

D4.9 Dialogue on Restoration of Biodiversity, Habitats and Ecosystems



Document Information

Grant Agreement number:	101052342
Project acronym:	Biodiversa+
Project full name:	The European Biodiversity Partnership
Biodiversa+ duration:	7 years
Biodiversa+ start date:	<u>Start date:</u> 1 st October 2021
For more information about Biodiversa+	Website: http://www.biodiversa.eu/ Email: contact@biodiversa.eu Twitter: @BiodiversaPlus LinkedIn: Biodiversa+

Deliverable title:	D4.9: Usable report on the third consultation and / or dialogue conducted, summarising identified needs and possible follow-up activities by Biodiversa+
Authors:	Elise Buard, Catherine Juilliot (MTECT) with support of contributors listed in Annex 1
Work package title:	WP4 Connecting R&I programmes, results and experts to policy
Task or sub-task title:	Subtask 4.1.1: Consultations and dialogues with environmental policy makers, R&I policy makers, managers, experts and relevant stakeholders
Lead partner:	MTECT
Date of publication:	September 2024
Disclaimer	Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

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What is Biodiversa+

The European Biodiversity Partnership, Biodiversa+, supports excellent research on biodiversity with an impact for policy and society. Connecting science, policy and practise for transformative change, Biodiversa+ is part of the European Biodiversity Strategy for 2030 that aims to put Europe's biodiversity on a path to recovery by 2030. Co-funded by the European Commission, Biodiversa+ gathers 81 partners from research funding, programming and environmental policy actors in 40 European and associated countries to work on 5 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 to high-end knowledge for deploying Nature-based Solutions and valuation of 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: <https://www.biodiversa.eu/>

What is the BiodivRestore Knowledge Hub

The BiodivRestore Knowledge Hub was launched on 30 and 31 May 2024 in Paris and aims to establish a Pan-European knowledge hub on nature restoration to strengthen the knowledge base for the implementation of the Nature Restoration Law (NRL).

It was set up to build on the success of the “BiodivRestore” ERANET COFUND that was jointly launched by Biodiversa+ and Water JPI/Water4All. It is part of the actions linked to the call for projects, co-funded by the European Commission, and brings together 52 specialists from a range of expertise relating to the restoration of freshwater, terrestrial, coastal and marine ecosystems. It is seen as a first step in the European scientific community's contribution to support the implementation of the EU's proposed Nature Restoration Law (NRL), by building on existing initiatives and practices, and in line with countries' needs. The aim is to support countries in the development and implementation of their future national restoration plans through knowledge sharing and shared research activities.

The BiodivRestore Knowledge Hub plans to develop activities related to:

- Development of science-based guidelines/standards/good practices to increase the effectiveness and efficiency of restoration measures by countries;
- Improving general knowledge of the purpose and principles of ecological restoration, success factors, co-benefits associated with ecological restoration and how to manage conflicting interests.

More information at: <https://www.biodiversa.eu/engagement/biodivrestore-knowledge-hub/>

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Table of acronyms

AI	Artificial Intelligence
BiodivRestore KH	BiodivRestore Knowledge Hub
CBD	Convention on Biological Diversity
CSL	Credibility, salience and legitimacy
DG ENV	Directorate-General for Environment
EC	European Commission
EU	European Union
FAO	Food and Agriculture Organization (United Nations)
GBF	Global Biodiversity Framework
HEU	Horizon Europe
HSS	Human and Social Sciences
INTERREG	Inter-Regional (EU programme)
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IUCN	International Union for Conservation of Nature
KPI	Key Project Indicators (LIFE)
LIFE	Financial Instrument for the Environment (EU programme)
MS	Member State (of UE)
NBS	Nature-Based Solutions
NBSAP	National Biodiversity Strategies and Action Plans
NGO	Non-governmental organization
NRL	Nature Restoration Law
NRPs	National Restoration Plans
PNACC	National Climate Change Adaptation Plan (of France)
R&I	Research and Innovation
ROI	Return on Investment
SRIA	Strategic Research and Innovation Agenda (of Biodiversa+)
TAIEX	Technical Assistance and Information Exchange instrument of the European Commission
ToR	Terms of References
UNFCCC	United Nations Framework Convention on Climate Change
WP	Work Package (of Biodiversa+)

Executive Summary

The Biodiversa+ Dialogue Event on "Restoring Biodiversity, Habitats and Ecosystems" brought together 33 participants, including researchers, policy makers and stakeholders, to discuss how Biodiversa+, as the European Partnership for Biodiversity, could support the implementation of national restoration plans. The main objectives of this dialogue event were twofold:

1. identify knowledge gaps and research needs on biodiversity restoration and,
2. identify activities that Biodiversa+ and the BiodivRestore Knowledge Hub can undertake on biodiversity restoration.

Participants highlighted the need to develop inclusive prioritisation approaches involving social and natural sciences, to enable integration at the local level, and to incorporate the concept of ecological continuity into restoration criteria. This was based on a non-exhaustive theoretical paper (framework paper – Annex 2) and two pre-identified entry points, i.e. i) science-based support for prioritisation, ii) ensuring restoration in the long term. To ensure long-term restoration, they identified the need for long-term funding for restoration projects, as well as support for long-term monitoring. Restoration monitoring should be supported by guidance and key R&I, such as harmonising protocols, developing synergies with climate monitoring and different scales of monitoring (local, national, regional and international). Participants also identified the need to involve stakeholders from those different scales (local, national, regional and international) and the need for legal guidance and communication to the public, scientists and diverse practitioners. The outcomes of the dialogue identified numerous proposals that could be relevant to the Biodiversa+ portfolio of activities as well as to the BiodivRestore Knowledge Hub. Several proposals could be further developed, and this dialogue event represents a first step towards broader consultations to implement R&I on biodiversity restoration through the upcoming Biodiversa+ flagship programme on conservation and restoration of biodiversity.

Introduction

Biodiversa+, the European Biodiversity Partnership launched in October 2021, has a long-term strategic vision described in its Strategic Research and Innovation Agenda (SRIA). The SRIA describes the 5 themes that guide the activities of the partnership: Biodiversity protection and restoration; Transformative change; EU's global action; Better knowledge of biodiversity and its dynamics and Better knowledge for Nature-based Solutions (NBS) in a global change context. To better address the topical theme of restoration, Biodiversa+ plans to include it in an update of the current flagship programme on "Supporting biodiversity and ecosystem protection across land and sea".

Nature restoration is an important aspect of **The European Biodiversity Strategy for 2030**, that aims to put Europe's biodiversity on a path to recovery by 2030. This strategy contains specific actions and commitments, including the launch of a European nature restoration plan to ensure that Member States put in place measures to restore degraded ecosystems.

The Nature Restoration Law (NRL), proposed by the European Commission (EC) and adopted by EU Member States on 17 June 2024, includes an overarching restoration objective for the long-term recovery of nature in the EU's land and sea areas, with binding restoration targets for specific habitats and species. The agreement aims to restore at least 20% of the EU's land and sea areas by 2030 and all ecosystems in need of restoration by 2050. Member States will have to develop National Restoration Plans (NRPs) within 2 years (June 2026), including quantification and indicative maps of the areas to be restored in order to meet the restoration targets.

Biodiversa+ aims to explore how research and innovation (R&I) can contribute to the implementation of National Restoration Plans (NRPs).

This Dialogue Event took place in the context of the 2022 **Kunming-Montreal Global Biodiversity Framework of the Convention on Biological Diversity (GBF¹)**. Target 2 of the GBF aims to ensure that by 2030 at least 30% of areas of degraded terrestrial, inland water, and marine and coastal ecosystems are under effective restoration. This in order to enhance biodiversity and ecosystem functions and services, ecological integrity and connectivity.

The Dialogue Event focused on achieving the **following three objectives** in order to contribute to a science-based approach for ecological restoration:

1. Identifying knowledge needs and research gaps to be addressed,
2. Identifying activities that could be implemented by Biodiversa+ for some key aspects of restoration,
3. Identifying contributions to the BiodivRestore Knowledge Hub.

First, a brief literature review was done to guide discussions on the most pressing research challenges in restoration. This review resulted in the identification of five promising starting points. These topics were discussed in a working group meeting and prioritised through a survey with Biodiversa+ partners. The two most urgent starting points were selected to serve as the basis for the dialogue-event discussions and activities.

