bioagora

Bio Knowledge Agora: Developing the Science Service for European Research and Biodiversity

Connecting **biodiversity knowledge** and **decision-making**

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D2.3. A Framework for the Assessment of Transformative Potential of Networks

Version 4

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Judith Westerink, Jeanne Nel, Rosalie van Dam, Amy Wortel, Renata Włodarczyk-Marciniak, M. Susana Orta-Ortiz, Eszter Kelemen, Karla Locher, Sibylle Schroer, Mihai Adamescu, Kaisa Korhonen-Kurki, Marie Vandewalle, Robin Dianoux, Stefan Knauss, Enzo Falco, Salla Rantala and Socrates Schouten

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LIST OF ACRONYMS AND ABBREVIATIONS

Acronym / Abbreviation	Meaning / Full text
BDS 2030	EU Biodiversity Strategy 2030
EU	European Union
IPBES	The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
KEN	Knowledge Exchange Network
KCBD	Knowledge Center for Biodiversity
NBS	Nature Based Solutions
SPI	Science-Policy Interface
SPSI	Science-Policy-Society Interface
SSBD	Science Service for Biodiversity
ToC	Theory of Change
ToTC	Theory of Transformative Change

BACKGROUND: ABOUT THE BIOAGORA PROJECT

BioAgora is a collaborative European project funded by the Horizon Europe programme. It addresses the acute gap in bridging biodiversity science to decision making and ensuring that decision makers across all societal sectors have access to research-based knowledge when planning, budgeting and deciding on actions that have an impact on local, national, EU and global biodiversity.

The main outcome of BioAgora will be the development of the Science Service for Biodiversity. This new service will fully support the ecological transition required by the European Green Deal and the European Union's Biodiversity Strategy for 2030. The Science Service will channel the entire landscape of biodiversity science from monitoring to policy analysis to EU institutions and the broader community of decisionmakers at all levels of governance as the scientific pillar of EU's Knowledge Centre for Biodiversity (KCBD).

The Science Service will be built based on an assessment of on-going processes of science-policy interfaces (SPIs) across Europe and beyond. BioAgora will analyse the state-of-the-art of the SPIs and co-develop new ways of bridging the gap between science, practice and policy on biodiversity. An assessment of the *transformative potential* of the SPIs to surpass barriers for evidence-based decision-making on biodiversity is a central task for BioAgora. The results of that analysis are summarised in this report.

The BioAgora project was launched in July 2022 for a duration of five years. It gathers a Consortium of 22 partners, from 13 European countries, led by the Finnish Environment Institute (Syke). Partners represent a diversity of actors coming from academia, public authorities, SMEs, and associations. BioAgora receives funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101059438.

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NON-TECHNICAL ABSTRACT

The BioAgora project supports the goals of the European Biodiversity Strategy for 2030 by developing a Science Service for Biodiversity. This Science Service builds on science-policy-society interfaces (SPSIs): networks and processes that bring together a wide range of actors to exchange, learn and work together. For the Science Service to support transformative change, these SPSIs – and the networks they involve – must themselves be capable of transformation.

This report presents an assessment framework developed by BioAgora partners to support such networks in their own development. The framework is designed not for external evaluation, but as a tool for collective learning and improvement. It invites networks to reflect on their capacities and practices through a structured process of self-assessment, using probing questions in a participatory group setting.

The questions are organised around levels often used in shaping a 'Theory of Transformative Change' – including motivation, composition, internal processes, activities, external processes, outputs, outcomes and impacts (Figure 1; Figure 2). Each level prompts networks to consider both their intended outcomes and the ways they work towards them. The framework also supports reflection on how networks combine three broad pathways to achieve impact: collaborating with others, challenging existing structures, and disrupting unsustainable patterns.

Tested and refined through BioAgora, the framework aims to support SPSIs and networks in deepening their transformative potential—contributing to more effective and inclusive pathways towards biodiversity goals.

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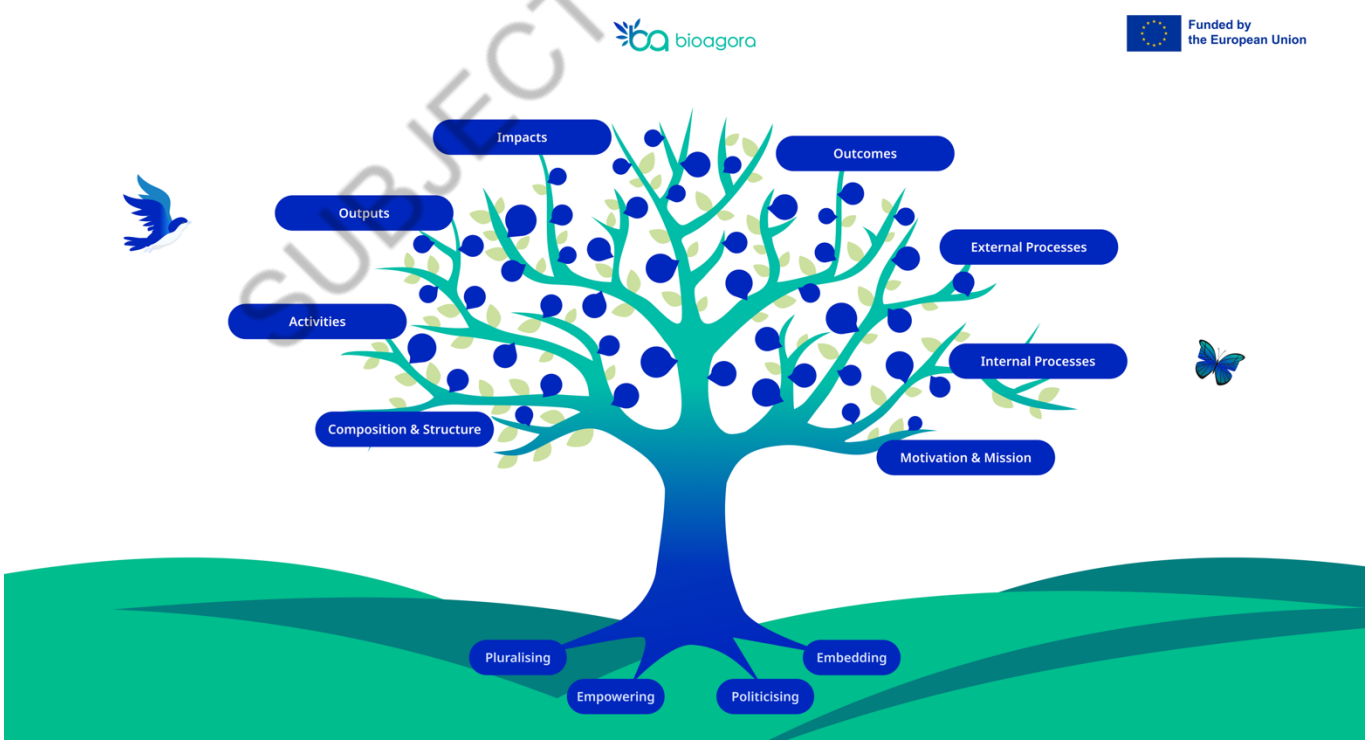

Figure 1: Visualisation of the assessment framework.

TECHNICAL ABSTRACT

The BioAgora project aims to develop a Science Service for biodiversity within the EU to enable the transformative changes needed for reaching the goals of the European Biodiversity Strategy for 2030. The Science Service builds on science-policy-society interfaces (SPSIs), which organise processes and networks that mobilise diverse actors to exchange, learn and work together. For the Science Service to enable transformative change, SPSIs and their networks will also need to be transformative. An assessment framework to support the transformative potential of networks is presented here to support this endeavour.

The purpose of the assessment framework is to foster collective learning and improvement of networks for contributing to transformative changes for biodiversity, rather than for holding networks accountable. The target group of the assessment is therefore the networks themselves, in the form of collective self-assessment, although outside experts could be invited to support the assessment process. The assessment can be applied for learning during network design, monitoring and evaluation.

In line with the purpose of the framework, an organisational learning assessment is applied, which emphasises collective learning and reflexivity by asking probing questions, rather than by quantifying a list of indicators. The BioAgora project partners co-produced a 'Theory of Transformative Change' to support this form of organisational learning assessment (Figure 1; Figure 2). A Theory of Change is a participatory methodology that provides systematic levels to think through in guiding change processes towards a desired impact. These systematic levels are frequently incorporated into monitoring frameworks, and include: motivation, composition, internal processes, activities, external processes, outputs, outcomes, and impact.

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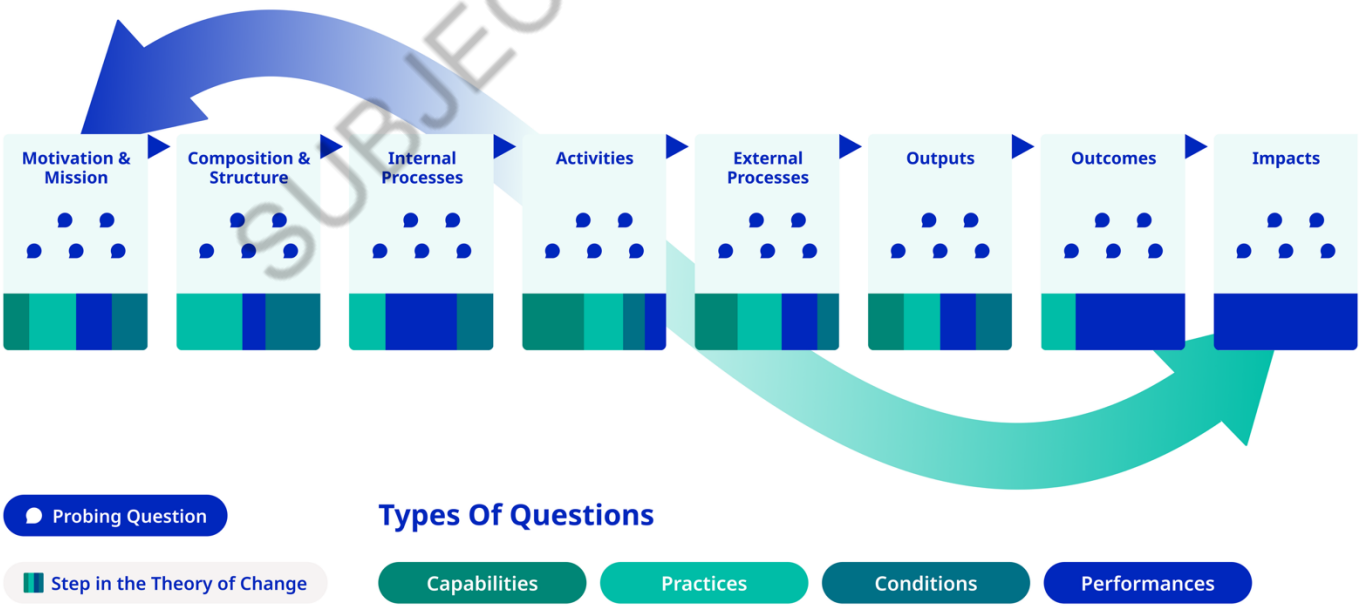


Figure 2: The assessment framework is composed of an eight-step Theory of Transformative Change and is put into practice using 'probing questions', categorised into four types of question.

The questions in the assessment framework are organised around the Theory of Transformative Change. They consider both *what* transformative outcomes networks work towards, as well as *how* they work towards these outcomes. The *what* pertains especially to the need to address the underlying causes of biodiversity loss to achieve transformative changes. The *how* (to work transformatively) was informed by four 'PEPE' principles: pluralising, empowering, politicising and embedding. Pluralising requires making sense of a plurality of knowledge and perspectives, Empowering builds both individual and collective capacities for change, Politicizing engages with power to open space for sustainability-aligned values, and Embedding sustains iterative learning and collective action in institutions and networks.

The questions on external processes also interrogate the extent to which networks are engaged in and combine three pathways to navigate towards transformative change: collaborate, challenge and disrupt (Figure 3). These three pathways were distinguished as important for reaching the desired impact of transformative changes for biodiversity in the co-produced theory of change.

For each step, questions interrogate the network according to its capabilities, practices, performances, and conditions (Figure 2). Capabilities refer to the (individual and collective) skills, knowledge and understanding needed to work in a transformative way and to contribute to transformative change. Practices refer to the PEPE principles for working in transformative ways. Performances refer to what the network achieves. Conditions refer to what is conditional to transformative capabilities, practices and performances of networks, for example in terms of resources or supporting context.

The framework will used and refined in BioAgora in an iterative way, to inform the project's own reflection and development of the Science Service for Biodiversity. In addition, we hope that the framework will support networks that wish to develop their transformative potential.

SUBJECT TO CHANGES

Figure 3: Pathways to transformative change, based on the main external strategies of networks.

EXECUTIVE SUMMARY

BACKGROUND AND AIMS

The BioAgora project aims to establish a transformative Science Service for biodiversity (SSBD) within the EU, to more effectively link knowledge to policymaking and implementation, thereby contributing to the transformative changes necessary to achieve the goals of the BDS 2030. In this report we present a framework for assessing the potential of networks to contribute to transformative changes for biodiversity. Because of the establishment of the SSBD, the framework pays special attention to networks at the science-policy-society interfaces (SPSIs). The framework assumes that networks can only convincingly contribute to transformative change if they themselves work in transformative ways. This is explained below.

- In this report, the following definitions are used: **Transformative changes** imply system-wide reorganisations that go beyond the direct drivers of biodiversity loss, addressing the indirect drivers (the underlying causes), including demographic, political, economic, and institutional arrangements, and lifestyles and behaviours, underpinned by societal values. In this study we therefore focus on the underlying causes of biodiversity loss (which can be linked to structures and views), and at the same time examine the role of agents (in our case in the form of networks) in transforming those structures and views. Transformative change in this sense is as much about 'what to change' as it is about 'how to change'.
- **Social networks** refer to social relations/ interactions between actors. Here, we focus on the kind of social networks that are comprised of a collective of actors with a specific mission, (formal or informal) membership, (formal and informal) rules and procedures. Members engage in joint actions and activities.
- **SPSIs** are viewed as both processes and networks. Organised networks at the SPSI can function as actors mobilizing diverse networks to exchange, learn and work together.
- **The transformative potential of networks** (including SPSIs) is viewed as the capacity of networks to spark, nurture and accelerate transformative changes through their influence in wider networks and on other actors, while working themselves in transformative ways (process).

SUBJECT TO CHANGES

APPROACH

This Deliverable is the result of a co-production process involving BioAgora project partners, who were deeply engaged in other relevant parts of the project. In a series of online workshops, core concepts were proposed and selected, an assessment approach was chosen, a Theory of Transformative Change for networks was developed, assessment framework building blocks were discussed, and assessment questions were designed. The draft framework was then tested with three SPSI networks. The writing of the report, including the summary of relevant literature related to the core concepts, was also a collaborative effort.

CONCEPTS: KEY ELEMENTS FOR THE ASSESSMENT OF TRANSFORMATIVE POTENTIAL

To inform the assessment framework, we consulted the state-of-the-art literature on transformative change for biodiversity (including barriers and leverage), characteristics and

governance of networks and SPISs, boundary management, and types of existing assessment frameworks. We focussed on concepts that could define transformative potential of networks and could help us choose a suitable assessment approach.

What to change: Transformative changes for biodiversity demand attention not only to direct drivers of biodiversity loss, but especially to indirect drivers, also called underlying causes. We explored the underlying causes of biodiversity loss using the main barriers 'for ratcheting up the BDS 2030' as identified in BioAgora Deliverable 1.1, and other literature. We linked these barriers to three embedded spheres of transformation: practices, structures and views.

Leverage points: Leverage points help to identify entry points for changes across practices, structures and views, as well as for identifying agents with power to act. Addressing the above barriers tends to require a mixture of shallower leverage points to address barriers in the practical sphere, combined with deeper leverage points in the structural and views spheres. Shallower leverage points are places in the system where interventions are relatively easy to implement, but bring about little change to the overall functioning of the system, while deeper ones might be more difficult to alter but potentially result in transformative change.

How to change: The four PEPE principles (pluralising, empowering, politicising, embedding) are key to evaluate the ways networks work towards transformative change for biodiversity. Pluralising is about opening up science-policy-society processes to a diversity of knowledge systems, and paying close attention to respect, learning and sense making of differences and connections, especially including marginalised perspectives together with existing mainstream and dominant paradigms. Empowering is building individual capacities, and simulating joint visions of the future to mobilise connections among actors and collective action. It is closely linked to Politicising, which challenges vested interests and gives room to empowerment by explicitly engaging with power dynamics, and helping to shift power to currently marginalised groups, who may hold values more aligned with sustainability. Embedding is about sustaining iterative learning and collective action in institutions and networks.

Networks: Networks are characterised as much by their resources (capital), as they are by the processes and activities (flows) that they stimulate. In evaluating the transformative potential of networks, we therefore focus both on the capitals and practices of networks. We identified three forms of capital: informational, social and human. Informational capital relates to the data, information, knowledge and expertise that can be mobilised by the network; social capital refers to the diversity of social relations and resources that can be collectively mobilised; human capital refers to the skills and competences of individuals in the network. Important collective capabilities of networks are being resourceful, connected and adaptive. Practices of networks include their ideals and objectives, their organisation, their actions and strategies, and their realisation. A practice-based view sees strategies as something people *do* rather than something networks and organisations *have*. Strategies are constantly evolving and self-transforming and are not always conscious or planned. Generally speaking, those networks that are able to use the diversity and range of the different relational strategies to mobilise all kinds of individuals, organisations and institutions, are able to obtain a broader range of human, social and informational capital, which helps them to mobilise a diversity of practises to realise their objectives.

Coordination and governance of networks: Given that networks are continuously evolving and need to relate to changing contexts, an adaptive governance model is essential to contribute to transformative change. An adaptive governance approach copes with the complexity of

SUBJECT TO CHANGES

transformative change by combining different types of knowledge, creating opportunities for self-organisation, and enabling learning, experimentation, and reflexivity.

Science-Policy-Society Interfaces (SPSIs), as special forms of networks, bridge the spheres of science, policy and society and link different forms of knowing and doing (expert knowledge, scientific knowledge, indigenous and local knowledge, etc.). Organised networks at the SPSI function as actors mobilizing diverse networks to exchange knowledge, learn and work together. Transformative SPSIs use collaborative and co-productive relationships between science, policy and society (business, civil society, media etc.) to activate participants to play their role as co-creators of knowledge, contribute their own experience, and take up responsibility for what is needed to move forward together.

Governance of SPSIs: Many SPSIs work with science-policy interactions through existing networks that deal with biodiversity issues and aim to achieve a policy impact. This kind of 'network-of-networks' approach helps to co-develop appropriate members' skills and capacities through improved networking and shared best practices. The network-of-networks approach is a hybrid approach that combines two more traditional forms of governing SPSIs: the informal network approach and platform approach. An informal network approach has minimal formalisation and flexible structures, whilst a platform approach takes a more formalised structure with a clear division of responsibilities between entities. Compared to these more traditional forms, the network-of-networks governance approach articulates several benefits for enhancing the SPSI functions of knowledge exchange and learning, including: openness and inclusiveness, clear institutional support, uncomplicated and small internal structure for efficient operation, independence assured by transparent principles and procedures based on scientific standards, different and flexible levels of membership for provision of funding and support.

