

# Foresight Workshop on Nature-based Solutions and Transformative Change: Exploring Future Research Horizons

Oslo – 25-26 February 2025



Co-funded by  
the European Union

## Document Information

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

<b>Deliverable title</b>	D3.11 Foresight report on emerging questions and scientific frontiers on Nature-based Solutions
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<b>Work package title</b>	WP3: Promote and support design and implementation of NbS, and valuation of biodiversity in private sectors
<b>Task or sub-task title</b>	Subtask 3.2.1: Support for joint programming of R&I on NbS
<b>Lead partner</b>	RCN
<b>Disclaimer</b>	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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### Acknowledgements

We would like to sincerely thank all participants for their active contribution in the workshop. A special thanks goes to UNEP-WCMC for their invaluable efforts in the planning and organisation.

## **What is Biodiversa+**

The European Biodiversity Partnership, Biodiversa+, supports excellent research on biodiversity with an impact for policy and society. Connecting science, policy and practice 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 partners from research funding, programming and environmental policy actors in 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/>

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## **Executive Summary**

This report summarises the outcomes of a foresight workshop organised by Biodiversa+ with support from UNEP-WCMC and hosted by the Research Council of Norway in Oslo on 25–26 February 2025. The workshop convened approximately 30 participants from diverse disciplinary and professional backgrounds to explore the relationship between Nature-based Solutions (NbS) and transformative change (TC), with the objective of identifying emerging research and innovation (R&I) needs and future scientific frontiers.

The workshop combined horizon scanning, systems-oriented group discussions and participatory foresight methods. A STEEPV framework (Social, Technological, Economic, Environmental, Political, Values), aligned with the European Environment Agency's drivers of change, was used to identify key trends, uncertainties and potential disruptions shaping the NbS-TC nexus towards 2050. Discussions were grounded in four socio-ecological contexts (urban areas, agricultural landscapes, mountain ecosystems and coastal regions) and complemented by the development of shared "images of the future" to inform longer-term research perspectives.

Horizon scanning revealed strongly interconnected societal, environmental and governance-related dynamics influencing NbS and TC. Participants highlighted growing recognition of NbS alongside a persistent disconnection between societies and nature, increasing polarisation and challenges to trust in science, and the central role of governance, legitimacy and values. Emerging concepts such as nature-positive economies, regenerative systems and rights of nature were identified, together with disruptive "wild cards" capable of reshaping transformation pathways. A key insight was that baseline conditions are unstable and highly context-dependent, challenging generic approaches and underscoring the need for adaptive, place-based research.

Across all four contexts, participants agreed that NbS can contribute to transformative change, but only when embedded in broader systemic shifts. These include integrated, cross-sectoral governance; reconfigured incentive and subsidy systems; a shift from ownership to stewardship of ecosystems; and stronger attention to social equity, justice and long-term risk and resilience. Governance, finance, values and behaviour emerged as decisive enablers (or constraints) for NbS-driven transformation.

Key research priorities identified include the development of shared frameworks and indicators to assess NbS contributions to transformative change; governance and economic research on pathways towards a nature-positive economy; increased focus on risk, disaster preparedness and long-term effects of NbS; and stronger socio-ecological and transdisciplinary approaches. The workshop concludes that NbS hold significant potential to support transformative change, but only if aligned with deep systemic shifts and supported by long-term commitment and adaptive learning.

## Introduction

A key focus of Biodiversa+'s work is promoting and supporting the development and implementation of knowledge on Nature-based Solutions (NbS) for policymakers, businesses, and practitioners.

In this context, Biodiversa+ organised a foresight workshop to explore the nexus between Nature-based Solutions (NbS) and transformative change (TC), with a specific emphasis on identifying emerging research and innovation (R&I) needs and scientific frontiers, with the support of United Nations Environment Programme World Conservation Monitoring Center (UNEP-WCMC).

The UN and major global agreements (e.g., Paris Agreement, Kunming-Montreal Global Biodiversity Framework, Sustainable Development Goals) envision a future where climate is stabilized through net-zero emissions, biodiversity thrives with restored ecosystems, and societies transition to sustainable and resilient ways of living.

For example, the 2050 Vision of the Kunming-Montreal Global Biodiversity Framework (KMGBF) is a world living in harmony with nature, where “biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people”.

