Leads and brickstones for a nature positive society

Methodology of the cross-case analysis and across case synthesis

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1 PU = Public
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V1			

Summary

Task 1.7, methods for synthesis and comparative analysis, has been described as reviewing approaches for comparative analysis, to support the synthesis of the cases to feed into D1.1 and into WP3. The task is meant to develop the methodology for synthesis of the three layers of analysis and the comparative analysis of lessons of biodiversity loss and the potential for transformative change. For this a literature review to assess the policy, institutional (including regulatory) and governance context, enablers and constrains of transformative change leading to a theory of transformative governance has been performed.

The aims of the cross-case analysis and the across case synthesis is to:

- Delineate the combination of factors that may have contributed to gains or losses of biodiversity,
- Seek for explanations why cases differ,
- Identify governance models that are capable of catalysing transformative change,
- Articulate the narratives, concepts, hypotheses, or theories discovered or constructed from the set of cases,
- To gather critical evidence to modify biodiversity policies.

This aim has been kept in focus when developing the methodology for the cross-case synthesis and across case synthesis. There are two anchor points of a cross case analysis: the sector and the transformative practice. The BIOTraCes project focuses on bio-innovations in high impact sectors, and values, knowledge and (sustainable/unsustainable) behaviour, as well as their interrelations. Key in the relation between sector and innovation is the analysis of human-nature relations. Should this be conceptualized as a formal SES or a more inclusive and integral understanding of man humbly being part of nature. Each case will address these questions, the overall analysis brings these insights together.

To develop the required methodology, we made use of several methods including a literature review, workshops (diverge/converge) to gain expert knowledge, and back casting a theory of transformative change. Preparation of the workshops departed from the following notions:

- The synthesis is directed to the goal of a nature positive society,
- Cases are primarily understood as a system of relations,
- Power shift is the key to transformative change: it blocks or enables bio-innovations and lifestyle innovations,
- Power is observed and discussed from the (most) marginal perspective,
- Narratives (ideologies, logics, values etc) can be a key element of power that transforms.

These notions resulted in the following three topics for the workshops: (1) Social Ecological System (SES) comparisons, (2) Power cross case analysis and (3) Values, knowledge, narratives, and realities comparisons. Each workshop has been introduced with a discussion paper, sketching some theoretical and methodological options to take on board in the overall analysis.

The activity of back casting to get a sense of what is needed for the theory of transformative change is straightforward. At first, the practicalities of a theory of change have been drawn from a multi-stakeholder guide. Next the theory has been accessed using the platform of the Centre for Theory of

Change. We interpreted good examples in this platform of applying the theory of change as theories of transformative change due to of their impacts. We used these examples to discuss the relation between narratives, as component of a theory of change, with theory of transformative change on biodiversity.

Based on the results of the workshops several conclusions have been drawn, that help to shape the overall analysis. The workshops have shown some insights in the way the partners foresee the work on their case and the theoretical embedding of their work. The overall image is one of great methodological diversity, which is a rich source of insights about inclusion and power mechanisms. On the other hand, this also implies a risk of methodological and theoretical inconsistency. The conclusion that needs to be drawn here is that there will be a need for a secondary analysis, which will put the outcomes of the case analyses in a consistent theoretically embedded narrative.

Another important conclusion can be made about the use of grounded theory. There seems to be a tension between using grounded theory in the cases and applying theoretical concepts that bring along a compelling theoretical framework. Among others, a clear example is the concept of a Social Ecological System. This concept is embedded in a paradigm of system thinking, with drivers of change, underlying causes of change and so forth. This system thinking aims to reduce the overall biodiversity decline by preferably connecting causes to habitats and species. This reductionist perspective may collide fundamentally with the way societal partners conceptualize their relationship with nature. The societal partner may use a more holistic perspective to look at nature and society. Our societal partners cooperate in the research but are not "the object" of our research. In the cases we may focus on a larger network of people, because we are interested in grasping their values and specific modes of relation with animals, territories, and other non-humans.

The theoretical concepts of system thinking should help and must not stand in the way of careful listening to the societal partner and discovering the full potential of their perspectives for a nature positive society. For the overall analysis this implies that the set of cases should not solely be analysed from the perspectives and theories in use in the actual science policy interface, because this could only reiterate what's already accepted a useful and relevant knowledge. If there is a choice of theories to make, more open theories, that can be aligned with grounded theory, such as working with the concepts of commons, may be preferred.

The overall analysis should go beyond the idea of transitional change. The overall analysis should make a clear distinction between transitional and transformative change. When change is transformative, the process is less controlled by the power structures of the vested interests and invisible sources of power are recognized and addressed.

The last conclusion we want to make here, is about narratives. Narratives can be a great help to convey the message of the cases. But who writes the meta-narrative? A meta-narrative may contribute to simplification of the image of a nature positive society and as such exert power over those who have other ideas. The narrative we build within the project – as an outcome-, 'to convey the message of the cases', will be a meta-narrative. It is the narrative of different narratives, an umbrella used to implement 'change' on a political and societal level. This necessarily involves a certain degree of 'decontextualisation', but at the same time this meta-narrative must emphasise the plurality of voices, actors, perspectives, and approaches.

In the overall analysis we must pay attention to decontextualization which would run at odds with our principle of pluralization. Instead, the overall analysis should pinpoint the relevance of positionalities of those voices and perspectives that governance should be open for.

The literature, workshops and the back-casting activity led to the following methodological proposition. It makes sense to organise the final cross-case analysis and across case synthesis in three steps: starting by reviewing all cases as systems of relations in which bio-innovations emerge in different case studies, develop, and if and how they are implemented. then looking closer in the way power works in the set of case studies and finally try to extract the proof that could substantiate the theory of transformative change. It is proposed here to finally embed the case findings in a post structural research paradigm, because this paradigm is seen most adequate to address visible and invisible sources of power, that interact to adopt or withstand innovations from unheard voices and unrecognized perspectives. Below, only the main research questions of a three-step analysis/synthesis will be given.

In the first step of the analysis the case studies are seen as systems of relations. BIOTraCes works with the societal partners to understand how the inclusion of marginalised voices, perspectives, values and identities can affect human-nature entanglements.

The research question here is:

How do human-nature relations and entanglements change in response to the inclusion of marginalised perspectives, values, knowledge, identities (bio-innovations) in each high impact sector and what actual and potential steps in terms of human-nature relations are made towards a nature positive society?

The second step deals with a deep dive analysis of power in the system of relations. Critical discourse analysis of what is considered as transformative pathways. The most important research question here would be:

What mechanisms of power, detectable in more than one case, coming from various angles, contribute to leverage or cause blockage of bio-innovations and when does power from marginalised perspectives, values, identities, and groups become transformative?

The final step of the analysis deals with the question how inclusion of marginalised perspectives (perspectives, values, identities) changes existing power relations that create lock-ins; and the synthesis of the logic of bio-innovations as brick stones of a nature-positive society. BIOTraCes works with partners to unveil how marginality is produced and reproduced in the target areas, so to give voice and to empower marginal subjects.

The most important research question would be:

What governance principles foster marginalised perspectives on a nature-positive society and how can these help to include other values, knowledge, and behaviour?

The action of a three steps analysis will land in two different tasks in work package 2. Its results should inform the handbook with the theory of transformative change, and the various tasks for work package 3. It must be ensured that, although the overall analysis and synthesis takes place in different tasks, one coherent framework should be used.

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1 Task description

1.1 Initial description

Task 1.7, methods for synthesis and comparative analysis, has been described as follows:

- Reviewing approaches for comparative analysis, to support the synthesis of the cases to feed into D1.1 and into WP3.
- Develop the methodology for synthesis of the three layers of analysis and the comparative analysis of lessons of biodiversity loss and the potential for transformative change.
- Review literature to assess the policy, institutional (including regulatory) and governance context, enablers and constrains of transformative change leading to a theory of transformative governance. i.e., governance models that are capable of catalysing transformative change across societal spheres, sectors and scales.
- Develop the main Theory of Transformative Change approach by taking stock of the lessons learned about the outcomes in terms of challenges and progress towards transformative outcomes toward pluralist and inclusive nature positive societies.

1.2 Interpretation of the task

Task 1.7 is paving the way towards a theory of transformative change (see figure 1). It informs and instructs the overall analysis across the cases and refers to the concepts and theories in use in BIOTraCes (see figure 1). While each case must answer the question what it (potentially) contributes to an inclusive and nature positive society, a similar question holds for the collection of cases.

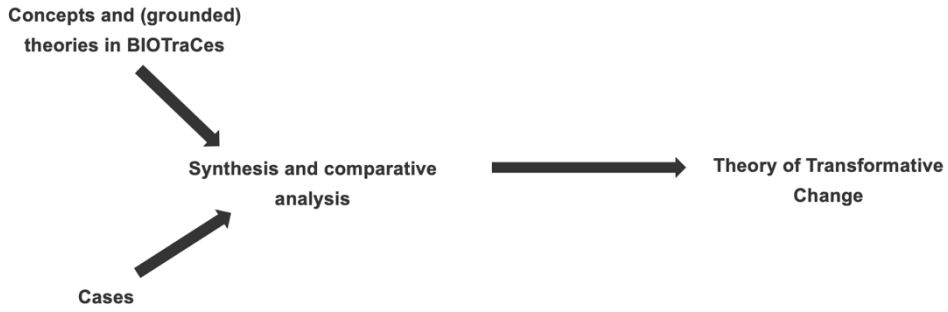

Figure 1 The comparative analysis and synthesis in context of the overall project

This report presupposes the existence of nine case studies that have been thoroughly analysed. Each case must deliver part of the proof the theory of transformative change should built upon or rely on.

This means that each case needs to clarify:

- The causes and underlying causes of biodiversity loss in their respective high impact sector (Business as usual = reference for BIOTraCes)

- Why the inclusion of marginalised perspectives, values, and identities would lead to better results (compared to business as usual), and therefore should become part and parcel of biodiversity policies.

This evidence should be solid, convincing, and understandable for those working in the science policy interface.

Each of the cases will be analysed in a way that resonates with familiar disciplinary ways a partner is used to work. The set of cases will lodge many differences, also methodological and theoretical, besides many commonalities. One commonality will be about power, another about participatory action research. Each partner must address power in a way that yields leverages and blockages. This requires reflexive monitoring. Nevertheless, they may differ substantially in the way invisible mechanisms of power are studied or in the way intersectional mechanisms are disclosed. For this, a secondary overall analysis will be needed, to deepen the analysis and put the outcomes of the cases in a consistent ontological framework. The same holds for social-ecological systems. Each of the cases must study the discourse on human-nature relations in the business as usual, and compare this with marginalised perspectives, to assess the benefits of inclusion.

This secondary analysis is aimed at in task 1.7 and will be described in this deliverable.

The aims of the cross-case analysis and the across case synthesis is to:

- Delineate the combination of factors that may have contributed to gains or losses of biodiversity,
- Seek for explanations why cases differ,
- Identify governance models that are capable of catalysing transformative change,
- Articulate the narratives, concepts, hypotheses, or theories discovered or constructed from the set of cases,
- To gather critical evidence to modify biodiversity policies.