Boundary management by SPSIs and the role of power: SPSIs inherently occur at the interface of many boundaries – language, culture, administrative units, disciplines, knowledge systems, etc. These boundaries are not fixed and actors are actively involved in actions such as demarcating, contesting, bridging and diminishing boundaries. Managing boundaries requires constant consideration and navigation of their enabling and constraining properties. For example, at times, bridging the boundaries between science, policy and society may be needed with the aid of boundary processes such as co-creation of knowledge for policy innovation. At other times, the boundary of science may need to be actively contested to give way to marginalised forms of knowledge that may help transform dominant cultural notions of 'nature'. The capability of an SPSI to engage with power in constructive ways in managing these boundaries is critical. The SPSI network can enhance boundary management and transformative potential by adopting a more critical and reflexive approach, with more room for other types of knowledge than science and a better representation among experts of all geographic regions. Explicitly considering processes of pluralising, empowering, politicising and embedding in managing boundaries and co-production is essential. In addition, five actions are suggested as central to the transformative power of 'sustainability-oriented research networks': lobbying/advocating, scaling, accessing events with powerful economic actors, creating visibility and synthesising/capitalising research findings.

Distilling principles and practices for enhancing transformative potential: From the review of core concepts, we distilled four clusters of principles and practices to enhance a network's transformative potential. Each of these clusters therefore both contribute to transformative change as well as work in transformative ways: (1) Co-developing complementary pathways which

SUBJECT TO CHANGES

address the underlying causes of biodiversity loss and contribute to system re-organisation. Working towards these pathways requires trust, a common vision to develop transformation, and an organisational structure that supports self-organisation for the benefit of innovation; (2) Engaging in innovating practices, ideas and governance that helps to question what is considered normal and to shift paradigms, values and culture. This requires seizing opportunities and a proactive approach to resistance; (3) Expanding the scope of the network to include diverse actor coalitions, the public, business, science and civil society realms, with attention to balancing power dynamics; and (4) managing boundaries between science, policy, market, art, civil society in a critical and reflexive approach, co-producing knowledge and actions.

In addition to these principles and practices, we adopted the 'PEPE' principles of pluralising, empowering, politicising and embedding. We also included the following value positions: feeling comfortable with dilemmas, being reflexive and acting upon it, practicing value-based and normative directionality, being critical of the current mainstream, and learning.

Types of assessment frameworks: There are many types of assessment and evaluation frameworks. They differ in terms of what they assess or evaluate (formal policy goals or issues that others find important; outcomes and/or process), at what stage of the policy cycle the assessment is done (ex ante, ex durante, ex post) and who evaluates (external expert, participatory or self-assessment). Approaches also vary in their ontology and epistemology. We adopted a transformative epistemology, because we accept the factuality of biodiversity decline, while we acknowledge the plurality of perspectives and knowledge systems, and aim with our research to contribute to change. In deciding which assessment framework to use, we considered the pros and cons of four types of evaluation: realistic, inclusive, responsive, reflexive and organisational learning based on making a 'Theory of Change' explicit. Based on this we made decisions to adopt an organisational learning assessment because of its emphasis on group learning and reflexivity. This organisational learning assessment is a qualitative methodology, seeking to ask probing questions to elicit group reflection and learning, rather than provide a list of indicators to be quantified. The Theory of Change approach adds to the organisational learning assessment by providing a participatory methodology and systematic levels to think through in co-developing mechanisms towards impact (in this case, transformative change).

Types of assessment questions: We also reviewed relevant frameworks proposed specifically for evaluating transformative potential of political-economy programmes, alternative food networks, Living labs, and knowledge co-production. From this, we derived the need to evaluate networks' capabilities, practices, performances, and conditions. Capabilities refer to the (individual and collective) skills, knowledge and understanding needed to work in a transformative way and to contribute to transformative change. Practices refer to the PEPE principles for working in transformative ways. Performances refer to what the network achieves. Conditions refer to what is conditional to transformative capabilities, practices and performances of networks, for example in terms of resources or supporting context.

ASSESSMENT FRAMEWORK FOR TRANSFORMATIVE POTENTIAL OF NETWORKS

Informed by the literature review, and in deliberation through iterative co-design workshops, decisions were made regarding the purpose of the assessment framework, the envisioned 'user groups', which building blocks of the assessment framework were included, and we proposed and selected assessment questions.

SUBJECT TO CHANGES

User group: The assessment framework targets networks for a self-assessment. However, the network could invite an outside expert to support them in their self-assessment if they are looking for a more objective assessment. It can also be used by policy makers who wish to support capabilities and conditions of networks conducive to transformative potential.

Purpose: The assessment framework is designed for learning, not to judge or hold networks accountable. Aided by the framework, a network can identify points for improvement in the network's setup, activities and ways of working. The framework can be used in the phases of designing (ex-ante), monitoring (ex-durante) and evaluating (ex-post).

Building blocks of framework: The framework was developed using the following building blocks: (1) considerations of what to transform and how to transform; (2) steps in a Theory of (Transformative) Change which were used to systematically think through and distil out key elements that were important in working towards impact (in our case, transformative changes for biodiversity). (3) Assessment questions, which were set for each of these steps in the Theory of Change to interrogate the capabilities, practices, performances, and conditions of the network; (4) Qualitative 4 point scale evaluation of: very insufficient – insufficient – sufficient – good.

Using the steps in the Theory of Change, essential elements to evaluate transformative potential were iteratively identified:

- Motivation and mission: refers to the 'reason to exist' of the network, its purpose and its founding principles. Networks can strengthen their transformative potential by considering the PEPE principles and by explicitly addressing underlying causes of biodiversity loss.
- Composition and structure: composition refers to the members of the network, with open and diverse composition more likely to have transformative potential because of flows of information and ideas. Structure refers to the enabling organisation of a network, possible division in subnetworks, its place in networks of networks, and its rules and procedures (formal and informal).
- Internal processes: refer to the informal rules, norms and procedures that reflect the culture in the network, with transformative potential enhanced through respecting a diversity of perspectives, trust building, working across boundaries, and leading by example.
- Activities: include capabilities of a network to connect members and networks across many boundaries, translate and make sense of different knowledge forms, and encourage organisational learning.
- External processes: are important for leveraging and influencing broader networks. Depending on the situation and the target group, the network will have to navigate between collaborating, challenging and disruptive approaches. Distinguishing which approach to choose when, is an important capability.
- Outputs: should be based on pluralised knowledge and include, for example, synthesis reports, events, an online platform, policy briefs, and stories and images that help imagine a good future in harmony with nature, along with associated actions towards this. The network can also have more politicising outputs such as contributing to or initiating petitions or campaigns, protests or lawsuits.
- Outcomes: influences beyond the 'span of control' of the network, but include supporting, for example, effective biodiversity policy, mainstreaming of innovations such as Nature

SUBJECT TO CHANGES

Based Solutions and rights of nature, and shifts of power away from current vested interests and empowerment of biodiversity positive and currently marginalised practices and groups.

- Impact: impact towards transformative change offers a moment for reflection, and for making the link with the network's motivation and mission.

Three pathways to impact were distinguished based on the main strategies for transforming external processes. These focus on the 'modes of working with the system': collaborate – challenge – disrupt. The **'collaborate'** pathway is one which operates within existing systems, building relations of trust and working with 'coalitions of the willing', and aims for constructive and inclusive forms of interaction and learning. Examples include: principles and standards for business; public–private partnerships; capacity building programmes. The **'challenge'** pathway is also constructive, but more critical. It gives more attention to the politics of unsustainable and inequitable practices and calls on powerful actors to take responsibility. Examples include: assessments of winners and losers; biodiversity impact chains tracing direct negative biodiversity impacts to underlying causes and associated offenders; co-creation of open science letters to government; advocating for ambitious policy to regulate actors impacting negatively on biodiversity. The **'disrupt'** pathway is aimed at breaking down elements of the current system that hinder transformative change for biodiversity, and re-configuring whole-of-society (systems of systems) to have a positive impact on biodiversity and equity outcomes. Networks that move along this pathway do not use violence, but support or work with activist groups and social-environmental lawyers. Examples include: providing evidence to support social-environmental litigation or social movements; science activism; court cases.

All three pathways address underlying causes of biodiversity decline and reflect on power and behaviour. The transformative potential of networks will depend on their ability to navigate between collaborating, challenging and disrupting: they will have to be agile, to anticipate and to combine or to change strategies based on the changing context, the target groups and the opportunities and needs of the moment.

SUBJECT TO CHANGES

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

The framework for assessment of the transformative potential of networks as presented in this report needs further testing in various situations to make it useful for use by networks of various types of stakeholder and knowledge holder. The framework will be used in BioAgora in an iterative way for reflection on and development of the Science Service for Biodiversity. In addition, we hope that the framework will support networks and networks of networks in general that wish to develop their transformative potential.

Table of contents

1 Introduction 17
1.1 Context of BioAgora 17
1.2 Aim and objectives of this report 18
1.3 Research approach 19
1.3.1 Literature study 19
1.3.2 Input from other BioAgora Tasks 20
1.3.3 Design process 20
1.4 Structure of the report 21
2 Concepts 22
2.1 Transformative change 22
2.1.1 What to change 23
2.1.2 How to change 27
2.1.3 The role of structure and agency in change 28
2.2 Characteristics of networks and SPSIs 29
2.2.1 Social networks 29
2.2.2 Coordination and governance in networks 31
2.2.3 Science-policy-society interfaces (SPSIs) 32
2.2.4 Boundary management 34
2.2.5 Power at the science-policy-society interface 36
2.3 Transformative potential of networks 37
2.4 Assessment 38
2.4.1 Assessment and evaluation approaches 38
2.4.2 Relevant frameworks 40
3 Assessment framework (transformative potential of networks) 44
3.1 Purpose and user groups 44
3.2 Building blocks 44
3.3 Co-creating a Theory of Transformative Change for networks 45
3.3.1 Motivation and mission 45
3.3.2 Composition and structure 47

SUBJECT TO CHANGES

3.3.3 Internal processes 47
3.3.4 Activities 47
3.3.5 External processes 48
3.3.6 Outputs 48
3.3.7 Outcomes 48
3.3.8 Impact 48
3.4 Pathways to impact 49
3.5 Assessment questions 51
3.6 Take-off and landing 55
4 Testing the framework 56
4.1 Introduction and approach 56
4.2 What did we modify 57
4.3 Experiences in applying the framework 58
4.4 Quotes from the workshops 60
5 Discussion 62
5.1 Learning in a rapidly evolving context 62
5.2 Suitability of the framework in various situations 62
5.3 Limitations of the framework 62
5.4 Recommendations for application of the framework 63
5.5 Evaluation of the design process 63
6 Conclusions and recommendations 64
6.1 Conclusions 64
6.2 Recommendations 65
7 References 66

SUBJECT TO CHANGES

LIST OF TABLES

Table 1: Design process of the assessment framework. Seven consecutive design stages were performed, with stages 2-4 taking place in one single workshop. 20
Table 2: The barriers that were found in deliverable 1.1. 26
Table 3. Assessment questions per step in the Theory of Change 51
Table 4: Participant quotes, arranged per step in the Theory of Change 60

LIST OF FIGURES

Figure 1: Visualisation of the assessment framework. 5
Figure 2: The assessment framework is composed of an eight-step Theory of Transformative Change and put into practice using 'probing questions', falling into four different types of question. 6
Figure 3: Pathways to transformative change, based on the main external strategies of networks. 7
Figure 4: Draft framework (version November 2023) of functions developed by BioAgora 17
Figure 5: Leverage as conceptualised by Diaz et al. (2019) based on IPBES work: 25
Figure 6: Key predictors of effectiveness of network governance forms (Provan and Kenis 2008) 31
Figure 7: Classification of evaluation approaches (Van Mierlo et al., 2010). 39
Figure 8: Framework for the assessment of the transformative potential of alternative food networks (Lohest et al. 2019). 41
Figure 9: A framework to assess collective capabilities and contextual performance of Living Labs (Bouwma et al. 2022) 42
Figure 10: Criteria for the assessment of co-production (Roux et al., 2021). 43
Figure 11: Theory of Transformative Change for networks as developed in Task 2.3 as an analytical step in the design process of the assessment framework. See also Figures 1 and 2, on pages 5-6. 46
Figure 12: Pathways towards transformative change based on the main external strategies of networks, as identified during the co-design workshops. For a nicely designed visualisation of the three pathways, see Figure 3 on page 7. 50
Figure 13: Stylised rendering of the framework in action 58
Figure 14: Screenshot of an exercise on leverage in the Pollination KEN workshop 59

SUBJECT TO CHANGES

1 Introduction

1.1 Context of BioAgora

BioAgora is a collaborative European project funded by the Horizon Europe programme. It aims to connect research results on biodiversity to the needs of policy making in a targeted dialogue between scientists, other knowledge holders and policy actors. Its main outcome will be the development of a Science Service for Biodiversity (SSBD). This new service will fully support the ecological transition required by the European Green Deal and the European Union's Biodiversity Strategy for 2030.

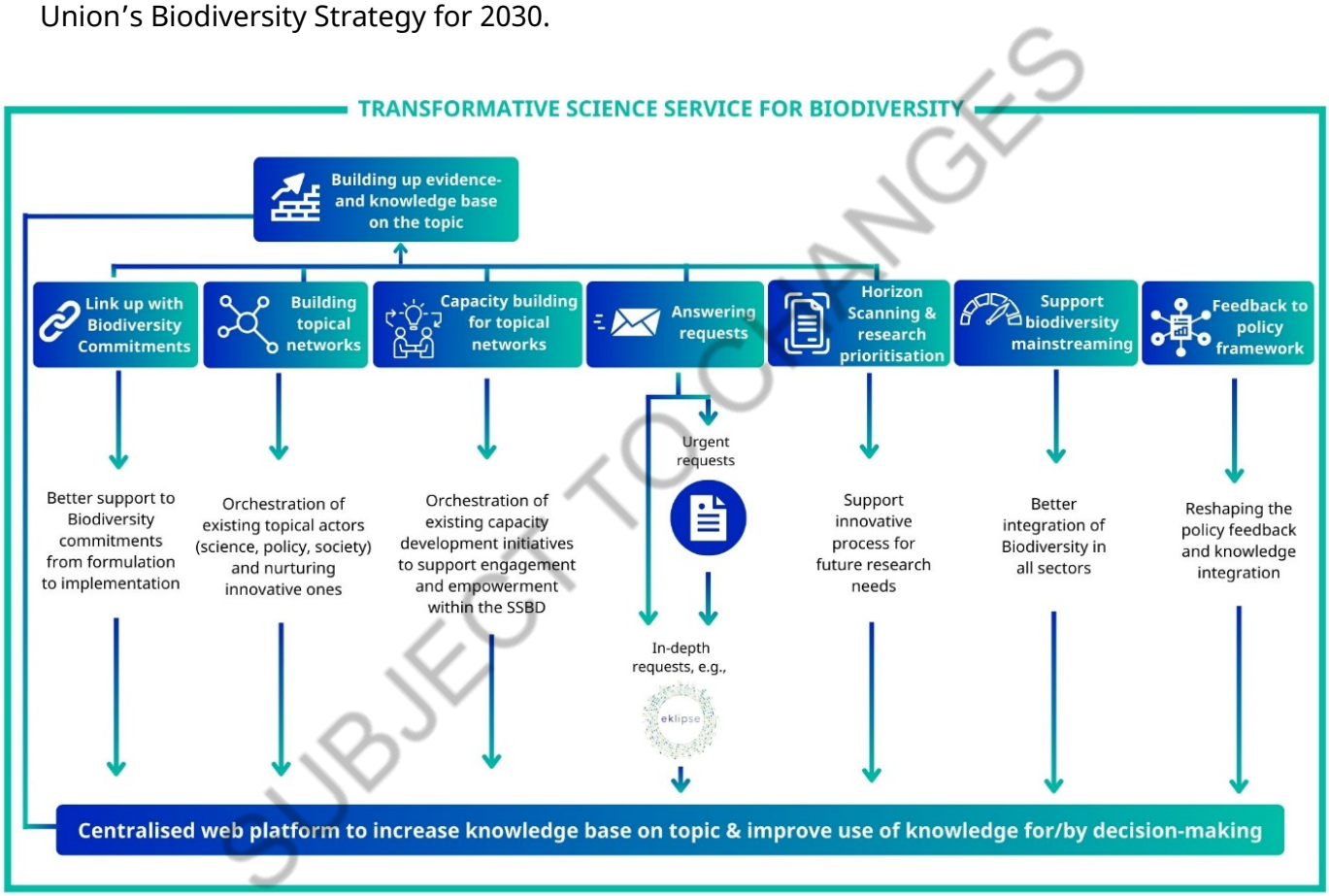


Figure 4: Draft framework (version November 2023) of functions developed by BioAgora including potential functions of the future Science Service, having partly been tested by the first Knowledge Exchange Networks (KENs) (Task 1.2) and partly to be tested by the new KENs (Task 1.3). Based on the lessons learned, this framework will be refined and finalised within WP4. Please note the key agreed and overarching role of the transformative approach within BioAgora.

The EU Biodiversity Strategy for 2030 (BDS 2030), launched on 20 May 2020, aims to address the five main drivers of biodiversity loss (changes in land and sea use, overexploitation, climate change, pollution, and invasive alien species), to set out an enhanced governance framework to fill remaining gaps, to ensure the full implementation of EU legislation and to pull together

all existing efforts. The SSBD, being built by the BioAgora project, aims to ratchet up the BDS 2030 by orchestrating science-policy interactions within the EU which can link scientific knowledge more effectively with policy making and implementation. To develop the Science Service for Biodiversity, BioAgora started with identifying and testing key potential functions of the Science Service, to be co-designed and established with the support of a broad range of stakeholders to reach its goal to ratchet up the implementation of the BDS 2030 (see Figure 4). Because of this mission of BioAgora to build a transformative SSBD, this Deliverable has special attention for transformative potential of networks at the science-policy-society interfaces (SPSIs).

1.2 Aim and objectives of this report

The aim of this Deliverable is to develop a framework for assessing the potential of networks, in particular networks at the science-policy-society interfaces (SPSIs), to contribute to transformative change for biodiversity. Transformative change implies a system-wide reorganisation that goes beyond the direct drivers of biodiversity loss, and implies change in the indirect drivers (the underlying causes, see paragraph 2.1), including demographic, political, economic, and institutional arrangements, and lifestyles and behaviours, underpinned by societal values. We start from the assumption that networks can only convincingly contribute if they themselves work in transformative ways.

The core concepts of this study are explored in-depth in Chapter 2. In this report we use the following definitions, in line with the evolving working definitions used in BioAgora:

- In this study we consider **SPSIs** both as processes and networks. Organised networks at the SPSI can function as actors mobilising diverse networks to exchange, learn and work together.
- **Social networks** refer to social relations/interactions between actors. Here, we focus on the kind of social networks that are comprised of a collective of actors with a specific mission, (formal or informal) membership, (formal and informal) rules and procedures. Members engage in joint actions and activities.
- The **transformative potential** of networks is viewed as the capacity of networks to spark, nurture and accelerate transformative changes through their influence in wider networks and on other actors, while working themselves in transformative ways (process).

The overall aim of this Deliverable relates to four objectives of BioAgora:

- To articulate the desired overall impact and outcomes of BioAgora - and in particular the SSBD - in terms of transformative change, addressing the underlying causes of biodiversity decline.
- To co-develop within BioAgora, the main pathways for (SPSI) networks to achieve such transformative change, including both top down structural arrangements and bottom up enabling processes, and how these interact.

SUBJECT TO CHANGES

- To identify the key elements in these pathways that need to be assessed to reflect on the transformative potential of the SPSI network and develop methods of evaluating these to make them explicit.
- To apply this assessment framework to BioAgora Knowledge Exchange Networks (KENs) and refine where necessary.

