restoration Regulation, should use a fair, cross-society approach consulting with all affected stakeholders at regional and local levels throughout the process;
- Tackling biodiversity loss and restoring ecosystems will require significant public and private investment and engagement at the national and European levels;
- While industry and businesses impact nature, they also produce important innovations, partnerships and expertise that can help address biodiversity loss;
- Biodiversity considerations must be better integrated into public and business decision-making processes at all levels;
- Education in environmental sustainability, and youth engagement are important for making societal transformation a reality.

Rationale:

Stakeholders and their engagement is central to the functioning of the Partnership and to achieving its intended impact, they are integral agents of change. Biodiversity issues often lie at the intersection of numerous political and socio-economic interests, raising questions that require the consideration of diverse sectors, such as environment, agriculture, fisheries, mining, energy, and health. For R&I on biodiversity to be effective and inclusive, it must recognise the limitations of the linear research model (Barot et al. 2015, Durham E. et al. 2014). It must also consider multiple criteria and a broad range of stakeholder perspectives in order to enable a cross-sectoral approach to conserving and sustainably managing and using biodiversity. Good evidence-based advice can only stem from good science. However, it is equally true that advice will only be useful if it addresses issues that are perceived as relevant by society and its various stakeholders. This Partnership builds upon the successful approach co-developed with a wide range of stakeholders in the context of the precursor BiodivERsA (Figure 9). This approach promotes the (co-)generation of relevant knowledge and continuous stakeholder engagement from the worlds of policy, practice, and business. It allows scientists to act as honest brokers of policy and/or management alternatives (Pielke 2007). The Partnership will address the formulation and channelling of stakeholders' knowledge and needs into R&I. This will facilitate the uptake of research outputs, creating societal or market value by quickly translating new findings into concrete recommendations for environmental policies and innovation.

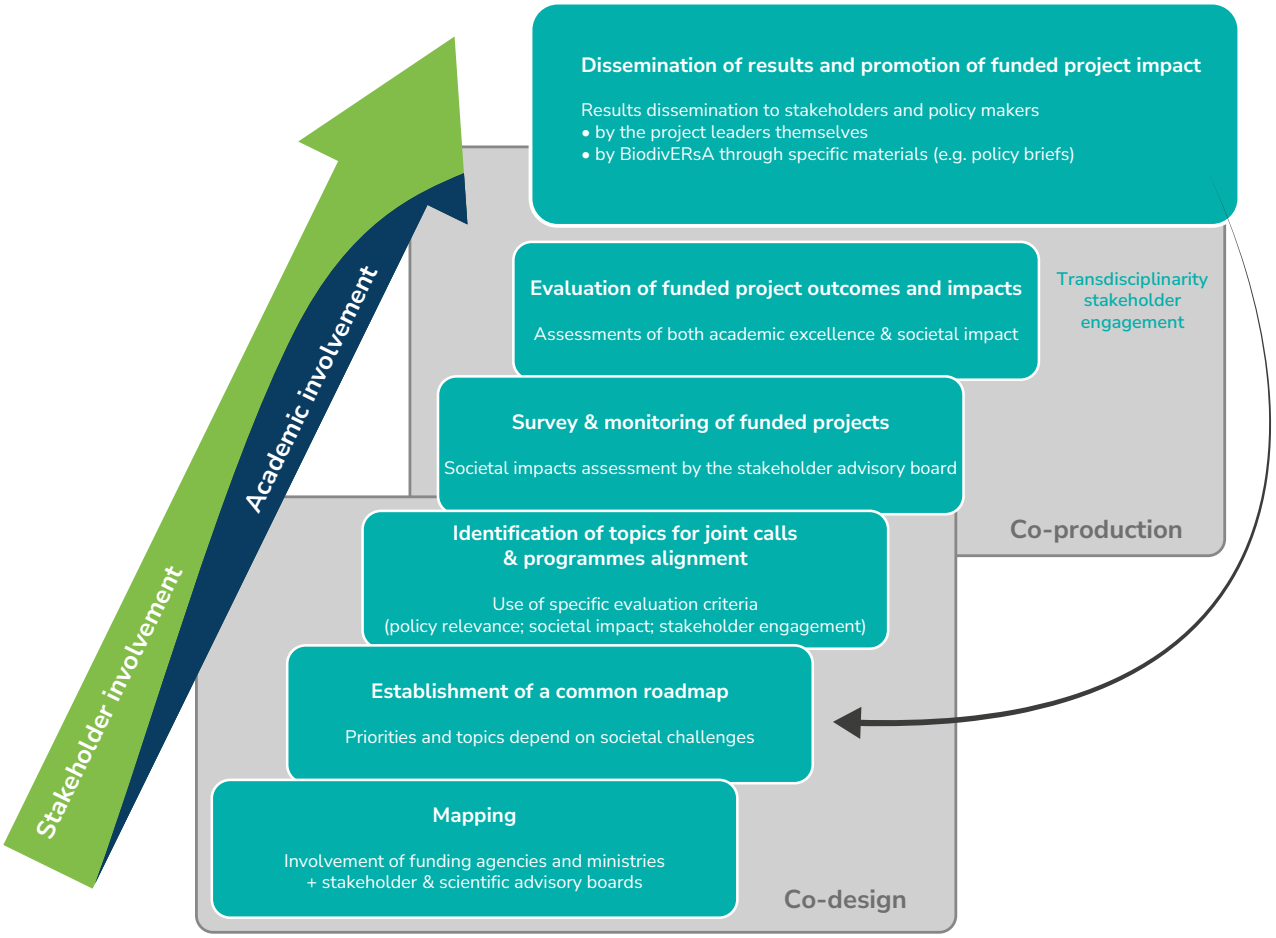


Figure 9: Approach and methodology used to engage stakeholders and promote the science-policy and science-society dialogue in BiodivERsA throughout the research development process. Although academic excellence is a major criterion for evaluating research supported by the Biodiversa+ Partnership, approaches like co-design of programmes and (co-)promotion of research results are also essential to increase the societal impact of the funded research. Figure after Mauser et al. (2013).

Main approaches and expected impacts:

The enabling approach to stakeholder engagement cuts across all Topical and Cross-cutting themes of Biodiversa+, and facilitates the systemic co-design, co-development and co-implementation of R&I in the field of biodiversity and Nature-based Solutions. There are five specific approaches and related expected impacts:

1. **Systematisation of the Partnership's stakeholder engagement processes, through inclusive, purposeful and systematic stakeholder mapping**; development and support of the Biome, the open-ended group of stakeholders interested to actively contribute to the Partnership, and the reinforcement of internal stakeholders' mobilisation processes.

2. **Stakeholder engagement throughout the Partnership process** (cf. Figure 9), related to co-design and implementation of coherent and impactful activities on relevant biodiversity topics at the science-policy or science-society interface. Key steps in this process include:

   » regular consultations with the Biodiversa+ Advisory Board composed of 12 scientists and non-academic stakeholders, and the Enlarged Stakeholder Board consisting of six colleges: (i) Habitat, species and nature conservation; (ii) economic and industrial activities; (iii) relations with the public; (iv) wild and domestic genetic resources; (v) European Policymakers and members of the European Parliament; (vi) boundary organisations. This allows for two-way exchanges and the mobilisation of a large number of stakeholders.

   » one-on-one collaborations with well-established and emerging initiatives throughout the lifetime of the Partnership, tailored to

specific activities and objectives. Some of these initiatives/organisations (will) play a specific role in reaching out to our target audiences, and stakeholders more widely (e.g. the European Knowledge Centre on Biodiversity, NetworkNature, GBIF, EEA, Alternet, BioAgora, CO-OP4CBD, RESPIN, ECA Network and many others);
- develop narratives and content on the importance of stakeholder engagement in the context of the Partnership to demonstrate impact achieved in this context (link to communication activities in WP6).

3. **Reinforcing capacity of R&I actors to engage stakeholders in their research activities**, including the engagement of policy stakeholders, citizens and businesses. This can be achieved through development and promotion of guidance tools (Durham et al. 2014, Lemaitre et al. 2018) and training. This is fundamental, since the R&I individuals and teams are important entities that need to engage with stakeholders. For example, biodiversity researchers often have very strong links with individual local and national stakeholders. Biodiversa+ can support researchers in building their capacity for stakeholder engagement at the science-policy and science-society interface, particularly at the European and international levels, which are often the aim of researchers. Biodiversa+ can also support researchers in communicating with stakeholders. Activities will primarily target the research audience, but capacity development for non-academic audiences will also be undertaken in specific cases (e.g. when establishing knowledge hubs), and in collaboration with relevant organisations when external expertise is required. This includes organising summer schools in collaboration with Alternet to build the capacity of early-career researchers in biodiversity within the European landscape in the context of transformative change.