There are two anchor points of a cross case analysis: the sector and the transformative practice (see figure 2). The BIOTraCes project focuses on biodiversity innovations[1]: the inclusion of marginalised perspectives, knowledge, values and identities in high impact sectors. Key in the relation between sector and bio-innovation is the analysis of human-nature relations. Should this be a formal SES or a more inclusive and integral understanding of man humbly being part of nature. The case will talk about this, the overall analysis brings these insights together.

[1] Quote from D1.4: Critical categories for the selection of innovative experiments in the field: leave space to self-emerging, unplanned, more-than-human , disruptive. Interventions indeed should remain open to the emergence or 'likely presence' of nonhuman agency (Lorimer). In addition, transformations tend to be self-emergent, and not rationalistic: the interventions should not be planned by experts charged with conserving biodiversity and ensuring biodiversity control. They are potentially "surprising ecological events" that do not result from "a tendency towards the imposition of forms of transcendent order that often have poor ecological (and sometimes social) consequences" (ibidem). We are not searching for what Lorimer call "government by experiment" but to forms of interventions "operating as open-ended, learning processes": these kind of experiments are often "vested with particular interests and strategic purposes" (ibidem).

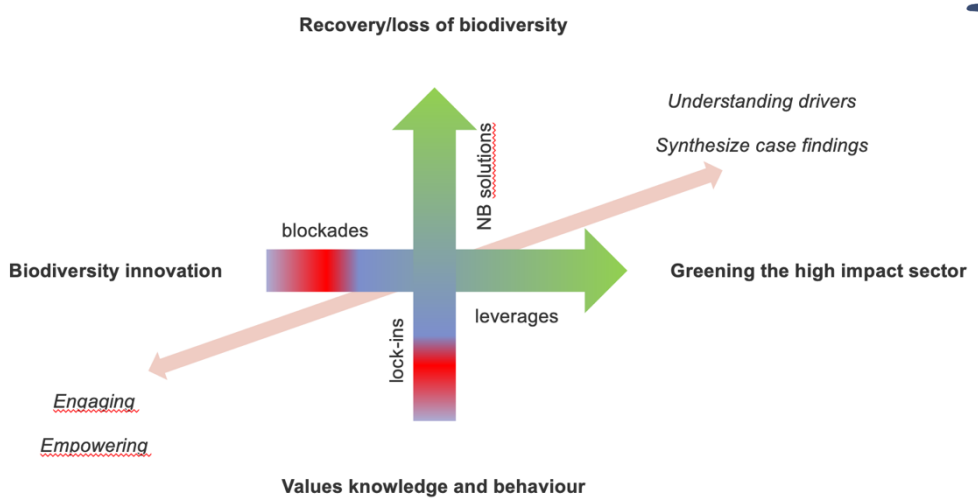

Figure 2 The anchor points of a cross case analysis

The cross-case analysis should look with a lens of system at the cases as (lodging) biodiversity innovations that may or may not have an impact in the high impact sector. Here we can dive in the system of human-nature relations. In a further cross-case analysis, we should also look at values, knowledge, and behaviour, and how bio-innovations sprouting from them align or collide with (in)direct drivers of biodiversity loss, or get stuck in power lock-ins. This is a second layer of analysis in which power is the key object. The synthesis across cases may focus on governance conditions and narratives: aiming to give full proof that including marginalised voices and perspectives, knowledge, values and identities can change vested interests and landscapes of power.

Challenge

BIOTraCes' case studies are characterized by their flexible nature, evolving over the course of the study, focusing on a phenomenon in context, using multiple methods of data collection. They have been chosen in four different high impact sectors (figure 3). Moreover, they have been chosen according to diversity principles in the research design method (Przeworksi & Teune, 1982; George & Bennett, 2005). BIOTraCes seeks to compare cases that differ substantially, to find similar processes or outcomes in diverse contexts. The power of applying diversity principles in the selection of cases lies in its ability to extend the lessons learned in a single case to inform another case and to uncover similar processes in unexpected contexts (Khan & VanWynsberghe, 2008). We need to learn from both the uniqueness and the commonalities of our cases. However, we should beware of decontextualization, unless it precedes recontextualization of cases.

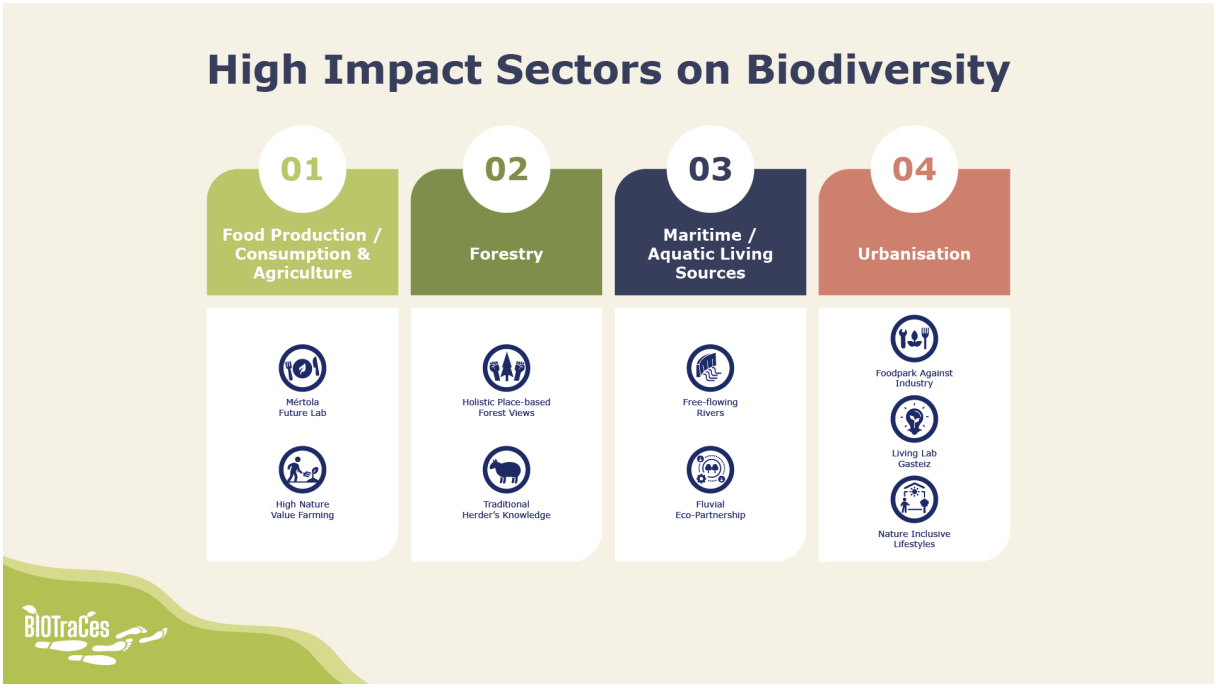

Figure 3 The distribution of BIOTraCes' cases over four high impact sectors

The output of the cases should feed in the Theory of Transformative Change. The flexibility in the choice of methods for performing our case studies is one of the characteristics that leads to challenges in conducting the synthesis. The process of synthesis entails organizing the relevant evidence extracted from the included sources and then finding some way of bringing it together.

1.3 Interdependencies with other tasks

This section outlines how different work packages, tasks and cases are connected. It is important to know how different work packages and tasks build on each other, to know what types of case outputs can be expected. These expectations were a leading component of finding, collecting, and deciding on methods for the synthesis and comparative analysis.

The interdependencies mentioned in here have been discussed with the respective task leaders in bilateral meetings. These meetings aimed to find disputes and congruencies between the way task 1.7 was executed and the other relevant tasks. Even though these meetings had primary a processual aim, some negotiations on content took place. A clear example of this can be found in the interaction with task 3.1 and 3.2 about leverage and strategy. UGOT stressed their case to be nested in a world-wide economic power structure and requested the overall analysis to include and address this. An overview of the interdependencies explored is provided in the following figure (4). Moreover, the interdependencies of task 1.7 compared to other tasks are described in table 1.

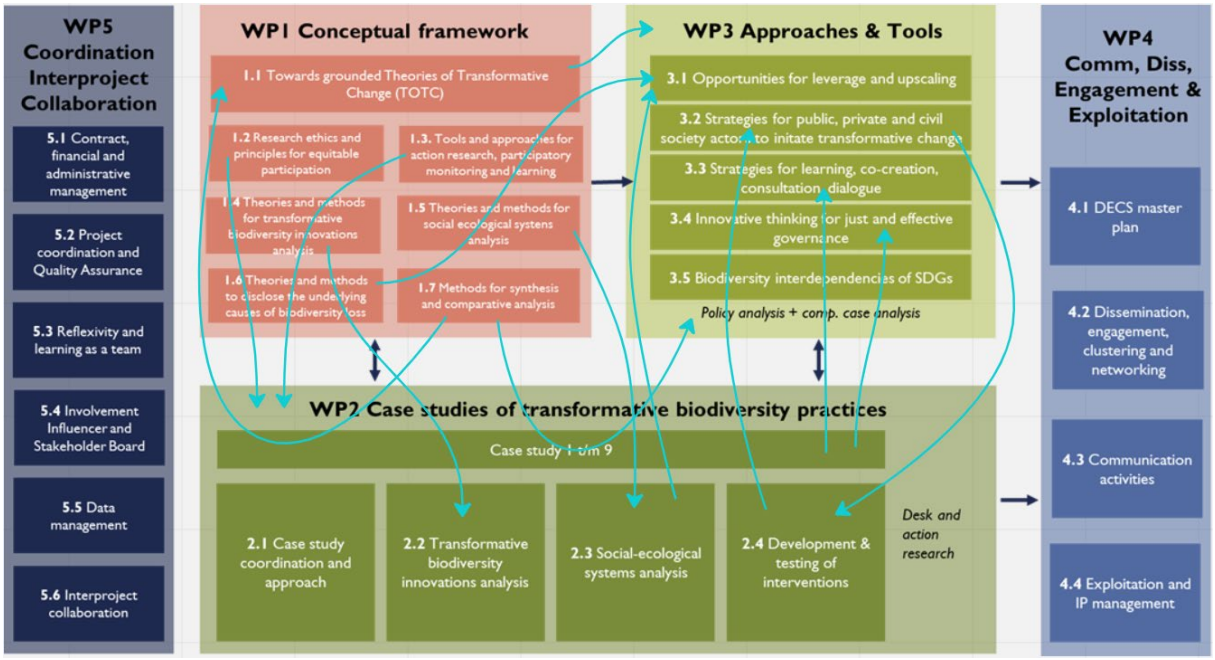

Figure 4 An overview of task interdependencies

The blue arrows in figure 4 are connecting the different tasks, have been drawn by consortium members on MIRO during an interactive work session.

We explored how the (desired) outcomes of different tasks are interdependent on methods for synthesis and comparative analysis. *Prior refers to tasks that inform the overall analysis and synthesis and we have therefore considered. Future refers to information that is conducted by task 1.7 which could guide and inspire future tasks. **The degree of interdependency is determined, where 0= no interdependency, +=some interdependency and ++=great interdependency.