Transformative change through Nature-based Solutions will be critical in achieving this vision by addressing the root causes of environmental challenges while delivering social and economic benefits.

However, NbS are not fully integrated into the conceptualisation of TC, even though they could indeed play a crucial role in helping achieve the 2050 vision of the KMGBF, of a world living in harmony with nature<sup>1</sup>. Unlocking the full potential of NbS in the context of TC could produce changes in paradigms, goals and values, and practices needed for their implementation. This workshop aimed to grasp this interplay and explore possible mutual dependencies and how they may support each other to advance further and support Research and innovation (R&I) at the crossroads of NbS and TC.

This report is an effort to represent what was done in the workshop and to summarise the outcomes. The workshop and this report aim to inform the midterm update of [Biodiversa+'s Strategic Research and Innovation Agenda \(SRIA\)](#) and the EU's long-term biodiversity research strategy. It is also relevant to ongoing debates around both NbS and TC in international science-policy fora<sup>2</sup>. Additionally, the insights gained will help Biodiversa+ better connect and articulate two of its main flagship programs: “Better knowledge to develop, deploy and assess nature-based solutions” and “Supporting societal transformation for the sustainable use and management of biodiversity”, including their associated activities and funded projects (BiodivNBS and BiodivTransform).

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<sup>1</sup> [2050 Vision and 2030 Mission](#)

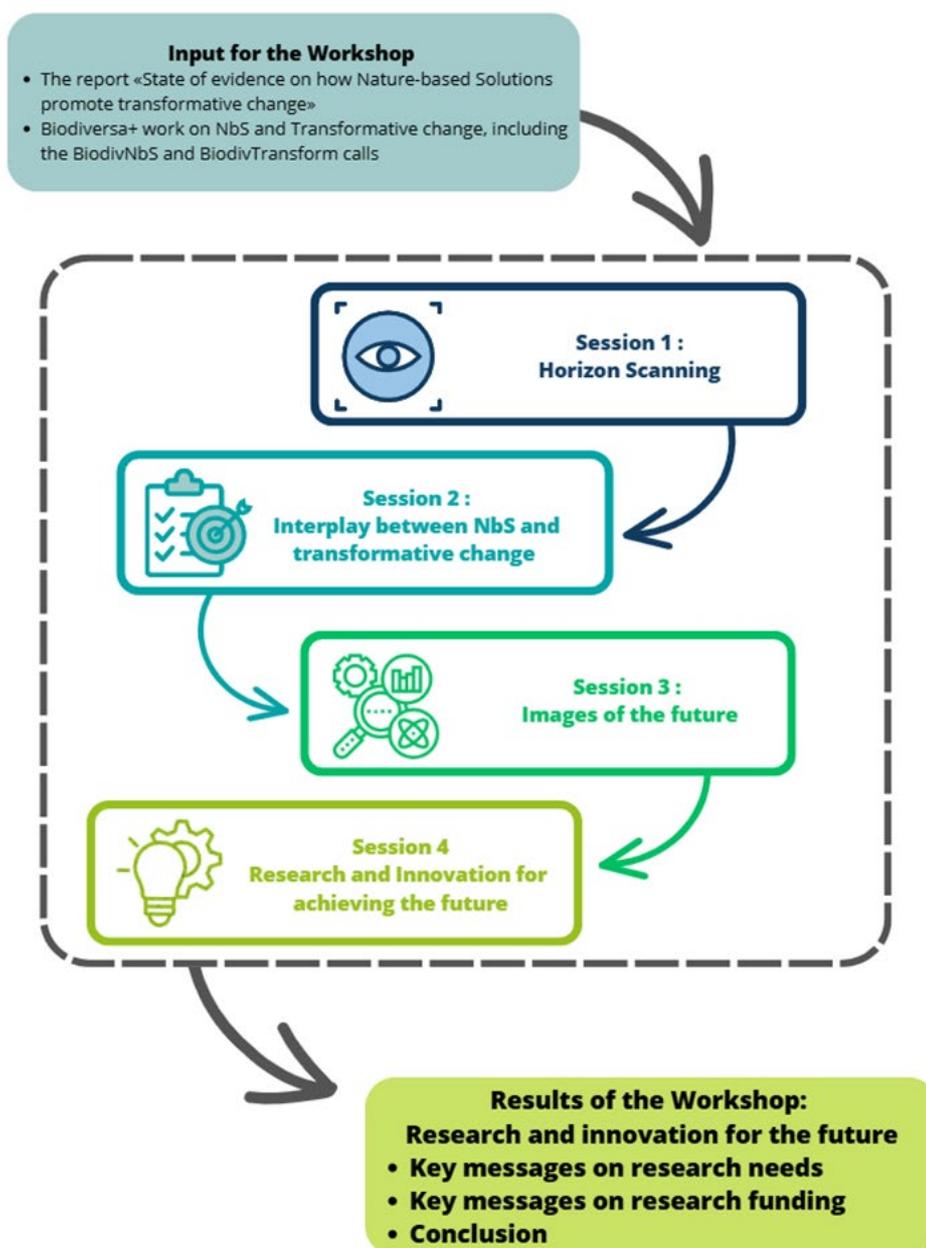
<sup>2</sup> Examples from research literature:

- [Beyond experimentation: how are urban nature-based solutions living labs in Europe and Latin America designed and implemented for transformative change?](#)
- [Leveraging Nature-based Solutions for transformation: Reconnecting people and nature](#)
- [Assessing nature-based solutions for transformative change](#)

## 1. Methodology and process

Biodiversa+ organised the workshop, which was supported by UNEP-WCMC and hosted by the Research Council of Norway (RCN). The workshop was held in Oslo on the 25th and 26th of February 2025 over two half-days. It gathered 30 participants from diverse backgrounds and disciplines (see full list in Annex 1). The workshop was informed by Biodiversa+'s work on NbS and transformative change, as well as the report “State of evidence on how Nature-based Solutions promote transformative change”, written by UNEP-WCMC for Biodiversa+<sup>3</sup>. This study, commissioned by Biodiversa+, aimed to investigate the evidence demonstrating that Nature-based Solutions (NbS) can contribute to transformative change in the sustainable use and management of biodiversity in social-ecological contexts.

Figure 1: Workshop structure and context



<sup>3</sup> [State of evidence on how Nature-based Solutions promote transformative change](#)

The first day began with a welcome address by the hosts, RCN, followed by an introduction by the Biodiversa+ Operational team on the partnership, including organisation, priorities and goals, and strategy. UNEP-WCMC provided the context of the workshop by reminding the audience of the 2030 and 2050 goals for nature and people, and presenting the overview and key findings of the desk study, which formed the framework paper for the workshop; State of evidence of the contribution of NbS to transformative change. The overview of the study was followed by a questions and answer session by participants.

After the introductions, the workshop consisted of discussions, organised in four groups. The composition of the groups varied throughout the workshop to facilitate the cross-fertilisation of ideas. Representatives of the organisers were present to facilitate the discussions. The participants were responsible for reporting back to the plenary from each table. Written material was provided to guide the discussions.

## 1.1. Day 1 – 25 February 2025

The first collaborative session was based around the objective of participants identifying current and emerging trends, drivers, and uncertainties that influence NbS and transformative change. These trends could include technological advancements, policy shifts, environmental challenges, and social movements. To achieve this objective, a horizon scan was conducted, where participants identified current, emerging and potential trends, drivers and barriers that could influence the nexus between NbS and transformative change over the next 25 years (to 2050). Participants were encouraged to think about what is currently driving the system and how this may change in the future.

In light of that, the discussions were structured by the STEEPV framework (Social, Technological, Economic, Environmental, Political, Values) and the four drivers of change defined by the European Environment Agency (2020)<sup>4</sup> (Global megatrends, European trends, Emerging trends and wild cards; see illustration).