¹ Kunming Montreal Global Biodiversity Framework (KM GBF): <https://www.cbd.int/gbf>

Entry point A: Science-based support for prioritisation

As part of a science-based approach to ecological restoration, careful site selection and timely intervention are essential to ensure restoration success and achievement of the objectives. The identification of these sites should prioritise restoration actions, while taking into account synergies with climate change mitigation, adaptation, land degradation neutrality and disaster preparedness, as well as key sectors such as agriculture, forestry and fisheries. Recognising the diversity of methodologies and criteria for prioritising restoration sites, the dialogue event explored the current state of research and the challenges involved.

The primary objective was to identify critical knowledge needs and research gaps, keeping in mind the need to reflect on the guidance and support tools to be developed.

Entry point B: Ensuring restoration in the long-term

Assessing the effectiveness of ecological restoration remains challenging. The literature review shows that there is a fundamental need to accurately measure, monitor and evaluate the effectiveness of restoration efforts in the long term. At the same time, adequate practical tools are scarce, especially for complex socio-ecological systems. This requires further research.

Based on these two starting points, participants of the Dialogue-event worked in sub-groups to propose a list of research questions and ideas for activities that could be implemented by Biodiversa+ and the BiodivRestore Knowledge Hub to support nature restoration efforts in European Member States and the implementation of the NRL. There were three sessions, one for each of the three objectives of the Dialogue-event. These sessions were followed by a collegial discussion based on the outcomes of each sub-group.

This report synthesises the outcomes of the dialogue-event, in order to provide research funding organisations and all Biodiversa+ partners with:

- Identified knowledge needs which could form a basis for reflection for the upcoming Biodiversa+ call on 'Restoration of ecosystem function, integrity and connectivity, (BiodivFunc), to be launched in September 2025,
- Activities that could support the implementation of the revised 'Conservation and Restoration' flagship programme by the Biodiversa+ partners and the BiodivRestore KH.

1. Research questions for prioritization of restoration actions and long-term monitoring

1.1. Science-based support for prioritisation

1.1.1. Key points for the implementation of a prioritisation method

A consensus has emerged on the need for science-based prioritisation. However, this is not happening in practice due to significant implementation issues (as in Natura 2000²).

This raises the question: Can prioritisation approaches be inclusive, involving social and natural sciences, to enable implementation at the local level? This also relates to GBF targets 1 and 2 under goal A³, calling for inclusive and just conservation/restoration

- Develop a **common vision for restoration goals**: which restoration goals, when and how?
 - How to reconcile different scientific logics leading to different and possibly contradicting model outcomes and approaches for restoration (e.g., dynamics)?
 - Nature restoration requires a transdisciplinary approach, we should involve experts from different fields and sectors - water policy, agriculture, etc.
 - How do we measure and communicate the impact of our restoration efforts to society to explain why restoration is important to all stakeholders?
- **Implementing adaptive standards** from international to site levels
 - Shared definitions, models, approaches and methods on restoration generated by science: there are various opinions in the transdisciplinary restoration fields, which are not shared by all practitioners.
 - Terminology:
 - What is “effective restoration”?
 - What is the “good standard”?

It is necessary to define “good ecological status” in coherence with the dynamic nature of biodiversity and ecosystems.
- Need for **tools to identify priorities** that are adapted to the different scales, e.g. pilot studies.
 - Geographical scale: multiscale identification of prioritisation
 - Global scale
 - EU scale
 - Local scale

² Natura 2000 and Europe's forests: understanding and tackling implementation challenges. Biodiversa +. Available at: <https://www.biodiversa.eu/2022/10/06/natura-2000-and-europes-forests-understanding-and-tackling-implementation-challenges/>

³ Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society

- Landscape scale
- Habitat scale
- Site level

There is a risk in using standardised methods for restoration at different scales: how to identify and avoid those risks?

- Need to extend the thinking process from restoration of sites to restoration of landscapes

E.g., Natura 2000 process: understand what has been done by different Member States to avoid making the same mistakes, see what should be avoided in the recovery plans, while considering the stakeholder level during the process.

➤ Knowledge gaps:

- Basic data needs must be met in order to underpin science-based prioritisation, taking into consideration that there are limited resources and time. For instance:
 - “National Ecosystem Maps” or preferably “National Habitat Maps”,
 - Conservation status data
 - Ecotoxicological studies on deep-sea species to propose thresholds
 - Biodiversity of soils, particularly in relation to different types of soil minerals
- Data on habitat conditions (conservation status assessment) is a major knowledge gap. E.g.: High quality mapping of habitat condition and favourable reference areas
- How can habitats and species with an unknown status be included in the prioritisation process?
- Using a stepwise model: to improve existing data effectively with limited resources and time. Which steps are crucial to target first for successful restoration planning?
- Using remote sensing: What are the possibilities and limitations of using remote sensing / AI methods for planning and evaluation? How to ensure sufficient in situ data validation, incl. national data?
- Need for (hands-on) spatially explicit models that cover multiple species and multiple habitat qualities in the same model for prediction of short- and long-term outcome depending on restoration strategy (e.g., broad/limited approach, enhancing links/enlarging existing habitats)
- Reflect on the use of citizen data. Need for standardisation of this data as we need to take into account their current limitations. Good statistical analysis is needed to correct the bias due to an increase in observers.

However, there is still a need to start planning and prioritising restoration at different spatial scales, even if data and information are incomplete or not totally adequate. Accept the uncertainties that come with it, and accept the risk of making mistakes.

➤ Restoration trade-offs

- How to deal with habitats and species with competing needs? How to restore them together?

- Need for further research on how the degradation of some ecosystems affects others? Who decides on trade-offs and criteria? Between species, habitats, scales, priorities, etc.

1.1.2. Criteria for prioritising site restoration

- There should be room for a **bottom-up, practical approach to prioritisation and site selection**, in parallel with scientific prioritisation.
- Criteria for prioritisation should **emphasise ecosystem functions**.
- An evidence-based framework is needed to **support decision-making** where conflicting conservation objectives occur.

E.g., when the restoration of an Annex I habitat would have a negative impact on another Annex I habitat or species.

- **Demonstration of cost-effectiveness** via indicators to show the importance of prioritising a site for restoration
- Need to look for **synergies with other sciences** in particular social sciences, especially on how climate change is changing the landscape.

It's really important to reframe the debate and to move away from contradictions and misinformation for nature restoration activities. There is a need to take into account the positive and negative impact of nature restoration on local communities and activities. Social sciences can help to study these interactions and provide tools/solutions to address issues that might arise.

For example, in forestry, if mixed forests are currently less economically profitable than monospecific forests, looking for synergies in the context of climate change will show that mixed forests are more resilient to climate change and better for biodiversity. This could be a more 'profitable' ecosystem in the long-term (also a win-win vs lose-lose situation).

1.1.3. Incorporating the concept of ecological continuity into restoration criteria

- How can **connectivity be taken into account** when setting priorities at national and European level?

How can cross-border issues be taken into account? For example, how can the protection of species that cross borders and habitats be ensured? What can be done if a species does not have the same protection status depending on the country it crosses?

The question of how to integrate connectivity could be developed as a research question.

Connectivity is fundamental to the functionality of ecosystems, especially for fragmented ecosystems at different scales. To enhance and restore connectivity, we can implement ecoducts, or artificial translocation. However, it is not necessary to rely solely on artificial solutions, we can implement Nature based Solutions as ecological corridors, or remove existing barriers. Functioning of ecosystems is an important attribute and the backbone of ecosystem services, but so far, it has not been considered as such in restoration. Microbes play a significant role in ensuring ecosystem functionality, yet they are often overlooked and require further investigation to fully understand their role. Biomass production and food web interactions are crucial ecosystem functions. Reintroduction or bottom-up rewilding can allow the

restoration of important ecosystem functions. E.g.: The reintroduction of crickets in Flanders was a key initiative in the effort to restore biodiversity.

A literature synthesis is required on particular issues, like possible trade-offs between multiple functions and ecosystem services.