The assessment framework for the transformative potential of networks was co-designed in BioAgora via co-producing transformative pathways for (SPSI) networks contributing to transformative change and working in transformative ways. It contains assessment questions that allows for reflection on the strengths of existing (SPSI) networks, and also identify weaknesses, tensions and risks that may arise and hamper transformative potential. In addition to assessing the transformative potential of existing (SPSI) networks (ex-durante and ex-post), the framework may also be adapted for designing future SPSIs that have a desire to be transformative (ex-ante).

1.3 Research approach

1.3.1 Literature study

To ground the assessment framework in scientific conceptions of the role of networks in transformative change as well as in existing assessment approaches, we studied and discussed relevant literature based on the expertise within the team.

To understand the meaning of 'transformative potential' we summarised the relevant literature on transformative change for biodiversity, barriers and leverage. Because transformative change is not only about effectiveness (in the sense of recovery of biodiversity), but also about justice, we chose to align with four key principles for working in transformative ways, known as the PEPE principles (pluralising, empowering, politicising, embedding, see Chambers et al., 2022).

We looked for theories and empirical studies describing the characteristics and functioning of networks, as well as their management and governance. This was important to find aspects that could help understand their transformative potential. In particular, we looked at literature about the characteristics and functioning of networks operating at the science-policy-society interface (SPSIs). Because of this focus on SPSIs, we suspected that literature on boundary management could help us find additional indicators to assess transformative potential. Our assumption was that transformative change requires the travelling of ideas between the worlds of science, policy, business, civil society, etcetera. Boundary management is a lens to distinguish strategies to deal with differences between those worlds.

Finally, we made an overview of assessment approaches and existing frameworks to be able to make grounded choices regarding our own framework. This required discussion of epistemologies to decide on user groups, methodology and data sources.

SUBJECT TO CHANGES

1.3.2 Input from other BioAgora Tasks

In addition to the literature, we made use of work carried out in other BioAgora tasks. For the description of barriers, tipping points and leverage, the work of Task 1.1 in Deliverable 1.1, defining challenges for implementing the BDS2030, was inspirational. The definition of networks and SPSIs was done jointly in WP2, and in particular in alliance with Task 2.1 (Assessing the community of key actors for the BDS2030). Exchange with the Tasks 2.1 and 2.2 (Assessing policy tools of networks to support BDS2030 targets) was very important for understanding network governance and strategies that enhance transformative potential of networks.

1.3.3 Design process

Designing the assessment framework of transformative potential of networks was done in seven stages:

Table 1: Design process of the assessment framework. Seven consecutive design stages were performed, with stages 2-4 taking place in one single workshop.

Stage		Format	Participants
1	Structuring: the basic structure of the framework was cast.	4 online workshops of 2 hours each	Research team
2	Diverging: relevant concepts and definitions were exchanged.	One full-day online workshop	Research team
3	Converging: choices were made regarding concepts, definitions and approaches.		
4	Assembling: building blocks were elaborated as assessment questions and assembled into a coherent whole.		
5	Adapting: finetuning was done based on internal application and reviews, interactions in the team, and in iterations with literature study.	3 online workshop of 2 hours	Research team
6		one face-to-face meeting	Project team
7	Testing: insights were gathered about how to use and evolve the framework in practice.	3 online workshops	Participants from external networks

In all these steps, collaborative approaches were used to provide space for the knowledge and creativity in the team. It was very helpful that the team included experts who also participated in other relevant parts of the project (such as the Tasks 1.1, 1.2, 2.1, 2.2, WP4). A series of eight team workshops was held online with the aid of the online brainstorming tool Miro. The collaborative writing of this Deliverable was also important in the exchange of knowledge and ideas. Central in the design process was an online workshop of one day. This resulted in a

SUBJECT TO CHANGES

comprehensive, hierarchical framework of assessment questions. For applicability, questions were prioritised and selected. As a result, for example, questions about general functioning of networks were left out: the remaining assessment questions focus on their transformative potential.

Following the framework design, the framework was tested with three SPSI networks, each of them part of BioAgora KENs (see Chapter 4).

1.4 Structure of the report

Chapter 2 gives an overview of the relevant concepts and methodologies, based on the literature. Relevant literature on transformative change, networks and assessment approaches is summarised. This is an important introduction to the concepts used in the assessment framework for the transformative potential of networks, which is presented in Chapter 3. Chapter 4 discusses the testing of the framework. In Chapter 5, we discuss the suitability of the framework for use in various situations and evaluate our own design process. Chapter 6 contains the conclusions of this research and recommendations for BioAgora and a broader audience.

SUBJECT TO CHANGES

2 Concepts

This section provides a review of existing concepts that were selected based on their relevance to the transformative potential of networks working towards achieving biodiversity goals. It outlines the state of art knowledge on these concepts, with the final Section 2.3 distilling from this the principles and practices pertinent for inclusion in the assessment framework.

2.1 Transformative change

The IPBES Global Assessment defines transformative change as "a fundamental, system-wide reorganisation across technological, economic and social factors" (IPBES 2019). Transformative change is then about *systemic change*, addressing not only the direct drivers of biodiversity loss (sea and land change, direct exploitation of resources, climate change, pollution, invasive alien species), but also the indirect drivers or underlying causes behind those direct drivers (IPBES 2024; Díaz et al., 2019). Indirect drivers can be demographic, sociocultural, economic or related to institutions, governance, conflicts and epidemics and they are underpinned by societal values and behaviours (IPBES, 2019). The conception of transformative change that is widely used in the studies and debates around biodiversity is closely related to the concept used in sustainability science. Commonly used "*Sustainability transformation*" is generally understood to denote a profound, substantial and irreversible change (Brown et al., 2013). Scoones et al. (2015) classify the multiple forms of 'sustainability transformation' as 1) shaping and resisting structures, 2) reframing knowledge, 3) realising institutions and incentives, and 4) mobilising and networking. Alternatively, "*transformations towards sustainability*" refer to fundamental changes in structural, functional, relational and cognitive aspects of socio-technical-ecological systems that lead to new patterns of interactions and outcomes (Patterson et al., 2017). The various definitions of transformative change are united by the need to change both in the extent (how much) and in the essential character (what kind) of change (Bulkeley et al., 2020).

In the context of biodiversity, transformation theories draw from socio-ecological approaches and insights from socio-technical transitions research. The socio-ecological and socio-economic perspectives emphasise the potential for grassroots innovation and local initiatives to catalyse macro-scale change in the economic paradigm and cultural values, which are regarded as the core underlying drivers of unsustainability. While global environmental change research has a macro-scale focus, much research into deliberate socio-ecological transformations appears largely place-based, addressing transformations of human-nature interactions in local settings (de Koning et al., 2023; Deutsch et al., 2023). In contrast, the socio-technical perspective of sustainability *transitions* takes a multi-level perspective, emphasising the interplay of 'landscape' (large scale context such as climate change and economic trends), 'regime' (current system/ organisation of a specific sector) and 'niche' (socio-technical innovation) level activities in enabling change in meso-level functional systems. Termeer et al. (2017) question whether change can be simultaneously in-depth, large scale and fast. They propose that transformative change must be continuous and that 'small wins' in terms of

SUBJECT TO CHANGES

profound and fast change in smaller initiatives can be enabled, amplified and unlocked to culminate into large scale change.

Geels et al. (2015) propose that these two analytical positions on systemic change (transformation vs. transition) represent 'revolutionary' and 'reconfiguration' approaches. In a broad sense, Stirling (2015) distinguishes transformations from transitions as follows. Transitions move towards a known and presumably shared end, can be managed under orderly control through existing structures and often emphasise technological innovation. Transformations involve social innovations, challenging the current structures, and are more about the 'culturing' than about the controlling of radical social change. According to Stirling, democratic struggle is essential for transformative change, which should be fostered rather than avoided. He values in particular the role of social movements.

The IPBES Transformative Change Assessment (IPBES, 2024) and earlier Values Assessment (Balvanera et al., 2022) demonstrate that thinking about transformative change in the biodiversity and sustainability sciences has joined with transformative change thinking in the emancipatory sciences (including feminist, indigenous peoples, anti-racism, see Mertens, 1999; Kim, 2018; Menton et al., 2020). Transformation is not only about 'bending the curve of biodiversity decline', but also about shifting power to currently marginalised groups, who often hold values more aligned with sustainability, thus giving room to other-than-currently-dominant perspectives of (values of) nature.

SUBJECT TO CHANGES

2.1.1 What to change

An essential question is what needs to be transformed? Efforts to protect, retore and manage biodiversity have mainly focuses on the direct drivers of biodiversity change, such as habitat changes, invasive alien species, pollution, over-exploitation. Transformative change for biodiversity broadens the scope of this to focus also on the indirect drivers of biodiversity loss, the so-called 'underlying causes' of the direct drivers. O'Brien (2018) extends this broadening of scope on 'what to change' through elaborating three 'spheres of transformation': the practical, political and personal spheres. The practical sphere represents specific actions, interventions, strategies and behaviours that directly contribute to a desired outcome. The political sphere represents the systems and structures that facilitate or constrain practical responses. The personal sphere of transformation represents the (individual and collective) subjective beliefs, values, worldviews and paradigms that influence how people perceive, define or constitute systems and structures, as well as their behaviours and practices. Conventionally, the biodiversity sector has mainly emphasised the practical sphere. Transformative change, with its focus on the indirect drivers or underlying causes, broadens this to include the political and personal sphere. In the latest IPBES Transformative Assessment Report (IPBES 2024), these three spheres have been recast as *practices*, *structures* and *views*, respectively.

Transition theory calls for addressing barriers such as power lock-ins and resistance from powerful actors with vested interests (Raymond et al., 2014; Goldstein et al., 2023), and shifting

socio-cultural barriers including values, ideologies, and beliefs (Moosavi et al. 2023). BioAgora made an overview of possible barriers to the implementation of the EU Biodiversity Strategy BDS 2030 (Deliverable 1.1: Lenti et al., 2023). This overview was developed at the start of the BioAgora project and represents the culmination of review of science literature, grey literature, and interviews. The overview is continually evolving, particularly as the Knowledge Exchange Networks kick off. Therefore, the list is not exhaustive or definitive, but is a good illustration of the main barriers scientists and policy makers currently find most challenging in relation to the implementation of BDS 2030. These challenges are:

- "Availability of knowledge" refers to challenges in policy planning and implementation due to the lack of sufficient data or robust scientific knowledge, or due to ineffective communication and lack of interaction between science and policy making.
- "Funding" includes challenges related to the insufficiency and inadequacy of financial instruments allocated to biodiversity conservation goals.
- "Horizontal policy coherence" comprehends the incompatibility or lack of coherence between the policy objectives, instruments, and actions of the EU Biodiversity Strategy (nature conservation policy in general) and other sectoral (EU) policies.
- "Management effectiveness" covers challenges affecting the implementation of area-based conservation measures (e.g. Natura 2000 sites), like carrying out comprehensive management actions which fit to the local ecological, cultural, and socio-economic context, and which is supported by an effective institutional setup.
- "Systematic spatial planning" comprehends the lack of systematic conservation planning with transparent spatial priorities and clear conservation targets that avoid taxonomic bias and are based on solid ecological, social, and economic criteria.
- "Vertical policy implementation" refers to challenges related to the incorporation of EU strategic targets and directives into the national and regional laws and regulations of EU Member States.
- "Engagement" includes difficulties and contradictions related to stakeholder participation and public engagement.
- "Challenges related to the dominant economic and political system" include, among others, limitations to public interest deriving from the market society, or short-sighted political vision for biodiversity due to shortcomings of representative democracy.

SUBJECT TO CHANGES

To overcome barriers and initiate system wide transformative change, it is often suggested to find 'leverage points' (Dorninger et al., 2020). Meadows (1999) describes leverage points as places within a complex system where a small shift in one thing can produce big changes in the whole. Meadows (1999) proposes 12 leverage points, which Abson et al. (2017) categorised into four types of system characteristics: parameters, feedbacks, design and intent. At each specific characteristic interventions can be applied. These four types of characteristics are mentioned in order of 'shallow' leverage – places where interventions are relatively easy to implement, but bring about little change to the overall functioning of the system – to 'deep' leverage points that might be more difficult to alter but potentially result in transformational change. Abson et al. (2017) argue that many interventions aiming for sustainable change address shallow leverage points, therefore it is of urgent need to focus on less obvious but

potentially far more powerful areas of intervention; the deep leverage points. They find these deep leverage points in three important realms, that to a large extent echo the forms of sustainability transformation described by Scoones et al. (2015): Firstly, the role of institutions and institutional decline and failure to address systemic change. Secondly, people's connections to nature and their influences on sustainability outcomes, and thirdly, knowledge production and its use in transformational processes. In their paper they recommend addressing these deeper leverage points through processes of re-structuring, re-connecting and re-thinking.

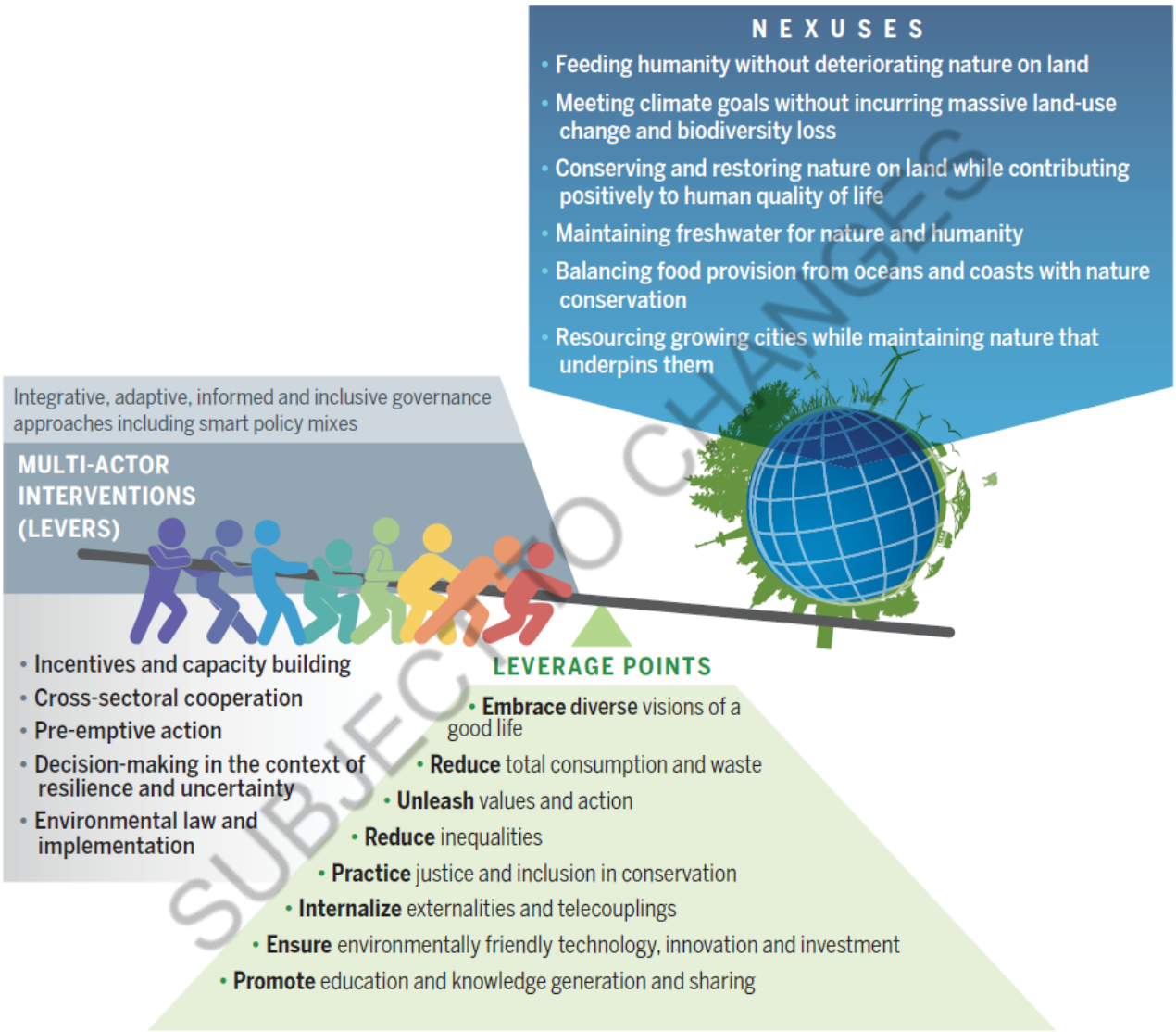


Figure 5: Leverage as conceptualised by Diaz et al. (2019) based on IPBES work: "(i) developing incentives and widespread capacity for environmental responsibility and eliminating perverse incentives; (ii) reforming sectoral and segmented decision-making to promote integration across sectors and jurisdictions; (iii) taking pre-emptive and precautionary actions in regulatory and management institutions and businesses to avoid, mitigate, and remedy the deterioration of nature, and monitoring their outcomes; (iv) managing for resilient social and ecological systems in the face of uncertainty and complexity to deliver decisions that are robust in a wide range of scenarios; and (v) strengthening environmental laws and policies and their implementation, and the rule of law more generally."

Diaz et al. (2019) summarise the eight leverage points and five levers for transformative change as identified by IPBES (Figure 5). We find that some of Diaz et al. (2019) proposed levers resonate with barriers that were found in Deliverable 1.1. These links are made explicit in Table 2, which also categorise the barriers and levers according to the three spheres of O'Brien (2018).

Table 2: The barriers that were found in Deliverable 1.1.
The barriers are categorised according to O'Brien's/IPBES's three spheres of transformation.
References (i, ii, iii etc.) to Diaz et al.'s levers (Figure 2) are added to these barriers.

Practices	Structures
Funding and time frames (Pascual et al., 2022) (Moosavi et al., 2023) (i) **Management challenges affecting the implementation of area-based conservation measures** (e.g. Natura 2000 sites), like carrying out comprehensive management actions which fit to the local ecological, cultural, and socio-economic context, and which is supported by an effective institutional setup. (iii) (iv) **Availability of knowledge-knowledge networks** refers to challenges in policy planning and implementation due to the lack of sufficient data or robust scientific knowledge, or due to ineffective communication and lack of interaction between science and policy making. (Schneider et al., 2021) (ii) **Incompatibility or lack of Horizontal policy coherence** between the policy objectives, instruments, and actions of the EU Biodiversity Strategy (nature conservation policy in general) and other sectoral (EU) policies (such as e.g. the CAP, forestry, urbanisation, energy and climate, or trade policies) (ii) **Systematic spatial planning** , which refers to challenges related to the lack of systematic conservation planning with transparent spatial priorities and clear conservation targets that avoid taxonomic bias and are based on solid ecological, social and economic criteria. Examples: low representation of threatened species; prioritisation of economic interests; lack of planning tools; etc (iii) (iv) **Access to information and technology, informational and technological** (Moosavi et al., 2023; Rudolph et al., 2020) (iii)(iv)	**Power imbalances and powerful actors limit or derail attempts** (Kelly et al., 2018) (Pascual et al., 2022) **Vertical policy implementation** (Kelly et al., 2018); "policy processes that hinge on individual actors are fragile if innovative approaches are not codified in formal institutions and widely shared practices" (Pahl-Wostl et al., 2013) (ii) **Lack of political commitment and engagement** (Kelly et al., 2018) (iii) **Current political and economic systems and structures** (Moosavi et al., 2023) (ii)
	Views
	Development of shared visions and beliefs (Kelly et al., 2018) (iii) **Lack of consideration of human agency,** in particular cognitive barriers that discourage actors from undertaking actions that lead to transformative change (Park et al., 2012) **Poor understanding of institutional dynamics, behaviour and influences**. (Kelly et al., 2018)

SUBJECT TO CHANGES

2.1.2 How to change

Another key question is, *how* to change? In considering transformative change, science and policy initiatives tend to emphasise the content and outcome of transformative change, without sufficient attention to the *process* used to explore the content. Yet increasing evidence shows that achieving an outcome of transformative change fundamentally depends on the process of working together in different, more transformative ways. This requires agility in navigating different ways of working and strategies based on the changing context, the target groups and the opportunities and needs of the moment (Chambers et al. 2022).