**Table 1**

	Global megatrends	European trends	Emerging trends	Wild cards
<b>Social</b>	Global, long-term trends that are slow to form but have a major impact once in place	Mid- to long-term trends specific to Europe and not all of them are likely to have major implications at global scale	Emerging developments that are occurring at a fast pace but are not yet fully established over mid- to long-term timescales	Developments that may seem unlikely or very unlikely at present but could occur in the future. And, if they do, they are likely to bring about disruptive change
<b>Technological</b>				
<b>Environmental</b>				
<b>Economic</b>				
<b>Political</b>				
<b>Values</b>				

The horizon scan exercise was followed by a participants led discussion session on the interplay between NbS and transformative change. The participants explored how NbS and TC are connected and

<sup>4</sup> [Drivers of change: challenges and opportunities for sustainability in Europe | European Environment Agency's home page](#)

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dependent on each other. They were specifically asked to consider how NbS can drive transformative change in different environments and what systemic shifts are needed to support their impact. This was done in the context of four ‘environments’ – urban areas, agricultural landscapes, mountain ecosystems and coastal regions – to give a tangible context within which to discuss NbS and TC. The aim was that by understanding this interplay, research and innovation can better support NbS and TC implementation, helping to shape a more sustainable and resilient future.

Day 1 ended with the participants being introduced to the third session - Images of the future. ‘Images of the future’ are a future set of circumstances in the context of this workshop, a vision of how NbS and transformative change may have evolved and be integrated by 2050<sup>5</sup>. Participants were tasked with selecting three trends among those, identified in the Horizon scanning, each from a different STEEPV category. Within their groups, they then selected three trends for the whole group. The purpose was to collaboratively develop possible visions of how NbS and transformative change might evolve by 2050 and to develop a shared vision of what successful integration of NbS and transformative change would look like in 10-20 years or by 2050. This was inspired by the idea of seeds<sup>6</sup>, which would then be used to develop ‘images of the future’ on Day 2.

### 1.2. Day 2 – 26 February 2025

Day 2 began with a recap of the main highlights of day 1. Professor Harriet Bulkeley was invited to give a presentation based on work from the European Research Council’s (ERC) Scientific Council. Their report analysed how ERC-funded research could shed light on the concept of transformative change, what it entails, and its potential to create the conditions for nature, economy, and society to thrive in a sustainable future<sup>7</sup>.

This was followed by a continuation of the ‘images of the future’ session from day 1. Participants used the three ‘seeds’ selected within their groups to develop images of the future. They were tasked with imagining what it would be like if these trends continued emerging, became more mainstream, or stopped (depending on the type of trend). Participants developed these images, coming up with different scenarios and aspects of the potential ‘future’.

The final session used the images of the future (and the previous sessions) to identify research and innovation (R&I) areas for achieving the ‘images’. The Biodiversa+ operational team gave an outline of the Biodiversa+ research and innovation context, including the six thematic calls and flagship programmes, and in particular the calls for research project proposals on Nature-based Solutions (BiodivNBS) and Transformative Change (BiodivTransform). Participants then identified R&I gaps and needs to be addressed for improving the understanding of the nexus between NbS and TC, as well as research support activities that may be needed (e.g. coordination and support of research).

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5 Miles, I., Saritas, O., Sokolov, A. (2016). *Foresight for Science, Technology and Innovation*. Berlin: Springer.

6 Preiser, R., Hichert, T., Biggs, R., van Velden, J., Magadzire, N., Peterson, G., Pereira, L., Mayer, K. & Benessaiah, K. (2024). Transformative foresight for diverse futures: the Seeds of Good Anthropocenes initiative. *Development Policy Review*, 42(Suppl. 1), 12791. <https://doi.org/10.1111/dpr.12791>

Rana, S., Ávila-García, D., Dib, V., Familia, L., Gerhardinger, L. C., Martin, E., ... Pereira, L. M. (2020). The voices of youth in envisioning positive futures for nature and people. *Ecosystems and People*, 16(1), 326–344. <https://doi.org/10.1080/26395916.2020.1821095>

7 [Transformative-change-for-a-sustainable-future.pdf](#)

## 2. Results

### 2.1. Horizon scanning

Participants came up with a large volume of current, emerging and potential trends, drivers and barriers across all the STEEPV categories and the types of drivers of change. A summary of these is presented in Table 1, organised by the drivers of change. Based on the STEEPV categories, two main themes arose: society, nature and environment; and technology, governance and knowledge (see table 2 below).