Task	Description task	Prior vs future*	Degree of dependency**	Description of dependency	Result of bilateral meetings
1.1	Towards grounded theories of transformative change	Future	++	Task 1.7 is a major source of information for 1.1. The overall picture of 1.7 should be agreed upon.	
1.2	Research ethics and principles for equitable participation		0	There is no relevant overlap with task 1.2, but this should be part and parcel of the case analyses.	
1.3	Tools and approaches for action research, participatory monitoring and learning	Future	+	Could be relevant to compare which Methods have been used in the end. This is part of the proof or evidence the theory of transformative change will be build on.	
1.4	Theories and methods for transformative biodiversity innovations analysis	Prior	+	There should be a bit of alignment between cases results to facile cross case analysis and synthesis. Interesting to consider: the meaning of 'transition' and what is interpretated as 'failure and/or success'. Discuss: how to define what's innovative. Can grounded/emergent theories be applied here?	This has been discussed with WP2 leader (UNICT), will stay in contact to align.
1.5	Theories and methods for social ecological system analyses	Prior & Future	+	Discuss the methodological guidance that may impose academic thinking on social praxis. Discuss the overall approach of Task 1.7, because BC3 should be coproducing this deliverable.	The conclusion of this meeting was that the work on 1.7 and 1.5 seems well aligned. For the general analysis, we agreed that a more systematic approach can be especially relevant/useful for studying the high-impact sectors. The more 'personal' it becomes (or rather: the further away from the norm), the more variation of interactions and interpretations there will be. A more relational/grounded approach may be more appropriate here.
1.6	Theories and methods to disclose underlaying causes of biodiversity loss	Prior and Future	+	Discuss the limits of causation frameworks and how to go beyond them.	Meetings with CER have been taking place and are ongoing to align tasks.
WP2			0	No clear link between WP2 and task 1.7 has been made. Yet many activities WP2 activities include cross case analysis and synthesis.	-
2.1	Case study coordination and approach	Prior and Future	+	There is a potential overlap between T2.1 and T1.7 because of Deliverables 2.5 and 2.6 (D2.5 Analysis case studies, D2.6 Overall report of case studies of transformative biodiversity innovations)	Alignment between 1.7 and 2.1 is going well

					Attention to profound human-nature relationships (All) The UNICT team and the WUR team have found agreement on how the final analysis will be executed, and where the work of 2.1 ends and that of T1.1 and WP3 begins. Simultaneously the relation with 2.2 is discussed.
WP3	Policy analysis and comparative case analysis are at the heart of WP3	Future	++	Input from 1.7 could therefore be very valuable for the outline of WP 3.	Meetings with Luciane (CES) have been taking place to discuss how to incorporate power and narrative analysis in T 1.7.

Table 2 description of interdependencies between task 1.7 and other tasks.

2 Methodological account

To conduct this document, we made use of several methods including a literature review, workshops (divergence/convergence) to gain expert knowledge, and back-casting a theory of transformative change. These three elements of the methodology to develop the methodology of the cross-case analysis and across case synthesis are discussed below.

2.1 Literature review

For both the literature review on cross case analysis and synthesis as well as the workshop preparation documents, a literature review was conducted, where literature was collected via Scopus. Queries that have been used in the literature search can be found in the annex I.

2.2 Workshop preparation

Three workshops have been organized: on social-ecological relations, on power and on narratives. The preparation of the workshops aimed at formulating specific elements of analysis. These elements were derived from the project plan, from sector comparisons, and from literature on how to manage case study diversity. Below the elements are presented. They have been used to discuss the design of the workshop with those who were active in this task, and to write the workshop documents as input for the discussions.

Some preliminary ideas to compare and synthesize case results, based on our project plan:

- How each of the cases challenge the sector,
- How our four principles have been put in practice,
- Describing/defining biodiversity innovations,
- Discriminate context bound from generic power bound,
- Show pluralism or value pluralism,
- Deviations from European values or the importance of local values versus European ones as expressed in the SDGs,
- Role of local knowledge systems.

Sector comparisons between cases:

- Mapping power structures in the four high impact sectors,
- Behavioural patterns/culture (we could apply the concept of subject-formation here, on how the sector disciplines consumers),
- How the sector as a system regulates bio-innovations or sustains/pertains inequalities or creates marginalisation (intersectionality),
- Policy frameworks and governance models for nature inclusion and bio-innovations,
- Scale and (in)directness of drivers of biodiversity loss,
- Compare intersecting variables found in each case) societal, institutional, and community-level circumstances, e.g., laws, policies, healthcare providers, school systems, law enforcement, religious institutions, crime rates; that shape people's life experiences, opportunities and choices in different ways depending on their gender, race, socio-economic status, sexuality, geographic location),
- Regulatory policy frameworks for the high impact sector,
- What strategies are in use to counter biodiversity loss,
- Comparing Social Ecological Systems (SES) conceptualisations in the biodiversity innovations,
- Comparing direct and indirect drivers of biodiversity loss,
- What is common ground, what is local/contextual,

- Drivers across and within cases,
- Effects of European policies versus local policies.

Topic choice of the workshops

Preparation of the workshops departed from the following notions:

- The synthesis is directed to the goal of a nature positive society,
- Cases are primarily understood as a webs of relations and human-nauture entanglements,
- Power shift is the key to transformative change: it blocks or enables bio-innovations (the inclusion of other perspectives, knowledge, values, and identities and lifestyle innovations and change of behaviour due to changes in one's relation to nature),
- Power shift may also allow for making visible ways of interacting with the environment that are there since decades or generations, but are at risk to disappear because innovations in lifestyles and production are promoted,
- Power is observed and discussed from the (most) marginal perspective,
- Narratives (ideologies, logics, values etc) can be a key element of power that transforms.

These notions resulted in the following three topics for the workshops (Figure 5):

- Social Ecological System (SES) comparisons
- Power cross case analysis
- Values, knowledge, narratives, and realities comparisons

Below the relevance of the three topics is discussed.

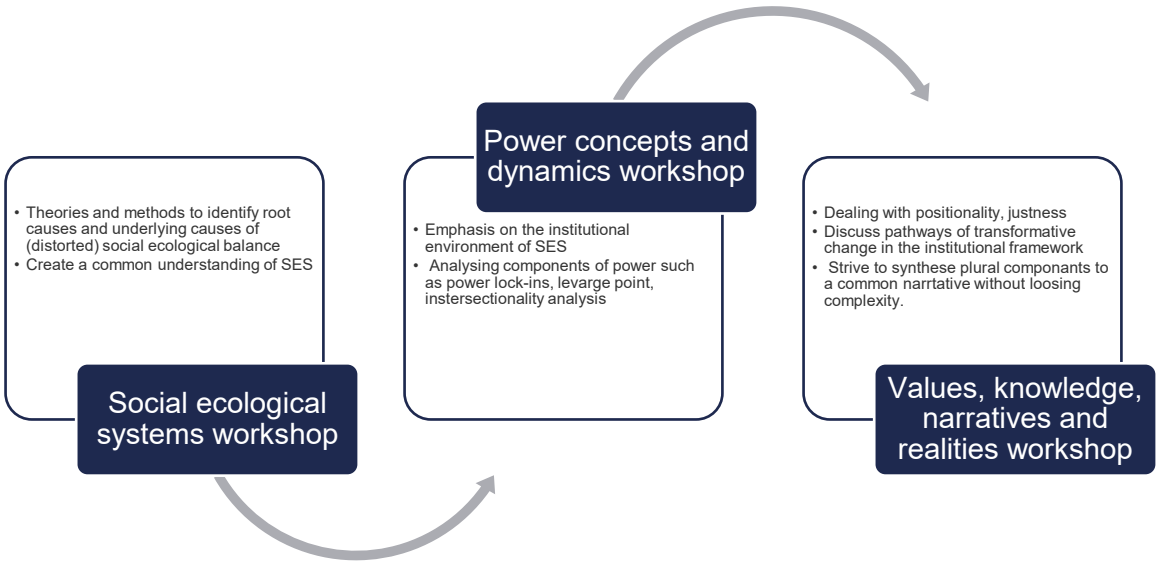

Figure 5 Co-creative process to compose methods for synthesis and comparative analysis

The SES comparisons entail the various relations between the social and the ecological that are relevant for each of the case studies, including underlying and root causes. This workshop is organized to achieve a common level of understanding what a SES is and how the SESs in the cases build up to the SES in the theory of transformative change.

Underlying subtopics and questions that derive from this topic are:

Synthesizing (bricklaying) bio-innovations and lifestyle innovations towards a picture of a nature positive society. Three types of innovations serve the purpose to build a common ground in order to cross-analyse the research with the partners.

- **Epistemological innovations**: paradigm shifts on how groups define their relationship (SES) with nature/planet earth,
- **Moral innovations**: how they justify their actions; how they judge moral issues in society,
- **Conceptual innovations**: how they conceptualize nature and what knowledge is used to understand the embedding of their actions in nature and society.

The power cross case analysis builds on the SES comparisons, and entails the institutional environment of the cases (the high impact sector as a system of privileges), intersectional analysis, power lock-ins, leverage points etc. For this we need a more or less common understanding of the concept of power.

Underlying subtopics and questions that derive from this topic are:

- Intersectionality analysis across cases: with what power structures the societal partners are confronted and how these structures interact to avoid innovations to become mainstream,
- Cross case analysis of power lock ins: derived from Intersectionality analysis,
- Cross case analysis of enablers/leverage points: derived from empowerment discussions/experiences.

The values, knowledge, narratives, and realities comparisons in the end builds on the power cross case analysis and deals with positionality, justness, and discusses pathways of transformative change in the institutional framework (e.g., by comparing how institutions function and how they should function according to the actors in the case). In this step we strive for a common understanding of transformative change and about documenting its pathways without losing its rootedness in complex systems.

Underlying subtopics and questions that derive from this topic are:
Synthesizing the pathways of transformative change (by combining innovation and power) needed for an inclusive and nature positive society:

- New pathways of lifestyle innovation and bio-innovations due to multiple power shifts,
- New pathways of lifestyle innovation and bio-innovations enforcing multiple power shifts and unblocking lock ins,
- Systems change pathways due to regulatory/financial/policy measures.

2.3 Back-casting the theory of transformative change

The activity of back-casting to get a sense of what is needed for the theory of transformative change has been done quite straightforward. At first, the practicalities of a theory of change have been drawn from The Multi Stakeholder Guide (Brouwer & Woodhill, 2015). Next the theory has been accessed using the platform of the Centre for Theory of Change, www.theoryofchange.org. On the internet we searched for famous examples of applying the theory of change, which we interpreted as theories of transformative change, because of their impacts. Lastly, we discussed the relation between narratives as component of a theory of change with theory of transformative change on biodiversity in the third workshop.

3 Literature review

To draw a TOTC, both cross case analysis and a case study synthesis are needed. These methods both have their characteristics, see table 2. Cases of BIOTraCes and the methodological expertise of partners have a great diversity that we must deal with and be aware of. For case-oriented approaches, we make use of the work by Khan & Van Wynsberghe (2008). The difference between what we consider as cross case analysis and across case synthesis is highlighted in table 2. We used literature to distinguish analysis from synthesis and to do justice to the diversity of cases in BIOTraCes.