Chambers et al. (2020) identify four inter-related 'ways of working' to enhance transformative change:

(1) **Pluralising: Opening up science-policy-society processes and navigating diverse perspectives**. 'Opening up' science-policy-society processes requires bringing in a diversity of knowledge systems and paying close attention to managing vested interests and including marginalised perspectives together with existing mainstream and dominant paradigms. 'Navigating diverse perspectives' requires respect and learning across diverse beliefs, values and goals and finding the common connections around contested, often falsely polarised, issues. The process of pluralizing is not to achieve consensus on all issues, but to foster respect and learning about diverse ways of knowing and being that can co-exist across societal and cultural contexts.

(2) **Empowering: Mobilizing people to act for collective good**. Empowering goes hand in hand with pluralizing to stimulate collective visions of the future and momentum for moving towards these together. It requires engaging in different ways of knowing and emotions to inspire people to act. Empowering is also strongly linked to politicizing (see below) in building individual capacity to act. This includes emancipation, especially in relation to those stakeholders that have historically been marginalised.

(3) **Politicising: engaging with power in ways that accelerate transformative change**. Politicizing is about engaging in the politics of knowledge and the politics of participation. This is important in order to address the power lock-ins, structures, values, relations and discourse that are blocking or enabling change. There are many ways, often overlapping, to connect across power differentials ranging from cooperating to reorganisation within existing systems to radical disruptions, with approaches such as directive, stimulating connections between local-global, deliberative, reflexive, revolutionary. Practicing agility across these approaches may be useful.

(4) **Embedding – Incorporating and sustaining iterative learning and collective action in institutions**. Embedding is about integrating research and learning into every day decision making while maintaining the ethics and intellectual dependence of different knowledge systems. It can be formal and informal learning but generally has to be embedded in some form of organisation to sustain the activities. Activating embedding may also require critical dis-embedding – what are the aspects in our institutions and norms that need to be limited or removed in order to enable transformative change?

SUBJECT TO CHANGES

These four "ways of working" connect in powerful ways. Pluralising forms the basis for transformative research and action; it is viewed as crucial to enabling conflicting perspectives to interact in constructive ways. Empowering change from below, and Politicising change from above and within are strongly complementary processes that need to be simultaneously considered to activate cross-scale systems change. Embedding research and learning into decision making is crucial to empowering and politicizing systems transformations.

The four ways of working overlap to some extent with other frameworks for transformative change. In order to encourage the potential for transformative change in strategic policy agendas, in particular the Biodiversity framework, Bulkeley et al. (2020) synthesised from the literature the following six principles that include a mixture of 'what' to work on and 'how' to work: (1) address underlying causes and underlying/indirect drivers, (2) take multiple paths, (3) expand action arena, (4) realise diverse co-benefits, (5) design deliberative and inclusive processes, and (6) adopt a proactive approach to resistance. Likewise, Wittmer et al. (2021), within their transformative framework, conceptualised the 'what' and 'how' of transformative change from the scientific debate to operationalise the analysis of biodiversity transformations. The conceptual framework is constituted by five building blocks for transformation sustainability: (1) a compelling transformative vision; (2) knowledge of systemic change; (3) navigation of the dynamics inherent in changing development pathways; (4) emancipated agency providing room for inclusive deliberation; and (5) transformative governance reflects this framing by being inclusive, informed, integrated, adaptative and accountable. Wittmer et al. argue that intended interventions (building block 5) are much more likely to encourage transformation to sustainability if embedded within a more comprehensive framing of transformative change (building blocks 1 to 4).

Governing transformative change is also profoundly about the 'how' of transformations. To achieve systemic change, governance of transformations (transformative governance) needs to appreciate complexity, uncertainty, emergence and asymmetries of power (Turnheim et al., 2015). Therefore, sustainability transformations are inevitably political – they are constantly horizontally and vertically negotiated with different actors, their values, aims and interests, and affect different groups of actors unequally (Patterson et al., 2017). Visseren-Hamakers et al. (2021) propose four characteristics to transformative governance, which overlap to some extent with the PEPE principles: integrative (broaden impact across scales, places, issues and sectors), inclusive (empowering minorities), adaptive (enabling learning), pluralist (use different source of knowledge).

SUBJECT TO CHANGES

2.1.3 The role of structure and agency in change

When considering the possible role of networks in transformative change, the duality of structure and agency as conceptualised by Giddens (1984) becomes relevant. He responded to an ongoing debate about the origin of change and stability in societies: do agents such as networks and individuals have power to initiate or influence change, or is individual behaviour determined by the structures, which are the properties of social systems? According to Giddens, there is a duality: structure both enables and constrains agency, while reflexive

agency inevitably (and mostly slowly) transforms structure. Structures concern signification, domination and legitimation in the form of discourses, rules and resources.

In this study we align with Giddens in focussing on the underlying causes of biodiversity loss, which can be linked to structures, and at the same time examining the role of agents (in the form of networks) in transforming those structures. The concept of leverage points (see 2.1.1) is relevant for identifying entry points for changing structures, as well as identifying agents with (potential) power to act.

According to Giddens, agency is the power to act. As introduced in the previous paragraphs, transformative change involves shifts of power from agents with vested interests that are harmful to biodiversity to agents which could use more power to act for the benefit of biodiversity and a more equal and just society. Networks can thus be a result of leverage (e.g. cross-sectoral cooperation (Diaz et al., 2019)), they can be a lever in themselves (Lam et al., 2021) and they can be agents aiming for leverage through their influence on other actors and networks.

SUBJECT TO CHANGES

2.2 Characteristics of networks and SPSIs

The networks and SPSIs examined in this deliverable vary in type and characteristics, but they are all, at their core, networks with established sets of practices related to their objectives and strategies. They are structured around specific modes of coordination, organisation, and governance. Additionally, they differ in how they define the scope of their membership and stakeholders, how they organise roles and interactions – particularly through boundary management – and how they attribute power to certain actors in shaping their activities.

Such networks can be formal or informal, active in one or multiple topics or sectors, closed or open, local or distributed, and either short-lived or long-term. Examples include Alternet, Biodiversa, Capitals Coalition, Greenpeace, CSAs, the European Christian Environmental Network, and groups of nature volunteers engaged in bird monitoring.

This section provides an overview of different network arrangements, their definitions, and implications, demonstrating their relevance and the means of assessing them to understand the transformative potential of networks and SPSIs.

2.2.1 Social networks

In this deliverable, we focus on social networks that are comprised of actors with a specific mission, (formal or informal) membership, (formal and informal) rules and procedures, and members engaged in joint activities. In this sense, networks are characterised as much by their resources (capital), as they are by the processes and activities (flows) that they stimulate.

In the development, realisation, and operation of social networks, three main resources interact: social capital, human capital, and informational capital, all of which contribute to their success (Putnam, 1995; Salamon, 1991; Bourdieu, 1987, 1998). Generally, social networks that employ a range of relational strategies to mobilise individuals, organisations, and institutions can access a broader palette of human, social, and informational capital, enhancing their ability to achieve their objectives (Van Dam, 2016). Informational capital encompasses data, information, knowledge, and expertise available to people and networks, both in explicit forms and in more informal or tacit ways. Social capital refers to actual or potential resources embedded in social ties, trust, reciprocity, and shared norms and values (Bourdieu, 1986; Putnam, 1995).

For the networks that we consider in this study, multiple forms of social capital are relevant: bonding, bridging and linking social capital. Bonding social capital refers to the quality of relations within a group, bridging social capital is between groups, and linking social capital describes the levels of trust and learning between groups of different positions of power. Mostly, social capital refers to a group level, whereas human capital refers to the individual level. Human capital valuable to networks includes skills and competences such as an enterprising attitude, leadership, networking abilities, strategic vision, improvisation, empathy, and perseverance (Coleman, 1988; Salamon, 1991; Woodhall, 2001). These skills and competences can also be considered at the organisational and network level. Baser and Morgan (2008) distinguish between individual competences and 'collective capabilities.' Bouwma et al. (2022) identified key collective capabilities in living labs that support sustainability transitions, including 'being resourceful,' 'being connected,' and 'being adaptive.'

SUBJECT TO CHANGES

In evaluating the transformative potential of networks, we focus both on the capitals and the processes of networks, and therefore on their practices: their ideals and objectives, their organisation, their actions and strategies, and their realisation. A practice-based view on strategies is seeing strategies as something people *do* rather than something networks and organisations *have* (Jarzabkowski and Seidl, 2008). Moreover, social networks must be seen within their social context: actors do not act in isolation, but draw on socially defined ways of acting (Whittington 2006). Following the related ideas of Luhmann (1995) and Seidl (2005), we see the realisation and inherent strategies of a network as the contingent product of a self-transforming organisation that relates its internal process to the outside world. In the *process of self-transformation*, interactions between social networks and the outside world influence the identity of the network, leading in turn to new strategies (Van Dam et al., 2014). Strategies are not always completely conscious or planned, but can also be unconscious, intuitive, flexible, changeable and pragmatic. Some strategies are consciously devised, and others arise during the ride because it suits actors best at that moment. A common strategy used by networks to transform their contexts is to combine different types of social networks. For example, a thematic network (e.g. farmer group, water users) may combine resources with a social network more related to the institutional context (public and/or private), which gives them greater reach, resources and skills to catalyse uptake and desired changes. In such networks of

networks the different networks may share a common goal, even for different reasons (see 2.2.2 and 2.2.3).

2.2.2 Coordination and governance in networks

Social networks are continually evolving, both shaping and being shaped by their context (Weick, 1979; Jarzabkowski, 1994). They often operate in both an informal context (e.g. with fellow residents) and a formal one (e.g. the policy context, institutional actors), therefore engaging in both formal and informal organisational practices (Borgen and Hegrenes, 2005; Douma and Schreuder, 2002). Given the continuously evolving, in-context nature of networks, an adaptive governance model is essential to contribute to transformative change. Adaptive governance requires a flexible, learning attitude in response to changing and uncertain conditions (Folke et al., 2005). It involves combining diverse types of knowledge, creating opportunities for self-organisation, and nurturing sources of resilience for renewal and reorganisation (ibid.). Being adaptive, enabling learning, experimentation, and reflexivity is considered essential in transformative governance in general to cope with the complexity of transformative change (Visseren-Hamakers et al., 2021).

Provan and Kenis (2008) described three main types of networks according to how they are governed: networks governed by a lead organisation, networks governed by their members, and networks governed by an administrative organisation (see Figure 6). According to them, brokered forms of network governance (lead organisation, administrative organisation) become important with increasing network size, decreasing trust and decreasing goal consensus, because of the higher need for network level competencies. A structure with a lead organisation is likely to be the most efficient, but the least welcoming to active involvement of the network members. Commitment of participants is likely to be highest in a 'shared governance' model. A 'network administrative organisation', in which the network is administered by a dedicated organisation, but is monitored by the members, is a compromise between inclusive decision making and efficient operation (introducing bureaucracy). A shared governance model is the most flexible and adaptive, while the other two models will provide more stability.

SUBJECT TO CHANGES

Governance Forms	Trust	Number of Participants	Goal Consensus	Need for Network-Level Competencies
Shared governance	High density	Few	High	Low
Lead organization	Low density, highly centralized	Moderate number	Moderately low	Moderate
Network administrative organization	Moderate density, NAO monitored by members	Moderate to many	Moderately high	High

Figure 6: Key predictors of effectiveness of network governance forms (Provan and Kenis 2008)

When networks evolve, it may be necessary to adapt the mode of governance. Evolution from shared governance to one of the brokered forms (lead organisation; administrative organisation) is more likely than the other way around, because more formalised forms of governance are more resistant to change (ibid). Stadtler and Karakulak (2020) warn that broker organisations can take over too many of the boundary crossing tasks from the members, weakening the collaboration. Vogel (2021) pleas for an organisational structure fostering self-organisation to support innovation in knowledge networks.

2.2.3 Science-policy-society interfaces (SPSIs)

In this study we choose to speak of science-policy-society interfaces (SPSIs) instead of SPIs to acknowledge that transformative change cannot be limited to policy and science, but involves system-wide reorganisation of society. In other words, SPIs can only be transformative when they become SPSIs and not only involve scientists and policy makers, but also civil society, businesses, et cetera. Science-policy interfaces (SPIs) have been defined as processes as well as networks: SPIs are "*social processes which encompass relations between scientists and other actors in the policy process, and which allow for exchanges, co-evolution, and joint construction of knowledge with the aim of enriching decision-making*" (van den Hove 2007). In this sense, SPISs are special forms of networks which bridge across the spheres of science, policy and society and link different forms of knowing and doing (expert knowledge, scientific knowledge, indigenous and local knowledge, etc.).

Many SPSIs work with science-policy interactions using existing networks that deal with biodiversity issues and aim to achieve a policy impact (Kelemen et al., 2021). This 'network-of-networks' approach helps to co-develop appropriate members' skills and capacities through improved networking and shared best practices. As such, it is an approach that moves beyond a linear form of 'knowledge transfer' from science to policy. This linear form of knowledge transfer in SPIs is currently the dominant form of SPI practice (Young et al., 2014; Maas et al., 2022), in which science and politics are separated by clear boundaries. In this arrangement, policy makers use the clear, relevant, readable, actionable and legitimate knowledge provided by science in their decisions (Cash et al., 2003; O'Sullivan et al., 2018). However, such a linear model, where they are mere recipients of knowledge, allows policy actors to shrug off responsibility because they did what science tells them is best. Science may be blamed for decisions that are deemed unfavourable or failed, and policy will not suffer the consequences (Maas et al., 2022). At the same time, in this configuration, scientific findings and the orientations they point to can also be dismissed by policy-makers as having been produced in a scientific bubble and not being 'realistic', pragmatic or taking a holistic view of societal challenges beyond environmental issues. This form of knowledge transfer also absolves researchers from supporting the process of translating knowledge to relevant, useable and actionable forms of knowledge for policy, hence contributing to the science-policy implementation gap.

The aspect of finding an alternative to this model, and change the direction of interaction to non-linear, collaborative and co-productive relationships, is increasingly being discussed (Maas

SUBJECT TO CHANGES

et al., 2022; Kelemen et al., 2021). The arrangement would be based on joint engagement (by scientists, policymakers, civil society, business) and working out the information and data needed in a given situation. Such an approach moves beyond policy makers as mere recipients of knowledge to activate the responsibility of policy makers and encourage them to play their role as co-creators of knowledge with scientists, by participating in the creation of research questions and contributing their own experience (Maas et al., 2022).

There are two main models of organizing and governing science-policy interfaces (SPIs): an informal network approach and a platform approach. The first is characterised by minimal formalisation, flexible structures, is based on voluntarism and depends on the willingness of individuals to act. The second is characterised by a more formalised, elaborate organisational structure with a clear division of responsibilities between entities, where membership applies at the organisational level, and although it guarantees the rights of members also imposes requirements on them (Görg et al., 2016; Kelemen et al., 2021). Görg et al. (2016) compare the main advantages and disadvantages of the two models and make some recommendations for designing hybrid arrangements.

The main strengths of the informal network approach are that it is inexpensive (based on in-kind contributions); it has an open structure (no institutional membership is required) and a potentially broader representation of disciplines; it is highly feasible and inclusive; and it can have an external evaluation body (combination of evaluation and advisory board) to ensure transparency; inclusiveness (voluntary enrolment). Potential weaknesses result from the lack of organised structures and voluntary character. These include the possible domination of a group or individual, the lack of accountability mechanisms (differences in resources); the lack of formal relationships with policy; hindered management and ensuring effectiveness; the unclear role and engagement of secretariat body; the difficulties in securing funding due to lack of institutional support; and the uncertainty about the entity that will clarify disputed issues (Görg et al., 2016).

The strengths of the platform approach are linked to the stability and visibility based on institutional support; the clear delineation of activities based on rights, obligations, responsibilities and incentives for members which streamline efficiency; the existence of a legal entity to speak out on issues that cause doubt (defend in case contested outcomes); and the secretariat with a significant role in communications. The potential weaknesses of this model include that there is less openness and inclusiveness towards diverse actors; that the platform might be influenced (or be so perceived) both internally or externally (potential lack of independence from decision makers); and that it can be too formalised and bureaucratic (more resources needed to ensure stability) (Görg et al., 2016).

According to Görg et al., the recommended design combines the advantages of both approaches: openness and inclusiveness, with clear institutional support, uncomplicated and small internal structure for efficient operation, independence assured by transparent principles and procedures based on scientific standards, different and flexible levels of membership for provision of funding and support. Recent studies highlight that such hybrid

SUBJECT TO CHANGES

approaches to SPIs do exist. For example, Kelemen et al. (2021) identified the network-of-networks approach as a third model mixing characteristics of both the platform and the network model. This network-of-networks (NoN) model engages voluntary individuals in science-policy interactions through their existing networks which can all support the functioning of the interface via a shared governance framework (c.f. Provan and Kenis 2008, see 2.2.2). Organizing a network-of-networks can help to access up-to-date knowledge and reduce redundancies, and at the same time improve the policy outreach of existing networks. To this end, at least three main functions should be fulfilled by a network-of-networks SPSI: 1) synthesis of available knowledge, 2) development of a common research strategy, and 3) capacity building, networking and international collaboration. Additionally, to ensure the reliability and robustness of outputs generated by such a network-of-networks, high transparency and ethical standards should be followed (Young et al. 2014).

2.2.4 Boundary management

Networks and organisations operating at the science-policy-society interface can be conceptualised as boundary organisations enabling collaboration and exchange of knowledge between science, policy and society (Wiegleb and Bruns 2023). These are different 'worlds' with different languages, practices, cultures and rules of the game. For transformative change it is crucial that ideas can 'travel between worlds', that collaboration takes place across boundaries, and that closed strongholds of power can be challenged from the outside. Managing boundaries between science, policy, market, art, civil society, etc., we argue, belongs to the capabilities that define the transformative potential of networks.

Boundaries reflect socially constructed distinctions between categories (Jones, 2009). They enable us to make sense of the world: language is full of categorisations. For example, distinctions between different kinds of people and sectors of society ('worlds') can be conceptualised respectively as social and institutional boundaries (Lamont and Molnar, 2002; Nickolai et al., 2012; Westerink 2016). Networks may be composed of very similar people and organisations, such as farmers and farmer cooperatives, but they can also consist of very different people and organisations, such as farmers and their organisations, scientists and their institutes, and policy makers and their governmental bodies. Such boundaries, reflecting differences in for example culture, language, ways of working, and discipline, can create barriers for collaboration and flows of information. However, this is not necessarily so.

Boundaries are at the same time enabling and constraining. Whether boundaries become barriers depends on the quality of the relations within the network, conceptualised as social capital (Putnam et al., 2004). Particularly bridging and linking social capital can play an important role in bridging boundaries (see 2.2.1). Moreover: if these forms of social capital are strong, boundaries can turn into opportunities for collaboration and transformation. In that case, different types of people and organisations acknowledge that they need each other to achieve their ambitions for change.