**Table 2**

Trend Category	Thematic Domain	Example Trends
<b>Global</b>	Society–Nature–Environment	Disconnection from nature; NbS more valued; planetary boundaries crossed; balance/imbalance between ecosystem services and demands; disaster risk reduction; climate-related migration.
<b>Global</b>	Technology, Governance & Knowledge	Post-fact society; tech-bubble; AI; misinformation; polarisation; socio-economic inequality; trade wars; rise of far right; digitalisation; interdisciplinary collaboration.
<b>European</b>	Society–Nature–Environment	Wind farms disrupt fossil economy; consumer shift from meat; biodiversity risk assessment; NbS effectiveness changing with climate; rollback of EU Green Deal; the EU Nature Restoration Law
<b>European</b>	Technology, Governance & Knowledge	The EU Interconnected Electricity Grid; inclusive/exclusive policies; battle between neoliberals/progressives; legitimacy of multilateralism; CSRD simplification; cities active at EU level
<b>Emerging</b>	Society–Nature–Environment	Rights to nature; regenerative systems; “internet of nature”; sustainable bioeconomy; NbS more implemented; urban mining; sea level rise; new ecosystems
<b>Emerging</b>	Technology, Governance & Knowledge	Disbelief in science; degrowth; indigenous integration; new food technology; populism vs green policies; local self-organisation; better knowledge flow; autocracy increase
<b>Wild Card</b>	Society–Nature–Environment	Nature-positive economy; geo-engineering; rewilding on steroids; clean energy innovation; shift in valuing nature; alien use of land; rewilding post-disasters
<b>Wild card</b>	Technology, Governance & Knowledge	Tactical nuclear weapons use; collapse of economic institutions; intergenerational justice; Mars as Planet B; extinction of humans; post-disaster activism; utopian/dystopian visions

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The Horizon Scanning identified current and emerging trends, drivers, barriers & uncertainties that influence NbS and TC. In the following discussion, participants, among other things, reflected on the importance of governance to achieve NbS and TC goals. Some noted that while co-production and co-creation are often promoted as general solutions, there is valid scepticism about their actual implementation and purpose, especially regarding their defined role in democratic processes. It was also highlighted that, in the current context, the baseline is unstable and many factors are shifting, which must be taken into account. One participant raised concerns that trends can sometimes be overly simplistic and fail to reflect geographic and contextual nuances. When exploring options, there may be valuable examples of good practice to learn from, and excessive generalisation risks overlooking these. Another point raised was that transformative change may be more likely to occur in the aftermath of destruction or disruptive events.

## 2.2. Interplay between NbS and transformative change

As already mentioned, participants were asked to consider both how NbS can drive transformative change in different environments and what systemic shifts are needed to support their impact. This was done in the context of four ‘environments’ – urban areas, agricultural landscapes, mountain ecosystems and coastal regions – to give a tangible context within which to discuss NbS and TC. All groups recognised the specificities of “their” environment, i.e. the challenges, relevant NbS changes needed for TC as represented in the tables below. There were several examples of systems perspectives, i.e. that challenges and opportunities are interlinked across sectors. (The tables below give an overview.)

### 2.2.1. Urban areas group

In this complex context the workshop participants acknowledged that it is necessary to work across the climate-water-energy-health (and more) nexus to meet NbS and TC goals.

**Table 3**

<b>Summary of challenges:</b>	<ul style="list-style-type: none"> <li>- higher temperatures and microclimate mitigation</li> <li>- (storm) water management</li> </ul>
<b>Relevant NbS:</b>	<ul style="list-style-type: none"> <li>- blue and green infrastructure</li> </ul>
<b>Transformative shifts needed for TC:</b>	<ul style="list-style-type: none"> <li>- need to work across sectors breaking silos, integrating different spatial planning; long-term evaluation and monitoring of the NbS initiatives</li> </ul>

### 2.2.2. Agricultural landscapes group

This group spent some time reflecting on an example from Denmark where the state buys land to take it out of production, in order to reduce the load of nutrients in coastal waters, GHG reductions, and secondary to protect biodiversity. Many ideas came up: Payment for Ecosystem Services, “Make farmers proud again”, value food more, local production, need for an open/fair discussion on the trade-offs, and diet change.