Cross case analysis	Case study synthesis
Variable oriented	Case oriented
Process tracing Intersectional analysis	Framework analysis (Gale et al, 2013) Narrative analysis Common typologies as clusters of phenomena
De-contextualisation: factors, agencies, mechanisms, lock-ins etc	Re-contextualisation: connecting mechanisms to the narrative
Production and accumulation of knowledge by comparing and contrasting cases in search of commonalities/mechanisms (nomothetic generalizations)	Production and accumulation of knowledge by taking the essence of one case (the narrative) on board when analysing subsequent cases and creating typologies (idiographic generalizations)

Table 2 Characteristics of a cross case analysis and a case study synthesis.

Below we explored further insights from literature on the elements of analysis and synthesis as mentioned in table 2.

Cross-case analysis

A cross-case analysis could be variable oriented, which implies this type of analysis to be reductionist due to data reduction. The case study synthesis is more holistic, attempting to address case studies in a contextual manner with its focus on narratives. The cross-case analysis can feed into the case study synthesis.

Through the concept of Intersectionality, we may see how power is not monolithic, but operates along various axes, including race, class, gender, sexuality, ethnicity, nation, ability, and age operate as reciprocally constructing phenomena. Intersectionality can help to address diversity and complexity in systems, wherein inequalities are sustained by specific forms of knowledge and social categories. On the intersectional analysis Hill Collins (2015) distinguishes three interdependent sets of concerns:

- An analysis that is situated within the power relations that it studies,
- An analytical strategy that provides new angles of vision on social phenomena,
- A critical praxis that informs social justice projects (how practitioners use intersectionality, often not called intersectionality).

The cross-case analysis will be looking for contrasts and commonalities, leaving out many of the case specific details. This, of course, is a necessary step to reduce complexity, but should not become some sort of cultural essentialism (Grillo, 2003). This would imply a simple picture of minority and majority populations, resonating political and media rhetoric (Grillo, 2003). In the cross case analysis at least a multi-institutional politics approach is needed, to keep track of the diversity of power manifestations (Armstrong & Bernstein, 2008).

Across case synthesis

In figure 6 below various methods of case study synthesis are indicated.

TABLE 1. RELEVANT CASE STUDY SYNTHESIS METHODS (ADAPTED FROM [4] [6]).

Synthesis method	Description	Strengths	Challenges
Case survey [16][17]	Formal process for systematically coding relevant data from a large number of case studies for quantitative analysis, allowing statistical comparisons across studies. Study findings and attributes are extracted using closed-form questions for increased reliability, while survey analysis methods are used on the extracted data. The resulting dataset is used to construct cross-case matrices or summary tables.	• Can incorporate diverse evidence types. • Can cope with large numbers of primary studies. • Could be used for theory-building.	• Applicable to outcomes, but less adequate for process. • Lacks sensitivity to interpretive aspects of evidence
Qualitative comparative analysis (QCA) [27]	The qualitative comparative analysis method is a mixed synthesis method that analyzes complex causal connections using Boolean logic to explain pathways to a particular outcome based on a truth table. The Boolean analysis of necessary and sufficient conditions for particular outcomes is based on the presence/absence of independent variables and outcomes in each primary study	• Transparent. • Can incorporate diverse forms of evidence. • Allows competing explanations to be explored and retained and permits theories about causality. • Does not require as many cases as the case survey method.	• Focused on causality determination, not interpretive aspects of qualitative data.
Cross-case analysis [19][20]	Includes a variety of devices, such as tabular displays and graphs, to manage and present qualitative data. It includes meta-matrices for partitioning and clustering data in various ways. Evidence from each primary study is summarized and coded under broad thematic headings, and then summarized within themes across studies with a brief citation of primary evidence. Commonalities and differences between the studies are noted.	• Highly systematic method. • Potentially allows inclusion of diverse evidence types. • Could be used for theory-building.	• Can be seen as unnecessarily and inappropriately stifling interpretive processes.
Thematic Synthesis [5][31]	A method for identifying, analyzing, and reporting patterns (themes) within data. It organizes and describes the data set in rich detail and interprets various aspects of the research topic. It can be used within different theoretical frameworks, and it can be an essentialist or realist method that reports experience, meanings, and the reality of participants. It can also be a constructionist method, which examines the ways in which events, realities, meanings, experience, and other aspects affect the range of discourses.	• Flexible procedures for reviewers. • Copes well with diverse evidence types. • Could be used for theory-building.	• Lack of transparency. • Largely descriptive/data-driven basis to groupings.
Narrative synthesis [25]	A defining characteristic of narrative synthesis is the adoption of a narrative (as opposed to statistical) summary of the findings of studies. It is a general framework of selected narrative descriptions and ordering of primary evidence with commentary and interpretation, combined with specific tools and techniques that help to increase transparency and trustworthiness. It can be applied to reviews of quantitative or qualitative research as individual tools and techniques can be selected according to the type of study design and data included in the review.	• Can cope with large evidence base, comprising diverse evidence types. • Flexibility. • Can be used for theory-building.	• Lack of transparency. • Many variants and lack of procedures/standards. • May be dependent on prejudices of reviewer.

Figure 6 Various methods to perform an across-case synthesis

Adequate synthesizing methods for BIOTraCes seems to be working with typologies and a framework analysis.

Typologies

Typologies can be seen as clusters or families of phenomena. They share a specified combination of factors/mechanisms, not necessarily related by cause, neither mutually exclusive. Typologizing can

support the construction of theory by identifying subclasses, pathways, root causes of a major phenomenon (Khan & Van Wynsberghe (2008). Another way of theory construction deals with de-contextualization, bracketing essential elements and components across cases, and subsequently putting them back into the social context.

Framework Analysis

Framework Analysis is a well-recognised qualitative analysis method for applied research. It offers a transparent and systematic process that allows for identification of patterns between cases without losing the contextual details that could be missed if data were pooled.

Cross case analysis is then built up in stages:

(i) applying a data extraction template and thematic coding of data

(ii) developing a matrix of themes within cases and across cases variable by variable

(iii) development of an overarching thematic framework(s) that provides a representation of the whole data set and cross-cutting themes.

This is likely to involve an iterative process as themes are identified, grouped, and categorised and analytic interpretations built across the included case studies. The final stage is production of a narrative account of the synthesis results presented according to the final framework and major thematic categories. Categories for reporting can be like: purpose and approach; what works – what supports; and outcomes. (Hardoon et al, 2021).

Framework analysis can affect trust relations. When one does research in the field, he establishes deep, trustful personal relations with people, and these relations and situated forms of knowledge are at the core of his understanding and analysis. They are not simply data that could be extracted as an objectified corpus and putted in a qualitative data analysis program to be processed. The possibility of framework analysis is given here, as a method to consider, but only with the utmost care.

Below, in figure 7, some more differences between synthesis and analysis are explained.

TABLE 2 - DETAILED DESCRIPTION OF THEMATIC, CROSS-CASE AND NARRATIVE METHODS OF SYNTHESIS

Thematic Synthesis	*Cross-Case Analysis*	*Narrative Synthesis*
Purpose: Progressive theming to form a chain of reasoning.	**Purpose:** Progressive tabling to form a chain of reasoning.	**Purpose:** Progressive linking to form a chain of reasoning.
Data Sources: Findings and interpretations of existing studies and relevant theory.	**Data Sources:** Findings and interpretations of existing studies and relevant theory.	**Data Sources:** Findings and interpretations of existing studies and relevant theory.
Data Collection: Purposive sampling	**Data Collection:** Purposive sampling.	**Data Collection:** Convenience sampling.
Process: Constructing interpretations	**Process:** Constructing interpretations.	**Process:** Bridging summaries.
Product: Conceptual maps and interpretations	**Product:** Interpretations across case studies.	**Product:** Logical rationalizations.
Steps Description [5]	**Steps Description [19]**	**Steps Description [25]**
Extract data: Extract data from the primary studies, including bibliographical information, aims, context, and results.	**Data Reduction:** Process of selecting, focusing, simplifying, abstracting and transforming the results from studies.	**Developing a theoretical model of how the interventions work, why and for whom**: Inform decisions about the review question and what types of studies to review.
Code data: Identify and code interesting concepts, categories, findings, and results in a systematic fashion across the entire data set.	**Data Display:** A display is an organized, compressed assembly of information that permits conclusion drawing and action using a "tool-box". The "tool-box" includes un-ordered, site-ordered, and time-ordered meta-matrices, scatterplots, and cause and effects graphs or networks	**Developing a preliminary synthesis:** To organize findings from included studies to: describe patterns across the studies in terms of the direction or size of effects; to identify and list the facilitators and barriers to implementation reported.
Translate codes into themes, sub-themes, and higher order themes.	**Conclusion Drawing and Verification:** From the start of data collection, the qualitative analyst is beginning to decide what things mean – is noting regularities, patterns, explanations, possible configurations, causal flows and propositions. Conclusions are also verified as the researcher proceeds, The meanings emerging from the data have to be tested for their plausibility, their sturdiness, their "confirmability" – that is, their validity.	**Exploring relationships in the data**: To consider the factors that might explain any differences in direction and size of effect or facilitators and/or barriers to successful implementation across the included studies; To understand how and why interventions have an effect.
Create a model of higher-order themes: Explore relationships between themes and create a model of higher-order themes.		**Assessing the robustness of the synthesis product:** To provide an assessment of the strength of the evidence for drawing and generalizing conclusions to different population groups and/or contexts.
Assess the trustworthiness of the synthesis: Assess the trustworthiness of the interpretations leading up to the thematic synthesis.		

Figure 7 Methodological differences of an analysis and a synthesis

This information has been used in the workshops, to tailor the methodology towards the set of cases and the frameworks that are common and reliable.

4 Workshops

Three workshops have been organized: on social-ecological relations, on power and on narratives. For each of them a document describing several options for the analysis and synthesis has been prepared. They are given below. For each workshop the preparatory document is given, followed by a concise account of the workshop discussion.

4.1 Workshop 1. Social Ecological Systems

Introduction

We live in an era where humans are a determining factor for how the environment is shaped. Economic and political structures are the main factors influencing the structure, quality and functioning of the world' ecosystems. The current communities, economies and cultures are embedded in the

biosphere and transform it at every scale; this is called *the Anthropocene*. The way humans change the ecosystems are unsustainable, so a revision of the paradigms that are in place until now is required. One school of thought to achieve this revision, is the Social Ecological System (SES) thinking. In SES, the biosphere is valued as a precondition of social justice, economic development, and sustainability. In this sense, the socio-ecological systems paradigm allows an approach to the understanding of complexity and the adaptive management of systems to ensure the sustainability of life on the planet (Reyers et al., 2018). Connecting for a nature inclusive society, BIOTraCes' slogan therefore fits perfectly in the social ecological system paradigm.

The workshop took place on the 26th of September meeting of Task 1.7. It explored some avenues on how SES thinking can be taken on board in BIOTraCes and which SES types are most appropriate, given the wide variety of case studies.