1.2. Ensuring restoration in the long term

In order to ensure long-term restoration, there is a need for long-term funding for restoration projects. Beyond funding, guidance and important R&I on monitoring restoration such as harmonisation of protocols, development of synergies with climate monitoring and other monitoring protocols at several scales (local, national, regional and international scales) are essential. Long-term monitoring as well as the development of impact-based methods to monitor restoration projects and to assess the potential of up-scaling the restoration efforts are needed.

1.2.1. Finance

➤ Long-term restoration goals versus short-term socio-economic interest:

Land users and politicians typically operate within shorter timeframes. For instance, land users want to be aware of their projected gains for the current year. Their objectives and focus are more immediate. It is essential to consider a broader perspective. In contrast, the forestry sector has a timeframe often measured in decades or even centuries. A requirement for reporting every three years can present a challenge in such cases.

➤ Dealing with financing that is not adapted for the **long-term objectives in restoration** (like long term monitoring)

Research grants typically last for 3-5 years, with projects committed to share results for about 5 years, via websites, publications, conferences etc. For continued long-term monitoring and management funding needs to last more than 15-20 years. It should become more common practice to continue monitoring after the project ends. We could have similar guidelines for measuring indicators during and after the project.

➤ And **who will finance** it in the long run?

Two exploration paths given were mentioned by participants: Funding by administrations and/or by philanthropic donors.

- What are the **key socio-economic success factors/conditions** to ensure non-deterioration of restored or existing good condition areas?
- Decision-making horizons at different levels: There is a need to better communicate and discuss with **local stakeholders** (companies, managers) on the short term versus longer-term benefits of restoration.

1.2.2. Guidance

➤ Best practice guidelines:

- Best practice guidance on adaptive management for climate change is needed to ensure that restoration projects and ecosystems are resilient to change, due to both environmental and socio-economic factors. Need for a holistic approach.
- Best practice guidance should combine scientific evidence with knowledge practices (incl. traditional and local knowledge) to build a stronger knowledge base to support restoration. This guidance may also include methods to improve knowledge transfer within and between organisations on different levels (encouraging adaptive management methods to encourage practitioners to move beyond an object-focused view).
- There is a need for clear long-term restoration objectives to be reached, including anticipation of future pressures, i.e., guidance on 'when' and 'how'.

The Nature restoration Law (NRL) requires the Member States to provide clear and coherent National Restoration Plans (NRPs) within two years, in order to ensure proper implementation and monitoring. Some participants feel that, with regards to prioritisation, there is little need for guidance on the "WHERE" and "WHAT" to restore. That is already described in legally binding regulations for the Member States in Birds Directives, Nature Restoration Law, etc. They expressed a need for more guidance on "HOW" to up-scale restoration in a rational manner and to ensure long term restoration. This is the priority and the effort should be supported. E.g.: How can we restore this area? How does the ecosystem function? How is it placed in the landscape, in order to fulfil the legal obligations? How can we take into account environmental pressures to ensure the good status of ecosystems? How can we identify and avoid risks of applying broadscale methods that potentially can become harmful for biodiversity in the long-term? How can existing good practice, such as LIFE projects, be better valorised and/or transferred?

- Synergies that need to be take into account:
 - Have to take into account the synergy with climate change and future pressures in the restoration process, so that restoration is effective.
 - How to identify areas for restoration that have the greatest synergies with climate change, degradation neutrality and disaster risk prevention.

Suggestions to consider within synergies:

- Need to consider socio-cultural benefits in synergies.
- Make predictions and models.
- Make precautionary plans (E.g.: the French precautionary plan: PNACC (National Climate Change Adaptation Plan), Brazil precautionary plan)

1.2.3. Biodiversity monitoring

- **Harmonisation of protocols and methods for monitoring** in NRPs
 - Harmonisation through schemes and scales

Harmonisation of protocols and methods should be conducted through different schemes and on different scales (local, national, regional, European and international) by all organisations involved in the monitoring of a specific habitat or ecosystem.

For example, in the forest field:

- The European network of national forest inventories is now moving towards the integration of biodiversity-related aspects, often using different criteria that need to be harmonised, and towards work relevant to forest policy. Some of these are carried out by organisations funded by the private sector (research institutes receiving private funding from the timber industry). This network is used by national ministries to assess the state and condition of ecosystems on a 5-10 years cycle, depending on the country.
- A similar system can be established on a large scale for biodiversity if national ministries allocate budget, staff, etc. to it. At present, long-term monitoring of biodiversity is mainly carried out by NGOs.
- In Germany, for example, biodiversity monitoring is mainly entrusted to forestry experts, which have specific monitoring tools and programmes developed for them. The main thresholds and definitions are based on European forest indicators. These indicators are not always linked to basic biodiversity research and are therefore not always a perfect indicator of biodiversity.
- Another example for greenhouse gas emissions: In France Citépa, the national agency for greenhouse gas emissions, is working on a similar system with local analysis.

- Development of synergies:

- with climate change monitoring:

Monitoring tools used for biodiversity could be also used for monitoring climate change and vice versa. Starting in 2026, the NRL will require the Member States to implement geographically explicit land monitoring, especially with sophisticated methodologies, for high carbon stock areas, land monitoring, land restoration, etc.

- with other international conventions:

Monitoring is required for the NRL, but also for other international conventions such as the Rio Convention including the CBD. Monitoring will support the reporting of indicators (headline, core or component) to the conventions. The current updating of the CBD NBSAPs provides an opportunity to align monitoring requirements, like protocols and common indicators. Capacity building is needed, for example through guidance documents. A prior assessment of capacity needs may be useful to identify the activities required.

➤ Need for long-term monitoring

- Monitoring timeframes must be long enough to detect ecological change.
- How to standardise monitoring designs (temporal resolution, time period for certain habitats, e.g., 10 years), take into account extinction debt, colonisation credit... There could be transitional periods where conditions seem great but then things get worse, or places where you see no effect before 10 years. Although it's difficult to implement, long-term monitoring is needed to measure the outcomes and impacts of restoration, which will require additional resources to support research infrastructures and scientists. E.g.: Support and develop existing networks of permanent plots to monitor biodiversity to demonstrate the benefits of restoration efforts and make adjustments where necessary (linked with adaptive management).

➤ Measuring

- How to measure progress/ success/ failure effectively and constructively? In the context of a major pressure, it is important to ensure that the restoration is cost-effective and successful in the long term (E.g., by using citizens' perceptions).

- It must be impact-based rather than effort-based to assess the effectiveness of restoration. The documents from international treaties (e.g., UNFCCC⁴, FAO) show which indicators need to be monitored to demonstrate success of restoration.
- Monitoring should be more impact-based, like within the LIFE programme. The LIFE Key Project Indicators (KPIs) which provide information on the results achieved by LIFE projects and are good indicators to follow up and see the impact on the ground, should be considered.
- The harmonisation of protocols (species and habitats) at regional, national and EU level could be part of the answer (detailed above). Impact-based monitoring will allow us to identify limits and prevent risks of standardised restoration (suitable indicators).
- How do we monitor the impact of restoration efforts (baseline data, common indicators) to assess the potential of upscaling?
- Monitoring social parameters: such as conflict resolution or ecotourism. For example, the benefits that communities receive thanks to restoration, by measuring people's happiness before and after restoration, and seeing if discourses change afterwards?
- To enhance monitoring strategies: need for technological development and the evaluation of appropriate variables. It could also be useful to use remote sensing in addition to the permanent network of monitoring sites.
- Need for more research on umbrella species⁵ to see if the annex species in the NRL are umbrella species and are adequate. This analysis will allow to identify if the annex species are adapted and include enough species.

➤ Steering

- What actions need to be taken if objectives are not being met or if actions are having unintended (wicked) effects.

E.g : if restoring one habitat will have a negative effect on the other.

- There needs to be a mitigation plan,
- There is a need for adaptive management of restoration if restoration actions have unintended effects.

- How will the implementation and programming of a restoration strategy be adapted in the context of climate change?

E.g.: even when Nature-based Solutions (NbS) are included in the programme, will they be sufficient or even adapted biodiversity monitoring.

⁴ United Nations Framework Convention on Climate Change (UNFCCC) <https://unfccc.int/>

⁵ An umbrella species is defined as a species whose extensive territory or ecological niche allows the protection of a large number of other species if it is protected

1.3. Cross cutting issues

Several proposals related to stakeholder engagement were raised, as was the need for legal guidance. Communication to the public, scientists and various practitioners was discussed throughout the two entry points and could be implemented for both.

