



Exploring Transformative Solutions for Biodiversity and Sustainability

Introduction

Many recent international science-policy assessments emphasise that Business-as-Usual is no longer sustainable and transformative change of our socio-economic systems is required for tackling issues such as biodiversity loss and climate change. Evidence on what portfolio of transformative solutions are sufficient and effective is urgently needed to mainstream biodiversity and climate change in public and private decision-making. This requires the development of holistic and transdisciplinary approaches, data-driven science, and new tools, models and scenarios that address the main causes of biodiversity loss and explore options for transformative change that are socially just. This is vital to meet many EU objectives, strategies, and commitments such as the EU Biodiversity Strategy 2030, the Nature Restoration Law and the associated national restoration plans.

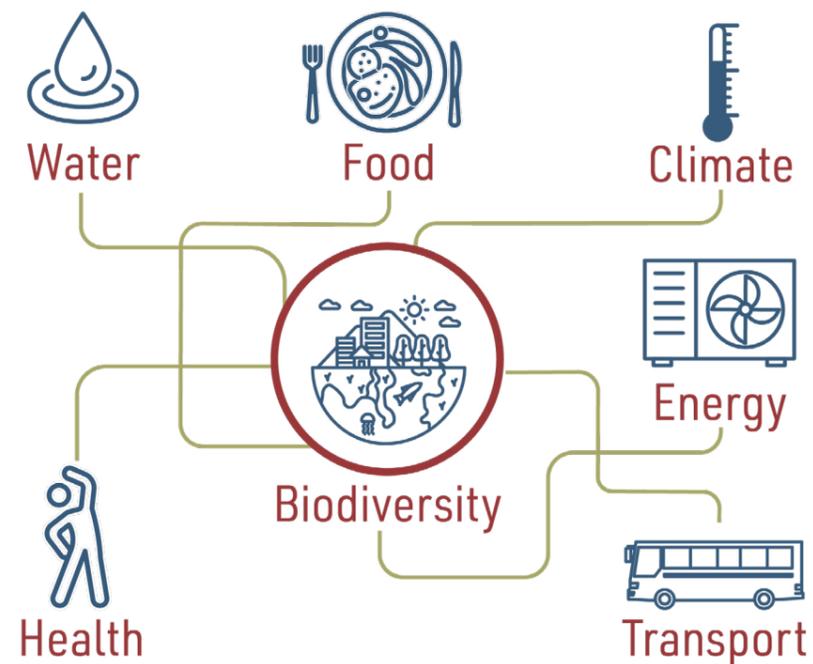
Supported by Horizon Europe, the BIONEXT project develops knowledge and tools to increase understanding and support transformative solutions that consider the key nexus interlinkages between biodiversity, climate change, food, water, energy, transport, and health (Figure 1). By bringing together the concepts of the nexus and transformative change to directly address the drivers of biodiversity loss, BIONEXT aims to demonstrate the benefits of mainstreaming nexus thinking into policymaking and governance (including financing), as well as how to initiate, accelerate and upscale transformative changes that are biodiversity-relevant, just, and socially accepted.



Transformative change:

Fundamental change that enables system-wide reorganisation across technological, economic, and social factors, including paradigms, goals, and values (IPBES 2019).

Transformative change is needed to address the major challenges to nature and humankind, such as biodiversity loss, climate change, and social injustices. Transformative change means that we move beyond just fixing isolated problems and instead fundamentally shift how we interact with the natural world. Generating such fundamental shifts in our mindsets, policies, and practices demands action from all, from citizens to policymakers. A change is only transformative if it shakes up how ecological, technological, and socio-economic systems are wired.



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Figure 1. The seven elements of the biodiversity nexus addressed by Bionext project.

Evidence and analysis

In 2023, BIONEXT conducted two extensive peer reviewed scientific literature reviews. The first review focused on understanding the role of biodiversity in the climate, food, water, energy, transport, and health nexus in Europe. The review highlighted the immense complexity of the interdependencies between biodiversity and the other six nexus elements. About half of the interlinkages involving biodiversity were negative influences of other nexus elements on biodiversity, highlighting the substantial damage being inflicted on nature from human activities. By contrast, much less evidence exists on the negative impacts of biodiversity on the other nexus elements, and this was mainly restricted to the effects of invasive alien species and vector-borne disease. About one third of the studies demonstrated the positive influence of biodiversity on the other nexus elements, which included policies and management actions that aim to deliver co-benefits such as agroecological practices, ecosystem restoration, ecosystem protection for the provision of ecosystem services or nature-based solutions, green and blue infrastructure, and sustainable and healthy diets.