4. **Increase the societal relevance of the research and citizens' awareness of the biodiversity crisis**, by encouraging civil participation and co-producing knowledge with citizens, including through citizen science (Goudeseune et al. 2020). This includes:
   - increasing capacities to engage with citizens, including the younger generation. This can be achieved by further developing the research community's capacity to engage in citizen science, for example by providing further guidance, tools, and other resources, such as training, support with developing citizen science plan and operational frameworks;
   - further advancing the understanding and evaluation of citizen science in R&I programmes, for example by showcasing and exemplifying successful citizen science approaches and demonstrating the added-value of citizen science for better science and increased citizen awareness, by analysing and promoting capacities to support citizen science in R&I programmes and by providing guidance for applicants and evaluations;
   - promote the long-term engagement of citizens in science by collaborating with key long-term citizen science initiatives (e.g. the European Citizen Science Association, Earthwatch, iNaturalist) and by co-developing activities around education and citizen science (e.g. arts and science).

5. **Establish longer-term research collaborations with stakeholders from policy**, practice and business sectors. Based on previous experience, three-year projects are often too short to adequately engage with stakeholders and achieve tangible outcomes, with regards to the utilisation of research results. The Partnership will therefore ensure that the R&I programmes are designed and implemented in a way that facilitates longer-term engagement and achieves more profound, lasting impacts.

4.3. Communication, Outreach and Open Science

Link with the EU Biodiversity Strategy 2030, which acknowledges that:

- The fight against biodiversity loss must be based on sound science. Investing in research, innovation and knowledge exchange is key to gathering the best data and developing the most effective Nature-based Solutions;
- Efforts are needed to bridge the gap between science, policy and practice by promoting best practices through traditional and innovative communication channels.

Rationale

To achieve its main objectives, demonstrate its impact, and strengthen its visibility, the Partnership must ensure effective communication, dissemination, and exploitation of the results generated by its activities and funded projects. To reach the broad range of biodiversity-related stakeholders, including researchers and research organisations, practitioners, businesses, policymakers, the media, and citizens, targeted strategies are required for each group. To encourage the uptake of outputs and ensure the knowledge (outcomes), the messaging should be co-created with researchers and stakeholders. An example is the way Biodiversa+ produces policy briefs in collaboration with researchers and policymakers to ensure the right messages reach the right people and facilitate uptake in policy development. Another example is the development of a set of guides on the use of biodiversity data by businesses in collaboration with members of the private sector.

These actions allow for a clearer and more accessible understanding of the interactions between the natural environment and society or the economy. This is essential for raising public awareness, informing decision-making processes, and fostering the uptake of knowledge on the importance of biodiversity.

Researchers should share knowledge and data openly with all relevant stakeholders as early as possible in the research process. This strengthens trust in science, accelerates knowledge brokerage, and increases the likelihood of effective uptake and implementation. The growing emphasis on reproducible science and open data is supported by initiatives such as the European Open Science Cloud and the European Commission's Open Research Europe open-access publishing platform. An increasing number of datasets are now being standardised automatically and made freely available through open and FAIR-compliant data aggregators such as GBIF, the Ocean Biodiversity Information System, and other reputable repositories. The Partnership is committed to further advancing open and timely access to biodiversity knowledge and data in line with the FAIR principles. This will ensure that key outputs can be easily discovered, accessed, interpreted, and reused.

Main activities

Various activities are being implemented to strengthen access to the knowledge and data generated by the Partnership, and to demonstrate its added value and impact. These activities are mutually reinforcing and include:

1. Enhancement of the Partnership website showcasing the role of R&I across Europe in protecting, restoring, and sustainably managing biodiversity, and in advancing Nature-based Solutions. The website integrates several modules, including the Biodiversa+ Access Platform, which catalogues and presents the results of funded projects and supports the Partnership's open-science objectives.

2. Development and dissemination of communication materials, as well as the organisation of participatory communication events with the media and other relevant stakeholders. This is key to raising awareness of the Partnership's major outputs and outcomes, along with those of its funded projects. Particular emphasis is placed on creating success stories that demonstrate how biodiversity R&I can address societal challenges across Europe in real-world contexts. Communication formats include short videos, infographics, and podcasts. Additional activities include the production of policy briefs and other policy-relevant products based on the outputs of the Partnership-funded projects.

3. Development of resources and practical guidance for funded projects. The Partnership provides tailored support to help funded projects strengthen the communication and visibility of their results. This includes the integration of communication aspects into broader capacity-building activities, particularly those focused on the science-policy interface. These efforts foster a more holistic and coordinated approach to planning and implementing effective outreach.

Expected outcomes

Communication, outreach, and open science are essential for demonstrating the impact of the Partnership as a whole, as well as the results of its specific activities. The following outcomes are expected:

- Increased visibility of the Partnership, its activities, and the outputs of both individual funded projects and cross-cutting initiatives.
- Greater recognition among the research community and relevant non-academic stakeholders — including policy-makers, decision-makers from the private sector and practitioners — of the added value of the Partnership.
- Improved uptake of results from Partnership-funded projects by relevant stakeholders, supported by more effective brokerage and transfer of science-based knowledge.
- Better-informed policy development and implementation, enabled by robust, science-based support for policy evaluation and design.
- Enhanced public awareness of biodiversity-related issues and of the role of biodiversity in science-based solutions addressing societal challenges.
- Improved capacity of biodiversity researchers to reach and engage diverse audiences through appropriate and effective communication approaches.

Engagement with other initiatives

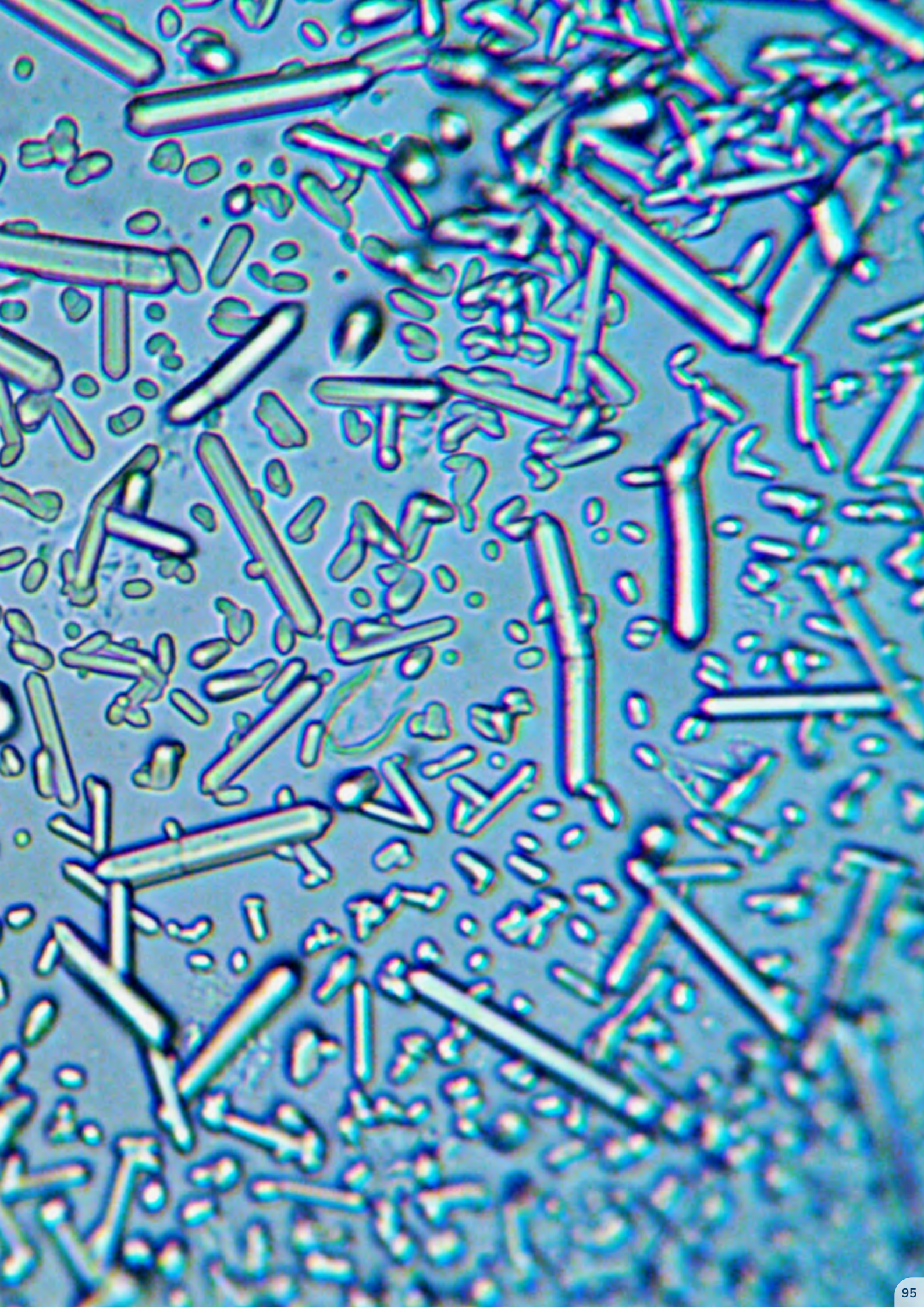
The Partnership will collaborate with existing initiatives and organisations to raise awareness of its activities, support high-impact events, and increase the uptake of knowledge generated by projects funded through the Partnership. These include, among others:

- The Oppla platform, to enhance the visibility and uptake of results from projects focusing on NbS;
- Networks and organisations supporting science and environmental communication, such as the European Federation of Journalists, the European Union of Science Journalists' Associations, and relevant environmental journalism networks;
- Relevant EU and national services and institutions, to strengthen alignment, maximise outreach, and facilitate the use of project outputs in policy and practice