**Table 4**

<b>Summary of challenges:</b>	<ul style="list-style-type: none"> <li>- farming is reliant on subsidies in the EU</li> <li>- high cost of food prices</li> <li>- less interest of youth in farming</li> <li>- threats to biodiversity</li> </ul>
<b>Relevant NbS:</b>	<ul style="list-style-type: none"> <li>- regenerative agriculture for both nature and farmers</li> <li>- peatland restoration</li> <li>- buffer zones-including riparian zones</li> </ul>
<b>Transformative shifts needed for TC:</b>	<ul style="list-style-type: none"> <li>- payment for Ecosystem Services (PES)</li> <li>- more value for food, 'making farmers proud again'</li> <li>- support for local production</li> <li>- open/fair discussions on the trade-offs, and diet changes needed</li> </ul>

### **2.2.3. Mountain ecosystems group**

Here the workshop participants recognized that although some mountain areas are still “remote”, these ecosystems are also strongly impacted by society as well as from environmental and climate change processes.

**Table 5**

<b>Summary of challenges:</b>	<ul style="list-style-type: none"> <li>- threats to biodiversity, i.e., climate change</li> <li>- land use change</li> <li>- animal husbandry</li> <li>- Pastoralisation</li> <li>- tourism activities</li> <li>- energy sources infrastructure development</li> </ul>
<b>Relevant NbS:</b>	<ul style="list-style-type: none"> <li>- water management, including retention, is key</li> <li>- rewilding, including reintroduction and regeneration</li> </ul>
<b>Transformative shifts needed for TC:</b>	<ul style="list-style-type: none"> <li>- shift from ownership to stewardship of the mountain ecosystems</li> <li>- reviving valuable/viable old cultural traditions</li> <li>- car traffic management</li> <li>- fewer tourism activities</li> <li>- challenge the gap between risk acceptance and awareness</li> </ul>

### **2.2.4. Coastal regions group**

This ecosystem is strongly affected by dense human population and activities. Participants stated that NbS needs to develop beyond only a technical demonstration. Some said that “In coastal zones, nature is going to take back its space.”

There was general agreement that large population (demographic) and economic shifts are needed, and there are big social equity issues with the population density and diversity, but also opportunities in strong local communities.

Table 6

<b>Summary of challenges:</b>	<ul style="list-style-type: none"> <li>- heavy pollution</li> <li>- overuse of natural resources by the tourism industry</li> <li>- Overfishing</li> <li>- Trawling</li> <li>- transport infrastructure development</li> <li>- extreme weather events, sea level rise due to climate change</li> </ul>
<b>Relevant NbS:</b>	<ul style="list-style-type: none"> <li>- natural structures that are better at protecting coastal zones - how viable are they? Is someone willing to invest?</li> <li>- embankments, giving room to rivers, is important - at what temporal scale?</li> <li>- solve big social equity issues such as population density and diversity</li> </ul>
<b>Transformative shifts needed for TC:</b>	<ul style="list-style-type: none"> <li>- look to the principles in the IPBES TC assessment</li> </ul>

### 2.2.5. Summary of the Interplay session

Participants identified and mapped out how NbS could drive transformative change in the different environments. This understanding of the interplay between NbS and TC can better support the design of research and innovation at the intersection of NbS and TC.

This exercise:

- explored the current landscape of NbS and TC, identifying existing challenges, solutions, and mapped out how NbS could drive TC in the assigned environments (urban, agricultural, mountain, coastal)
- analysed transformative shifts needed in policy, finance, governance and behaviours to scale NbS effectively

The system thinking approach was to further understand the key barriers and drivers that influence success.



**Table 7: Summary of what is needed for NbS to drive transformative change in the different environments**

Urban	Agricultural	Mountains	Coastal
<ul style="list-style-type: none"> <li>Scaling up, out, and deep</li> <li>Breaking the silos</li> <li>Working across different levels, sectors of government, sectors of policy, integrating different spatial planning</li> <li>Long-term thinking, long-term participation, changing perception with nature</li> </ul>	<ul style="list-style-type: none"> <li>Farmers allowing NbS to be implemented or implementing themselves</li> <li>Change subsidies system</li> <li>People were proud of making food, make them proud of looking after the environment</li> </ul>	<ul style="list-style-type: none"> <li>From ownership to stewardship of the mountains</li> <li>Reviving old cultural traditions (but aware of why they were dropped)</li> <li>Slow tourism</li> <li>Risk awareness</li> </ul>	<ul style="list-style-type: none"> <li>The coast is in many countries where most people live, high pressure on nature, many equity and equality issues as well as physical land use conflicts</li> <li>Non-reformist solutions</li> <li>NbS need to go beyond technical demonstration</li> </ul>

### 2.3. Images of the future

The task of this session was to develop a shared vision of what successful integration of NbS and transformative change could look like by 2050.