SUBJECT TO CHANGES

An important boundary in the biodiversity debate is the distinction between humans and nature, the social and the ecological. Attempts have been made to bridge the divide, for example with concepts such as social-ecological systems (Ostrom, 2009; Walker et al., 2004). Others have criticised the dichotomy and make a plea for more relational and pluralising approaches (Pascual et al., 2021; West et al., 2020). The IPBES Values Assessment (2022) provides an excellent base for pluralising values of nature.

Boundaries are not fixed: processes of bounding are on-going. Actors are actively involved in actions such as demarcating, contesting, bridging and diminishing boundaries (Van Broekhoven et al., 2015). They use various kinds of boundary arrangements in boundary management, including boundary objects, boundary concepts and boundary organisations (Westerink, 2016). Boundary objects and boundary concepts are useful in bridging and translation (Star and Griesemer 1989, Westerink et al., 2017). Boundary organisations (which can be formal organisations but also more informal networks) translate and coordinate between different 'worlds', such as science and policy (Parker and Crona, 2012).

Managing boundaries requires constant consideration and navigation of the enabling and constraining properties. For example, a too narrow definition of a system boundary will overlook important aspects and relations. However, not defining system boundaries at all will make it impossible to study and to govern. Science and policy do have distinct roles in society, but collaboration and translation could improve the performance of both. Making no distinction between the social and the ecological will hinder pointing out the causes and underlying causes of biodiversity decline, but transformative change will require pluralising, debating and practicing values that diminish the distinction. In addition, managing boundaries requires navigation and adaptation in terms of boundary actions and the use of boundary arrangements. At times, bridging the boundaries between science, policy and society may be needed with the aid of boundary processes such as cocreation of knowledge for policy innovation. At other times, the boundary of science may need to be actively contested to give way to marginalised forms of knowledge that may help transform dominant cultural notions of 'nature'.

Thus, SPSI networks, as boundary organisations, need to coordinate and translate between science, policy and other sectors of society. Their functioning may depend on their capability to build and maintain bridging and linking social capital. For that, the use of boundary objects and boundary concepts is important, including conceptualisations of human-nature relations. However, science and SPSIs do not necessarily need to seek harmony in cross-boundary relations: some authors make a plea for more critical, disruptive and activist approaches in boundary management for transformative change (Wiegleb and Bruns, 2023; Nguyen et al., 2019; Artico et al., 2023). This is because boundaries are structures of power. It matters who is in and who is out, what is considered relevant and what is not; who can decide and who cannot, what is allowed to be said and what not, what is considered as knowledge and what is not.

SUBJECT TO CHANGES

2.2.5 Power at the science-policy-society interface

According to Beck (1994, 1997), decision-making about societal developments is no longer largely in the hands of representative democracy, but also in those of companies, scientists, the media, new social movements and individual citizens. This implies that we do not assume a central role of the state, but we attribute importance to a plurality of discourses, organisations and networks within and beyond the state (Bevir, 2004; Foucault, 1994, 1998). Governance is consequently understood as continuously shifting networks of both governmental and non-governmental agents and the embedded technologies of power/knowledge (Foucault, 1994, 2003). One could see power as contingent and relational, as something that is exercised, not as something one possesses (Foucault, 1998). This means that we assume that power is being exercised by all actors at the science-policy-society interface.

Collaboration in networks can be a way to overcome power imbalances between actors, as well as to 'join forces' to acquire power in the pursuit of change for sustainability (Levesque et al., 2017; Partzsch, 2015). Several types of power can be relevant, and knowledge as (form of) power is of particular relevance at the at SPSIs (Avelino, 2021; Foucault, 1982). Part of the idea behind informational capital (Bourdieu, 1987; Van Dam, 2016) is that knowledge and information have 'intrinsic value' which means that information gained, used or exchanged is also a way of gaining, using or exchanging power.

Analytical frameworks to conceptualise co-production in the science-policy sphere refer to power as one of the key institutional characteristics (see e.g. Chambers et al., 2021). Even if institutional structures create room for participation and co-production, the pursuit of epistemic authority recreates uneven power relations and reinforces the privileges of the elites (Esguerra and Van der Hel, 2020; Wiegleb and Bruns, 2023). Turnhout et al. (2020) argue that co-production is often depoliticised, i.e. political differences and competing interests are ignored or downscaled, and actors are required to stay within a neutral, scientifically sanctioned rationality. They differentiate three ways through which depoliticisation of co-production might emerge: (1) through inviting elite actors into the process who have more resources and time available and therefore can shape the co-production process more actively than others by defining its scope or the relevant knowledge domains; (2) through considering scientific consensus as a panacea to uncertainty and therefore fostering consensus over contestation and diverse opinions which otherwise characterise the real decision situation; and (3) through organizing co-production in the form of projects or pilots, which have a limited scope and timeline, and therefore cannot challenge the power structures which are inherent to the wider political context (Turnhout et al., 2020). A transformative approach, aimed at pluralising, empowering, politicising and embedding (see 2.1.2), should avoid such pitfalls.

Wiegleb and Bruns (2023) analysed boundary work in IPBES and concluded that its transformative potential could be enhanced by a more critical and reflexive co-productionist approach, with more room for other types of knowledge than science and a better representation among experts of all geographic regions. In other words, pluralizing knowledge, fair representation and boundary work through coproduction of knowledge.

SUBJECT TO CHANGES

Schneider et al. (2021) see coproduction as central in the 'transformative power' of 'sustainability-oriented research networks'. In their conception, transformative power seems synonymous to 'wielding influence' regarding 'powerful actors'. They propose the following five fields of action to leverage the network's transformative power as 'collective agent': lobbying/advocating, scaling, access events with powerful economic actors, create visibility and synthesise/capitalise research findings.

2.3 Transformative potential of networks

As described in the introduction, we view the transformative potential of networks and SPSIs as the capacity of networks to spark, nurture and accelerate transformative changes. This requires networks working in transformative ways, meaning adopting a set of capabilities and practices and complying with specific performances and conditions that, ultimately, succeed to influence wider networks and powerful actors. In this section we wrap up the overview of the literature in 2.1 and 2.2 in the form of concrete insights in practices and principles to boost the transformative potential of SPSI networks.

The first insight is a focus on underlying causes of biodiversity decline, **co-developing strategies** for leverage and assessing their effectiveness in delivering positive outcomes for biodiversity and society. Addressing underlying causes of biodiversity loss is essential for transformative potential. That means that the network should not focus on changes that merely 'tweak the system', but should contribute to system reorganisation. According to Vogel (2021), to unlock transformative potential of networks, three things are important: trust, a common vision to develop transformation, and an organisational structure that supports self-organisation for the benefit of innovation.

The second one is getting involved in decision-making processes driven by the desire to influence public policy, businesses, and behaviour and lifestyles of citizens. At the root of decision making and behaviour are **paradigms, values and culture**: what is considered important and what is considered normal. Transformative networks therefore engage in innovating practices, ideas and governance: in trying to phase in desirable options, enhancing biodiversity and justice, and to phase out the undesirable ones (embedding). Transformative networks will need to be adaptable: identifying and seizing opportunities, anticipating resistance with a proactive approach.

The third one calls networks to expand the action arena (Bulkeley et al., 2020). Even science and policy together will not bring about transformative change: **the whole of society is needed** including businesses, NGO's and citizens. In this report we therefore speak of Science-Policy-Society interface that coalitions of actors from the public, business, science and civil society realms with the purpose of mutually reinforcing transformative pathways (Lambin et. al., 2020). In such coalitions, **power dynamics** need to be considered to balance power misalignments between diverse societal actors (Pascual et al., 2022). Transformative networks

SUBJECT TO CHANGES

therefore will try to make emerging biodiversity positive initiatives stronger, give marginalised voices a stage, and identify power lock-ins that hinder transformation. This means transformative networks should invest in designing deliberative and inclusive processes, collaboration between networks, networks of networks, and partnerships, using each other's strengths.

Fourth, for transformative potential it is key to manage boundaries between science, policy, market, art, civil society in a more **critical and reflexive co-productionist approach**; pluralizing knowledge, fair representation and boundary work through coproduction of knowledge (Wiegleb and Bruns 2023). Knowledge production must combine credibility, legitimacy and relevance: transdisciplinary approaches are therefore preferred (Cash et al., 2003).

Therefore, transformative potential is not only about contributing to transformative change or enabling transformations, but also about working in transformative ways. For that reason we adopt the PEPE principles of pluralizing, empowering, politicizing and embedding (see paragraph 2.1.2). Underlying the above elements of transformative potential of networks, we suppose the following values: feeling comfortable with dilemmas, being reflexive and acting upon it, practicing value-based and normative directionality, being critical of the current mainstream, and learning. Being transformative is about becoming transformative: developing transformative practice.

SUBJECT TO CHANGES

2.4 Assessment

In developing an assessment framework, it is essential to be explicit about basic choices regarding epistemology, in relation to the purpose of the framework. In this Deliverable we present a framework for the assessment of transformative potential of networks. This transformational purpose has consequences for our epistemological position, which concerns the meaning of the outcomes of the assessment, how they can be known and how they are produced. In turn, epistemology provides the basic assumptions for methodology. To be able to make an explicit choice, we first make an overview of assessment and evaluation approaches. After that, we explore existing frameworks that may inform our framework.

2.4.1 Assessment and evaluation approaches

In general, there are various approaches to assessment and evaluation. They differ in the questions of what to assess or evaluate (formal policy goals or issues that others find important; outcomes and/ or process), when to evaluate (ex ante, ex durante, ex post) and who evaluates (external expert, participatory or self-assessment). Approaches also vary in their ontology and epistemology. Van Mierlo et al. (2010) summarised the classification of Mertens (1999) as follows (Figure 7):

	Positivist	Constructivist	Transformative
Ontology	There is one reality that can be known with certain probability	Multiple realities are socially constructed; no one reality is more true than other	Differences in viewpoints are related to the value system and power differences
Epistemology	Objectivity important/ distant and dispassionate standpoint	Knowledge created in interaction evaluator/participants	Depth of understanding, balanced, and complete
Methodology	Quantitative	Qualitative	Quantitative, qualitative, or mixed

Figure 7: Classification of evaluation approaches (Van Mierlo et al., 2010).

A positivist epistemology would not suit our purposes because of the role of power and different perspectives and values in transformative change. However, a constructivist epistemology would not be suitable either, because it would view the concept of biodiversity decline as socially constructed and would put the researcher in the role of an observer of social phenomena. Instead, we adopt a transformative epistemology, because we accept the factuality of biodiversity decline, while we acknowledge the plurality of perspectives and knowledge systems, and aim with our research to contribute to change.

We will discuss the following evaluation approaches here:

- Realistic evaluation
- Inclusive evaluation
- Responsive evaluation
- Reflexive monitoring
- Organisational learning and Theory of Change

Realistic evaluation is based on a positivist, or rather a critical realist epistemology. It is a theory driven approach for evaluation of policy programmes, but goes beyond a classical theory of change or intervention logic (intervention → outcome) by considering the mechanisms and social context of an intervention (Pawson and Tilley, 1997). Such an approach acknowledges that interventions may have different outcomes in different contexts and for different groups. A complete realist evaluation question is: "What works, for whom, in what respects, to what extent, in what contexts, and how?". The context – mechanism – outcome relations are the main focus of the analysis. A weakness of a realistic approach is that it takes policy goals as a given and does not necessarily consider (unwanted) external effects nor interests of other stakeholders. It is an ex-post approach.

Inclusive evaluation aims to contribute to social transformation, in the sense of giving voice to marginalised groups (Mertens, 1999). Mertens claims that evaluations will become more reliable and objective when evaluators not only inquire the opinions and experiences of programme implementors, but also those of programme target groups. This means that the evaluator has to work with plurality of views and positions of power. An evaluation can therefore never be completely neutral and evaluators need to consider who they empower or marginalise with their report. Inclusive evaluation, although purposely including marginalised groups, remains an expert evaluation.

SUBJECT TO CHANGES

Responsive evaluation is based on a constructivist epistemology and puts stakeholders in the position of evaluators. A responsive evaluation "is a participatory and democratic process. It is a process in which the evaluator fosters the inclusion of multiple, sometimes vulnerable voices and aims to create an ongoing dialogue between stakeholders about differences in perspectives. A responsive evaluator focuses on creating a mutual understanding of the social practice at hand. In this practice, the evaluator collects and connects personal accounts from people who have a stake in the evaluation." (Visse et al., 2012). The expert is a process facilitator. Responsive evaluation is an ex-post approach.

Reflexive monitoring, a transformative approach, is done as part of processes of innovation, of which the problem definition is under construction and the outcomes are not and cannot be predefined (Van Mierlo et al., 2010). The monitoring and evaluation are done in a reflexive manner with the participating stakeholders (self-assessment) in relatively short cycles of learning and adapting, during the innovation process (ex durante). Reflexive methodologies must "contribute to collective, institutional change, within the project and via the project, which is regarded as contributing to system innovation."

Argyris and Schön (1978) presented a theory for organisational learning based on making implicit 'theories of action' explicit and assessing them in combination with their results. They also introduced the concept of single and double-loop learning, in which single loop learning concerns improving existing practices (doing things right), and double-loop learning reflection on practices in relation to goals (doing the right things). This 'theory of action' approach is very similar to the 'theory of change' approach that has become popular in design and evaluation of programs (Kubisch, 1997). Essential in a Theory of Change approach is the interactive composition of the ToC in group sessions and its translation into indicators for monitoring. Theories of action and theories of change can be helpful in ex ante, ex durante and ex post assessments.

SUBJECT TO CHANGES

2.4.2 Relevant frameworks

Decker (2020) proposed a framework for assessing transformative potential of political programmes from an economic perspective. According to him, transformation is now mainly driven by capitalism, and second-order transformation is needed to transform capitalism. This is to be achieved through redistribution (addressing property and labour), socialisation (addressing competition and markets) and planning (addressing regulation of capital). He proposes to assess transformative potential of political programmes according to the extent to which they incorporate these three strategies. Decker's framework is abstract and general and would need to be targeted and worked out for the purposes of our study. Its focus on economic conditions is helpful for our purposes, but we need a broader perspective on societal change.

Lohest et al. (2019) proposed a framework for the assessment of transformative potential of Alternative Food Networks (AFNs) (Figure 8). According to the authors "AFNs have a high transformative potential linked to the new ways of organizing and governing the entire food

chains they promote; this potential to transform sustainability relates to their practices of food democracy/democratic processes, and that is concerned with the power-relationships they configure." They distinguish political power-configuration practices (indicators A1-A3 in Figure 8), political power-configuration performances (A4), social power-configuration practices (B1-B3), social power-configuration performances (B4-B6), economic power-configuration practices (C1-C3), and economic power-configuration performances (C4-C5). The framework of Lohest et al. is too specific for our purposes, but its emphasis on democratic processes and power configurations can inform our framework. In addition, their distinction between practices and performances and some of the criteria and indicators can probably be modified to be relevant to science-policy interface networks.

	Assessment criteria	***Indicators***
Practices	Funding resources	A1. Ownership properties of the retailer/facilitator
	Participation in the decision-making process	A2. Existence of participative and/or cooperative decision-making processes
		A3. The formal/legal distribution of power in the decision-making process
	Sensitization practices	B1. Existence of formal sensitization programs for consumers
		B2. Which information is offered to the consumers and by which means
	Knowledge transmission and learning processes	B3. Existence of frequent and formal meetings between producers and consumers
	Terms of trade	C1. Level of pricing power for producers/suppliers
		C2. The basis for setting prices
	Competition management by the retailer/facilitator	C3. Commitment modalities between sellers (producers/suppliers) and buyers (retailer or consumers)
Performances	Level of participation of the stakeholders	A4. Whether the stakeholders are satisfied with their power and inclusion in the decision-making processes
	Quality of social relations between stakeholders	B4. Whether the producers/suppliers trust in the reliability of the relationships with the retailer/facilitator
	Level of recognition of the work of the producers/suppliers	B5. Whether the supplier feels recognized and valued for his/her work by the client
	Level of consumers' sensitization about sustainable food and producers' daily realities	B6. Whether the consumers feel more and more aware and conscious about the sustainability of food systems and producers' labor conditions
	Level of the economic viability of producers	C4. Level of monthly income in regards to the minimal local income to live
	Affordability	C5. Level of feeling about economic affordability (consumers)

Figure 8: Framework for the assessment of the transformative potential of alternative food networks (Lohest et al. 2019).

SUBJECT TO CHANGES

Bouwma et al. (2022) composed a framework for the assessment of the contributions of 'living labs' to sustainability transitions in terms of their capabilities and contextual performance (Figure 9). It is a relevant example for our purposes because: 1) Living Labs are networks of diverse stakeholders: they are collaborations of policy makers, businesses, scientists and citizens; 2) performance in terms of contribution to transition is conceptually similar to transformative potential; and 3) transformative potential of networks is likely to relate to capabilities of those networks. The capabilities of networks to contribute to transformative change are likely to be similar to those of Living Labs in their contribution to sustainability transitions. An interesting feature of the framework is its flexibility in use: it is suitable for ex ante, ex durante and ex post assessments and for external as well as self-evaluation.

Nevertheless, the framework of Bouwma et al. is not likely to be a complete match to our purposes, because Living Labs generally operate at a smaller level of scale (in terms of number of people involved, local level, specific innovations) than the networks and science-policy interfaces addressed in our study. However, capabilities are relevant to our framework too.