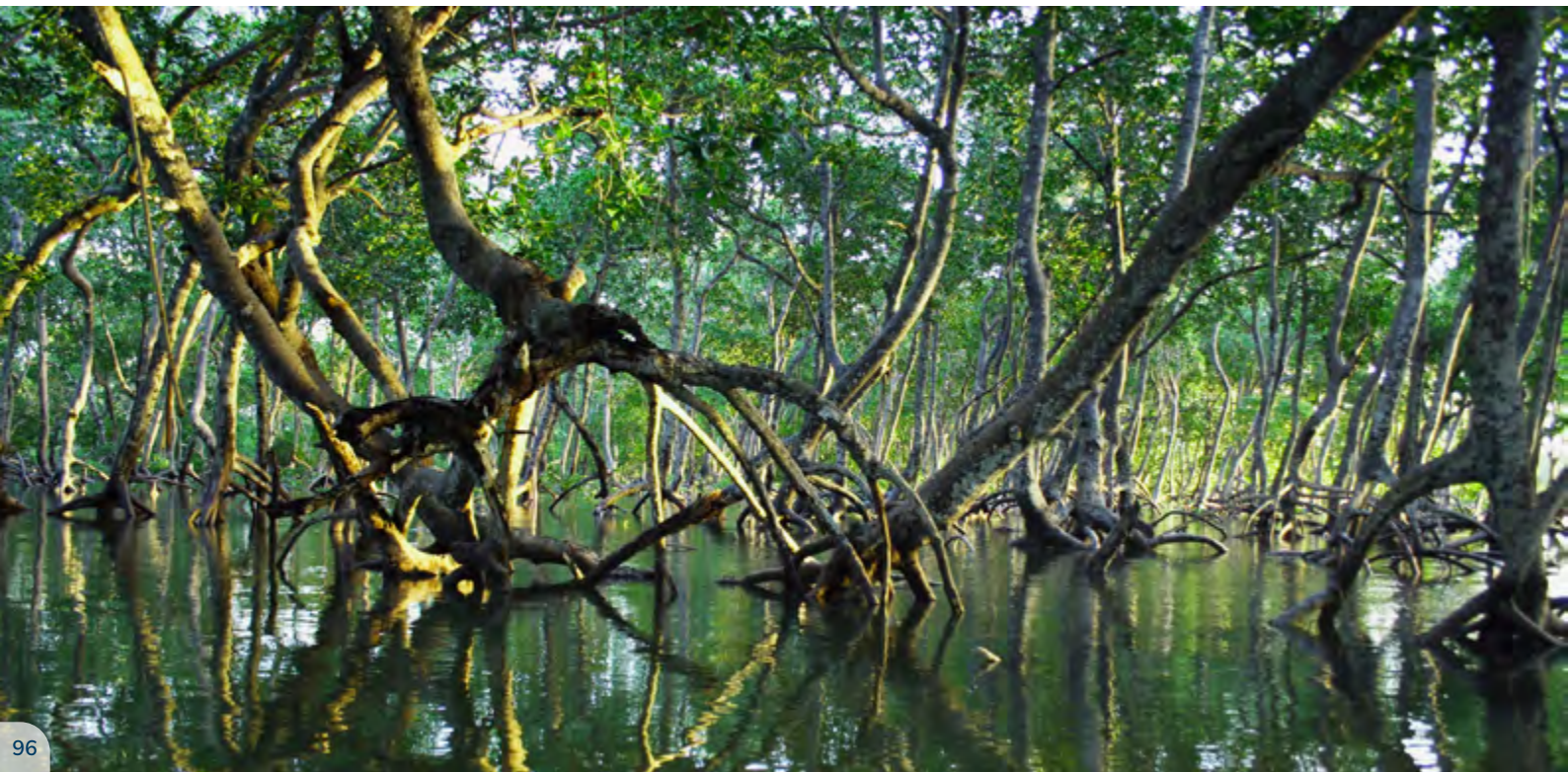
5. Annual implementation plans and activities



To implement and operationalise the strategic objectives of the SRIA and plans laid out in the Grant Agreement, the Partnership establishes Annual Work Plans describing specific activities in each of the 9 Biodiversa+ Work Packages, to deliver on the 5 Specific Objectives (Figure 4). These activities are also designed to address the objectives of the four Biodiversa+ Flagship Programmes, established with a holistic approach to deliver societal impact across key overarching themes (Figure 10, Annex I).

The formation of these annual plans are achieved by taking stock of past and current activities and outputs, and elaboration of the planning with input from the Partnership members, the Partnership Advisory Board, the relevant EC services and DGs, as well as collaborations and dialogues with relevant stakeholders (in particular through the Enlarged Stakeholder Board) and other organisations and Partnerships.

When developing the annual implementation plans, a specific mechanism is employed to identify and select the topics for joint calls for research proposals, to be implemented each year by the Partnership (Figure 10).



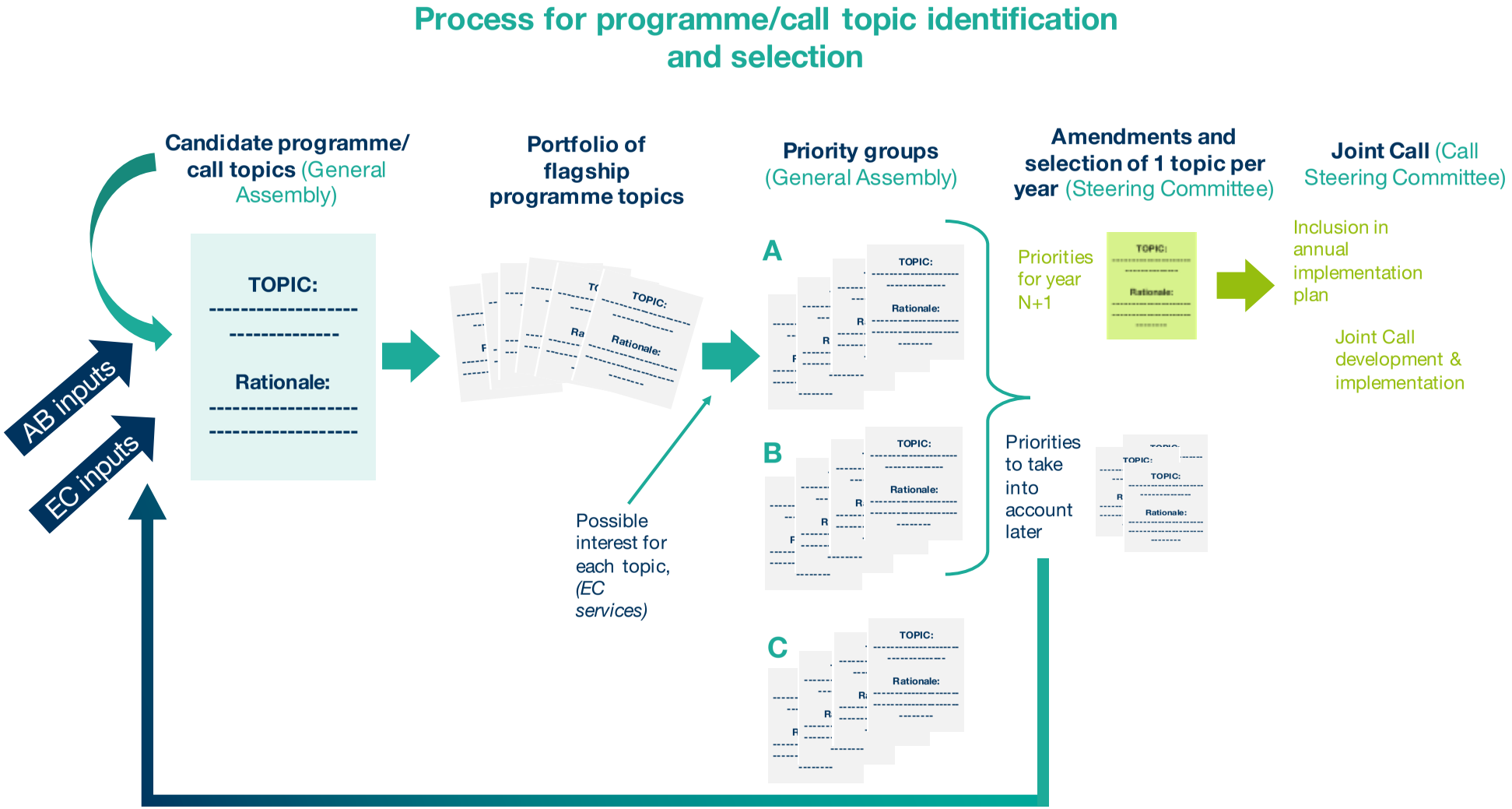


Figure 10: Process used each year to propose and select the topics of the joint calls to be included in the annual implementation plans



6. Complementarity with other Horizon Europe programmes and initiatives

This section details the complementarities with other programmes and initiatives that form part of Horizon Europe. This collaboration will be adapted further as the Horizon Europe Work Programme is rolled out.