1.3.1. Stakeholder involvement

- **Co-create restoration projects with involvement of local people and stakeholders** to ensure restoration success taking into consideration the relevant scientific information and the obligations that arise from the NRL
 - As local people and stakeholders have a better understanding of land use and the history of the natural environment, it is essential to involve them in a co-creation process of restoration projects (including prioritisation methods and decisions that cannot be based on science alone) and to support the implementation of the project. Local facilitators could be involved to link the different knowledge processes (scientific and traditional).
 - In order to gain the support and help of local communities in restoration activities, early involvement is key. This will allow for their participation and lead to better understanding from them on the importance of this ecological restoration.
 - The help of sociologists and psychologists may be required.
 - Pilot and demonstration cases are important for stakeholders to see the benefits.
 - An idea for the creation of national knowledge hubs where scientists and stakeholders can work together.
 - Demonstrate the socio-economic benefits of restoration and consider the negative part of restoration for stakeholders to reduce conflict and make trade-offs between restoration objectives and stakeholder interests.

It is essential to engage all levels of society, including local communities and influential stakeholders such as lobby groups representing the automotive, construction, engineering, and mining industries. An interdisciplinary approach to stakeholder engagement is crucial to collaborate with these groups on solutions that address and mitigate light, noise, and particle emissions, as well as potential knowledge gaps.

➤ **Reflect on a participatory and inclusive restoration process**

Stakeholder engagement was at the heart of the debate: At what stage do you involve stakeholders? Is it efficient to involve them directly?

Two opposing views were supported:

- One point of view is to let the scientists start first, and then bring the local stakeholders to the table to present their objectives.
- The other is to involve stakeholders as early as possible. They know their own interests well and it is best to know them beforehand. Involving stakeholders from the beginning will give them a sense

of ownership over the process. Majority agreement as the basics of participation: not to bring the finished project to them as this is not participation.

A consensus was reached:

Have a multi-scale approach: different types of stakeholders depending on different scales (national and local) need to be involved - without being too rigid.

The framework needs to be clear to allow for optimal participation and to indicate the limits within which participation is possible, with precise scientific objectives to avoid inappropriate statements such as "climate change is not happening", etc.

- **Timing is essential**, involving everyone is very important, but be aware of the time constraints.
- Biodiversity conservation and restoration monitoring to demonstrate success is a joint effort between governments, NGOs and other stakeholders. **Remote sensing images and derived products, such as various indicators, should be available to the national government and to the other stakeholders.** Credibility, salience and legitimacy (CSL) of these indicators are important to demonstrate success, promote stakeholder agreement and as input for informed decision making. Feasibility can be added as a fourth criterion⁶.

1.3.2. Legal guidance

- **Guidance to cope with legal obstacles**, e.g, best practices for different Member States, priorities in their policies (renewable acceleration areas, critical raw materials), landownerships, leases and permits in the way of effective restoration, with the involvement of legal experts.

Regarding local legal hurdles, participants mentioned a few ways to build institutional arrangements regarding land ownership. There is a need to secure land tenure including through a natural responsive land consolidation. Land consolidation seems to be implemented for agricultural land, but could also be used to provide nature rights: nature could be recognized as a stakeholder and have ownership over its land. Another innovative tool has been implemented in France: The Reel Environmental Obligation (ORE), that allows a private owner to sell its land while making sure that the future owner will respect environmental safeguard for a long period. So, it's a legal innovation to secure long term approaches.

- Need to make sure that restoration is implemented in the **long term despite political changes/instability.**

The NRL and its implementation through National Restoration Plans can help, as Member States can only commit to increasing their efforts by improving the indicators that must not be downgraded (as in the KM-GBF or UNFCCC).

1.3.3. Communication to the general public, scientists & stakeholders

- Communication is key to **overcome misinformation & support community engagement.**

By fostering research based on behavioural sciences to improve processes for instance through communication and marketing efforts.

⁶ <https://www.sciencedirect.com/science/article/pii/S1470160X18304606> and <https://www.sciencedirect.com/science/article/pii/S1364815216301840>

- Need for a **professional communication strategy**
- Need to **communicate by demonstrating cost-effectiveness** including to the general public.

It is essential to utilise monetary terms to communicate to people the financial benefits from restoration and to employ reliable indicators for measuring restoration. This enables the demonstration of the return on investment (ROI) of restoration in terms of financial, labour and policy costs. Scientists have also a role in showing the results of investing in restoration.

- **Best/Good Practice guidance on stakeholder engagement:**

There is an urgent need for good practice, underpinned by social sciences, on how to get stakeholder engagement right. People are experimenting and making the same mistakes. There is a need to provide best practice at different scales and to show what works. For example, on the format of do's and don'ts.

- **Non-scientific approaches**, such as promoting the artistic, cultural and heritage value of a project can be very effective in building long-term support for restoration projects.

E.g: Involving hunters in stewardship programmes is very effective for community engagement. Or other key communication channels for the society such as influencers.

Communication is key in this process, there is a need for better communication on the benefits that stakeholders can have. Projects should be accompanied by communication and marketing efforts from the very beginning and until after the end of the project in order to convince people.

- **Communication proposals:**

- Positive storytelling about restoration. Communicate with stakeholders to find win-win solutions, to show that it will be worth it. Either way, the more we engage in a negative narrative, the more difficult it is and the more stakeholder communication and engagement stagnates.
- Some feel that there should be an obligation to make information available after projects, that some of the money should be set aside for this and that restoration projects should become part of a larger effort after their completion. E.g.: there is a common platform of the French Observatory of biodiversity, that gathers data and pilots on biodiversity in France (its state, its evolution, the pressures it faces and its interactions with French society)
- Collaborative platform to gather existing knowledge:

There is a need for a place where scientists and stakeholders could find information on ongoing projects.

In regards to the assessment of existing knowledge, for example to find best practices in similar fields, a solution was proposed: to create a platform for all existing knowledge.

- With keywords to help navigation, a section with good and bad practices. This platform can be useful for NGOs, researchers, interested citizens, etc.
- One of the problems is the lack of information and uncertainty of what has already been restored. All the data exists, but is dispersed in different papers; there is a need for a centralised database.

2. Reflection on activities that could be carried out in Biodiversa+

The participants were then invited to brainstorm on relevant activities that could be implemented by Biodiversa+ under the two entry points of the dialogue event according to Biodiversa+'s portfolio of activities (Figure 1):

- Activities for foresight/ agenda setting
- Activities to support to research and innovation (R&I) (including biodiversity monitoring)
- Activities for capacity building and transdisciplinary dialogue
- Activities related to internationalisation

Many activities were suggested by the dialogue participants to feed the future Biodiversa+ flagship programme on restoration. The main need mentioned was capacity building and transdisciplinary dialogue, especially knowledge exchange for and between scientists involved in restoration projects or wishing to develop restoration research projects, such as an online platform to share experiences and results

Participants also identified a strong need for communication to involve stakeholders and citizens in the research projects themselves and to organise transdisciplinary dialogues. Specific activities within research projects related to the implementation of NRPs were proposed. Listening to the discussions, it appeared that there is not only a need for more specific research on restoration and monitoring, but also a need for further explanation, synthesis and discussion among a wider range of actors and sectors. This requires support, including funding for long-term research and monitoring infrastructures, to be further implemented. The need for restoration monitoring tools based on research at multiple scales was also highlighted in order to engage practitioners in new methods of adaptive management. Many of these elements could be supported by Biodiversa+ through its portfolio of activities, but several suggestions seem more relevant to the BiodivRestore KH or could be linked to other initiatives.

It is important to highlight that Biodiversa+ will not fund implementation projects, such as restoration projects of specific habitats in the field under "support to research & implementation". These projects are not part of the planned activities, other programmes (eg. INTERREG, Life...) do fund such projects.

Below you can see the recommendations from the workshop and the WP's or other activities they are most relevant for.