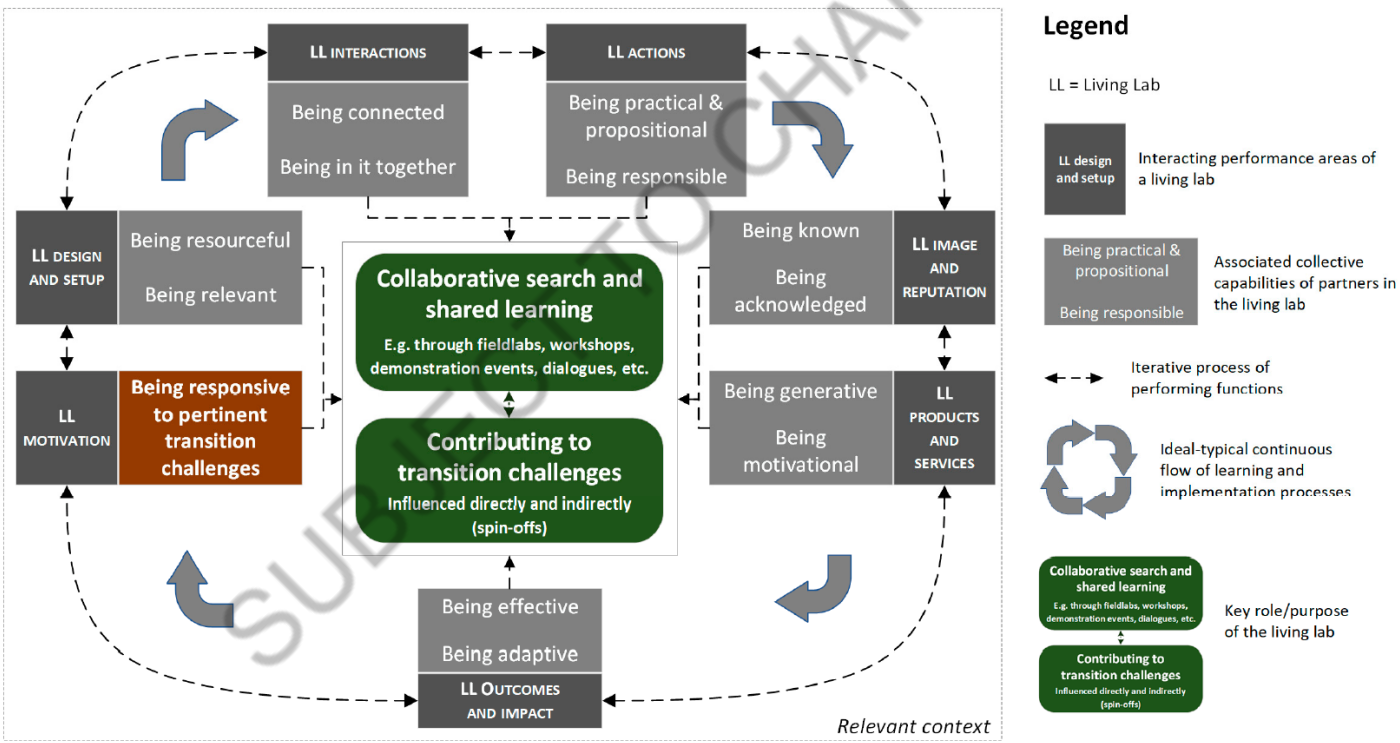


Figure 9: A framework to assess collective capabilities and contextual performance of Living Labs (Bouwma et al. 2022)

As much of the role of SPSIs concerns the exchange and co-production of knowledge across the science-policy-society interface, it is relevant to look at frameworks developed for that purpose. Reed et al. (2014) defined five principles for knowledge exchange: design (designing the process well), represent (representing user needs and priorities), engage (building long-term relationships), impact (focusing on delivering tangible results), and reflect and sustain (monitoring the process and ensuring continuation). Tengö et al (2017) distinguished five tasks

for bridging scientific and indigenous knowledge systems: mobilise (bringing out and articulating forms of knowledge), translate (enabling mutual comprehension), negotiate (joint assessment of convergence, divergence and conflicts across knowledge contributions), synthesise (shaping a broadly accepted common knowledge that maintains the integrity of each knowledge system), and apply (knowledge usable for decision making for all actors involved). For the assessment of processes of co-production in adaptive planning, Roux et al. (2021) designed a framework with the following criteria: context-based, pluralistic, goal-oriented and reflexive, interactive, and actionable (see Figure 10). Several of the principles and criteria of these frameworks may be relevant for ours, such as pluralizing knowledge and people, engagement and interaction, translation, reflection, and actionable outputs.

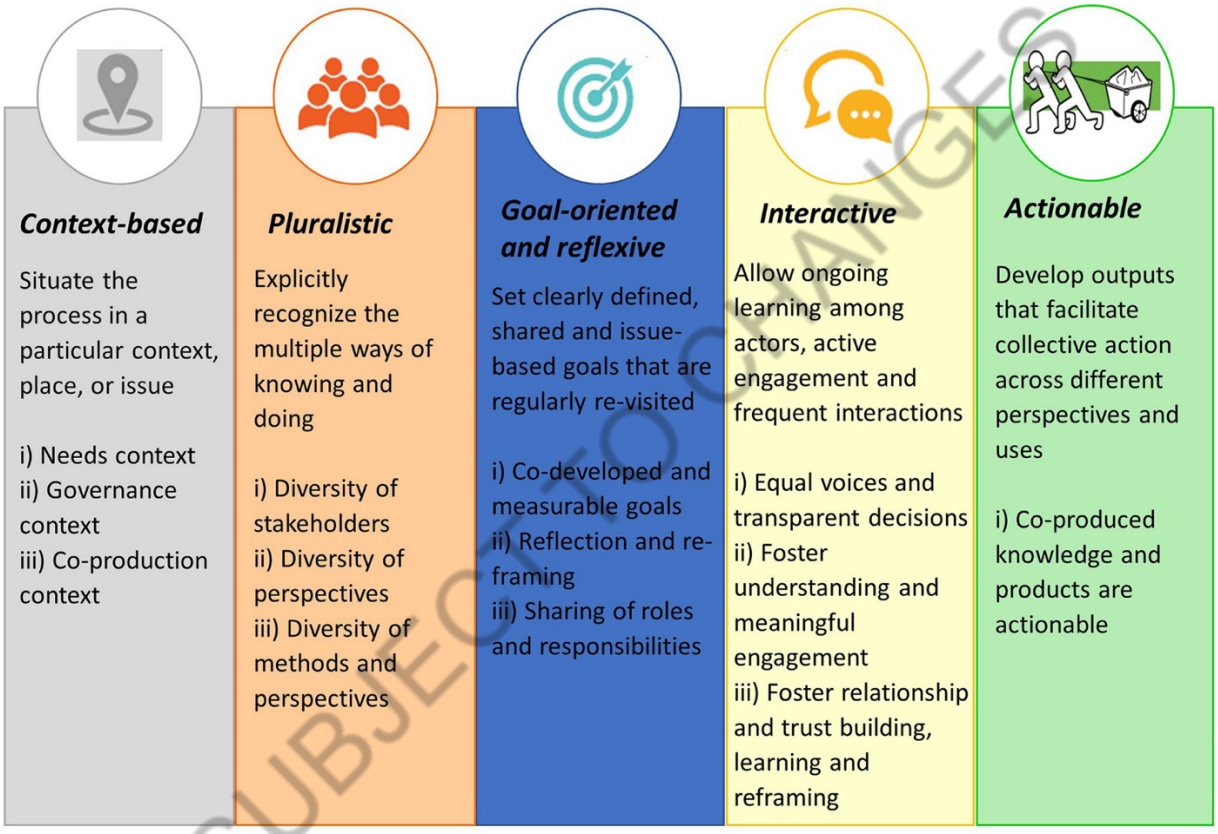


Figure 10: Criteria for the assessment of co-production (Roux et al., 2021).

SUBJECT TO CHANGES

3 Assessment framework (transformative potential of networks)

3.1 Purpose and user groups

The purpose of the framework presented in this chapter is to support the (self-)assessment of the transformative potential of networks, and in particular networks at the science-policy-society interface. The framework is to support the design of the Science Service and in particular its transformative mission, but should be more generally applicable. It is envisioned to be used by networks for self-assessment, to provide guidance to become more transformative, if that is their ambition. However, the framework can also be used for assessments 'from the outside', if for example a more objective view is preferable. Such an assessment would need inside knowledge nonetheless. A middle way could be that a network invites an outside expert to support them in their self-assessment.

The framework is not designed to judge or to hold networks accountable. Rather, it is meant to better understand the functioning of the network, to support learning, and to identify points for improvement in the network's setup, activities and ways of working. It can therefore be used in the phases of designing (ex-ante), monitoring (ex-durante) and evaluating (ex-post). Assessment can be iterative, supporting a continuous learning process. With repeated use, the assessment could focus on the specific points on which the network wants to improve itself.

Lastly, the framework could be useful for policy makers who wish to support the transformative potential of networks. In particular, they could look at the questions about capabilities and conditions to find out whether their policies are supportive or counterproductive.

Figures illustrating the framework can be found on pages 5 and 6 of this Deliverable.

SUBJECT TO CHANGES

3.2 Building blocks

The framework has the following building blocks:

- Steps in a Theory of Transformative Change (ToTC) for the role of networks. It is important to make explicit how we expect that networks can contribute to transformative change for biodiversity. This is because transformative change is not 'makeable' or predictable, and it must be possible to adapt theories of change. We distinguished the following steps: Motivation/ mission → Composition/ structure → Internal processes → Activities → External processes → Outputs → Outcomes/ influence → Impact/ transformative changes. See further paragraph 3.3.

- Two aspects of transformative potential of networks: contributing to transformative change (what to transform) AND working in a transformative way (how to transform). Although working in a transformative way is no guarantee for contributing to transformative change, we believe that it is imperative to such a contribution. Therefore, the framework contains questions regarding both aspects of transformative potential.
- Assessment questions regarding capabilities, practices, performances, and conditions. Capabilities refer to the (individual and collective) skills, knowledge and understanding needed to work in a transformative way and to contribute to transformative change (see Baser and Morgan, 2008). Practices refer to the PEPE principles for working in transformative ways (see 2.1.2). Performances refer to what the network achieves. And conditions refer to what is conditional to transformative capabilities, practices and performances of networks, for example in terms of resources or supporting context. We chose to formulate questions rather than criteria, because application of the framework will more likely be in the form of questions. Questions were formulated for each step in the ToTC, but not all types of questions are equally relevant to all steps.
- Qualitative 4 point scale evaluation. Most questions are qualitative, and even the outcomes of quantitative questions will need to be appreciated in a qualitative way. We propose the following scores: very insufficient – insufficient – sufficient – good.

SUBJECT TO CHANGES

3.3 Co-creating a Theory of Transformative Change for networks

In the process of designing the assessment framework, the research team co-produced a Theory of Transformative Change for networks (Figure 11). This Theory of Transformative Change was used as a tool to systematically think through and distil out key elements that were important to include in the assessment framework for evaluating the transformative potential of SPSIs. Various aspects were formulated for the steps in the ToTC (Motivation/ mission → Composition/ structure → Internal processes → Activities → External processes → Outputs → Outcomes/ influence → Impact/ transformative changes) that were later clustered, summarised and where possible labelled according to the PEPE principles.

3.3.1 Motivation and mission

Motivation and mission refers to the 'reason to exist' of the network, its purpose and its founding principles. This can be formal or informal. For example, a network could position itself at the science-policy-society interface to enable collaboration of science, policy and practice for the benefit of biodiversity. A network is more likely to focus on contributing to transformative change and to work in transformative ways when this is part of its motivation and mission. It helps when the network has a clear picture of its role(s) and of its target groups. The PEPE principles can guide this (see 2.1.2). The principle of pluralising can lead to a diversity of target groups to collaborate with. The principle of empowering can guide the

distinction of target groups that could be empowered by the network, such as change agents, biodiversity innovators, marginalised (but nature-positive) groups and enabling players (who can help empower others or can apply other forms of leverage). The principle of politicizing could convince the network to take challenging and/ or disruptive pathways (see below) and to include actors in their target groups that have vested interest in the current status quo and are therefore likely to resist transformative changes. The principle of embedding can help the network think of target groups that can help mainstreaming biodiversity in society: in policy and practices. It does not suffice to have 'businesses' as target group: some businesses will resist transformative changes because of vested interests, but others can be change agents, biodiversity innovators or enabling players. Similarly, public authorities can be change agents or enabling players, but they can also put their weight into reproducing the status quo. Moreover, often within the same firm or the same governmental organisation, change agents as well as resisting agents can be found. It will probably help the network to explicate such strategies, in relation to its transformative objectives, in a Theory of Change.

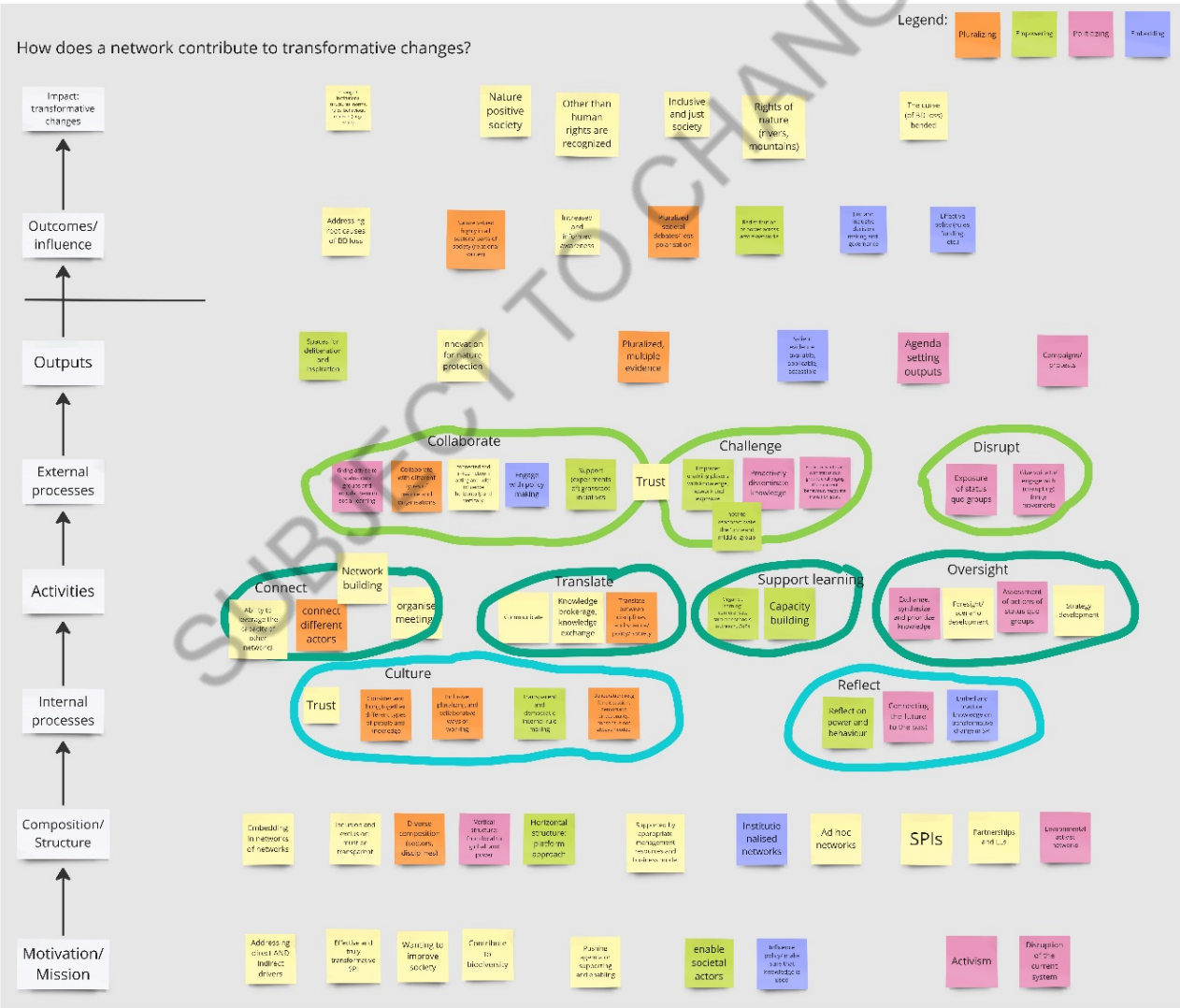


Figure 11: Theory of Transformative Change for networks as developed in Task 2.3 as an analytical step in the design process of the assessment framework. See also Figures 1 and 2, on pages 5-6.

3.3.2 Composition and structure

The composition and structure of the network follow from its motivation and mission. Composition refers to the members of the network. Again, membership can be formal or informal. It is never static because members will come and go. A network can be an open community, a 'coalition of the willing', or it can be a select 'club' to which new members must be admitted or even invited. An open and diverse community (based on the principle of 'pluralizing') is more likely to have transformative potential because of flows of information and ideas through 'networks of networks'. However, this only works if the mission (e.g. contribute to biodiversity restoration) of the network is clear and can bind its members. In spite of being open, the network can still – based on its defined roles and target groups - strategically invite actors into the network, such as agents with power to influence. The structure of the network refers to its organisation, possible division in subnetworks, its place in networks of networks, and its rules and procedures. Rules and procedures can be informal, but it will help to formalise some of them, including those regarding inclusive and transparent decision making and ethics.

3.3.3 Internal processes

Internal processes follow from the above, and in particular the informal rules, norms and procedures that reflect the culture in the network. The pluralising principle is particularly important for the internal processes. Respect for diversity of perspectives, values and types of knowledge is essential for building trust in the network, which in turn is essential for internal cross-boundary collaboration and for innovation. The network must be reflexive on practices, power and behaviour in the network. Leaders should give the example, and if necessary, rules must be formalised through joint decision making (see above). The empowering principle can guide the network to invest in empowerment of its members for the benefit of its activities and external processes.

3.3.4 Activities

Activities include connecting (network building, connecting actors, organising meetings, leveraging other networks, transdisciplinarity), translating (communicating, knowledge brokerage, translating between disciplines and across the science-policy boundary) and organising learning (capacity building, organising knowledge exchange, summer schools). SPSI's in addition may create oversight by synthesizing (pluralised and validated) knowledge, making assessments of impacts and underlying causes, futuring by producing visions and scenarios, prioritizing issues for research and policy making, and helping develop strategies to address underlying causes of biodiversity loss. An important capability would be to respond to developments and use windows of opportunity for its activities.

SUBJECT TO CHANGES

3.3.5 External processes

External processes are important for leveraging and influencing broader networks. Here, the target groups as defined under 'motivation and mission' again are important, as well as capability of the network to identify those groups. All PEPE principles are important. Depending on the situation and the target group, the network will have to navigate between collaborating, challenging and disruptive approaches (see below). Distinguishing which approach to choose when is an important capability. Challenging and disrupting can involve collaboration with some target groups in order to challenge others or to disrupt systems. Performance of the network in external processes can be assessed based on the responses and opinions of such target groups.

3.3.6 Outputs

Outputs of the network can be various, such as synthesis reports, events, an online platform, and policy briefs. The network can also have more politicizing outputs such as contributing to or initiate petitions or campaigns, protests or lawsuits. For a network to have impact at the SPSI (embedding), it is important that outputs are based on validated, plural knowledge, and that they are accessible, available, relevant, practical and implementable. A very important type of output are likely to be stories and images that help imagine a good future in harmony with nature (a nature positive, inclusive and just society, for example), and actions on the way to that future that are feasible on the short term.

SUBJECT TO CHANGES

3.3.7 Outcomes

Outcomes of the work of the network are beyond the 'span of control' of the network, but are essential to anticipate and to reflect on, because this is where the underlying causes of biodiversity loss can be influenced. Outcomes relate to "mainstreaming biodiversity in society": both in terms of a paradigm shift towards valuing nature highly and in terms of integrating biodiversity in practices and policies in all sectors of society. Leverage could be aimed at influencing outcomes, such as through rewarding systems. Outcomes could include effective biodiversity policy, mainstreaming of innovations such as Nature Based Solutions and rights of nature, and shifts of power away from current vested interests and empowerment of biodiversity positive and currently marginalised practices and groups.

3.3.8 Impact

Impact of the work of the network, for transformative potential, refers to system-wide reorganisation of society in terms of nature-positive lifestyles, practices and behaviours, markets and governance, leading to recovery of biodiversity worldwide. It will be very hard to assess the influence of the network at this level. Including impact in the assessment framework is for the purpose of reflection, and for making the link with the network's motivation and mission.

3.4 Pathways to impact

In the coproduced Theory of Transformative Change for networks we distinguished three pathways to impact. They are based on the main strategies for transforming external processes (paragraph 3.3.5), which focussed on the 'modes of working with the system': collaborate – challenge – disrupt (see also Wadell et al. 2015; Shrivastava et al. 2020). We reformulated the key elements of each step in the Theory of Transformative Change according to these pathways (

Figure 12).

The **'collaborate'** pathway is one which operates within existing systems, building relations of trust and working with 'coalitions of the willing'. Transformative change has to be initiated at all levels, the communication needs to include top-down as well as bottom-up changes. Solution finding depends on multi-level communication where actors from various political levels, geographical scales and industry sectors come together to share decision-making. A multi-level planning practice can contribute to social-ecological development, as the sharing of power and participatory decision-making can facilitate more flexible, inclusive and effective planning for solution finding (Castro-Arce and Vanclay, 2020). The aim should not be an 'against' but a 'within', allowing compromises to find the best solution from different perspectives.