6.1. Complementarity with Green Deal Calls, Horizon Europe Calls & Missions

To address the global effort to halt the degradation of ecosystems, restore damaged ones and preserve intact ones — as emphasised by the UN's Decade on Ecosystem Restoration, the KMGBF, the EU Biodiversity Strategy for 2030 and the EU Nature Restoration Regulation — Biodiversa+ aims to help achieve the long-term recovery of diverse, resilient ecosystems across Europe. Building on the success of the 'BiodivRestore' ERANET Cofund Action, which supported research on ecosystem restoration, Biodiversa+ has established a pan-European Knowledge Hub on Nature Restoration in a joint effort with Water JPI/Water4All Partnership. The hub is a network of researchers and stakeholders that fosters collaboration and knowledge sharing. Drawing on 22 BiodivRestore research projects, as well as the four R&I projects MERLIN, WaterLANDS, SUPERB and NaturaConnect, funded through the Horizon 2020 call for proposals on 'Restoring biodiversity and ecosystem services', the hub aims to empower countries to develop and implement national restoration plans, helping them to achieve the targets set by the EU and UN initiatives. The hub and its constituent projects have delivered tangible benefits for biodiversity, while addressing the challenges of scaling up restoration and the potential for restoring degraded ecosystems. Key findings from these projects were particularly important in informing actionable Biodiversa+ policy briefs and joint guidance. While projects such as MERLIN, WaterLANDS and the EU Missions projects ECoAdvance, FutureLAKES, SpongeWorks, SpongeScapes, and SpongeBoost carry out site-level demonstrations and take a different approach to the restoration and protection of freshwater, wetland and land ecosystems, Biodiversa+ operates

on an international scale to ensure that project results inform high-level EU legislation, such as the Nature Restoration Regulation. This collaboration has been particularly relevant to Topical Subtheme 1.2, 'Ecosystem restoration across terrestrial, freshwater, coastal and marine ecosystems', as the projects demonstrated the importance of research in supporting EU policy needs, contributing to the international biodiversity agenda and demonstrating the technical and economic feasibility of the proposed actions.

The Work Programmes of Horizon Europe Cluster 6, 'Food, Bioeconomy, Natural Resources, Agriculture and Environment' contain several initiatives that complement the Partnership. The document is divided into seven "Destinations", five of which have clear biodiversity components. These components focus on biodiversity as an integral part of primary production and of NbS that support food production, soil health, and nutrient retention. Other topics include: understanding biodiversity decline, trends, and status; biodiversity protection and restoration; the valuation of ecosystem services and natural capital; links with zoonoses and other diseases; and the connections between trade, extractive land use, social practices, climate change, and biodiversity.

Destination 1, 'Biodiversity and Ecosystem Services', in the Horizon Europe Work Programmes, has been particularly relevant to Biodiversa+. It included several calls for R&I actions which the Partnership used and uses to carry out joint activities, such as networking of project scientists, creating policy products (including policy briefs), and carrying out capacity-building activities (e.g. in the context of MEAs, IPBES/IPCC). There are also several relevant Coordination and Support Actions (CSAs), including four that are closely linked to Biodiversa+ and ensure input into the Knowledge Centre on Biodiversity: BioAgora, which is developing the Science Service for Biodiversity; NetworkNature, which is contributing to the community building and knowledge on NbS; CO-OP4CBD, which enhances EU coordination in advancing the implementation of the Convention on Biological Diversity; and RESPIN, which supports the integrated provision and use of IPBES and IPCC processes and outputs. Biodiversa+ works closely with these CSAs. All these initiatives have become so-called key collaborators to Biodiversa+.

In order to support the development of new methods and indicators for biodiversity monitoring, Biodiversa+ collaborated with the recently concluded EuropaBON project, and continues to collaborate on this topic with the European Parliament's preparatory action for the EBOCC, as well as with R&I projects, such as Marco-Bolo, MAMBO, and OBSGESSION. A continuous dialogue between the European Commission and Biodiversa+ ensures that the Horizon Europe 'main' work programmes and the Partnership's work plans complement each other and do not unintentionally overlap.

From a biodiversity perspective, several of the Missions (European Commission 2026) established under Horizon Europe are relevant, including "A Soil Deal for Europe", "Adaptation to Climate Change", "Restore our Ocean and Waters" and "Climate-Neutral and Smart Cities". There is clear scope for joint efforts and the exchange of information with these Missions in order to identify synergies and avoid duplication. The Biodiversa+ Partnership identifies activities and funded projects from the six calls, as well as their outputs and outcomes that are relevant to the Horizon Europe Missions. The aim is to provide information to support joint communication and policy discussions, enhance policy implementation, and identify synergies and trade-offs between biodiversity and other policy priorities, such as climate adaptation.

With "A Soil Deal for Europe" a collaboration has been initiated on measuring soil biodiversity, via the pilot on monitoring soil biodiversity Biodiversa+ has funded and an ongoing desk study on indicators for soil biodiversity.

Through these and other efforts, Biodiversa+ aims to play a pivotal role in the development and implementation of the EU's long-term strategic research agenda for biodiversity.

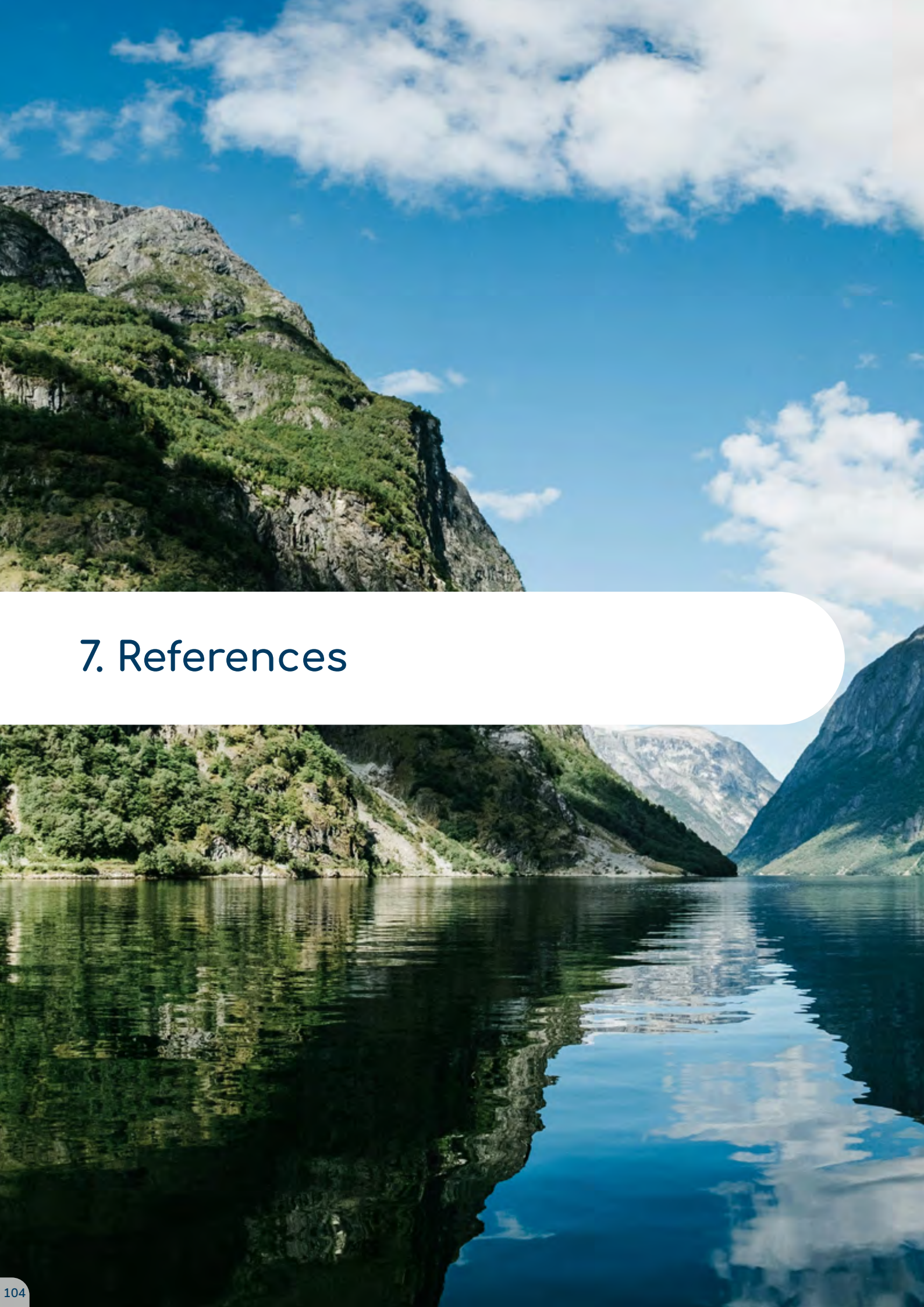
6.2. Collaboration with other European Partnerships

Biodiversa+ is committed to ensuring coherence and collaboration with other partnerships. To this end, it actively participates in the Partnerships' Exchange Group and engages in bilateral discussions on specific topics and issues. The aim of these collaborations is to identify topics of mutual interest that can be approached from different, complementary angles in order to create synergies and avoid overlap (see Table 1). However, the implementation process of Horizon Europe constrains the possibility to have joint funding calls or align activities across Partnerships, due to very different timelines and schedules. For Biodiversa+, the majority of the expected results will be achieved in the coming years as the first results from the projects in the research calls and monitoring pilots will become available from 2026 onwards.