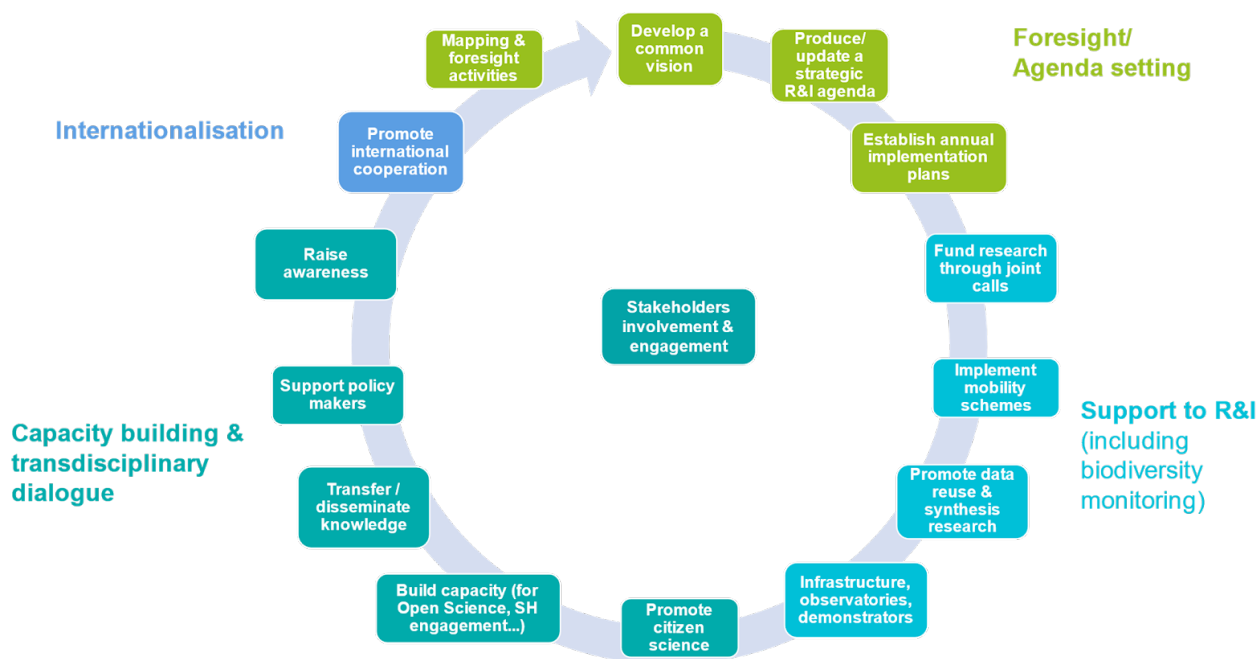


Figure 1 - Portfolio of Biodiversa+ activities

2.1. Activities for Foresight/Agenda setting

- **Develop science-based narratives** in favour of nature restoration in the context of Biodiversa+ SRIA

E.g., based on visions of future landscapes under various scenarios to help promote the involvement of policy makers, citizens and businesses, etc.

>> *Especially relevant to WP 8 or WP6 (SRIA update)*

2.2. Activities to support R&I (including biodiversity monitoring)

2.2.1. Research calls

- Engaging social scientists to **enhance the role of social and behavioral sciences** in garnering public support for nature restoration

>> *Especially relevant to WP 1 (WG on SSH in calls) & 7 (Guide on natural & SSH integration)*

- Fund a research call on the positive and negative impacts of restoration approaches (results vs activities)

>> *Especially relevant to WP 8 (call topics identification) and 1 (call text development)*

- Develop **basic research on restoration monitoring** including best practices on the use of remote sensing

>> *Especially relevant to WP 8 (call topics identification) and 1 (call text development) and 2 (best practices on use of remote sensing)*

- **Pilot studies at appropriate geographical scales** to assess the resilience of ecosystems to recovery, identify best practice and include local stakeholders
>> Especially relevant to WP 1 (call text development) and 2 (potential for monitoring pilot topics)
- **Research on reference systems:** Because reference systems are changing, do we need to let go of the reference? Are we now heading for dynamic ecosystems? What kind of conservation do we want? A dynamic conservation or based on an old referenced one? And how to do it in practice, how to conceptualise a model of restoration and conservation for ecosystems without a reference system? (e.g., rewilding: more dynamic)
>> Especially relevant to WP 1 (call text development)
- Develop **spatial management tools** to assess the scale of restoration impacts and their contribution to connectivity between sites to guide professionals and stakeholders.
>> Especially relevant to WP 1 (call text development) and 2 (potential for monitoring pilot topics)
- Fund research to develop **multi-scale prioritisation frameworks** to be used as examples for beneficiaries (scientists, stakeholders and the ecological restoration community).
>> Especially relevant to WP 1 (call text development)
- **Develop prospective scenarios** (“What if”) to visualise potential results of restoration for public and private actors
>> Especially relevant to WP 1 (call text development)

2.2.2. Knowledge Synthesis & Desk studies

- **Compile and digest mapped indicators** to guide prioritisation
>> Especially relevant to WP 4 (desk studies) and BiodivRestore Knowledge Hub
- Fill the **knowledge gaps on costs and benefits of restoration** by habitat/practice by compiling information
>> Especially relevant to WP 4 (desk studies) and BiodivRestore Knowledge Hub
- Map the knowledge gaps on restoration to **inform policy makers** (deep sea e.g.)
>> Especially relevant to WP 4 (desk studies) and BiodivRestore Knowledge Hub
- Support a **review** or dashboard for researchers, policy makers, practitioners:
 - of habitat types at national level,
 - on mapping of the condition of these habitats.*>> Especially relevant to WP 4 (desk studies) and BiodivRestore Knowledge Hub*

2.2.3. Involve stakeholders in research proposal

- Getting people to work together on **joint projects** through stocktaking, workshops with a project coordinator who takes primary responsibility.
>> Especially relevant to WP 1 (clustering), WP7 (stakeholder engagement) and BiodivRestore Knowledge Hub

- **Organise a policy forum** with representatives of ministries to present concrete actions to support stakeholders (NGOs, politics, ...) engagement in research projects on restoration.

>> *Especially relevant to WP 4 (science-policy fora)*

- **Bottom-up consultation upstream of the prioritisation decision-making process:** E.g., organise a communication event between local policy makers, stakeholders and local communities to assess how their marine resources can be managed in a way that is beneficial to all parties, and to identify key areas of focus for marine biodiversity and its protection.

>> *Especially relevant to WP 1 (call text development) and BiodivRestore Knowledge Hub*

2.2.4. Focus on NRL and related activities

- For **stakeholder engagement**: stakeholder mapping exercise, identify obstacles and opportunities in terms of understanding and perceptions around the NRL.

>> *Especially relevant to BiodivRestore Knowledge Hub and WP7 (stakeholder engagement)*

- **Guidance document for Terms of References (ToR)** to **communicate** the opportunities and benefits of the NRL aided by experts in communication, social, law and psychology)

>> *Especially relevant to BiodivRestore Knowledge Hub and WP6 (communication)*

- Promoting **dialogue with actors from various sectors** identify their perceptions and understanding considering the NRL to develop new forms of engagement (farmers, forest owner, fishers...) through appropriate tools such as forums, workshops and/or surveys

>> *Especially relevant to BiodivRestore Knowledge Hub and WP7 (stakeholder engagement)*

- **Workshop with climate and natural scientists** to redefine “viable nature restoration options” in the context of climate change to advise policy makers. The NRL works with defined habitats, but these are changing with climate change in the long term, so need to add expertise to not stick to habitats already known.

>> *Especially relevant to WP 1 (call text development) and BiodivRestore Knowledge Hub*

- **Workshop on National Restoration Plans (NRPs)** with scientists, spatial planners, policy makers, NGOs, ministries etc. of the 27 member states to identify prioritisation criteria, best practices and areas to be restored for maximum synergies in the restoration plans. E.g : present case study per MS.

>> *Especially relevant to WP 4 (science-policy fora) and BiodivRestore Knowledge Hub*

- Produce a **National Restoration Plan guidance document** outlining the different options (legal and bottom-up) for what is feasible for scientists.