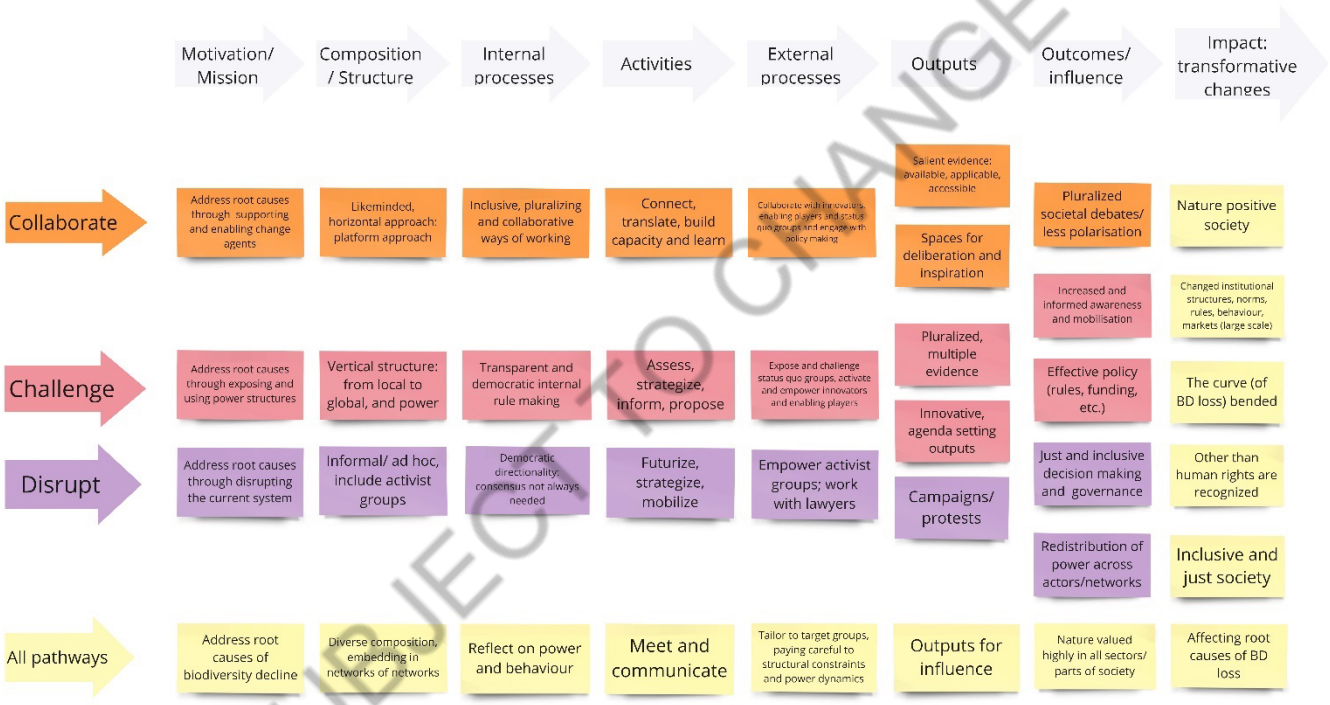
The 'collaborate' pathway is aimed at constructive and inclusive forms of interaction and learning. It aims at 'meeting stakeholders where they are at' and building a foundation of trust, seeking shared meaning and common connections that can be mobilised to move forward together (even despite disagreement). This can contribute to transformative change by working with for example biodiversity positive initiatives or with change agents within powerful institutions, and by contributing to pluralising and depolarizing debates. Collaborative pathways engage with politics by giving attention to power dynamics and representation within the team of collaborators, thereby building safe and inclusive participatory spaces where all voices can be heard and considered. However, collaborative pathways tend to be largely apolitical to external power relations that may act as barrier. Examples of collaborative pathways include: developing principles and standards for business; public–private partnerships; community-based natural resource management; and capacity building programmes.

The **'challenge'** pathway is also constructive, but more critical. In this pathway, networks not only identify direct impacts on biodiversity, but they also expose causes and underlying causes. The challenge pathway gives more attention to the politics of unsustainable and inequitable practices, and calls on powerful actors to take responsibility. At the same time challenge pathways seek to empower biodiversity innovators and activate enabling players that could help create leverage. Examples of challenge pathways include: assessments that trace the flows of winners and losers; biodiversity impact chains that track direct negative biodiversity impacts back to underlying causes and actors responsible for this; ambitious policy to regulate

SUBJECT TO CHANGES

actors impacting negatively on biodiversity; and actions to centre and engage marginalised groups within science.

The **'disrupt'** pathway is aimed at breaking down elements of the current system that hinder transformative change for biodiversity, and re-configuring whole-of-society (systems of systems) to have a positive impact on biodiversity and equity outcomes. Networks that move along this pathway do not use violence, but support or work with activist groups and social-environmental lawyers to stop, for example, harmful production or consumption processes or perverse incentive systems. Examples of disruptive pathways include: providing evidence to support social-environmental litigation (e.g. alternative scenarios); providing science support to social movements; co-creation of open science letters to government calling for higher environmental ambitions; science activism, court cases.



SUBJECT TO CHANGES

Figure 12: Pathways towards transformative change, based on the main external strategies of networks identified during the co-design workshops. For a visual summary of the three pathways, see Figure 3 on page 7.

These pathways are not mutually exclusive. First of all, all pathways work towards the same impact, which is transformative change for biodiversity. Second, some aspects will be important for all pathways, such as addressing underlying causes of biodiversity decline and reflecting on power and behaviour. Third, transformative potential of networks will depend on their ability to navigate between collaborating, challenging and disrupting: they will have to be agile, to anticipate and to combine or to change strategies based on the changing context, the target groups and the opportunities and needs of the moment. All three pathways have strengths and pitfalls. For example, the collaborative pathway could involve the risk of being

used for greenwashing (see Giraldo and Rosset, 2023) Thus, transformative change tends to require agility between all three of these pathways at different stages of the process, or when different situations present themselves. For example, a strategy to challenge status quo actors to take responsibility for their impact on biodiversity can very well include collaborating with or supporting change agents such as NGOs or journalists. Different networks may afford different priority to working with these three pathways. It is not necessary (or perhaps even desirable) for all networks to be able to accomplish all three pathways. However, networks should be able to tap into the skills of other networks for achieving the necessary agility between the three pathways, which are seemingly at odds with each other. We contend that combining networks in this way is very important for networks to transform their contexts, particularly when it comes to the modes of working with system actors to change the status quo.

3.5 Assessment questions

As already indicated, our report defines a **network** as a collective of actors, with a specific mission, (formal or informal) membership, (formal and informal) rules and procedures, and members engaged in joint activities.

Based on the building blocks introduced in the previous paragraphs, the assessment questions below (Table 3) were developed in a collaborative process to support the joint self-assessment of the transformative potential of a network, and to nurture social learning reflections.

After developing a joint narrative as answer to a question, the group can agree on a score:

- ☹ Very insufficient
- 😐 Insufficient
- 🙂 Sufficient
- 😍 Good

This can evoke a discussion about things to change and to improve.

Table 3. Assessment questions per step in the Theory of Change

Motivation and Mission
Capabilities
To what extent is the network capable of reflecting on and evolving its mission?
Practices
To what extent does the network see a transformative role for itself?
To what extent does the mission of the network include bringing together different knowledge systems and types of knowledge?
To what extent does the mission motivate its members to critically reflect on and adapt their own practices?
To what extent does the network aim for outreach to larger networks and the general public?
To what extent does the network aim to alleviate harmful competition between similar networks?

SUBJECT TO CHANGES

Performances
To what extent does the mission/vision of the network concern content, roles of the network, and target groups?
To what extent does the network aim for biodiversity restoration, bending the curve, and addressing underlying causes of biodiversity loss?
To what extent does the network have a theory of change (or strategy) that makes explicit how it expects to reach its goals and objectives in contributing to transformative change?
Conditions
To what extent does the network have knowledge of transformative change?
To what extent does the network have a good understanding of the status quo and of possible leverage points?
To what extent are the relevant spatial scales, steps in (supply) chains and levels of power sufficiently covered in the mission of the network?
Composition and Structure
Practices
To what extent are the members of the network sufficiently diverse? (Change agents, innovators, marginalised groups, activist networks)
To what extent is there an assessment of the power imbalances in the composition and structure of the network and are means of remediation put in place?
To what extent does the network include examples of practice, action, experiment, innovation, activism?
To what extent is the network sufficiently open to new members, connections and collaborations?
Performances
To what extent does the network have a reflexive approach to its overall structure and ways to transform itself?
To what extent do structures and procedures support transformative activities and internal and external processes (i.e. steps 3, 4 and 5)?
Conditions
Network of networks: To what extent is the network embedded in and connected with other networks?
To what extent does the structure of the network allow adaptability as well as stability, clear guidance and decision making?
To what extent are key stakeholders (that are part of the network) change agents, i.e. actors with power to influence?
Internal Processes
Practices
To what extent does the network work in a transparent, inclusive, pluralizing, transdisciplinary and collaborative way?
To what extent does reflection take place on practices, power and behaviour in the network?
To what extent does the network follow its own guiding values, including ethics?
Performances
To what extent does collaboration across boundaries take place within the network?
To what extent does empowerment of network members take place?
To what extent is there a culture where people can be challenged and feel safe?
To what extent does change in practices, power and behaviour take place in the network?

SUBJECT TO CHANGES

Conditions
To what extent does the network have a code of conduct to deal with potential ethical risks inherent to its processes?
Activities
Capabilities
To what extent does the network have capabilities to organise learning?
To what extent does the network have capabilities for futuring, assessing, synthesizing, prioritizing, and strategizing?
To what extent does the network have capabilities of boundary work, including the capacity to recognise diverse knowledge needs?
To what extent does the network have the capability to respond and adapt to developments, and use windows of opportunity for its activities?
To what extent does the network have knowledge of the legal frameworks and how to use them for leverage?
Practices
To what extent does the network translate between science and science, policy, business, society?
To what extent does the network coproduce knowledge and support learning?
To what extent does the network take into account relational, instrumental and intrinsic values of nature?
Performances
To what extent does the network choose its activities strategically in relation to its (transformative) mission?
To what extent do activities contribute to (deep) leverage?
Conditions
To what extent does the network have sufficient funds and other resources for its transformative activities?
To what extent does the network have access to state-of-the-art knowledge and up to date data?
External Processes
Capabilities
To what extent does the network have the capability to identify powerful status quo actors, enabling players, biodiversity innovators and marginalised groups?
To what extent does the network have capabilities to collaborate?
To what extent does the network have the capability to leverage the capacity of other networks?
To what extent does the network have capabilities to challenge?
To what extent does the network have capabilities to disrupt?
To what extent does the network have the skills to distinguish when to collaborate, challenge or disrupt?
Practices
To what extent does the network collaborate?
To what extent is the network using the network of networks approach instead of reinventing the wheel?
To what extent does the network support and empower marginalised groups?
To what extent does the network support new and emerging ideas, grassroot initiatives and innovative niches?
To what extent does the network work in transdisciplinary and interdisciplinary ways?

SUBJECT TO CHANGES

To what extent does the network challenge?
To what extent does the network engage in political discussions?
To what extent does the network expose threats to biodiversity, power lock-ins and social and environmental injustice?
To what extent does the network proactively challenge or expose (behaviour and policy of) groups with vested interests in the status quo, with assessments and proposals for action?
To what extent does the network adopt a proactive approach to resistance to change?
To what extent does the network disrupt?
To what extent does the network proactively interact with and support disruptive groups?
To what extent does the network work with lawyers to support lawsuits against environmental injustice?
Performances
To what extent does the network have a strategy for dealing with various target groups? (Enabling players, research funders, unheard middle, marginalised voices, status quo actors, activists, etc.)
To what extent do the interactions get responses from policy and decision makers?
To what extent do biodiversity champions, marginalised groups, grassroot initiatives appreciate the activities of the network?
To what extent is the network widely regarded as a respected and credible knowledge broker?
Conditions
To what extent is working with disruptive groups accepted in the network?
To what extent is the network embedded in vertical and cross-sectoral networks of networks?
To what extent does the network possess sufficient bridging and linking social capital?
Outputs
Capabilities
To what extent does the network have sufficient innovation skills, bringing forth new ideas, solutions and actions, based on new knowledge?
To what extent does the network have capabilities to facilitate open deliberation?
Practices
To what extent do outputs address underlying causes of biodiversity loss?
To what extent to what extent are events and other outputs pluralising, empowering and politicising?
Performances
To what extent does the network produce stories of a good future and what can be done?
To what extent is evidence pluralised and multiple?
To what extent do outputs appear to be influential in terms of leading to change? (Behavioural change, awareness, recommendations, policy)
Conditions
To what extent does the network have access to media, influencers and politics?
To what extent to what extent is there support and legitimation to engage in activist events?
Outcomes
Practices
To what extent does the network assess and is it reflexive on its outcome and impact?
To what extent does the work of the network lead to pluralised and respectful societal debates?
Performances
To what extent has the action arena been expanded for mainstreaming biodiversity in society?
To what extent has the network managed to engage sectors of society in protecting, restoring and managing biodiversity?

SUBJECT TO CHANGES

To what extent has the agency of enabling players been strengthened, have marginalised groups been empowered, has power of status quo groups declined, etc.?
To what extent does the network affect policy (public and private)?
To what extent do the outcomes of the network contribute to changing rewarding systems (science, practitioners, politics, society)?
To what extent has the network contributed to effective biodiversity policy?
To what extent does the network achieve the implementation of rights of nature (rivers, mountains) in legislation?
To what extent has the network contributed to just, inclusive governance?
To what extent does the network contribute to a paradigm shift?
To what extent can a paradigm shift from 'economy first' to 'biodiversity and people first' in part be ascribed to the work of the network?
To what extent are innovations (including nature-based solutions) implemented for nature-positive and just communities?
Impacts
Performances
To what extent is the network perceived as a driver of change?
To what extent are there cases that show that practices and individual and collective behaviours towards nature have changed?
To what extent does the network contribute to a nature positive, inclusive and just society?
To what extent does the network contribute to bending the curve of biodiversity loss?

SUBJECT TO CHANGES

3.6 Take-off and landing

Using the framework presupposes an ambition of a network to develop its transformative potential. Depending on the knowledge present among the participants on transformative change and other relevant concepts, the facilitator could choose to give an introduction first. At the least, the participants should be introduced to the purpose, rationale and setup of the framework. It is important to stress that the assessment questions are meant for reflection and learning, rather than for accountability. For learning and reflection, an atmosphere of security and trust is essential. There are various tools available for facilitators to foster a good learning environment.

After going through the questions together, reflecting on them, and assessing the outcomes, it is recommendable to take some time to capture the main lessons from the exercise. The groups could discuss questions such as: what did we enjoy about assessing our transformative potential? What was difficult, unpleasant, confronting? What would we do differently in our next assessment? What were the main lessons?

*Further guidance on **designing and facilitating workshops** is provided in the **Supplementary Material** accompanying this Deliverable, available via the Deliverable record on Zenodo.*

4 Testing the framework

4.1 Introduction and approach

Between June and October 2024, we conducted pilot workshops with BioAgora Knowledge Exchange Networks (KENs) to test and refine the framework for networks to assess their transformative potential. These sessions provided an opportunity to explore how participants engage with probing questions, assess the framework's relevance and practicality, and identify areas for improvement.

BioAgora KENs are testbeds growing the network around the topic that the KEN represents, and looking at how to get information flowing from the network to the European Commission – but also being responsive to other stakeholders relevant to the European Biodiversity Strategy for 2030.

We framed the workshops as having dual objectives, one serving the KENs and the other testing the assessment framework:

1. For the KENs, the objective was to stimulate reflection on concepts and insights that could help them gain traction and identify diverse networks and stakeholders to amplify their transformative aims for biodiversity.
2. For testing the assessment framework, the objective was to evaluate the utility of the framework in terms of its ability to stimulate discussion and learning with the DCs and their network partners on transformative approaches for their respective topics (pollination, freshwater, nature-based solutions), and to identify areas where the framework needed improvement and development. We specifically considered: (1) to what extent the participants were able to use the Theory of Change approach and probing questions to stimulate discussion, and (2) which concepts seemed to be most relevant, and which needed clarification.

To test the framework, three participatory self-assessment workshops were conducted. Each workshop included three facilitators from the D2.3 team (a facilitator and two note-takers), one or two leads from the KEN, and six to eight external participants involved with the KEN. The KENs we worked with were:

1. **Nature-Based Solutions:** Participants from *NetworkNature*, a formalised network supporting the scaling of NBS, were primarily employed at international NGOs.
2. **Free-Flowing Rivers:** Participants engaged in achieving the EU Biodiversity Strategy goal of restoring 25,000 km of rivers, including freshwater ecologists, hydrobiologists, NGO representatives, and policymakers.
3. **Pollination and Pollinator Biodiversity:** Participants linked to initiatives such as the EU New Deal for Pollinators and IPBES Pollination Assessment, including scientists and an EU-level policy officer.

SUBJECT TO CHANGES

Participants, despite their diverse institutional affiliations—including universities, research centers, NGOs, and government bodies—were all active in the science-policy-society interface (SPSI).

In brief, the workshops began with an introduction to transformative change, followed by structured discussions for each step in the Theory of Change. After each discussion, participants assessed their network's transformative potential using emoji. Three note-takers recorded insights, with one specifically evaluating the framework's performance. Each workshop concluded with a brief reflection on both the questions and the framework as a whole.

Workshops 2 and 3 were modestly adjusted based on prior experiences and the attending networks, involving minor changes to a small subset (3–6) of preselected questions.

The following sections describe how we operationalised and modified the draft framework and what we experienced during the workshops.

4.2 What did we modify

This section describes the design choices and modifications to the framework as it was before going into the testing phase.

1. While in-person workshop application may be considered most suitable for applying this sort of reflexive process, this can be unfeasible for networks – which by their nature tend to be geographically dispersed. We therefore adapted the framework for a **2-hour online workshop**. We felt that longer than 2-hours would present problems with network availability and willingness to participate.
2. In adapting the framework to a 2-hour online workshop, the most important decision was to select questions. **Selecting questions** is important for practical reasons: discussing one question may take around 10 minutes. In this learning evaluation we were striving for a deeper discussion on highly relevant questions rather than a comprehensive shallower discussion. Networks that wish to assess their transformative potential may want to select questions that are relevant to their situation. For example, some questions are specific for networks that work at an SPSI. It is also important to select questions drawing on expertise from a network topic expert, and an expert in transdisciplinarity or transformative change. For the testing phase, selecting questions was done in a two-tier way. We first compiled a longlist of questions that we considered most relevant and likely to stimulate discussion in the particular DCs. This amounted to about half of the questions to use for the workshops. Secondly, we highlighted the questions that we felt would best stimulate discussion and reflection. We selected two of these 'main questions' per step in the ToC.
3. We decided focus only on the levels in the Theory of Change that were in network's **span of control** (steps 1-6: *Motivation/Mission, Composition/Structure, Internal processes, Activities, External Processes, Outputs*). An exception to this rule was one workshop in which we included Outcomes, at the specific request of the DC.

SUBJECT TO CHANGES

4. The questions were initially designed as a long list, each assessable on a 4-point scale. For the workshops, we chose to have participants **assign scores at the level of the Theory of Change** rather than for individual questions. This approach aligns with the intent to encourage joint reflection, using the questions as prompts for discussion rather than separate evaluation criteria.
5. We did not go into the **four types of question** (capabilities, practices, performances, conditions) in the workshops. These categories were useful to systematically define comprehensive probing questions initially, but detailed discussions on how the framework was 'constructed' were not important for the assessments themselves.