Table 1: List of the main European partnerships identified for collaboration, and possible types of collaborative activities.

European Partnership	Types of Collaborative Activities	Expected Results	Status of collaboration
AGROECOLOGY Accelerating farming systems transition: Agroecology Living Labs and Research Infrastructures	• Identify shared priorities and co-design joint activities, particularly those focusing on biodiversity-friendly agriculture and soil health • Joint workshops on restoration, pollinators, genetic diversity, and landscape-level management • Synergies with BiodivMon and soil monitoring pilots • Integrate Biodiversa+ research results into Agroecology Living Labs	• Provision of evidence-based input for agroecological transitions • Integration of biodiversity knowledge into Living Lab experimentation • Joint guidelines / factsheets / briefs for practitioners and ministries	• Ongoing dialogue on priorities, synergies, and joint activities • Joint thematic workshops, e.g. science-policy dialogue workshop in 2026, and other activities planned for Phase 3
CBE JU Circular Bio-based Europe Joint Undertaking	• Identify synergies regarding sustainable biomass use, circular systems, and biodiversity safeguards • Joint workshops on biodiversity impacts of bio-based value chains	• Integration of biodiversity criteria into circular bioeconomy innovations • Joint exploration of solutions to reduce the negative impact of supply chains on biodiversity	• Dialogue planned for Phase 3
Water4All Water Security for the Planet	• Coordination of research into gaps in aquatic ecosystem restoration and monitoring • Synergies with BiodivMon and pilots on aquatic monitoring • Joint workshops on freshwater biodiversity, hydromorphology, ecological flows • Joint call coordination and scope clarification	• Strengthened R&I on freshwater biodiversity dynamics and ecosystem services • Joint approaches to aquatic restoration and monitoring • Exchange of indicators and harmonised monitoring approaches • Jointly agreed delineation of aquatic vs. cross-realm biodiversity research (BiodivNBS vs Aquatic Ecosystem Services calls) • Improved coherence of EU-funded research on aquatic biodiversity and ecosystem services across partnerships • Mechanisms for cross-project learning on ecosystem services, pressures and management integration	• Ongoing in-depth consultation on priorities, synergies, and joint activities • Collaboration on joint call and knowledge hub in BiodivRestore Cofund Action • Joint thematic workshops and other activities planned for Phase 3

SBEP European Partnership for a climate-neutral, sustainable and productive Blue Economy	• Identify shared priorities on marine biodiversity protection, MPAs, invasive alien species, and blue carbon ecosystems • Synergies with BiodivMon and marine monitoring pilots • Joint activities on coastal/marine Nature-based Solutions and restoration	• Improved scientific basis for marine management and marine protected areas governance • Co-developed approaches for coastal restoration and NbS • Integrated marine socio-ecological knowledge into policy support	• Ongoing in-depth consultation on priorities, synergies, and joint activities • Joint thematic workshops and other activities planned for Phase 3
DUT Driving Urban Transitions to a Sustainable Future	• Identify synergies and align planning on urban greening, ecosystem services, and climate adaptation • Workshops on urban biodiversity, green/blue infrastructure, and NbS for cities • Coordinated dissemination and community-building • Operational alignment of BiodivNBS and DUT calls on Nature-based Solutions in urban contexts	• Strategic plan for urban biodiversity and NbS co-developed by both partnerships • Potential joint R&I programme on urban nature and resilient cities • Increased evidence base for implementing Urban Greening Plans • Joint communication and coordination of research call, clarifying scope, complementarities and avoiding duplication • Structured exchange of learning across funded projects on urban NbS, ecosystem services and transformative change	• Ongoing in-depth consultation on priorities, synergies, and joint activities • Joint thematic workshops and other activities planned for Phase 3
EUPAHW European Partnership on Animal Health and Welfare	• Exploratory dialogue to identify synergies on OneHealth/EcoHealth connections • Joint activities on zoonotic disease ecology and biodiversity-health links	• Enhanced research links on biodiversity, disease vectors, pathogen spillover • Cross-sectoral guidance for OneHealth-based biodiversity management	• Dialogue planned for Phase 3
FOREST Forests and Forestry for a Sustainable Future	• Identify synergies and alignment of research on forest biodiversity, old-growth forests, and climate resilience • Exchange on forest monitoring methods and restoration • Mobilisation of Biodiversa+ outputs relevant for sustainable forestry	• Improved forest management approaches integrating biodiversity • Knowledge transfer into forest policy and restoration plans • Joint factsheets and technical briefs	• Ongoing dialogue on priorities, synergies, and joint activities • Joint thematic activities planned for Phase 3
PARC Partnership for the Assessment of Risks from Chemicals	• Joint exploration of impacts of pollutants, pesticides, contaminants on biodiversity • Coordination of monitoring and risk assessment methodologies	• Evidence to inform the regulation of chemicals that are harmful to ecosystems • Harmonised indicators linking biodiversity and chemical risk assessment	• Ongoing dialogue on priorities, synergies, and joint activities
SFS Sustainable Food Systems Partnership	• Identify synergies and coordinate research on biodiversity-friendly food systems, land–sea interactions, and supply chains • Joint foresight on sustainable diets and biodiversity footprints	• Mainstreaming biodiversity into food system transformation • Shared tools for assessing biodiversity impacts across supply chains	• Dialogue planned for Phase 3



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ANNEX I – Flagship Programmes

Introduction: The strategic framework

A layered approach

Biodiversa+ operates through a layered framework that connects long-term priorities with concrete action (see addendum 1 below for details):

Vision and objectives (the "Why")

Biodiversity is the foundation for climate resilience, sustainable economies, food and water security, public health, and social equity. Biodiversa+ aims to strengthen Europe's capacity to contribute to and collaborate on global efforts to protect and restore nature, ensuring that by 2050, biodiversity knowledge drives the transition toward resilient societies and economies. The Partnership delivers impact through five strategic objectives that act as levers for change, turning research and innovation (R&I) into real-world solutions.

Strategic Research and Innovation Agenda (the "What")

The SRIA translates the "why" into R&I priorities. Organised into topical and cross-cutting themes, it identifies the knowledge needed to achieve objectives.

Flagship Programmes (the "How")

The flagship programmes are the primary mechanism for implementing the SRIA. They consist of multi-annual, thematic initiatives that integrate R&I calls, capacity-building, stakeholder engagement, and policy support.

Work Packages (the "Who")

Work Packages are the operational units responsible for delivery. They translate strategy into action and ensure that results generated within the flagship programmes framework lead to impact.

Flagship programmes as engines of change

The topics of the flagship programmes were identified as the most critical areas where a coordinated, pan-European effort can deliver lasting impact. They are not simple thematic clusters, but holistic, long-term initiatives that:

- Implement the SRIA,
- Align research with EU and global policy priorities,
- Foster innovation, capacity-building, and science-policy dialogue.

Each flagship programme combines multiple activities, from gap analysis, foresight, and mapping, to R&I funding, community-building, and policy engagement, making them the central engines of transformative change within Biodiversa+. Crucially, they are embedded in Europe's wider policy framework: contributing to the EU Biodiversity Strategy for 2030, supporting the Nature Restoration Regulation (NRR), and strengthening implementation of sectoral strategies and directives on forests, soils, water, marine ecosystems, food systems, climate adaptation, and species protection. This alignment ensures that Biodiversa+ not only funds excellent science but also provides the evidence and capacity needed to deliver on Europe's biodiversity commitments.

Flagship programme 1: Securing Europe's natural heritage: From protection to restoration

Strategic vision

Europe and the world are experiencing unprecedented biodiversity loss, with existing protected areas falling short of safeguarding species, habitats, genetic diversity, evolutionary processes, and the ecosystem services they support. The EU Biodiversity Strategy for 2030, together with the Kunming-Montreal Global Biodiversity Framework, set ambitious targets for this decade, including protecting at least 30% of terrestrial, freshwater, coastal and marine ecosystems and restoring 30% of degraded ecosystems by 2030. These ambitions are reinforced by the EU Nature Restoration Regulation, which introduces legally binding targets: restoring at least 20% of EU terrestrial, freshwater, coastal and marine ecosystems by 2030 and all ecosystems in need by 2050, while emphasising ecological connectivity and investment in green and blue infrastructure.

The flagship programme "Supporting protection and restoration of biodiversity and ecosystems across terrestrial, freshwater, coastal and marine ecosystems " (FS1) translates this policy context into action. Aligned with Topical Theme 1 of the SRIA, FS1 generates actionable knowledge to guide protection and restoration of Europe's natural capital. It addresses biodiversity from genetic to ecosystem levels, supports coherent spatial planning, and strengthens the capacity to evaluate costs and benefits of protection and restoration.