The second review focused on deepening the understanding of transformative change in the biodiversity nexus. The analysis of the literature found that, while the transformative change concept is quickly gaining popularity, biodiversity is rarely the focal point for such change. Most literature generally addresses climate change or sustainability in a broad sense with biodiversity sometimes mentioned as a side issue. Research that does include biodiversity as a focus often approaches the biodiversity crisis as a systemic outcome of human impacts. Furthermore, both the active role of biodiversity, nature and ecosystems in creating social-ecological systems and alternative conceptions of nature and biodiversity are often overlooked, resulting in an understanding of 'transformation' that is unable to stimulate fundamental change away from Business-As-Usual. Finally, while transformative change inherently means an orientation towards a future vision of how humans and nature interact, the literature shows that transformation efforts often lack concrete ideas of what such a future might look like in a nexus context.

BIONEXT also conducted its first stakeholder workshop in 2023 aimed at co-developing nature positive visions for Europe in 2050 with 26 stakeholders representing the seven nexus elements from diverse European regions. The workshop focused on developing three visions underpinned by different value perspectives from the IPBES Nature Futures Framework. The stakeholders also enriched the European Shared Socioeconomic Pathways with considerations of biodiversity and its interlinkages with climate change, food, water, energy, transport and health.

BIONEXT has developed a case study database which identifies key features that drive transformative change and the critical factors of success and failure in implementing such change. The analysis confirms that transformative change remains difficult to identify and define. However, case studies that address three or more nexus elements appear to be more likely to achieve transformative change.

Policy Implications and Recommendations

Initial policy implications arising from the first 18 months of work in BIONEXT include:

- There is an urgent need for policy coherence across sectors. Policy coherence would contribute to the fostering of positive synergistic interlinkages across nexus elements and support the mainstreaming of the goals of the EU Biodiversity Strategy 2030.
- Biodiversity is rarely the central focus when it comes to understanding transformative change. This is worrying considering most nexus interactions negatively influence biodiversity. First, bringing the nexus approach in could help to understand the dynamic interactions between sectoral actors and ultimately help tackle the root causes of biodiversity loss; and second, more concrete descriptions of what transformation entails and how biodiversity is understood to play a role in it are two crucial steps towards more transformative policy mixes.
- Achieving transformative change necessitates the capacity to invent or create novel resources and options for change, the capacity to innovate and establish new institutions and structures, and the capacity to destabilize existing unsustainable ones. Policy processes that actively embrace a plurality of perspectives and explore mechanisms of change rooted in diverse place-based contexts can foster transformative change.
- Initiatives addressing biodiversity in combination with other nexus elements are more likely to succeed in supporting transformative change. In addition, ensuring cooperation and shared governance between communities, civil society, business, and public bodies have better potential in enabling long-term success in achieving transformative change.

Sustainability and Legacy

Recent BIONEXT outputs available for other projects and interested individuals to utilise include:

- The literature review on "Understanding the role of biodiversity in the climate, food, water, energy, transport and health nexus in Europe", which has contributed to the IPBES Nexus Assessment that will be negotiated in the 11th IPBES plenary in December 2024.
- The literature review on "Constructing a conceptual understanding of transformative change in the biodiversity nexus", which provides insight into how transformative change is understood and how it relates to the context of the biodiversity nexus.
- A database of more than 500 case studies from around the globe illustrating transformative change or transformative potential in practice, including analysis showing how transformative change is related to biodiversity and at least two of the other nexus elements. The database '[Biodiversity case studies indicating transformative change](#)' will be further analysed to identify trends and unifying features from success stories that have enabled transformative change in practice.
- A Network of Scientists has been initiated that focuses on the enhancement of nature-positive transformative change and cross-cutting interlinkages of different sectors for the biodiversity nexus. The network is set to facilitate engagement, networking, dissemination, and exploitation of research and its outputs. A "catalogue" (database) of relevant scientific networks is implemented in an [open platform by OPLA](#).

Project Objectives and Methodology

BIONEXT uses a transdisciplinary methodology that brings together existing, but fragmented, knowledge with new empirical advances through an iterative co-creation process. The methodology was designed to create an understanding of the role of transformative change in biodiversity policymaking whilst taking account of the interlinkages between biodiversity, climate change, food, water, energy, transport, and health.

The overall approach of BIONEXT is based on eight principles:

1. Addressing the complex nature of sustainability through co-production;
2. Alterating between theory and practice for actionable and just insights;
3. Combining exploratory and target-seeking scenarios for a comprehensive future analysis;
4. Understanding and modelling past, present, and future nexus interlinkages;
5. Adopting a socio-technical approach to understanding social-ecological change;
6. Co-creation and critical reflection for the design of just transition pathways;
7. Demonstrating transformative change in practice;
8. Knowledge and science brokerage for IPBES assessments and EU policy.



Project name

The Biodiversity Nexus: transformative change for sustainability (BIONEXT)



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