>> *Especially relevant to WP 1 (call text development) and BiodivRestore Knowledge Hub*

2.3. Activities for capacity building and transdisciplinary dialogue

2.3.1. Guidelines

- Produce a restoration investment prioritisation map that assesses the socio-economic benefits of restoration with interactive tools to support policy makers

>> *Especially relevant to WP 1 (call text development) and BiodivRestore Knowledge Hub*

- To ensure restoration in the long term develop and publish guidelines for monitoring the impact of restoration measures for policy makers and restoration practitioners

>> *Especially relevant to WP 1 (call text development) and BiodivRestore Knowledge Hub*

- To ensure restoration in the long term, develop and publish best practice guidance on adaptive management for restoration practitioners

>> *Especially relevant to BiodivRestore Knowledge Hub*

2.3.2. Knowledge exchanges

- **Gather knowledge in one place:**

A knowledge manager should organise an inventory, shared understanding and reconciliation of the definitions, models, approaches and methods of restoration generated by academia and practitioners, and make a synthesis of all existing information.

>> *Especially relevant to WP 6 (communication and open science) and BiodivRestore Knowledge Hub*

There were four proposals for the indicated WP's / activities:

- An **online platform** returns in each sub-group to centralise:
 - All restoration projects, classified by ecosystem types, E.g pan-European datasets available to anyone working on restoration projects etc. (the 'GPS' of restoration),
 - Best practices: what works and what does not - disseminate the result of pilot studies/sites,
 - The Nature Restoration Law translated (in all EU languages) so that stakeholders and scientists can understand it,
 - Important and key documents designed for each type of person: speaking the language of stakeholders, speaking the language of policymakers,
 - An AI chat box to answer questions (not enough human capacity to do this),
 - Translate into national languages to make it more accessible (e.g., partnership with DeepL).
- A **living document** with summarised information and links for people who want more information. So, if someone has questions or wants to start a project, they do not have to start from scratch.
- Gathering **national knowledge and experts into a single entity**: Set up research consortia in different member countries to reach out to local communities, so that researchers know who to contact in their country for specific knowledge. Someone who has an overview of the situation, e.g. pond expert, heath expert, etc.
- **Support a network of documented pilot & demonstration sites** for different habitats and practices across Europe. Particularly at landscape/seascape scale. Monitoring and outreach to public officials, practitioners and stakeholders.

>> *Especially relevant to BiodivRestore Knowledge Hub*

- Communication Team to **promote restoration projects** with new approaches for the public:

- Biodiversa+ coordination could improve and expand communication channels and social/technical means about restoration goals and benefits (e.g. outreach strategy, social media campaign, nudging).
- Develop new forms of dissemination (e.g., through art, stakeholder board games, videos with true facts to counter misinformation)
- Organise field visits of pilot studies: to see what works, and what does not work, for local stakeholders, other scientists.

>> *Especially relevant to WP 6 (communication)*

2.3.3. Transdisciplinary Dialogue

- Workshop between LIFE projects, Horizon EU projects, and Biodiversa+ projects to make people talk with each other, avoid overlaps and create synergies

>> *Especially relevant to WP 1 (clustering) and BiodivRestore Knowledge Hub*

- Dialogue event & Workshop

- Organise a Dialogue event with scientists specialised in policy and human and social sciences (HSS) along with citizen/society representatives to develop new ways of engaging citizens and civil society. (E.g., citizen-based platform)

>> *Especially relevant to BiodivRestore Knowledge Hub and WP7 (stakeholder engagement and citizen science)*

- Organise workshops to bring restoration experts together by ecosystems categories to gather knowledge and indicators efficiently

>> *Especially relevant to BiodivRestore Knowledge Hub*

2.4. Activities related to internationalization

2.4.1. Promoting international scientific cooperation

- **Exchange of good practices between countries** through consultation with national stakeholders for the development of a set of best practices.

>> *Especially relevant to BiodivRestore Knowledge Hub*

- **Develop an IUCN approach similar to TAIEX** (the European Commission's Technical Assistance and Information Exchange Instrument). To exchange knowledge and experiences of managing trade offs between restoration goals for public authorities and stakeholders. E.g : Funding for experts from one country to go to other countries to meet other experts on specific issues (a kind of mobility grant - experts have to apply) - could help to harmonise restoration efforts in Europe.

>> *Especially relevant to BiodivRestore Knowledge Hub*

- **Promote the policy briefs produced by Biodiversa+** so that negotiators bring them as key documents to meetings and negotiations

>> *Especially relevant to WP4 (policy briefs) and WP6 (communication)*

- Training and Capacity building for scientists, stakeholders and policy makers **on restoration aspects of the 2nd IPBES Global assessment**

>> *Especially relevant to WP5 (engagement with IPBES)*

2.4.2. Links with GBF (Global Biodiversity Framework)

- Develop **benchmarking approaches to compare National Restoration Plans** (NRPs) based on the GBF monitoring framework. Such approaches of benchmarking could help countries to improve their national plan in order to try to achieve the objectives of the GBF on the basis of better methods or measures proposed in other national plans identified through the benchmarking process.

>> *Especially relevant to WP1 (call text development), WP4 (desk studies) and BiodivRestore Knowledge Hub*

3. Reflection on activities that could be carried out by the BiodivRestore Knowledge Hub

The proposals of participants for the BiodivRestore KH could be grouped into three main disciplinary themes: Environment/Ecology, Social sciences and Economy and legal aspects. As for the Biodiversa+ activities (Part 2), the participants stressed the need for knowledge exchange between scientists and, also, with other stakeholders through the development of an online platform to share best practices, expertise and guidance.

3.1. Environment / Ecology

3.1.1. Guidance

- Provide guidance on how to **plan restoration at different spatial scales** using incomplete data to inform policy makers and restoration planners
- **Guidance on rational up-scaling**, including risks, limitations and opportunities, using standardised methods at different scales (temporal and spatial) to inform policy makers and restoration planners.
- **Guidance on governance model and approaches**, through successful case studies of where this has worked in the long term in the EU, testimonials, maintenance of good practices (contracts with landowners and public authorities) (e.g. legal constructions, compensations)
- Knowledge Hub experts advise on **issues of competing habitat and species needs**
- Check if there is a **need for regional fine tuning of restoration** plans for particular habitat type (e.g., for different parts of the EU)
- Policy support and advice on **managing trade-offs between nature restoration objectives**

3.1.2. Best practices

- **Overview and assessment of best practices of Nature Restoration**, incl. projects success/failures for restoration practitioners.
- Develop **best practices for specific stakeholders** that they can easily use to make the transition. For example: "How to farm on rewetted peatlands?" This can be done through living labs, pilot studies or field visits.
- Developing **good practices guidance on adaptive management** for restoration practitioners and on socio-economic topics.
- **Upscaling and replication of successful Nature Restoration activities**, exemplary cases at local level (action oriented, expansion of living labs and pilots)

3.1.3. Knowledge Exchange

- Open **online platform** for:
 - Assessing and facilitate the use of existing knowledge and best practices on restoration E.g: Toolbox of facts, maps, and case studies

- Dynamic atlas of areas that are covered by restoration incl. funding and policy aspects
 - Q&A: Questions and answers on Nature Restoration
 - Expert restoration templates: Each expert in a restoration area can create a template of how to restore that specific area (pond, salt lake, meadow...), so that it can be used by other restoration experts.
 - Analysis of existing restoration projects and sharing their success/failure stories
 - Translation into Member States' national languages
 - Collection and synthesis of 27 Member State's nature restoration plans (NRPs)
 - Working with keywords related to type of habitats locations, stakeholders, etc.
 - Monitoring the groups of stakeholders involved and interested in getting involved in the restoration project
- Need for a **structure at national level interface**, meeting of expertise, kind of national hubs to support restoration projects. Knowledge hub could organise the availability and employability of experts and knowledge where and when needed in local restoration cases.

- **Dialogue between EU (policy) and national/local (implementation) levels** on nature restoration

Can be inspired by the EU Business & Biodiversity Platform of DG ENV (Biodiversa+ has observer status). Issues are discussed there and they ensure that the right messages are communicated.

- **Strengthen links with other EU initiatives** by organising working groups on thematic meetings to jointly define topics for the Biodiversa+ SRIA, HEU work programme, new EU partnerships on forests and forestry and the LIFE programme.