Progress in action

A defining feature of FS1 is its strategic evolution. Initially focused on biodiversity protection, it expanded to include active restoration, reflecting the Partnership's responsiveness to evolving European policy priorities:

- Protection pillar: It is anchored by the 2021-2022 BiodivProtect call, which mobilised 34 countries to fund 36 transnational R&I projects with a budget exceeding EUR 44 million. Projects started in 2023 and are now actively generating new knowledge on ecosystem protection. Biodiversa+ has supported this community through a range of activities, including a kick-off meeting, a Science-Policy Forum, and a networking workshop. Capacity-building workshops on topics such as data management, open science, the science-policy interface, and communication were also organised. These activities are systematically offered to each new cohort of funded projects, across all flagship programmes.
- Restoration pillar: Building on the 2020 BiodivRestore COFUND Action, FS1 continues to advance restoration science and foster networking. The BiodivRestore Knowledge Hub was launched in May 2024 to synthesise evidence and connect experts. High-level dialogues held in 2024 and 2025 with policymakers, researchers, and practitioners helped refine the scope of the 2025-2026 BiodivConnect call, focused on restoring ecosystem function, integrity, and connectivity. This call is expected to mobilise over EUR 40 million.

Key outcomes

FS1 demonstrates Biodiversa+'s role as a crucial intermediary, translating broad policy ambitions into targeted research agendas, and ensuring that policy is based on the latest research. Achievements to date include:

- Advancing understanding of ecosystem functioning, habitat connectivity, restoration potential, and socio-ecological trade-offs, directly informing EU and Member States' restoration plans.
- Conducting a desk study mapping evidence on

the effectiveness of terrestrial protected areas.

- Supporting the BiodivRestore Knowledge Hub, a lasting platform for evidence synthesis and expert networking.

Looking ahead

FS1 will continue to consolidate knowledge and support implementation through the BiodivRestore Knowledge Hub, while also following up on research projects from the BiodivProtect and BiodivConnect calls. By combining research, policy support, and stakeholder engagement, FS1 equips Europe to deliver on ambitious EU and global targets for biodiversity protection and restoration, bringing tangible benefits for nature, society, and the economy.

Flagship programme 2: Monitoring biodiversity: Towards a coherent and integrated vision

Strategic vision

Reversing biodiversity loss and achieving Europe's 2030 and 2050 targets demands urgent, coordinated action grounded in robust, high-quality knowledge of biodiversity status and trends. However, biodiversity data across Europe often remain fragmented, inconsistent, or incomplete, hindering efforts to track trends, assess conservation measures, and guide evidence-based decision-making.

The flagship programme "Better transnational monitoring of biodiversity to better characterise, understand and report on biodiversity dynamics and trends" (FS2) addresses this challenge. Aligned with Cross-Cutting Theme A of the SRIA, FS2 aims to lay the groundwork for a durable, transnational network of harmonised monitoring schemes. It aligns priorities, fosters interoperability, promotes scalable approaches, and ensures outputs are directly relevant to research, policy, and practice.

Progress in action

Effective and harmonised biodiversity monitoring requires both robust research and continuous innovation in technologies and processes. FS2 therefore adopts a dual-track strategy:

- Research & innovation: The 2022-2023 BiodivMon call mobilised EUR 46 million to fund 33 transnational projects launched in 2024. These projects are dedicated to improving transnational monitoring, addressing critical knowledge gaps and testing innovative methods such as eDNA, bioacoustics, AI-based image recognition, and remote sensing. A kick-off, a Science-Policy Forum, and a clustering workshop (Tallinn, April 2024) fostered exchange and synergies between the projects, with additional capacity-building activities organised to support impact.
- Capacity building: FS2 leverages Biodiversa+'s unique network of environmental ministries and agencies to drive transnational coordination and harmonisation efforts. It supports extensive capacity-building for researchers and partners through workshops and webinars on topics such as monitoring priorities, indicators, data interoperability, protocol harmonisation, citizen science, and emerging technologies. FS2 has also launched six transnational pilot projects to test harmonised approaches and tackle key bottlenecks in transnational monitoring. These pilots focus on defining harmonised protocols, promoting new technologies and governance models, and increasing data availability. Led by Biodiversa+ partners, they build on existing R&I and mark the first practical steps towards transnational biodiversity monitoring networks.

Key outcomes

FS2 positions Biodiversa+ not just as a research funder, but as a key integrator connecting pioneering science with operational monitoring practice, contributing to the EU's ambition for a coordinated, technologically advanced, and policy-relevant biodiversity monitoring network. Achievements to date include:

- Funding cutting-edge projects to improve understanding of biodiversity status, dynamics, and trends.
- Producing strategic frameworks and practical guidance on governance, protocol harmonisation, monitoring prioritisation, novel technologies, and the sustainability of monitoring schemes.
- Establishing concrete test cases for harmonised monitoring through pilots.

Looking ahead

FS2 will continue to expand and consolidate the monitoring network through follow-up on the BiodivMon projects, new pilots, targeted capacity-building, and collaboration with global data platforms and initiatives. Future work will provide updated guidance on emerging technologies and monitoring priorities, and resources to support sustainable, interoperable biodiversity monitoring across Europe.

Flagship programme 3: Mainstreaming nature: Nature-based Solutions and the business case for biodiversity

Strategic vision

Nature-based Solutions (NbS) are a broad framework of actions that protect, conserve, restore, and sustainably manage natural or modified ecosystems to effectively address social, economic, and environmental challenges. These solutions provide multiple benefits for human well-being, ecosystem services, resilience, and biodiversity. Despite their clear potential, NbS remain underused and are often poorly integrated into policies and economic systems.

The flagship programme "Better knowledge to develop, deploy and assess Nature-based Solutions" (FS3) aims to address this lack of integration and to suggest viable solutions. Aligned with Cross-cutting Theme B of the SRIA, FS3 has a dual focus: advancing the science and uptake of NbS, and demonstrating the economic and social value of biodiversity. Together, these efforts aim to mainstream NbS and biodiversity into Europe's economic and societal systems.

Progress in action

FS3 marks a strategic shift from advocacy to implementation, moving beyond making the case for NbS and business engagement to developing the tools, evidence, and collaborations needed to put them into practice.

- On the research and policy side, the 2023-2024 BiodivNBS call mobilised more than EUR 40 million to fund 34 transnational projects and generate new knowledge on how NbS function, including their tipping points, trade-offs, and enabling mechanisms. These projects started in 2025, with a kick-off event organised to foster exchanges, alongside a Science-Policy Forum and capacity-building activities. In addition to R&I, FS3 strengthens Europe's NbS ecosystem by embedding Biodiversa+ in key coordination platforms such as NetworkNature+.
- On the business side, FS3 fosters meaningful collaboration with the private sector. It explores

the needs of the private sector through workshops, interviews, and surveys to help embed biodiversity into corporate decision-making and investment strategies. FS3 also contributes to the EU Business@Biodiversity Platform and engages with international sustainable finance initiatives to support European businesses in taking a leading role in investing in and deploying NbS.

Key outcomes

Beyond individual projects, FS3 has secured a durable foundation for NbS and business engagement across Europe, ensuring R&I is built on shared priorities and a continent-wide evidence base. Achievements to date include:

- Producing the EU NbS Roadmap to 2030 and expanding the NetworkNature databases on NbS projects and NbS knowledge gaps.
- Developing practical tools to connect R&I and the private sector, as well as guidance for companies on using and sharing biodiversity data.
- Supporting the BiodivClim Knowledge Hub, which connects experts on NbS for climate mitigation and adaptation and builds on the 2019 BiodivClim COFUND Action.

Looking ahead

FS3 will follow up on the BiodivNBS projects and continue to expand the evidence base for NbS. Upcoming activities include updating the European NbS Roadmap and supporting its uptake through collaboration with other European initiatives, ensuring NbS evidence is accessible across Europe and integrated into different sectors. On the business side, FS3 will advance biodiversity valuation methods and showcase sector-specific applications to drive change. By integrating NbS in both policy and markets, FS3 aims to position biodiversity as a practical driver of resilience, innovation, and sustainable growth.

Flagship programme 4: Catalysing sustainability: Transformative change for biodiversity

Strategic vision

Global assessments show that current trajectories will not meet our 2030 and 2050 goals. To halt and reverse biodiversity loss, we must go beyond addressing direct pressures like pollution and land use, and tackle the underlying drivers of decline.

The flagship programme “Supporting societal transformation for the sustainable use and management of biodiversity” (FS4) addresses this challenge. Aligned with Topical Theme 2 of the SRIA, FS4 provides the knowledge and methods needed to catalyse systemic shifts. It recognises that conservation and technical solutions alone are not enough. Lasting change depends on rethinking economic models, governance systems, and social values, while embedding biodiversity protection and restoration across all sectors and policies.

Progress in action

FS4 acts as a backbone programme, connecting and amplifying the work within the other flagship programmes. It drives transformative change both through its initiatives and the innovative methods used to deliver them.

- At the heart of FS4 is the BiodivTransform call

(2024-2025), which mobilised more than EUR 40 million from 37 agencies across 32 countries. Particularly emphasising interdisciplinarity, trans-disciplinarity, and stakeholder co-production, the call recognises that societal transformation requires more than a single disciplinary lens. An innovative "widening option" was also introduced to encourage participation from underrepresented countries.