Challenge and dilemma for BIOTraCes

SESs are both embedded in the social, as well as the environmental sciences. In the large amount of literature studies on the social dimension of resource and environmental management, most studies have limited themselves on studying processes within the social domain, leaving the proper investigation of the ecosystem out of their studies. In these social studies, lies the assumption that if the social system performs well, it will also manage the environmental resource in an adequate way (Folke, 2006). According to Smit & Wandel (2006), the social system may show great ability to cope with change and adapt where necessary, but this great adaptation may at the expense of changes in the capacity of ecosystems to sustain the adaptation. But we can argue here that the distinction between social and environmental realms is an arbitrary one. We might say that the environment emerges along with the more-than-human communities who dwell therein? Then the subject of the analysis would be the complex array of relations (political, storical, economic, etc..) that we call 'environment'.

The main focus of BIOTraCes is to find ways to empower ideas and initiatives that may contribute to a nature positive society, but which society fails to do justice to. According to those in power positions in the high impact sectors, they are deemed irrelevant, emotional, unrealistic and so forth. The cases BIOTraCes studies, are examples of citizens or communities that have and want to build towards a different relationship with nature in contrast with business as usual. This may imply that they also may have deviant perspectives on causes of biodiversity decline or on understandings of what is good for nature.

Two problems arise here that challenge the partnership of BIOTraCes. The first one is about hysteresis (more than one steady state of local ecosystems possible) effects and the second on framing of biodiversity loss. We must acknowledge that many SES conceptualisations and models try to account for the loss of nature. It is assumed that if pressure factors are relieved or removed, nature will recover to its previous state. But an ecosystem can have more than one steady state and taking away a pressure factor does not necessarily lead to process-inversion. Moreover, nature positivity may be completely different from preventing nature loss or ecological restoration. Nature positivity may stimulate natural processes with unknown outcomes[2], whereas restauration and protection are bound to the nature we already know and value. The second problem concerns the knowledge that is used to judge or assess the ecological implications of a bio-innovation. If this is done with the knowledge that underpins the business-as-usual practices of dealing with nature, this will probably not lead to a justifiable outcome to the bio-innovation. Academic knowledge resonates the power structures inherent to biodiversity issues. We must be aware of that and look frankly and open to what other perspectives can deliver for a nature positive society.

Having said this, immediately a dilemma surfaces. BIOTraCes results should find their way into the biodiversity science policy interface (SPI) and if the outcomes are seen as irrelevant, emotional, and unrealistic, the project fails. A practical solution might be that the cases deliver new insights and

[2] You may consider the development of a food-forest as a nature positive alternative to traditional agriculture, intended to work with nature instead of against. It's outcome in terms of biodiversity may deviate fundamentally from a forest nature reserve.

ingredients of a nature positive society, that however may not become immediately implemented into biodiversity policies. The Theory of Transformative Change together with a strategy to inform the biodiversity SPI could 'translate' the findings into recommendations for new policies.

Defining SES

In literature the following definition of SES was found:

> *' A concept used in a variety of analytical approaches intended to examine the relationship between people and nature as inter-linked, recognizing that humans should be seen as a part of, not apart from, nature, and nature as inter-linked to social systems.'* (Ostrom, 2009).

IPBES (2023) uses the following more elaborate definition, which is also adopted by BIOTraCes as definition of a SES.

> *'Social-ecological systems are complex adaptive systems in which people and nature are inextricably linked, in which both the social and ecological components exert strong influence over outcomes. The social dimension includes actors, institutions, cultures and economies, including livelihoods. The ecological dimension includes wild species and the ecosystem they inhabit' (IPBES 2023).*

These definitions are based on theoretical thinking, while some cases might interpret the SES of their case study differently.

Avenues for SES

There are some rather fundamental choices we can make to conceptually align our ways of thinking on social ecological relationships in our cases, without the need to use exactly the same model through all cases. They represent a focus on:

- A SES approach that can incorporate grounded theory on all sorts of relations between the social and the ecological,
- A SES approach that is based on a holistic view of nature, often present in bio-innovations, and that gives a counterweight to a technical and reductionist approach,
- A SES that does not look from the social to the ecological or vice versa, but one, based on system theory, that focuses on that relationship in terms of reciprocity,
- An approach that resonates with the SES thinking in the biodiversity science policy interface.

Below we will discuss the feasibility of these avenues, based on literature, with the aim to develop some options that may serve as input for the workshop. In concordance with the avenues, we will discuss grounded theory and SES, holistic SES, reciprocal SES and SPI-SES. In doing this we will build on task 1.5. The information provided here Is still rather limited, but hopefully enough to facilitate a deep discussion on options to choose and how these relate to the Theory of Transformative Change.

Grounded theory and SES

One of most extensively cited and empirically applied conceptual frameworks for analysing SESs is the social-ecological system framework (SESF), an interdisciplinary diagnostic tool for the study of

complex SESs designed by Ostrom (Ostrom, 2007, 2009). Ostrom's model is characterized by a flexible structure, that can be combined with grounded theory. Based on decades of research on common property governance, the SES framework suggests that social-ecological outcomes such as sustainability of a resource system are a function of the complex interactions among the diverse social and ecological components of that system (Vogt et al., 2015). SESF is associated with other concepts in the broader SES discourse, including other theories, concepts, and frameworks, such as ecosystem services, resilience, and a variety of other environmental governance theories, including multilevel governance, polycentric governance, and adaptive co-management (Partelow, 2018).

Ostrom developed the SESF to improve how case study data is reported and it can be used for cross-case comparisons. With the data and results from SESFs work, the SES theory can be enhanced and improved. The SESF consists of six groups of variables that can be used to characterize the Users, Resource System, Resource Units, Governance System, Interactions and Outcomes of SES (figure 8) (Ostrom, 2009). Ostrom's framework can be used to specify which variables constitute and characterize their cases, and/or which variables explain outcomes in the cases (Villamayor-Tomas et al. 2020). This framework could be useful for analysing and synthesising the different case studies in BIOTraCes, herewith contributing to a Theory of transformative Change.

SESF does not have a standardized set of procedures or a strict methodology to apply when studying a SES. Nagel & Partelow (2022) argue that although the SESF provides a uniform set of variables, it does not indicate any of the other necessary steps for a robust scientific study. Therefore, the SESF is not a method itself, it rather is a theory-derived conceptual guide for focusing the methods a researcher does choose on a set of variables that have previous empirical support in shaping commons, institutional development, and change, and/or collective action outcome. In certain studies, this 'free' methodology is desired, since it allows for flexibility in how different methods are adapted for different contexts. However, this has its disadvantages as well, as it has led to heterogeneous applications and is challenging when designing a coherent set of data collection and analysing methods across cases (Nagel & Partelow, 2022).

Another critique on the SESF is neglecting the ecological perspective in the framework: the way SESF is initially built excludes ecological theories and models, thereby limiting its ability to fully grasp the joint social-ecological outcomes and human-environment problems. This problem exists because Ostrom based the interdisciplinary framework on a general game theoretic model of institutionally mediated choice, which implies that all outcomes in SESs can be understood in terms of social processes and human decisions, and that ecological processes matter only in when they present a collective-action problem related to the collection and processing of information (Vogt et al., 2015).

Several studies (Binder et al., 2013; Epstein et al., 2013; Nagel & Partelow, 2022; Vogt et al., 2015)argue that ecological processes are very important to consider when studying SES and thus should be incorporated more in the framework. Ecological processes can yield different results despite similarities in the outcomes of social processes (Vogt et al., 2015).

Vogt et al. (2015) argue that we need to explicitly recognize that SES outcomes are coproduced by social systems in which choices are made, as well as an ecological system with dynamic natural processes that mediate the effect of those choices. SESF still is a promising tool for analysing SES, especially when it incorporates ecological theory and practices.

Epstein et al. (2013) made an attempt to improve the SESF thus added ecological rules and amended the framework in a way that it recognized ecological processes as important as social processes. These amends make the framework more complex, while the SES are already quite complex to study, but do also create more links within the system that can be studied.

Partelow (2018) proposes that the framework can be used in separate modified versions for specific resource use sectors (e.g., forestry, fisheries, food production, etc.), and a general framework would aggregate the generalizable commonalities between them|. He argues a benefit of Ostrom's

framework has been its flexibility to adapt, allowing a “welcomed pluralism” of methods, data, and associated concepts. However, pluralism creates challenges for synthesis, data comparison, and mutually agreed-upon methods for modifications.

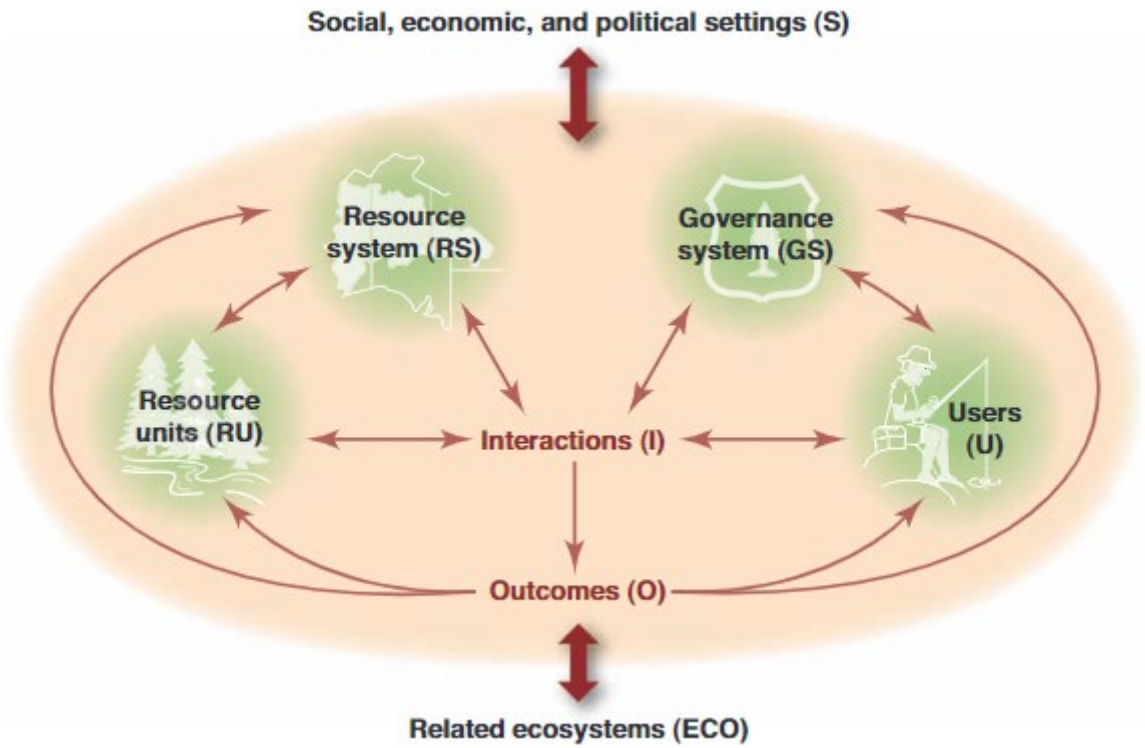

Figure 8 The core subsystems of Ostroms' SESF (Ostrom, 2009)

Holistic SES

In BIOTraCes, we want to move to an inclusive and nature positive society. To study this movement, it is important to understand how people in the case studies currently relate to nature. There are several frameworks available for analysing human-nature relationships through a social science lens, such as: Biophilia & Human-nature connections (HNC), Place identity and emergent alternatives to system thinking such as other-than-human approaches, including, e.g. multispecies ethnography and multispecies environmental justice, Amerindian perspectivism, ecologies of repair and landscape Berriane et al., 2021). These are explained more elaborately in task 1.5.