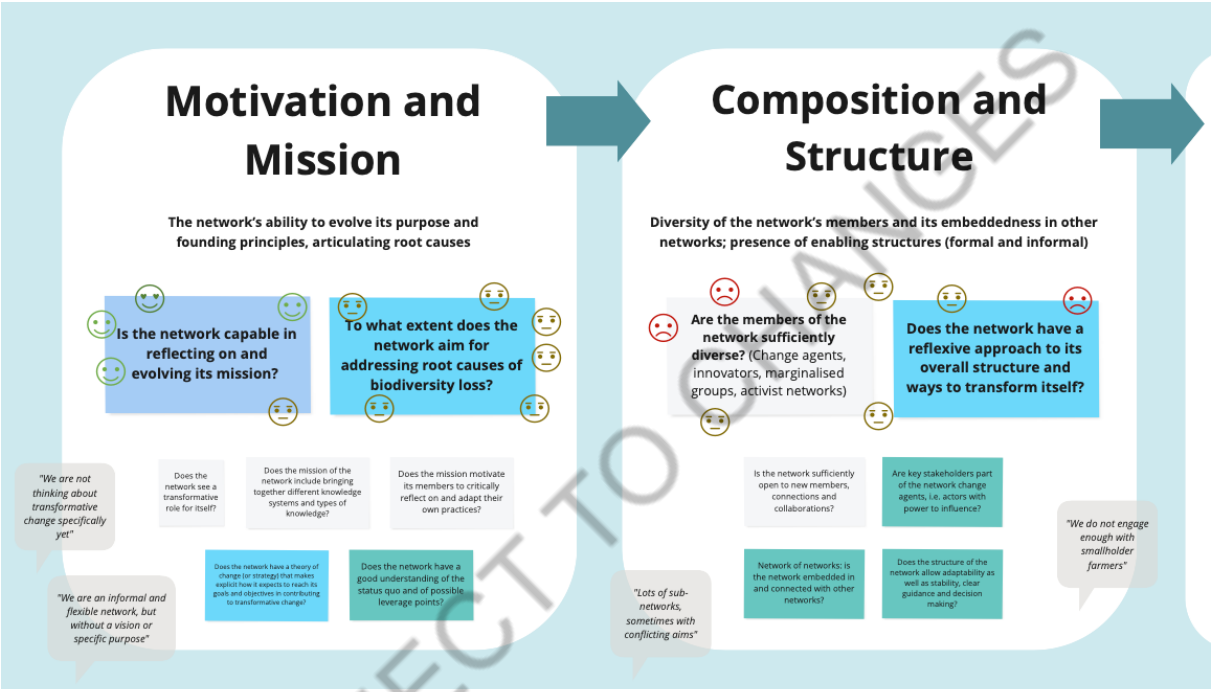


Figure 13: Stylised rendering of the framework in action

SUBJECT TO CHANGES

4.3 Experiences in applying the framework

Our experience of applying the framework across three workshops with KENs and two test-runs prior to that in the in-person BioAgora consortium meetings, highlighted its strengths and areas for refinement in facilitating self-evaluation and critical reflection among networks.

1. **Strengths of the framework**:
    - **Structure**: The framework's eight steps provided a clear, logical sequence, encouraging participants to explore various dimensions of their transformative potential. The framework allowed participants to revisit earlier discussions with enhanced understanding gained during later stages. Using well-established Theory of Change steps, which are often applied in monitoring and evaluation frameworks, also helped increase the familiarity of the framework for participants.

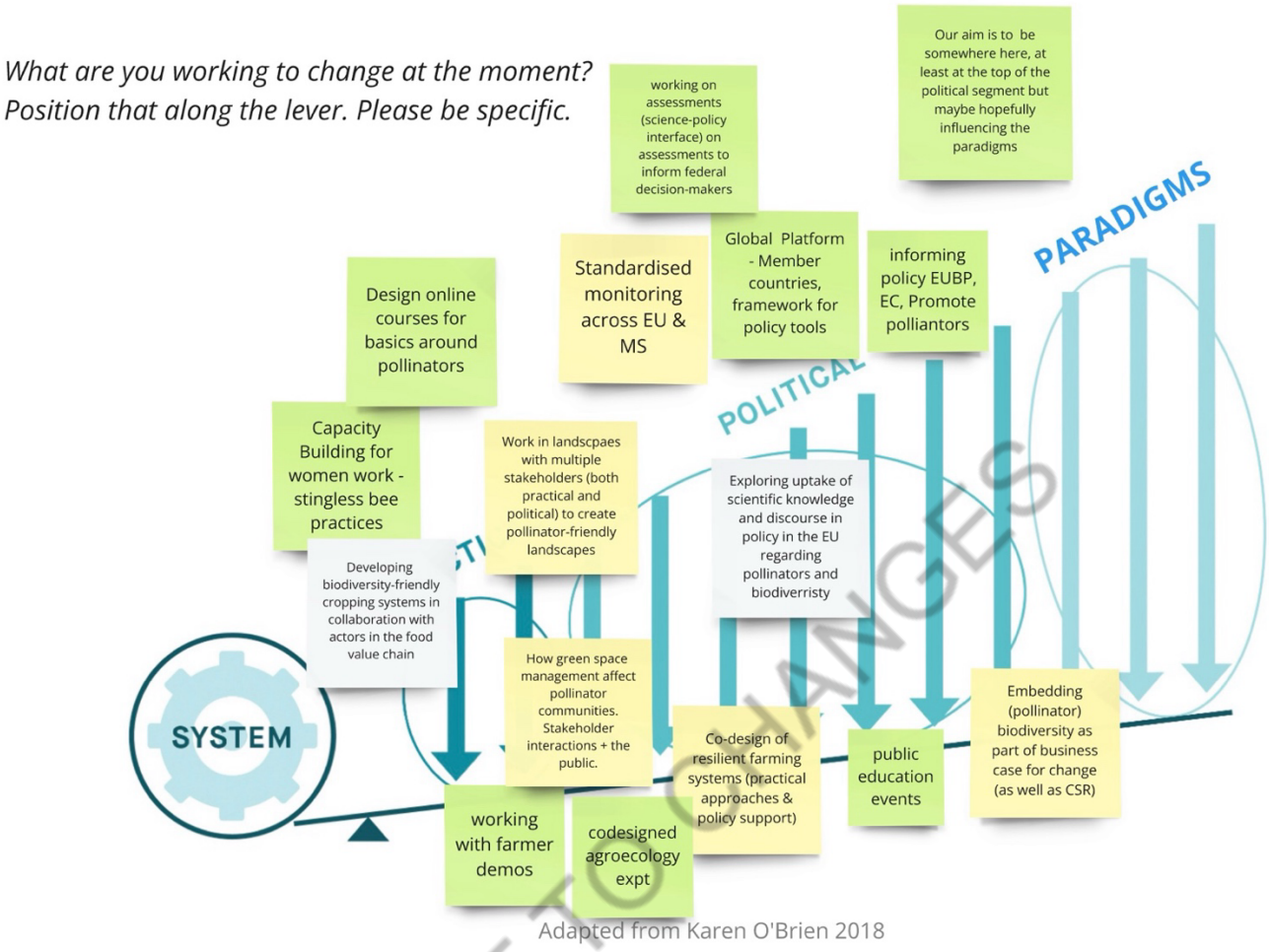


Figure 14: Screenshot of an exercise on leverage in the Pollination KEN workshop

SUBJECT TO CHANGES

- **Rich discussions**: Questions about network composition, processes, and activities often led to in-depth reflections on diversity, inclusivity, power dynamics, and co-production.
- **Collaborative group work**: Structured group activities enabled participants to identify frustrations, connect them to pathways, and assess transformative capabilities collectively. The framework and the workshop approach consistently fostered a safe, open environment for dialogue, enabling participants to critically evaluate their networks without fear of judgement.

2. **Challenges and refinements**:
   - **Time constraints**: Two hours proved to be the minimum needed for a successful workshop. In our two-hour sessions, there was no time to discuss individual participants' scores, let alone reach consensus on the appropriate evaluation. Ideally, scoring would have been more collaborative, with consensus-building. Additionally, we had to reduce time for evaluation and follow-up. Therefore, we recommend against workshops shorter than two hours, as they risk raising more issues than they resolve.

- **Concept clarity**: Early misunderstandings of terms like *pluralising*, *co-production*, and *disruptive pathways* hindered progress. Providing concrete examples upfront, such as explaining pluralism as both stakeholder diversity and worldview integration, improved engagement. Anchoring abstract concepts with tangible examples, such as framing non-confrontational disruption as a complement to other strategies, deepened participant understanding.
- **Question design**: Binary yes/no questions often limited depth of thought. Reintroducing the phrase "To what extent…" after the first workshop encouraged more open-ended and nuanced discussions.
- **Omitted steps**: For manageability, discussions on *Outcomes* and *Impacts* were excluded. Including these in future workshops could support more comprehensive reflections and revisiting of the Motivation and Mission.
- **Devising a follow-up**: We left little time for workshop evaluation and the formulation of next steps. A stronger link between self-evaluation insights and actionable strategies would be possible, but would require extra time or a follow-up meeting.

SUBJECT TO CHANGES

4.4 Quotes from the workshops

The following quotes (Table 4) illustrate insights generated during the workshops, highlighting how participants engaged with the framework. They provide examples of how networks perceive their own structure, purpose, and challenges, offering a glimpse into the types of reflections and discussions the framework facilitates.

Table 4: Participant quotes, arranged per step in the Theory of Change

Motivation and mission 🌟
"As a network we can't reflect, because we don't consider ourselves as a network with a specific purpose."
"We are very reactionary and hands-on in terms of what is happening right now that we need to address, we are always on the defensive rather than narrative-changing."
Composition and structure 🧩
"The ideal would be to expand to all these different actors, so that also the kind of actions that we can ensure is bigger."
"Working with NGOs is seen as political, whereas engaging with the big corporates/cooperatives is not seen as political."
"We are not actually so diverse when you consider backgrounds instead of types of stakeholders."
Internal processes ⚙️
"You preach to the choir and then the choir sings louder."
"It feels from the research community side as if power and politics did not exist, that we need provide evidence and then society would make the correct decisions."

"What authority do I have or anyone in the network to comment on how other people behave?"
Activities 🛠️
"Policy is now stacked against us [scientists] … Maybe we have to shift our attention from policy to society."
"We are producing a lot of scientific knowledge. The problem is how this knowledge is shared with communities. There is definitely no connection. If we don't know how to communicate with communities, we cannot change paradigms. […] We don't have the capacity."
External processes 🌐
"Why don't we pair with a favela or squatter group, rather than with Horizon projects and the private sector? … Do we have the skills?"
"In all of the projects I've seen I've never heard of a strategy for dealing with marginalised or unheard groups."
Participant A: "The assumption (here) is that networks have more TP if they are collaborative, pluralised, inclusive, etc. I am mainly interested in achieving a goal, to counteract the loss of biodiversity. If I have to deal with all these issues at the same time, I wonder if I will ever be able to focus on achieving this goal. … Sometimes using the 'old boys network', however horrible it is, may in the end be more effective. …" *Participant B*: "In my area of work, the status quo / BaU is not getting us there. We are missing targets left, right and centre. So we need to be more holistic. [A nodding]"
Outputs 📦
"How do you know whether your outputs are leading to change … Outputs alone do not lead to change."
"We are bringing forth new ideas - but we have little control over whether they're done. The story production side is weak."

SUBJECT TO CHANGES

5 Discussion

5.1 Learning in a rapidly evolving context

This framework emerges at a time of rapid evolution in transformative change scholarship and is designed to nurture reflection and broaden discussions on transformative change. A growing number of EU-funded projects are dedicated to advancing and applying this concept, offering opportunities to refine the framework through ongoing consultation. The EC is working to harness the insights from these projects by establishing a Transformative Change Cluster. BioAgora supports this effort by testing the feasibility of mobilising the Cluster as a network of networks at the science-policy-society interface, helping the EC implement its aspirations under the EU Biodiversity Strategy for 2030. This involves reflecting on the sustainability of Clustering projects in its ability to mobilise topical networks of a broad range of actors (in this case, working on Transformative Change), and exploring how such a topical network could best support the functioning of a Science Service in the future.

5.2 Suitability of the framework in various situations

The framework presented in this deliverable requires further testing across different contexts and may need adaptation to specific settings. While it was designed for networks operating at the science-policy interface, its applicability to individual initiatives or networks of networks remains untested. Additionally, the assessment questions are suited for ex post and ex durante evaluations; an ex ante assessment would require reformulating them (e.g., shifting from “to what extent” to “how will we”). The framework was developed for self-assessment in interactive workshops and may be less suitable for external expert evaluation or questionnaire-based approaches. A key consideration for future development is ensuring its usability for practitioners, not just scientists.

5.3 Limitations of the framework

The framework is designed to assess the transformative potential of networks, assuming that those using it have transformative ambitions. However, many other aspects of networks could be evaluated using complementary frameworks, such as those assessing ecological trends, contributions to social capital, business model sustainability, or governance and management structures. Notably, the framework does not include quantitative metrics (e.g., number of publications, members, or meetings). Its alignment with commonly used Theory of Change levels in monitoring and adaptive management frameworks may facilitate integration with other evaluation approaches. The use of question categories within each level (e.g., practices, performances, conditions) further supports complementarity with other assessment frameworks.

One gap identified in testing was the lack of an explicit step to determine next actions: “What concrete steps will we take based on what we have learned?” This distinction between

SUBJECT TO CHANGES

activating reflection and activating reflexivity was not sufficiently addressed. Time constraints make deep discussions on learning difficult, and allowing time for participants to process insights may be beneficial. However, incorporating a follow-up mechanism—such as setting a future date to apply the learning—would strengthen the framework.

Finally, the framework reflects the perspectives of the co-creating group. A different team would likely have designed it differently. Involving target groups—such as networks, activist groups, and policy actors—more directly in the design process would have improved its relevance and usability for transformative networks.

5.4 Recommendations for application of the framework

Application of the assessment framework requires some understanding of transformative change, or at the very least of transdisciplinary practice. All relevant concepts that are referred to in the assessment questions are explained in this report. Further guidance is provided through the Facilitator Notes. We highly recommend that a self-assessment by a network in an interactive workshop is supported by a facilitator who can work with network hosts to select questions in the framework for the meeting, and explain the rationale of the questions where needed. Ideally, the facilitator should have expertise in the topic of transformative change both from a biodiversity and an equity/justice perspective.

5.5 Evaluation of the design process

The presented assessment framework was co-produced by the BioAgora team. The design process was organised as a cross-WP reflection. All eight design workshops were held online, with the aid of a Miro board, because of the international composition of the team. Online workshops are not ideal for creativity and interaction. Nevertheless, the engagement of the team was high. Using a Theory of Change as a tool to distil key elements of networks to evaluate was very useful to think systematically through what was needed in an assessment framework. Working on the same Miro board over many months, accessible to all participants and project members, made the design process a joint and transparent one. The participants experienced the design process as fun and inspiring.

Most participants were social scientists, or social-ecological scientists. The combination of social and environmental scientists helped us to both keep the focus on biodiversity, while also formulating relevant inter- and transdisciplinary questions. Learning and co-creating across disciplines was experienced as inspiring and important. There is a need for more interdisciplinary learning in BioAgora.

In hindsight, Task 2.3 could have been given a longer duration in the project to allow for developing the framework for the assessment of transformative potential in an iterative way: testing and improving it, reflecting on the development of the SSBD, and for more room for interaction with EU policy makers and other relevant actors at the SPSI. With the release of the March 2025 update of this deliverable, we were able to incorporate results from testing and other insights gained beyond the original timeline of the Task.

SUBJECT TO CHANGES

6 Conclusions and recommendations

6.1 Conclusions

Task 2.3 set out to develop a framework for the assessment of transformative potential of networks. This framework should support the development of a transformative Science Service for Biodiversity at EU level, and it must be suitable for networks in general (and SPSI networks in particular) that wish to assess and improve their transformative potential. The framework presented in this Deliverable is the result of a process of interdisciplinary co-creation within the BioAgora team. This framework comes at a time when the concept of transformative change is in its infancy and evolving rapidly in understanding. Therefore, the framework is not definitive but should be seen as a work-in-progress.

The focus of this study is on networks because of their critical potential to leverage transformations. Ideas travel across boundaries through networks. In this way, networks facilitate collaboration across boundaries and can help to develop institutional innovations. We defined transformative potential of networks as: contributing to transformative change (i.e., addressing underlying causes of biodiversity loss, aiming for a nature positive future) and working in transformative ways (i.e., pluralizing, empowering, politicizing and embedding). We departed from the premise that stimulating a clear and reflexive internal process of the network has the potential to leverage transformative external processes at different levels. Transformative potential in the context of biodiversity involves the ability to mobilise and use knowledge from diverse perspectives, broaden problem-framings to consider both direct drivers and underlying causes of biodiversity loss, and capabilities to assess power differentials that may reproduce status quo lock-ins that limit the potential to enhance biodiversity. We propose that transformative potential of networks relates to their capability to weave and navigate pathways of collaborating, challenging and disrupting. This means that networks must be able to adjust their approaches strategically depending on the situations and the target groups they are dealing with in their external processes. This implies adopting a network of networks approach.

In line with transformative thinking, the framework presented in this report is meant as a tool for reflection and learning within a network. It can be used in the phase of setting up a network (ex ante), for reflexive monitoring during the life of a network (ex durante), and for looking back (ex post). It can be used for an assessment of the current state of the network as well as for identifying opportunities for strengthening its transformative potential.

SUBJECT TO CHANGES

6.2 Recommendations

We conclude with recommendations for BioAgora and for other potential users of the framework for assessing the transformative potential of networks.

We recommend that the framework be used in an iterative way to develop the transformative potential of the Science Service for Biodiversity. During one of the sessions of the Consortium Meeting in Leipzig (11-12 October 2023) a start was made with thinking about the SSBD in transformative terms, using a draft version of the framework. The results can be used to further the transformative potential of the SSBD as well as to improve the framework. For example, we recommend exploring how the Guiding Values and the Ethical Infrastructure of the SSBD can relate to its transformative potential. We recommend that discussions about the transformative potential of the SSBD continue for the duration of the BioAgora project.

In addition, the framework can be used to develop the individual functions of the SSBD from a transformative perspective. For example, recommendations for the function of building topical networks include: to ensure a fair representation of actors (and needs) from the political side to the business community, research and civil society, as well as those unusual (and reluctant) actors that could play a key role in enacting deep changes for BDS implementation; and to include representatives that hold various types of knowledge (e.g. indigenous, local, scientific, various disciplines, practice, implementation) and positions of power (e.g. funders, brokers, policy makers, lobbyists). It will be important to include non-scientific stakeholders in the further development of the framework. The current formulation of the assessment questions may be too theoretical and difficult to understand for practitioners. We recommend reaching out to EU policy actors for testing and discussing (parts of) the framework. It is recommendable to include different stakeholders as evaluators of framework to provide diverse perspectives.

The framework as presented in this Deliverable has been tested in collaboration with three BioAgora Demonstration Cases. Some valuable lessons have already been learned in the process. In general, we invite networks to start using the assessment framework. Such an assessment is fundamentally a co-evaluation process that needs to be done in groups to stimulate group reflection, preferably with the aid of a skilled facilitator. It is not a 'tick box exercise' – it is about crafting a group narrative and about social learning. We welcome feedback from networks using the framework.

The aim is the elaboration of a practical tool to be used by the Science Service as well as the wider community. In the future we aim to provide support and dissemination of the framework to enhance its use. We aim to further develop this framework within BioAgora, with its stakeholders and preferably also with the projects and initiatives dedicated to transformative change.

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