- Beyond funding, FS4 is reflected in Biodiversa+'s broader commitment to societal engagement through permanent structures like the Advisory Board, Enlarged Stakeholder Board, and Biome network. These ensure ongoing co-design, dialogue, and diverse perspectives across activities.

Key outcomes

FS4 demonstrates the strength of Biodiversa+'s dual strategy: engaging in extensive upstream consultation to shape R&I relevance, and investing heavily in downstream capacity-building to empower the research community to conduct this complex work effectively. Achievements to date include:

- Informing all calls through foresight processes, with BiodivTransform shaped by stakeholder dialogues and a dedicated knowledge synthesis on NbS and transformative change.
- Publishing a mapping of international collaboration in biodiversity and transformative change research, providing a baseline for future cooperation.
- Building capacity for early-career researchers to work at the science-policy interface through collaboration with Alternet, including summer schools, project grants, and mentoring.

Looking ahead

FS4 will continue to act as a backbone programme, leveraging synergies with other flagships. Next steps include following up on BiodivTransform projects, and strengthening links between NbS, private sector engagement, and transformative change. By fostering collaboration and embedding transformative principles in European R&I, FS4 will consolidate Europe's capacity to achieve the deep societal changes required for biodiversity sustainability.

Conclusion: From vision to transformation

Biodiversa+ was created to help Europe meet the twin challenges of halting biodiversity loss and building a sustainable future. The flagship programmes are the pillars of this effort. Each addresses a critical dimension of the biodiversity crisis, while together they create a balanced, interconnected response.

What makes this approach distinctive is not only the breadth of issues covered but also the way they are linked. The flagship programmes are more than funding streams: they are engines of change. They mobilise hundreds of researchers across Europe and beyond, build permanent networks and infrastructures, and ensure that engagement with policymakers, practitioners, and businesses is embedded throughout. Knowledge generated in one area feeds into another, and policy support is grounded in evidence and reinforced by capacity-building. This coherence ensures that the Partnership's work goes beyond isolated projects to build durable pathways for change, delivering on the EU Biodiversity Strategy for 2030.

By providing a blueprint for turning scientific excellence into tangible, evidence-based action, the flagship programmes align European and international R&I with global biodiversity goals, positioning Europe as both a laboratory and a pioneer in the transition to a nature-positive world.



Flagships addendum 1

Detailed strategy layers

- 2050 vision: The ultimate ambition aligned with the global vision of “Living in harmony with nature”

- Long-term goals (by 2030)
  - No net loss of ecosystems and an increase in the abundance of threatened species.
  - Widespread deployment of Nature-based Solutions across Europe.
  - Recognition of biodiversity as the foundation for sustainable development, with the EU as a global leader.

- Specific objectives: The five key “levers” the Partnership will use to achieve its 2030 goals, representing the direct impact areas for its R&I activities
  - Improved monitoring of biodiversity and ecosystem services.
  - Actionable knowledge to tackle the drivers of biodiversity loss.
  - An evidence base for the development and deployment of Nature-based Solutions.
  - Making the business case for biodiversity to integrate its value into economic practices.
  - Science-based support for EU policy-making.

- SRIA themes
  - Topical Theme 1: Better knowledge for biodiversity protection and restoration.
  - Topical Theme 2: Actionable knowledge for transformative change.
  - Topical Theme 3: Better knowledge to support the EU’s global action.
  - Cross-Cutting Theme A: Better knowledge on biodiversity and its dynamics.
  - Cross-Cutting Theme B: Better knowledge to develop, deploy, and assess NbS.

- Flagships:
  - Supporting protection and restoration of biodiversity and ecosystem across land, freshwater, coast and sea.
  - Better transnational monitoring of biodiversity to better characterise, understand and report on biodiversity dynamics and trends.
  - Better knowledge to develop, deploy and assess nature-based solutions.
  - Supporting societal transformation for the sustainable use and management of biodiversity.

- Work Packages
  - Promote and support R&I programmes and projects across the ERA.
  - Promote and support transnational biodiversity monitoring.
  - Promote and support design and implementation of NbS, and valuation of biodiversity in private sectors.
  - Connecting R&I programmes, results and experts to policy.
  - Internationalisation of European R&I activities
  - Communication, outreach and open science
  - Stakeholder engagement.
  - Develop and promote a common Partnership vision and strategy.
  - Coordination and management.

Topics such as biodiversity monitoring or NbS appear across several layers. Their role shifts depending on context: as levers in the objectives, as priorities in the SRIA, as frameworks in the Flagships, and as delivery structures in the Work Packages. This ensures strategic coherence and operational effectiveness, linking research priorities directly to real-world impact.

Flagships addendum 2

Summary of Flagship Programme R&I Calls

Flagship Programme	Call Name	Launch Year	Status	Total funding (€)	# of funded projects	# of partici-pating countries
FS1: Protection & Restoration	BiodivProtect	2021	Projects ongoing	> €44 Million	36	34
	BiodivConnect	2025	Projects shortlisted	> €40 Million	TBD	>29
FS2: Biodiversity Monitoring	BiodivMon	2022	Projects ongoing	> €46 Million	33	33
FS3: Nature-Based Solutions	BiodivNBS	2023	Projects ongoing	> €40 Million	34	33
FS4: Societal Transformation	BiodivTransform	2024	Projects ongoing	> €40 Million	35	32
Transversal to several FS	BiodivFuture	2026	Call open	> €40 Million	TBD	>30

Annex II - Engagement landscape

Table providing an overview of the engagement landscape of Biodiversa+, and how it relates to the topical or cross-cutting themes of the SRIA. It includes (groups of) organisations and stakeholders with which contributions are already occurring, and others that have been identified as key actors to consider and potentially engage with in the future.

Engagement landscape	1. Biodiversity protection & restoration		2. Transformative change		3. EU's global action		A. Biodiversity & its dynamics		B. NbS
	1.1. Protection	1.2. Restoration	2.1. Values	2.2. Governance	3.1. Tele-connections & trade	3.2. Investments	A.1. Status, trend & drivers	A.2. monitoring schemes	
COLLABORATIONS (past and ongoing)									
Alternet, fostering the European science-policy interface on biodiversity and ecosystem services			X	X					X
Banking associations and individual banks (e.g. European Central Bank, World Bank Group, etc.)						X			
BioAgora and its Science Service for Biodiversity	X	X	X		X			X	X
Consortium of European Taxonomic Facilities (CETAF)							X	X	
EU Business and Biodiversity Platform which helps to integrate natural capital and biodiversity considerations into business practices			X						
EU Directorate-General for International Partnerships, INTPA					X				
European Citizen Science Association (ECSA)							X	X	
European data management platforms such as Eurofleets, SITES (field-sites.se), ICP Forests, Oppla platform, etc.								X	
European Environment Agency	X	X	X	X	X	X	X	X	X

Engagement landscape	1. Biodiversity protection & restoration		2. Transformative change		3. EU's global action		A. Biodiversity & its dynamics		B. NbS
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European Partnerships (Water4All, Sustainable Blue Economy Partnership, Driving Urban Transitions, Agroecology, Future Food, Forests and Forestry, EJP Soil, etc.)	X	X		X			X	X	X
Global research infrastructures, Earth observation programmes, and monitoring networks for biodiversity (e.g. AnAEE, CEOS, Copernicus, COL, CSA, EGNOS, EMBRC ERIC/OBIS, EOSC, ESA, Galileo, GBIF, GEOBON, GERI, iLTER, JAXA, LifeWatch, LTER-Europe, MIRRI ERIC TDWG, NASA etc.)	X	X	X	X		X	X	X	
Horizon Europe Missions (Adaptation to climate change, Restore our ocean and waters, Soil deal for Europe)	X	X		X			X		X
Initiatives and projects on the business-biodiversity interface and focusing on nature valuation (e.g. One Planet Business and Biodiversity - OP2B, Business for Nature, Natural Capital Coalition, etc.)			X						
IUCN and related knowledge hubs (e.g. the KBA Technical Working Group)	X	X		X	X	X	X	X	X
Joint Research Center (JRC), in particular through the European Knowledge Center for Biodiversity	X	X	X	X	X	X		X	X
Local government for sustainability network (ICLEI) and individual local governments									X
Long-term monitoring schemes and data repositories in the public / private / NGO domain							X	X	
National and regional biodiversity related governmental institutions				X					
Nature conservation NGOs working at the interplay with development cooperation, with expertise to identify, formulate, and articulate policy positions on issues such as wildlife trafficking, CITES and integrating wildlife into EU development aid programmes					X	X			

Engagement landscape	1. Biodiversity protection & restoration		2. Transformative change		3. EU's global action		A. Biodiversity & its dynamics		B. NbS
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Network of experts that could provide bottom-up expertise into policy-linked processes such as development of national nature protection or restoration plans	X	X					X	X	X
NetworkNature (i.e., the European multi-stakeholder platform on NbS)			X						X
ODA programmes, agencies and development banks (e.g. UN Development Programme, African Development Bank Group, Deutsche Gesellschaft für Internationale Zusammenarbeit, Banque de France etc.)					X	X			
Organisations and businesses from the agricultural sector (e.g. the UN Food and Agriculture Organisation [FAO])					X				
Organisations supporting science and environmental communication (e.g. European Federation of Journalists, European Union of Science Journalists' Associations), and relevant environmental journalism networks.	X	X	X	X	X	X	X	X	X
Preparatory action for EU Biodiversity Observation Coordination Centre (EBOCC)								X	
Private companies generating, processing and/or analysing biodiversity monitoring data (incl. companies developing AI monitoring tools)								X	
Research communities and networks beyond Europe, notably from low- and middle-income countries, historically marginalised or formerly colonised countries, and biodiversity-rich countries					X	X			
Research projects funded under the Green Deal Call on 'Restoring biodiversity and ecosystem services' (LC-GD-7-1-2020)		X							