3.2. Social sciences

- **Social science-based actions to build stakeholder support:**

- A mapping of the stakeholder motivations ' involving behavioural scientists: to understand their perceptions and motivations in order to develop targeted communication strategies that can be shared at EU level.
- A multidisciplinary workshop (incl. SSH) for stakeholders' analysis in order to understand their motivations regarding restoration projects

It would be very useful to do the mapping hand in hand with multiple series of workshops that could involve these stakeholders in discussions

- **Good practices of stakeholder engagement & communication** for participatory Nature Restoration

3.3. Economic and legal aspects

- **Overview of legal aspects, property rights and institutional models** for Nature Restoration: for example, Institutional measures (e.g. contracts with farmers on pieces of land, ensuring they continue the same practices with no deterioration). There is a need for effective governance models.

- Overview of **available compensations for stakeholders** who contribute for the benefit of the NRL
- A **catalogue of funding opportunities and initiatives** for Nature Restoration projects for scientists.
- **Workshop on existing financing mechanisms** for nature restoration and identifying the financial gap based on content of NRP's.
- **Meta-analysis of cost-benefits** of Nature Restoration practices in the EU
- **Workshop on jurisdiction on private lands**: how to deal with property rights?
- **Rapid response to questions of public authorities and other decision-makers**: Answers to government questions, a helpdesk for EU, national and local authorities. Some Member States may not have the experts to advise them.

Knowledge Hub could set this up as BioAgora does on Transformative Change and others topics (<https://bioagora.eu/demonstration-cases/>)

Concluding remarks

The Dialogue Event allowed holding in-depth discussions on how Biodiversa+, the European Biodiversity Partnership, could support its partners to attempt the goal of 30% restoration of degraded habitats defined by the KM-GBF, and help EU MSs to implement their NRPs through appropriate research calls and activities related to its future extended flagship programme on Conservation and Restoration.

Even if the NRL defines the target to be achieved in 2030 and 2050 horizons, the dialogue participants pointed out the need to develop a common vision for restoration targets and terminology (e.g., effective restoration, good standard...) and to implement adaptive standards from site to international level. Knowledge gaps still need to be filled on basic data to define the location of habitats and their conservation status. This points to the need to develop stepwise and spatially explicit models using input from remote sensing, field studies and citizen data and data analysis using AI. The prioritisation of sites for restoration needs to develop through a practical bottom-up approach with criteria including ecosystem functions and ecological continuity to support decision making. Demonstration of cost-effectiveness with simple and impact-based indicators is essential to overcome misinformation and get continued support of local communities and enterprises. Indicators could be based on social parameters, benefits of restoration for local communities and economic activities, among others.

Restoration plans need to better include synergies at different scales and between policies, such as climate adaptation and land use. The humanities and social sciences should be more involved to study the positive and negative impacts of nature restoration on local communities and activities. They could also aid in involving all practitioners and stakeholders in research projects to co-create restoration projects and guidelines. The development of long-term monitoring is crucial for clear long-term restoration objectives, with adequate financial support and a permanent network of field plots to collect data. This will aid in basing restoration on scientific evidence, help detect ecological changes and develop long-term adaptive management that takes future pressures into account.

While there is already expertise to propose guidelines for best practices, it could benefit from increased accessibility and findability for example through a publicly available platform. Such guidelines should combine scientific evidence and local knowledge, to harmonise protocols and methods for monitoring restoration through systems and scale. This should be carried out by involving experts at different scales and developing synergies between local, national and international levels. Communication between scientists involved in restoration, but also between scientists and other stakeholders, including citizens, needs to be improved. Options mentioned were, development of positive storytelling (with appropriate keywords), a collaborative platform to gather existing knowledge, and introduction of a communication plan into research projects, to make information available during and after the projects.

Many activities were suggested by the dialogue participants to feed the future Biodiversa+ flagship programme on restoration. Capacity building and transdisciplinary dialogue were central, especially knowledge exchange for and between scientists involved in restoration projects or wishing to develop restoration research projects, such as an online platform to share experiences and results. Additional activities suggested were improvement of communication to involve stakeholders and citizens in the research projects themselves and organising transdisciplinary dialogues. Specific activities within research projects related to the implementation of NRLs were proposed.

Not only was the need for more specific research on restoration and monitoring clearly identified, but also a clear need for a better dialogue with a wider range of actors and sectors. The latter requires suitable support to be further implemented, i.e. funding and long-term research and monitoring infrastructures. The need for restoration monitoring tools based on research at multiple scales was also highlighted in order to engage practitioners in new methods of adaptive management. Many of these elements could be supported by Biodiversa+ through its portfolio of activities.

The proposals of participants discussed during the session related specifically to the BiodivRestore KH were used during the two following days for the launch of the BiodivRestore KH, but other activities discussed during the session related to Biodiversa+ activities could be also relevant for the KH. An analysis will be made of the outcomes of the dialogue-event (part 3 and 2) and the BiodivRestore KH seminar in order to feed into the KH action plan.

Annex 1- List of participants to the dialogue-event

Invited participants:

An Cliquet – Researcher, UGent - Ghent University, Belgium

Anushree Bhattacharjee – Stakeholder, UNEP WCMC - UN Environment Programme World Conservation Monitoring Centre, United Kingdom

Bram Vanschoenwinkel – Researcher, Vrije Universiteit Brussel, Belgium

Christina Pantazi - Policy maker, European Commission, DG ENV

David Thomas – Stakeholder, Endangered Landscapes & Seascapes Programme
- CCI, United Kingdom

Emelie Waldén - Policy maker, Swedish Environmental Protection Agency, Sweden

Florence Brun - Policy maker, French Ministry for Ecological Transition and Territorial Cohesion, France

Florian Claeys - Policy maker, European Commission, DG R&I

Jennifer Roche - Policy maker, National Parks and Wildlife Service (Irish Heritage Ministry), Ireland

Jérémy Piffady – Researcher, INRAE, France

Jordi Cortina-Segarra – Researcher, Universidad de Alicante, Departamento de Ecología, Spain

Jozée Sarrazin – Researcher, IFREMER, France

Kris Decler – Researcher, Research Institute for Nature and Forest, Belgium

Maja Sever – Stakeholder, Slovenia Forest Service, Slovenia

Mario Brauns – Researcher, Helmholtz Centre for Environmental Research, Germany

Metodi Sotirov – Researcher, University of Freiburg, Germany

Natalia Rodriguez – Stakeholder, Office Français de la Biodiversité, France

Robertus Hendriks - Policy maker, Ministry of Agriculture, Nature and Food Quality, Netherlands

Ruth Vanhaecht – Stakeholder, Sonian Forest Foundation, Belgium

Tristan da Silva e Ornelas – Researcher, University of Aveiro, Portugal

Walter Timo de Vries – Researcher, Technical University of Munich, Germany

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Biodiversa+ partners:

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Elise Buard, French Ministry for Ecological Transition and Territorial Cohesion

Michaël Moens, Agentschap voor Natuur en Bos, Belgium

Ondrej Kusbach, Technology Agency of Czech Republic

Rainer Sodtke, German aeronautics and space research centre, Biodiversa+ Vice Chair

Support (Biodiversa+ operational team):

Frédéric Lemaître, French Foundation for Research on Biodiversity

Patricia Kammerer, French Foundation for Research on Biodiversity

Marlies Laethem, Belgian Science Policy Office

Annex 2 – Framework Paper

Framework paper for the Dialogue-Event on restoration of biodiversity, habitats and ecosystems

Presentation of the dialogue-event

Biodiversa+, the European Partnership on Biodiversity, is organising a dialogue-event on the restoration of biodiversity, including ecosystems, habitats, and species, in line with the Biodiversa+ SRIA priority themes and its flagship programme on conservation and restoration.

This programme and theme are situated within the broader context of international efforts to protect and restore biodiversity, as outlined in the Convention on Biological Diversity agreed at COP 15 in December 2022, with the Global Biodiversity Framework⁷. This framework set a target of restoring 30% of degraded terrestrial and marine ecosystems.

More specifically, this programme and theme are in alignment with the European Biodiversity Strategy for 2030, which provides that Member States will ensure no deterioration in conservation trends and status of all protected habitats and species by 2030 and that at least 30% of species and habitats not currently in favourable status are in that category or show a strong positive trend (Paragraph 2.2.1)⁸.