The first step was to select three trends identified in the Horizon scanning. When selecting three trends, the groups agreed on many things:

- Three of the groups mentioned a nature-positive economy, one connected it with alternative theories and models, and another relating it to the specific context of high costs of debt and low interest rate.
- Three groups mentioned nexus elements (biodiversity, health, food production, water and climate), but in three different ways, i.e. a future where the many nexus response options [IPBES] are implemented, where we both have synergies and trade-offs between nexus elements, nexus thinking is related to the interlinkage between the nexus elements and resource exploitation, synergies, trade-offs and impacts<sup>8</sup>.
- Three groups included different trends relating to future governance, spanning from a populist future with extremists clashing, individualism, and mis/disinformation, to stronger grassroots and civil society movements, and finally a more hopeful vision of new forms of governance for transformative change pathways.

The second step in this session was to develop “images of the future”. The groups were to envision what it might be like as the three trends, drivers and barriers change over the next 25 years, and to try and relate this future context with a successful integration of NbS and TC. Different aspects relating to governance to achieve the NbS and TC goals dominated:

<sup>8</sup> Thematic Assessment Report on the Interlinkages among Biodiversity, Water, Food and Health | IPBES secretariat

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- The challenge of just transition was acknowledged. Who benefits and who bears the costs? Intragenerational justice. Trade-offs. The economic and financial sector's huge role and impact, they need to shift to do no harm.
- One group envisaged a potential «privatised» future where nature has monetary value and payment for ecosystem services (PES) is generally accepted. Maybe such a society would take better care of nature?
- Another perspective is the balance between state and society. As we cannot fully trust the state to do good, we need a resilient civil society. Private-public partnerships are an opportunity.
- Others claimed that we need a common land use policy, but to achieve that, we would also need strong governance.
- Management of commons can be successful when people cooperate under clear definitions of roles and stewardship.

One topic that was mentioned many times *is giving rights to nature*. The more optimistic participants shared good examples of what has been achieved in some cases and countries (Ecuador, New Zealand...). Others, while recognizing that we need to reconnect with nature, claimed that rights for nature is a niche. While Bolivia has achieved a lot globally in terms of the recognition of Indigenous Peoples and local communities and different world views, they are quite alone when it comes to advocacy for rights to nature.

### 3. Research and innovation for the future

In general, participants tended to be optimistic, referring to positive examples and cases to learn from and be inspired by. Some had a more straightforward, critical perspective. The latter were also sceptical of the idea that we should inform others how they should transform, since we also need to transform our ideas and practices.

The participants agreed that we already have generally accepted and widely used definitions of NbS and TC. We should concentrate on achieving goals and implementing policies based on what we know, rather than working for new definitions. The IPBES TC assessment gives us frameworks and normative goals – we may need a clear framework to assess what NbS are doing good and better<sup>9</sup>. The IUCN Global Standard for Nature-based Solutions may be of interest in this respect<sup>10</sup>.

One of the groups took the perspective of a probable funding landscape for 10 years in a populist society as lens: How would one, for example, see a competitive economy vs. a thriving nature, how would nature be valued, how could we translate and implement some of the global concepts from IP and LCs into local areas across Europe that don't have IP and LCs? How would the implementation of the Nature Restoration Regulation be, and what would the role of religion and the values that people hold around society and nature look like?

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<sup>9</sup> Thematic Assessment Report on the Underlying Causes of Biodiversity Loss and the Determinants of Transformative Change and Options for Achieving the 2050 Vision for Biodiversity | IPBES secretariat

<sup>10</sup> IUCN Global Standard for Nature-based Solutions | IUCN

### 3.1. Key messages on research needs

In general, it would be crucial to identify and/or define indicators of success. It is also important that frameworks and best practices are locally relevant.