The human environment system (HES) also shares great overlap with the social ecological system. Human activities affect the ecological system through actions in an intended or unintended way and in the short and long run. Feedback through environmental awareness and environmental changes to human actions is conceptualized in the short and long run. Concept of sustainability learning HES is applicable on any scale. However, it makes sense to have a complex system in which different social and ecological hierarchical levels are involved.

Reciprocal SES

To ensure a quality of life on earth, transformation towards sustainable living is necessary. In the sustainability science, socio-ecological systems have been studied to achieve this transformation. The clear interlinkages between social and ecological challenges are shifting the paradigm for the type of research and societal change needed to achieve short- and long-term sustainability studies on SES are evolving to reflect this recognition, proposing inter- and transdisciplinary research agendas with

distinct pursuits (Partelow, 2016). Different frameworks are available in the sustainability sciences, such as: Sustainable Livelihoods Framework (SLF), MA framework, IPBES Conceptual framework, Plural values framework, Social and ecological resilience framework and the Leverage points (LP) framework. These frameworks are discussed in task 1.3.

Research on SES is distributed over multiple disciplines and perspectives. Consequently, a lot of the collected knowledge in different SESs is not easy to compare, synthesise and communicate to non-specialists, despite common goals of these studies to use academic knowledge for advancing sustainability (Partelow, 2016). Because both ecology and society matter for the sustainability of SESs, one needs a systematic approach to evaluate the effects of ecological and social processes and their interactions. Multiple frameworks realise this systematic analysation exit. To compare with other possible frameworks a comparison by Binder et al. (2013) was used. They discriminated studies on the effect of the social system on the ecological system, the effect of the ecological system on the social system, or on understanding the reciprocity of both systems.

SPI-SES

IPBES has created a conceptual framework (CF) that was approved by the IPBES Second Plenary and built on the work of earlier IPBES' conceptual frameworks and the Millennium Ecosystem Assessment. The IPBES CF is a highly simplified model of the complex interactions between the natural world and human societies that are most relevant to IPBES's goal. However, it is a general integrative framework, thus not only applicable for IPBES work, and can be used by researchers and knowledge-policy communities that focus on the links between people and nature. IPBES proposes its CF as innovative because: "It has been constructed in a transparent, inclusive, and participatory manner, through multidisciplinary workshops and open review by a broad range of countries and stakeholders over more than two years. Secondly, it explicitly embraces different scientific disciplines (natural, social, engineering sciences), as well as diverse stakeholders (the scientific community, governments, international organizations, and civil society at different levels), and their different knowledge systems (western science, indigenous, local and practitioners' knowledge)"(Díaz et al., 2015).

The CF includes six primary interlinked elements (or components) representing the natural and social systems that operate at various scales in time and space: nature; nature's benefits to people; anthropogenic assets; institutions and governance systems and other indirect drivers of change; direct drivers of change; and good quality of life. The CF connects to the Driver, Pressure, State, Impact, Response (DPSIR) framework. The DPSIR framework was created in 1999 to report and analyse and report environmental problems, ranging in scale from local to global. The DPSIR framework is framework is an extension of the PSIR framework to develop a better understanding on the impacts of human activities on the environmental system, along the causal chain: drivers-pressure-state-impact-responses (Eurostat, 1999).

The framework has been used by international organizations to evaluate sustainable development activities to improve our understanding of barriers to sustainability and overcome them. It originated in the natural sciences, specifically integrated environmental assessment, and bases itself on systems science. This framework is policy oriented and allows for categorizing a problem domain (Binder et al., 2013).

An issue that occurs when working with DPSIR is that it cannot address the impact of aggregated, informal responses on the drivers and pressures related to environmental problems and sustainability challenges. This is caused by the structure of the framework in which an unacknowledged hierarchy of actors is created, whereby existing inequalities between actors and stakeholders within current approaches of development work are reproduced (Carr et al., 2007). (Gari et al. (2015) propose several recommendations that could be done to improve the framework when decided to work with it.

This critique is shared by (Svarstad et al., 2008), that moreover claim that the problem with the framework is the lack of efforts to find a satisfactory way of dealing with the multiple attitudes and definitions of issues by stakeholders and the public. Therefore, good communication between

researchers, on the one hand, and stakeholders and policy makers on the other has not yet been established.

SES options for BIOTraCes

The four SES avenues have now been explored and discussed with the help of scientific literature. The comparisons entail the various relations between the social and the ecological that are relevant for each of the case studies, including underlying and root causes. This leads to a level of understanding what a SES is and how SES divergence in the cases build up to the SES in the ToTC. With the various models found in literature, our avenues can now be transformed into options. These options can serve as a focus of discussion about a first level of conceptual alignment of the case studies that treats them as a family.

Click or tap here to enter text.

Avenue	Grounded theory	Holistic	Reciprocal/system	IPBES
Applicable SES Framework	SESF Ostrom 2007, 2009	HNC/HES Scholz and Binder 2004, Scholzet al. 2011a	Plural Values/Social and Ecological Resilience https://www.frontiersin.org/articles/10.3389/fevo.2021.609853/full Rocha et al, (2020); https://www.science.org/doi/10.1126/science.1144004	IPBES-CF/DPSIR Eurostat 1999, Carr et al. 2007, Svarstad et al. 2008
Conceptualization of the social system and its dynamics				
Conceptualisation of social system	The social system is composed of resource users (actors) and the governance system that influences the actions of the users by defining rules as well as monitoring and sanctions mechanism	The social system is conceptualized based on decision making theory to analyse human actions and learning and feedback processes at and between different hierarchical levels of the social system. The decision-making process includes: goal formation, strategy formation, and strategy selection, all of which are based on preferences and different degrees of environmental awareness.	Systems of plural values (relational, moral and held values) of biodiversity (distancing from commodification); Social resilience	The social system is conceptualized as the aggregated socioeconomic processes/variables in particular drivers and responses

Social scale	Includes all hierarchical levels	Includes all hierarchical levels	Focus on governance	Decision makers
Interaction type	Macro<> Micro	Macro<> Micro	From micro to macro (leverage)	Macro
Dynamics	Conceptualized textually by several variables such as “information sharing,” “deliberation processes,” and “self-organization activities” grouped under the label “interaction”	Learning processes and interferences between and within different levels of the social system are the drivers of the dynamics	Distinction of shallow and deep leverage points	Social dynamics are not conceptualized
Conceptualization of the environmental system and its dynamics				
Conceptualization of the ecological system	The ecological system is conceptualized from an anthropocentric perspective as resource system, e.g., water, forest, and corresponding resource units, e.g., water quantity, tree	The ecological system (environment) is conceptualized from an anthropocentric perspective as the coupled system to the social system. An HES analysis is problem oriented and typically departs from the ecological system. Tools such as MEFA can be used for conceptualizing the ecological system.	In coupled human and natural systems, people and nature interact reciprocally and form complex feedback loops.	Conceptualizes the ecological system (environment) from an anthropocentric perspective. It considers aggregated ecological processes and variables and differentiates into state and impact variables.
Social scale	Local and regional scale	Can be applied at any scale; favors regional, national scale	Can be applied at any scale	Can be applied at any scale
Interaction type	The ecological system could potentially be studied at any scale. Interactions between scales are named but	Interaction between scales might be included, but not explicitly foreseen	Resilience, feedback loops, thresholds, non-linear effects, legacy effects, time lags.	It does not consider the interaction between the spatial scales

	not further conceptualized			
Dynamics	The dynamics are considered by several variables (natural language descriptions) of the resource system and resource units such as growth rate, equilibrium properties, and productivity	Dynamics of the ecological system are not explicitly mentioned, but the understanding of the ecological system stands out front in this framework; feedbacks within ecological system can be analysed in form of stocks and flows	SES are human and natural coupled systems where people interact with biophysical components; they often exhibit nonlinear dynamics, reciprocal feedback loops, time lags, het-erogeneity and resilience	The dynamics are addressed implicitly through measurement of the state of the environment over time

Table 3 Based on interpretation and on the work of Binder et al. (2013)*, a table was created to easily compare the various models and methods.*

Key workshop questions

Question 1: "Which avenue resonates best with your case? And why?"

Question 2: "Which of the frameworks can be used to generalize across case outcomes?" And why?

Question 3: "Which of the framework suits the overall objectives of BIOTraCeS best?" And why?

In preparation of this workshop, we asked all participants of the workshop to carefully read this document and discuss it with their case-study teams.

4.2 Workshop 1. SES: Results

Date: September 26th
Attend by: Zoë van Eldik (Facilitator), Roel During (host), Amy Wortel (Note taker), Rosalie van Dam, Audra Balundé, Oscar Jacobsson, Bàlint,, Luciane, Domenico Pappalardo, Zsolt Molinár, Ruxandra Malina

Introduction

This workshop explores some avenues on how SES thinking can be taken on board in BIOTraCes and which SES types are most appropriate, given the wide variety of case studies 4 different frameworks for analyzing SES were proposed. During an interactive workshop of 1.5 hours the following three questions were discussed:

Question 1: "which part of the literature resonates most with you case? And why?"

Question 2: "Which of the collected elements can be used to generalize?" And why?

Question 3: "Which frameworks can foster unique outcomes of each case (plurality)" And why?

Answers and feedback to these questions are described below.

Energizer

To invite people to think about SES, the workshop started off with an energizer, where participants could share what comes to mind when they think about SES. The answers reveal some unsatisfied feelings with SES, for example: 'ongoing exclusiveness' and 'Incompleteness' (Figure 9). These

Figure 9 First associations with SES of participants

feelings were kept in mind while further discussing the different frameworks that were proposed in the preparation document.

Literature in relation to each case

In the first part of the workshop, we discussed *Question 1: "which part of the literature resonates most with you case? And why?".* Participants expressed their preferences for a framework that they thought was suitable for their case. They could choose from SESF, HNC/HES, Social and ecological resilience and IPBES-CF/DPSIR. A participant expressed that frameworks are not fully comparable, as they are independent, but during the workshop we still tried to extract what framework would fit their cases best.

In general, there was quite some variation in the preferences for one of the frameworks. This was based on the familiarity with the frameworks and the different focuses of the frameworks on either the social or ecological concept, or both. A participant justly concluded: "*dualism is hard".*
Besides, a participant expressed that all SES frameworks are incomplete, and it depends more on the thoughts you have behind the use of a concept: "To use it correctly, you should use a complexity thought"

SESF

Some preferences for SESF were expressed. One participant expressed that they are most familiar with working with grounded theory and in their case, they need to get to know the communities and

Themselves as researchers. Therefore, SESF fits well because grounded theory suggests that we can get to know the situation. Others expressed that they like the framework, although there might not be sufficient room for ecology in there, so it would not fit their case.