The dialogue event will also provide an opportunity to examine in greater detail some key aspects of the implementation of the objective of restoration under the EU Biodiversity Strategy, including the Nature Restoration Law (NRL), a proposal of European regulation identified as an important goal of the EU biodiversity strategy for 2030. The dialogue-event aims to convene about 30 experts encompassing scientists, civil society representatives and policy makers with proficiency in nature restoration. The event will be held in-person at the French Ministry in charge of the environment in Paris on May 28th (afternoon) and 29th (morning), and requires active participation in the plenary discussions and group activities. The dialogue-event is focused on achieving the three following objectives:

1. Identifying knowledge needs and research gaps to be addressed,
2. Identifying activities that could be implemented by Biodiversa+ for some key aspects of restoration,
3. Identifying contributions to the BiodivRestore Knowledge Hub (refer to the attached document).

General context

The Kunming-Montreal Global Biodiversity Framework has four long-term goals for 2050 and 23 action-oriented global targets for urgent action over the decade to 2030. Goal A provides that the integrity, connectivity and resilience of all ecosystems are maintained, enhanced, or restored, substantially increasing the area of natural ecosystems by 2050. Target 2 aims to ensure that by 2030 at least 30% of areas of degraded terrestrial, inland water, and marine and coastal ecosystems are under effective

⁷ Kunming-Montreal Global biodiversity framework. Draft decision submitted by the President, CBD/COP/DEC/15/4 19 December 2022

⁸ EU Biodiversity Strategy for 2030, EUR-Lex - 52020DC0380 – EN20 May 2020

restoration, in order to enhance biodiversity and ecosystem functions and services, ecological integrity and connectivity.

The EU's biodiversity strategy for 2030 is a comprehensive, ambitious and long-term plan to protect nature and reverse the degradation of ecosystems. The strategy aims to put Europe's biodiversity on a path to recovery by 2030, and contains specific actions and commitments. It includes a commitment to launch a European nature restoration plan to ensure that Member States put in place effective measures to restore degraded ecosystems.

As part of this plan, the European Commission (EC) proposed the first EU-wide Nature Restoration Law which includes an overarching restoration objective for the long-term recovery of nature in the EU's land and sea areas, with binding restoration targets for specific habitats and species⁹. The provisional agreement [adopted by the European Parliament](#) on 25 February aims to restore at least 20% of EU land and sea by 2030, and all ecosystems in need of restoration by 2050. It aims to contribute to achieving the EU's overarching objectives concerning climate change mitigation, climate change adaptation and land degradation neutrality. It includes specific targets for terrestrial/coastal/freshwater ecosystems, marine ecosystems, urban ecosystems, rivers and floodplains, pollinators, agricultural ecosystems and forest ecosystems. The NRL is currently awaiting finalisation of the adoption process by the co-legislators in the framework of the ordinary legislative procedure. Once the NRL enters into force, Member States will develop National Restoration Plans (NRPs) which will include the quantification and indicative maps of areas to be restored to reach restoration targets, among other provisions detailed in Articles 14 and 15.

Focus areas for the Dialogue-Event

A brief literature review was undertaken in relation to the various needs identified to guide discussions on the most pressing research challenges in restoration. The analysis drew from a selection of reports, policy documents and scientific articles (refer to the bibliography) primarily sourced from a Web of Science request, employing keywords "biodiversity restoration" and "Europe". This review facilitated the identification of five potential entry points - (1) science-based support for ecological restoration, (2) socio-cultural challenges of restoration, (3) policy and governance concerns, (4) developing and addressing a research and capacity agenda, (5) ensuring restoration in the long-term. These topics were deliberated upon in a working group meeting and prioritised through a survey shared with Biodiversa+ partners. The pinpointed two most urgent themes (part of entry point 1 and point 5) will serve as the structure for the dialogue-event discussions and activities. The others may become the topics of a subsequent dialogue-event or complementary initiatives of Biodiversa+.

Entry point A: Science-based support for prioritisation

As part of a science-based approach to ecological restoration, a careful site location selection and timely intervention are essential to ensure the success of restoration and the achievement of targets. Whether under the Global Biodiversity Framework, the EU Biodiversity Strategy or the provisional agreement on the Nature Restoration Law, restoration efforts are expected to be prioritised along various objectives.

⁹ For more information about the NRL, please check: https://environment.ec.europa.eu/topics/nature-andbiodiversity/nature-restoration-law_en

The Global Biodiversity Framework provides that actions to reach the 2030 targets take into account national circumstances, priorities and socioeconomic conditions. Target 2 refers to ecosystem functions and services, ecological integrity and connectivity, while Target 11 refers explicitly to the regulation of air, water and climate, soil health, pollination and reduction of disease risk, as well as protection from natural hazards and disasters.

The EU Biodiversity Strategy for 2030 emphasise the importance to restore ecosystems with the greatest potential to capture and store carbon and to prevent and reduce the impact of natural disasters.

For the restoration of terrestrial, coastal and freshwater habitat types, Member States will, as appropriate, until 2030 give priority to restoration measures in areas that are located in Natura 2000 sites. The provisional agreement on the Nature Restoration Regulation provides that Member States, when elaborating their national restoration plans, identify synergies with climate change mitigation, climate change adaptation, land degradation neutrality and disaster prevention and prioritise restoration measures accordingly. Member States will also identify synergies with agriculture and forestry.

Acknowledging the diversity of methods and criteria to prioritise restoration sites, the upcoming dialogue-event aims to delve into the associated scientific research and knowledge challenges and opportunities. While recognising the need to reflect on the necessary guidance and support tools to be developed, the primary objective revolves around pinpointing critical knowledge needs and research gaps.

Non-exhaustive list of questions to consider¹⁰:

- How to develop the necessary prioritisation approaches and models and make them available to policy makers in charge of developing restoration plans in each Member State?
- What strategies can be employed to identify sites with the most significant synergies with climate change mitigation and adaptation, land degradation neutrality and disaster risk prevention?
- How to ensure the integration of multi-stakeholder perspectives and socio-cultural criteria in prioritisation models? (Silva et al., 2023)
- What role does cost-effectiveness analysis play in identifying high-priority areas for restoration? (Silva et al., 2023; Strassburg et al., 2020)
- Should prioritisation decisions solely rely on scientific inputs, or should democratic processes be further emphasised? Who gets to decide restoration priorities? (Cannon, 2022; Strassburg et al., 2022)
- To what extent do the rights, preferences, participation and knowledge of local communities influence restoration prioritisation? (Strassburg et al., 2022)

Entry point B: Ensuring restoration in the long-term

Under the Global Biodiversity Framework, the actions set out in each target need to be initiated immediately and completed by 2030 so that, together, the results will enable achievement towards the outcome-oriented goals for 2050. The EU Biodiversity Strategy for 2030 echoes this vision, and highlight as a milestone, to ensure that Europe's biodiversity is on the path to recovery by 2030. The provision agreement on the NRL includes in its overarching objectives the long-term and sustained recovery of

¹⁰ The dialogue-event discussions will not be restricted to these considerations

biodiverse and resilient ecosystems. National restoration plans will include indication of the provisions for ensuring the continuous, long-term and sustained effects of the restoration measures.

Assessing the effectiveness of ecological restoration remains challenging. The literature review shows that there is a fundamental need to accurately measure, monitor and evaluate the effectiveness of restoration efforts in the long term, but underlines the scarcity of adequate practical tools, especially in complex socio-ecological systems (Li et al., 2017). This requires appropriate research development.

Non-exhaustive list of questions to consider²:

- How can current and potential future pressures be assessed and taken into account to ensure the stability and resilience necessary to ensure long-term maintenance of ecosystems, habitats and species?
- What strategies can be adopted to enhance monitoring strategies, verification systems and adequate baseline data on both socioeconomic and biophysical variables to provide critical confirmation on how to accelerate efforts? (IPBES, 2018)
- How can restoration project evaluations be scaled up from individual sites to broader landscape and regional levels? (Li et al., 2017)
- How can effective monitoring be integrated into adaptive management approaches? (Morrison, 2001)
- What differentiates effective monitoring from implementation monitoring, and how should these aspects be approached? (Machmer & Steeger, 2002)
- What monitoring timing, frequency and duration are optimal given the unpredictability of ecosystem recovery time scales? (Hall & Howarth, 2000)
- How can policy instruments be evaluated to address land degradation, both in environmental and social outcomes? (IPBES, 2018)

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