1. *A framework for standardisation and measurement of Nature-based Solutions and Transformative Change is needed.*

Both case studies and best practice examples should be standardised, and we need standards for metrics and protocols. We must agree on standards, and it is important to be able to measure the efficiency of incentives, policies and solutions. Scaling and applicability of models, perspectives and solutions across contexts is also a key challenge. More assessment of good practices is important. This framework is needed not least for long-term research and monitoring of biodiversity across generations.

2. *We need more research on governance for a nature-positive economy.*

How can our society stop or convert the private-positive economy into nature-positive? How can we understand economic growth dependencies and their potential solutions, including related macroeconomics? How can businesses work for, and with nature? How can we understand and steer citizen ('consumer') economic behaviour? How to turn a circular economy into a restorative one? How can we integrate the real costs and benefits of taking care of or damaging nature? How to understand maladaptive practices? How to transition from the EU's Common Agricultural Policy (CAP) to a Common Land-use Policy?

3. *Risk, disaster, preparedness and resilience research will become even more important.*

We need more knowledge on disasters, both in the short and long term, especially after major events, to increase our understanding of risk and risk assessments, and their inseparable connection to biodiversity and climate change.

4. *A more socio-ecological approach is needed.*

Better understanding and knowledge of pathways to stewardship and care. Better understanding of socio-economic and cultural understandings and knowledge that produce narratives of biodiversity loss.

5. *Long-term research*

What are the long-term effects of NbS and in what ways do they drive TC?

### 3.2. Key messages on research funding

6. *Use platforms and documents that are already in place.*

Many of the knowledge gaps are already presented in the IPBES TC and Nexus reports, and we should use these reports and similar reports as much as possible. At the same time, there is no need to invent new initiatives, we already have the platforms and networks, Biodiversa+, NetworkNature, and Oppla.

7. *Long-term research funding is a challenge.*

Participants in the workshop claimed that we lack long-term research funding. Funding for biodiversity research is limited and under pressure, and therefore, prioritising long-term research would probably have to be at the expense of other important research activities. Since the need for long-term funding is

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not scrutinised and discussed against other research priorities, one could also ask why not spend more of the funding on implementation and generating good practices and examples on how to do things? One impression is that within the biodiversity topic many are advocating for long-term research funding. But often this advocacy appears to be in favour of monitoring and evaluation to ensure that NbS interventions are assessed over extended periods, and although monitoring and evaluation is often related to research and carried out by researchers it is strictly speaking not research. We also probably need to balance between funding for long-term research and R&I efforts that are for more immediate use and implementation.

### 8. *Continue the work on connecting research with society.*

Bringing together research and people, users, stakeholders, investors, and society through inter-, transdisciplinarity and co-creation helps connect research and society, and promotes the use of research. Standardisation, scaling and good practices are important.

## Conclusion

In conclusion, the workshop highlighted the growing momentum in research and dialogue around NbS and transformative change, emphasising the need for systemic shifts across economic, political, and cultural domains to address the pressing, interconnected global crises of our time. Participants shared an understanding that big changes are needed in how our economies work, how decisions are made, and how we think about our relationship with nature and each other. The value of a holistic, systems approach was highlighted.

To deal with the challenges of climate change, loss of nature, and building a fairer, more sustainable world, we need to work together across different fields and include a wide range of voices, including scientists, policymakers, communities, and other relevant stakeholders. Justice emerged as a foundational element in shaping truly transformative NbS outcomes, reinforcing the importance of equity and inclusion throughout change processes. Both fairness and justice, as well as different views, structures and practices, must be at the heart of these changes. Participants also recognised that transformation can happen in many different ways, and that meaningful change takes time. It is important to create space for different approaches and to have long-term commitment, and continuous adaptive learning through monitoring and evaluation.

The outcomes of this workshop will directly feed into Biodiversa+ programs and activities on NbS and TC related R&I. Insights gained will also help Biodiversa+ better connect and articulate two of its main flagship programs, including their associated activities and funded projects (in the research calls BiodivNBS and BiodivTransform). The ambition in the coming two years is to build upon the results from this workshop and further test and explore the relation between NbS and TC with the BiodivNBS projects, and to add a business and biodiversity dimension to this.