HNC/HES

Regarding HNC/HES, it was expressed that this framework could be interesting because there is room to shed some light on the social demographic and inequality.

Social and ecological resilience
This framework is preferred by some of the participants because of its capability to cover plural values, governance systems and policy aspects, that are a focus area in their cases. Moreover, the framework resonates with their case because it refers to capacities to communities and individuals to react on disruptiveness of the natural environment, as well as promoting sustainable practices through our communication Lastly, the framework is valued for the applicably across scales, the spatial thinking, and its eco-centric approach. By this approach the framework distinguishes itself from the other frameworks.

IPBES-CF/DPSIR

This framework was perceived suitable for their cases by most of the participants and most are familiar with the framework. Although it is anthropocentric, it was praised for its flexibility, the simplicity to **work with and because it allows for inclusive ideas on human nature relationships, which could allow for different interpretations of the case studies.**
IPBES is preferred over DPSIR, because it is more usable in a changing system than DPSIR, and IPBES incorporates plural values, while DPSIR is too linear.

Frameworks for generalization

The second question we asked the participants was: “What frameworks are usable for generalization? *And why?”*. One participant shared their struggle to answer this question: “We are sharing insights for the need for the plurality of values of our cases, at the same time we want to generalize. That is not a contradiction, just a tension. Despite the struggle, this is a question that needed to be answered in some way to proceed, no matter how different each case is.

After some discussion on the question itself, there was an agreement on selecting elements that are generalizable, instead of choosing one framework together, as all frameworks have limitations and are not comparable. These chosen elements should not be complicated; they should be what we want to achieve together and what aspects we want to combine/synthesize and compare. By this, a consensus on our ways of working is created to make sure all voices are heard.

SESF

On SESF, someone mentioned that it may be difficult to guarantee comparability.

IPBES-CF
A handful of participants agreed that this framework is the easiest to be used. It allows for natural plurality in generalizing our cases and is very flexible.

However, someone expressed it is important to consider that maybe real power structures might not be visible through this. Therefore, we should adopt our approach to fit into this framework.

- ➔ For discussion: Interrogate what is transformative about IPBES (but also ask this for the other frameworks!)

Frameworks fitting the objectives

The last question of the workshop was as follows: *Question 3: "Which frameworks can foster unique outcomes of each case (plurality)" And why? // What frameworks fit the objectives best?*

During the last question, the discussion shifted from answering the question to a conversation on the way we are constructing task 1.7 currently:

One participant shared that they are pleased to notice we are thinking about the whole more instead of focusing on our case, they expressed this is a good development that possibly brings them one step forward towards ownership of the whole. Another participant mentioned that we can adapt different ways to set up SES, if we all have the same framework on our minds. Therefore, we need to choose the framework that fits best to the whole group of perspectives. Questions we need to ask in relation to these frameworks are:

- How are people creating lock-ins,
- What are causes of Biodiversity loss.

Issue of task 1.7

One participant expressed that they feel there is a problem: "Maybe there was a mistake defining this framework before the project; now we are trying to put the cases into a frame, but people are not comfortable with this; with the theoretical or methodological aspects. Because there might be absence of knowledge about this framework. I really think we should have thought about choosing the framework before. SES was introduced later than the project plan and I am not sure everyone is comfortable with a common perspective of SES. (…) Related to 2.4, it feels like we are producing two different comparing methodologies. So: 2.4 cannot exist solely next to 1.7; they should work together."

Final considerations

The knowledge among the group variates so it was good to have this workshop. Even though we are talking about complex theories, we had a fruitful discussion.

The essence, which I did not mention before, is that we must transform the IPBES framework. We should change it in such a way that it includes perspectives, logics and values that have until now been marginalised. This may take a totally different route than the normalized human-nature relationships how IPBES has described it. We could do this while working with all four proposed frameworks.

Theories are just providing a helping hand to perform case studies, but the most important thing in your case study is to listen and find out how people's perspectives work out and in what power struggles they end up in. So, what I heard and really liked: How does each of the case study and systems contribute to transformativity. Let's keep in mind what we would like to achieve with the collection of cases; we are not looking at individual cases! Each case will shed a light on what a nature positive society can entail.

Don't think we are trying to create a cage to work in, this is not our intention.

4.3 Workshop 2. Cross-analysing power

Introduction

'Unpacking power' is an important and sometimes intimidating component in relation to transformative change. The concept of power has been debated by many philosophers and scientist in the past and present (Avelino 2021). But despite its contested definition, its very existence in social relationships, whether cultural, political, economic, or ecological, cannot be denied.

This document offers an inventory of potential conceptualisations of power. This is done presenting academic theories on how power works, how power can be perceived and how power can (potentially) transform. Though all conceptualisations should be viewed important to consider, not all of them have

the same relevance for BIOTraCes. To further discuss this relevance, a workshop is organized on the 10th of October 2023.

Aim of this document

This piece of writing is meant to inform the discussion that will take place on the 10th of October meeting and contributes to Task 1.7. It explores how the concept of power and how it be taken on board in our theory of transformative change.

Definition of power

As mentioned in the introduction, the concept of power has been given many meanings. For BIOTraCes, we choose to highlight the definition of power that is mentioned in the IPBES values assessment[3]:

"Power is the capacity of actors to mobilize agency, resources, and discourses, as well as to utilize or shape institutions to achieve a goal. Power can be both constraining and enabling, and the capacity of one actor can inhibit the capacity of another actor. Power in the context of human-nature relationships can be manifested in multiple and non-exclusive ways through discourses and social structures. Discursive power is the power to use discourses or knowledge production to shape worldviews, identities, and values. Related to discursive power is the power to frame how issues are understood, communicated, and discussed (framing power). Structural power is the result of historically specific socio-cultural, political, and economic systems that reproduce social positions and/or hierarchies among social groups. Structural power relations determine, for example, who has the power to make rules regarding access, use, and responsibilities about nature/NCP[4], and who is excluded from this process (rule-making power); as well who has the formal or informal rights regarding nature/NCP which in turn determines the use of these assets and whose values are emphasized (operational power)."

Within this definition, several 'dynamics' and 'logics' of power are mentioned. Dynamics are ways in which power *works,* and logics are ways power *manifests and/or can be perceived*. We will unpack these dynamics and logics in the next two sections.

How power works

In this section, we highlight some of the main theories on how power works based on an extensive literature review by Avelino (2021) and some additional references from the field of development sociology. The work of Avelino does not offer one, all-encompassing definition of power, but rather offers a broad overview of power definitions and contestations that can be tailored to a specific context. This section should therefore be viewed as inspirational rather than prescriptive.

Theories of power and social change

In her literature review, Avelino (2021) distinguishes and discusses seven dominant interpretations and contestations of power. All interpretations can potentially arise in the BIOTraCes case studies. Therefore, one interpretation does not exclude others. It is, however, helpful to be aware of different interpretations, their contestations, and potential consequences. The article by Avelino also offers a table of all power contestation together with questions for research on social change and innovation. This table can be found in ANNEX II and can be used for further operationalising power together with social partners.

Expressions of power

The first debate that Avelino discusses is on 'how' power is expressed/exercised. In this debate, three main interpretations are distinguished:

The first concerns the interpretation of **'power over.'**
This interpretation of power focusses on social relationships: person A exercises power over person B.

[3] power | IPBES secretariat
[4] NCP: nature's contribution to people

Of course not all ‘power over’ concerns people. Institutes, companies, media etc. can also hold ‘power over’ someone or certain groups.

The second concerns the interpretation of **‘power to.’**
This interpretation of power focusses on the ‘capacity to act.’ Therefore, this interpretation views power more as something that is possessed or not: e.g. people may feel empowered or powerless.

The third offers a nuance between power over and power to and concerns the interpretation of ‘**power with.’** This is representative of the work of Partzsch (2017), who makes a distinction between power over (coercion and manipulation), power to (resistance and empowerment) and power with (cooperation and learning). Thereby he offers a framework to analyse how actors collaborate in the exercise of power for or against change.

In an article on ‘making sense of power through transdisciplinary sustainability research’ (de Geus, Avelino et al. 2023) the distinction between power to, power over and power with has been visualized in order to make differences more tangible in participatory settings (Figure 10).

Figure 10 Power to, power over and power with, as illustrated in De Geus et al. 2023

In the ‘Quick guide to power analysis’ developed by Oxfam[5], three additional expressions of power are also addressed. These are:

Power within: personal self-confidence, often linked to culture, religion or other aspects of identity, which influences the thoughts and actions that appear legitimate or acceptable.

Power for: the power of a clear vision and sense of purpose.

Power under: passing on mistreatment to others through fear, humiliation, anger, resentment, superiority, arrogance.

The additional expressions distinguished by Oxfam are closely related to the expressions discussed by Avelino, but offer slight nuances. For example: power within and power for can be strengthened though/part of power with and power to. Power under is often the result of power over.

Centred versus diffused power
The difference between centred or diffused power concerns how power is organized. Centred power is often associated with a type of ‘elitist power,’ but can also refer to central governments or any type of coordinating actor or group on top of a hierarchical institution. Diffused power concerns the struggle between plural interest groups. Decentralized power is often assumed to be ‘good’ and lead to more ‘equal’ or ‘just’ power relations. However, power decentralisation can also involve the (re)construction

[5] https://policy-practice.oxfam.org/resources/quick-guide-to-power-analysis-313950/

of old or new power inequalities and oppressions (e.g. when community-led initiatives primarily involve affluent actors with a high social capital, possible -and often unintendedly- excluding others).

Consensual versus conflictual power
The difference between consensual and conflictual power can be hard to determine and is often contested. For example, (Mann 1986) characterizing violence as 'the most concentrated, if bluntest, instrument op human power' while (Arendt 2016) views violence as something that can destroy power, but 'is utterly incapable of creating it' and 'power and violence are opposites; where one rules absolutely, the other is absent'. Moreso, power can also be used for turning a conflictual situation into a consensual one, hereby preventing conflict from emerging in the first place (Avelino 2021, p. 431). According to Avelino, the most important lesson to be learned from the power literature is to be aware of conflict that may be 'hidden' behind seemingly consensual processes, but also the other way around; to acknowledge the consensual forces that in the end may give rise to conflict.

Constraining versus enabling power
Power can manifest as both constraining and enabling in social innovation. Avelino divides two common interpretations in relation to structural power (power exercised by/through structures). Namely: social structures are 1) an object of social change (i.e. the structure is to be innovated/transformed) or 2) a constraint for social change. However, she also identifies structural power as an enabler of social change: e.g. legal forms that recognize a social (ecological) entity as such.

The pioneering case of the Mar Menor, in Spain, is the first ecosystem in Europe to be granted legal personhood in Europe. However, there is debate on how this new frame can be operationalised in court or in the legal realm. Another example of enabling structural power in nature conservation is the Whanganui River as Te Awa Tupua: Place-based law in a legally pluralistic society" (Charpleix 2018).

Quantity versus Quality
Most literature focusses on a quantitative expression of power: someone or something can have 'more or less' power. However, the framework of transformative power offers a much more qualitative approach which focusses on different of power regardless of its manifestation, namely: reinforcive, prefigurative and countervailing power. We will elaborate on this in our last section.