Engagement landscape	1. Biodiversity protection & restoration		2. Transformative change		3. EU's global action		A. Biodiversity & its dynamics		B. NbS
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Scientific societies, such as the Society for Conservation Biology, the Society for Ecological Restoration, etc.	X	X					X	X	X
Stakeholders from the civil society or private sectors (e.g. land owners and/or users, practitioners, etc.)	X	X	X	X	X	X	X	X	X
The System of Environmental-Economic Accounting (SEEA)			X						
the World Business Council for Sustainable Development (i.e. global CEO-led organisation encompassing 200 leading businesses working on transitioning to a sustainable world)			X						
UNEP-WCMC (incl. its World Database on Protected Areas)	X		X						
Wildlife Conservation Society					X	X			
World Wide Fund for Nature (WWF) and its European priority regions	X				X	X			
TO BE CONSIDERED IN THE FUTURE									
Africa-EU Partnership					X	X			
International and national private foundations (e.g. Euronatur, Deutsche Bundesstiftung Umwelt, Franklinia Foundation, VolkswagenStiftung, etc.)					X	X			
NGOs helping companies and other societal actors to identify best practice guidance and tools available to support informed business decisions related to biodiversity and natural capital.			X						

Annex III: List of indicators for Biodiversa+ calls

Call Indicator (Area)	Sub-indicator (sub-area)	Data Type	Inputs (data sources)	Measurement & Use (questions)
*General Information (Project description)	Project acronym and title Details on the organisation (incl. country) and coordinator Project period Project website and/or social media Details on the Partners Funding organisations WPs	Qualitative description	EPSS (submission platform of the pre-proposals and full proposals)	Project identification
*Publishable Project Summary	Short summary of Project context Main objectives Main activities Key findings Contribution to society	Qualitative description Project summary	Mid-term and Final Report on the reporting platform by the Project Coordinator and research Partners	Sources for communication
I Project Implementation	Project Objectives	Qualitative description & quantitative analysis list of objectives	Mid-term and Final Report on the reporting platform by the Project Coordinator and research Partners	Metrics to measure the projects results (deviation from initial objectives, no deviation from initial objectives)
I Project Implementation	Pre-defined Deliverables and Milestones	Quantitative analysis list of deliverables and milestones	Mid-term and Final Report on the reporting platform by the Project Coordinator and research Partners	Track the progress of the project and the difficulties encountered, help in the follow-up process
I Project Implementation	Communication	Quantitative analysis list of communication activities (to outreach the general public, not publications)	Mid-term and Final Report on the reporting platform by the Project Coordinator and research Partners	Track the communication activities to outreach the general public or Education project
I Project Implementation	Unforeseen Challenges	Qualitative description and analysis	Mid-term and Final Report on the reporting platform by the Project Coordinator and research Partners	Track the progress of the project and the difficulties encountered; help in the follow-up process; improvement of funding processes by Funding Organisation
II Scientific Outputs, Outcomes and Impact	Scientific dissemination activities (outputs)	Quantitative analysis list of project's publications, books, synthesis papers, etc.	Mid-term and Final Report on the reporting platform by the Project Coordinator and research Partners	Determine scientific dissemination of Knowledge in scientific communities
II Scientific Outputs, Outcomes and Impact	Scientific Presentations and Events (outputs)	Quantitative analysis list of conference proceedings, list of presentations, etc.	Mid-term and Final Report on the reporting platform by the Project Coordinator and research Partners	Determine scientific dissemination of Knowledge in scientific communities
II Scientific Outputs, Outcomes and Impact	Scientific Outputs Description	Quantitative analysis list of principal scientific results	Mid-term and Final Report on the reporting platform by the Project Coordinator and research Partners	Determine principal scientific results from the work accomplished (so far), methodologies used to carry out the research
II Scientific Outputs, Outcomes and Impact	Scientific outcomes and impact	Qualitative description and analysis	Mid-term and Final Report on the reporting platform by the Project Coordinator and research Partners	Determine scientific outputs and impact of the project

Call Indicator (Area)	Sub-indicator (sub-area)	Data Type	Inputs (data sources)	Measurement & Use (questions)
II Scientific Outputs, Outcomes and Impact	Follow-up of recruited personnel	Quantitative analysis (quantitative) List of Masters / PhDs / Postdoc supported, etc.	Mid-term and Final Report on the reporting platform by the Project Coordinator and research Partners	Improvement and engagement of project members and partners career
III Project Data	Research Infrastructures and Earth Observation	Quantitative analysis list of Research Infrastructures or Earth Observation Programmes (use of its products / services)	Final Report on the reporting platform by the Project Coordinator and research Partners	Use for work in T5.4 (mobilisation of research infrastructures), for reporting on open science and for analysing trans-disciplinarity (e.g. journal topics) in project outputs analyses
III Project Data	Data Management Plan (DMP)	Qualitative description Updated DMP	Updated DMP uploaded on the reporting platform by the Project Coordinator and research Partners	Used in analysing capacity building impact of Biodiversa+ in this area and for develop-ment of capacity building resources (guide, work-shops for funded projects, etc.)
IV Stakeholder Engagement & Societal (including policy) outputs, outcomes and impact	Stakeholder engagement activities and outputs	Qualitative description & quantitative analysis Project outputs' summary; list of engaged stake-holders, etc.	Mid-term and Final Report on the reporting platform by the Project Coordinator and research Partners	Measured along the broad lines of methods presented in BiodivERsA projects' outputs brochures and Stakeholder engage-ment handbook. Used to analyse and promote projects' and Partnership outputs/outcomes, and promote /develop best practices and capacity building (e.g. stakeholder engagement handbook, stakeholder mapping, etc.)
IV Stakeholder Engagement & Societal (including policy) outputs, outcomes and impact	Outcomes for society and policy	Qualitative description & quantitative analysis Project outputs' summary; Impact success stories, list of products, etc.	Final Report on the reporting platform by the Project Coordinator and research Partners	Measured along the broad lines of methods presented in BiodivERsA projects' outputs brochures. Used in analysis and promotion of project and Biodiversa+ outputs/outcomes, in WP6 (communication esp. success stories and Biodiversa achievements brochures), in WP4 T4.2.2 (e.g. database of project outputs relevant to the GBF), and in WP7 (esp. for capacity building work).
IV Stakeholder Engagement & Societal (including policy) outputs, outcomes and impact	Citizen Science	Qualitative description & quantitative analysis list of citizen science campaigns / scale / list of citizens involved / coun-tries involved, etc.	Final Report on the reporting platform by the Project Coordinator and research Partners	Used to analyse and promote project outcomes, impact of the Partnership, capacity building activities and guides (e.g. WP7 on citizen science)
V Innovation Results	Innovation Results	Qualitative description & quantitative analysis list of new methods, tech-niques, tools, prototypes, technology transfer activi-ties, etc.	Final Report on the reporting platform by the Project Coordinator and research Partners	Used to identify and promote project outputs and part of reporting to EC

Call Indicator (Area)	Sub-indicator (sub-area)	Data Type	Inputs (data sources)	Measurement & Use (questions)
VI Global Environmental Challenges & pressing issues	Global Environmental Challenges & pressing issues	Qualitative description & quantitative analysis summary of the contribution to the GBF / SDGs; list of the GBF / SDGs targets addressed	Final Report on the reporting platform by the Project Coordinator and research Partners	Used as part of analysing/ promoting outputs/ outcomes of funded projects and Biodiversa+, related to GBF implementation strategy (WP8), for engagement with MEAs (WP5)
VII Statement on expected longer term impact	Statement on expected longer term impact	Qualitative description	Final Report on the reporting platform by the Project Coordinator and the research Partners	Used to analyse and promote project impact
VIII - Transnational Added Value Collaboration	Networking Effect and added Value of the Transnational Call	Quantitative analysis list of papers involving multiple partners/ countries, etc. & Qualitative description summary on the collaboration / networking effects	Mid-term and Final Report on the reporting platform by the Project Coordinator and the research Partners	Determine the synergy outcomes and demonstrate the added value of Biodiversa+ opportunities/ projects
VIII - Transnational Added Value Collaboration	Follow up activities and plans for further exploitation of the results	Quantitative and qualitative analysis: additional funding, how the collaboration will continue, etc.	Final Report on the reporting platform by the Project Coordinator and the research Partners	Follow up activities and plans for further exploitation of the results of the projects
* Questions and comments to Biodiversa+	Questions and comments to Biodiversa+	Qualitative description	Mid-term and Final Report on the reporting platform by the Project Coordinator and the research Partners	Track the progress of the project and the difficulties encountered

biodiversa+
European Biodiversity Partnership



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