Empowerment versus disempowerment
'Empowerment' as a movement has been heavily criticized. This debate mainly concerns whether or not empowerment of one person or group can change as system that inherently disempowers (otherwise this group would not have to be empowered in the first place). Empowering can also lead to the (unintended) disempowered of others.

Power is knowledge versus power is no knowledge
This is a rather philosophical contestation. Knowledge as power very much relates to who is holding the 'truth' (if any truth exists) and who can mobilize people or resources with the use/communication of knowledge. Researching power as knowledge in social innovation requires a discursive approach that clarifies all kinds of types/dynamics involving knowledges, discourses, ideologies and normativities underly the process of change, implicitly or explicitly.

How power is understood: logics of power

In this section, we will elaborate on the different ways in which power *manifests* and/or can be *perceived*. We call this 'logics of power'. Between these logics, power can take different forms which can be visible, but also hidden or invisible[6]. Logics of power also occur at different levels: from household to local, national, or even global.

For this document, we derived four main logics of power. All logics are accompanied with approaches which are multi-applicable: they can be used to identify power relations within specific case studies and to analyse power relations across case studies.

[6] https://www.powercube.net/analyse-power/forms-of-power/

Actor-centred logics

Actor-centred logics are used to discuss *who exercises power.* Actors usually manifest as people, but can also embody groups, organisations, market sectors, institutions etc. Actor-centred power are often visible forms of power, therefore very suitable for empirical and/or participatory research.

Several tools have been designed to identify actor-centred power in nature conservation (Shackleton, Walters et al. 2023). Most of them can also be used in a participatory way including stakeholder mapping (Reed and Curzon 2015), social network analysis (Mbaru and Barnes 2017) and actor centred framing (Sahide, Sirimorok et al. 2021). A more extensive actor-centred tool, that also focusses on shifting power relations between multiple actors in social innovation and transitions, is the multi-actor perspective (MaP, ANNEX III), (Avelino and Wittmayer 2016, Avelino and Wittmayer 2017, Avelino and Wittmayer 2019). The MaP is a framework developed to identify shifting power relations between different categories of actors in sustainability transitions. Therefore, it can be used to discuss what different roles actors (want to) play in social/bio-innovations, and how powerful/powerless they feel in those roles. The build-up of the framework also includes some institutional logics, which are addressed next.

Institutional logics

Institutional logics can be used to look specifically at organized systems that shape our ways of perception and behaviour. Some institutional logics can be visible, like written out policies and rules, most of them however, are hidden, like entitlements, norms etc. By studying institutional logics, it is possible to grasp how power is exercised through an ensemble of institutional logics that prescribe how society manages resources and shapes ways of interaction with nature.

Most literature in relation to nature conservation and institutional power favours community-based initiatives inspired by Eleanor Ostrom's work on 'governing the commons' (1990). Some derivatives of Ostrom's work are design principles for community-based natural resources (Cox, Arnold et al. 2010) and environmental governance (Bennett and Satterfield 2018, Morrison, Adger et al. 2019).

Within the before mentioned MaP, institutional logics are merged with actor-centred logics. The MaP starts by differentiating three main axes of institutional logics: formal and informal, profit and non-profit, public, and private. If society is divided between these axes, four actor perspectives emerge: state (public agencies), market (firms and businesses), community (households, families etc.), non-profit (NGO's and associations). However, a so-called hybrid sphere of all sorts of organisations, networks and groups that cross the boundaries of these institutional logics can also be identified (e.g., a community owned business, lobby groups, community service groups etc.). By the means of participatory dialogue, certain stakeholder groups can discuss how power is divided between all categories, and how power should be divided to stimulate (nature positive) change. The main argument that Avelino and Wittmayer make, is "that social innovations emerge from diverse institutional logics. Therefore shifting (power) relations and boundaries between institutional logics is - in itself- a form of social innovation".

Structural logics

Structural logics considers the space in which actors exercise power. This space can be closed: when decisions are made by closed groups or invited: when people asked to participate but within set boundaries or created: when less powerful actors claim a space where they can set their own agenda. Most research that uses structural logics is focussed on limiting factors within these spaces that can result in certain injustices or inequalities. Examples are political, cultural, and economic structures (or structural forces) that conform societies in ways like social class, gender roles, economic relations, or colonial legacies.

A structural approach can help to identify the 'winners and losers' of structures and can be used to challenge the mainstream (see previous section on constraining or enabling power). However, structures are often hidden (shaping or influencing the political agenda behind the scenes) or invisible (like beliefs, socialisation, and ideology) (Therborn, 1999), therefore they can be harder to analyse. Adopting intersectionality can help to identify structural logics. Examples of this can be found on the intersectionality padlet.

Discursive logics

Discursive logics and affiliated approaches are based on Michel Foucault's work that identifies power as a productive force that shapes social norms (what counts as socially acceptable behaviour) and individual subjectivities (how we see ourselves) by acting through knowledge, truth claims and narratives (Shackleton, Walters et al. 2023). In this vein, actors, institutions, or social classes do not possess power and hence cannot exercise it. Instead, certain discourses exercise power *through* actors and institutions, shaping individual and collective behaviour (conduct) and subjectivity, through what Foucault calls 'governmentality' (Foucault 2007). Discursive logics can take a variety of form is often studied by analysing means of communication. For example: a speech can be visibly performed, while its influence can be hidden (e.g., propaganda) or even invisible (e.g. dogma).

Examples of discursive approaches in relation to nature positivity are: "green governmentality" (Rutherford 2007, Afieroho, Li et al. 2023), "environmentality" (Agrawal 2020, Anand and Mulyani 2020) and "Biopower." (Biermann and Anderson 2017, Bluwstein 2018).

Logics of power	Actor-centred	Institutional	Structural	Discursive
Focus	All types of actors (including groups, institutions, organisation etc) that exercise power	Organized systems that shape our ways of perception and behaviour (including policies, rules, norms etc.)	(Often implicit) structures that limit or expand the space in which power can be exercised (including class, gender, values etc.)	The use (and construction of) knowledge, realities and narratives that are of influence (including language, frames and determination processes)
Exemplary Methods to explore specific logics of power	Stakeholder mapping (Reed and Curzon 2015), Social network analysis (Mbaru and Barnes 2017) and actor centred framing (Sahide, Sirimorok et al. 2021), Multi-actor Perspective (Avelino and Wittmayer 2016, Avelino and Wittmayer 2017, Avelino and Wittmayer 2019).	Governing the commons' (Ostrom 1990). Design principles for community-based natural resources (Cox, Arnold et al. 2010) Environmental governance (Bennett and Satterfield 2018, Morrison, Adger et al. 2019).	Eco-cultural intersectionality (Parks 2020) Ecofeminism (Kaijser and Kronsell 2016) More-than - human or Posthuman Perspective (Panelli 2010)	Green governmentality (Rutherford 2007, Afieroho, Li et al. 2023), Environmentality (Agrawal 2020, Anand and Mulyani 2020) and Biopower (Biermann and Anderson 2017, Bluwstein 2018)
Potential pitfalls	Often unable to address implicit structures and discourses produced by actors	Often does not highlight or emphasise marginalised perspectives	Can be hard to identify and often differentiates a lot, even on a personal level	Can be hard to identify and often varies in influence in different contexts.

Potential opportunities	Very suitable for participatory & empirical research. Can offer clear insights on which actors should be addressed and/or involved in transition processes	Identifying and removing or changing institutional obstacles can have a large transformative impact.	Very suitable to address intersectionality and often essential in strategies to empower marginalised perspectives.	Important in relation to embedding transformative change, e.g. discursive logics are an important component of paradigmatic changes.

Table 4 Four logics of power (inspired by Shackleton, Walters et al. 2023).

Intersecting logics of power

The four logics of power can be analysed by themselves but in practice, most logics will intersect and therefore interact with each other. Especially in cross-sectoral partnerships, power can be perceived in many ways. This offers a challenge for synthesizing different case study results. Literature on how to deal with this challenge is scarce. The MaP offers an interesting and participative framework to identify and discuss important actor centred- and institutional logics. However, it fails to address structural and discursive logics. Another framework that also includes discursive logics in cross-sectoral partnerships are the 'actor strategies for shaping collective decisions' (Dewulf and Elbers 2018) (ANNEX IV). However, the strategies proposed are focused on highly organised partnerships and fail to highlight specific marginal perspectives. A framework that explicitly highlights marginalised perspectives is that of eco-cultural intersectionality (Parks 2020). Critical eco-cultural intersectionality builds on eco-oriented identity theories and separates itself from conventional intersectionality by explicitly dislocating itself from anthropocentric conventions. However, considering the BIOTraCes ambition for systematic and institutional change, our approach to power does require acknowledgement of- and interaction with the Anthropocene as we know it. Therefore, designing a framework that can address all logics of power offer both a dilemma and opportunity for BIOTraCes..

How power can be transformative

As previous two sections set out, there are many ways in which power works, each with their own advantage and/or disadvantage. This raises the question: to what purpose do we want to analyse the concept of power? Our project summery states that "BIOTraCes develops knowledge, tools and novel approaches that enable transformative changes (TC), necessary for achieving a nature positive society". This implies that we are looking for a framework to explore what kind of power dynamics push nature positive transitions forward. Driven by a similar need in relation to just energy transitions[7], Avelino has developed a framework for analysing the dimensions of transformative power (Avelino, under review; De Geus et al. 2023). This framework consists of 'prefigurative power' (the capacity to prefigure new ways of doing, thinking, and organizing), 'countervailing power' (the capacity to challenge and dismantle existing structures & institutions) and 'reinforcing power' (the capacity to reproduce existing (incl. new) structures and institutions). Taken together, these dimensions constitute as an important driving force of transformative change, therefore they can be considered as expression of 'transformative power'.

If we put the transformative power framework next to the BIOTraCes' theory of transformative change (ToTC), the three dimension of power which compose transformative power, can be linked to the four complementary principles that form the backbone of leveraging actions we aim to support. Therefore,

[7] The transformative power framework is one of the outcomes of the SONNET Energy project. The SONNET Energy project has received funding of the HORIZON2020 research and innovation program, under grant agreement No 837498. A full power guide, plus instruction video can be advised on https://sonnet-energy.eu/power-guide/ Home - SONNET Energy (sonnet-energy.eu).

the transformative power framework can offer a potential 'umbrella' in which these principles can be evaluated.

Power dimensions	*Definition*	*Link with ToTC*
	Transformative power	
Prefigurative power	*"The capacity to prefigure new ways of doing, thinking and organizing"*	In BIOTraCes, prefigurative power manifests in the way we apply the principle of pluralising. By 'going beyond standard approaches' and 'recognising and respecting the wide diversity of values' about biodiversity and human-nature relations, we actively look for new ways of doing, thinking and organizing.
Counterveiling power	*"The capacity to challenge and dismantle existing structures & institutions"*	By actively empowering and politicising, BIOTraCes explicitly aims to endorse the countervailing power of nature positive ideas and concepts, particularly from marginalised perspectives, values, identities.
Reinforcing power	"*The capacity to reproduce existing (incl. new) structures and institutions"*	BIOTraCes stimulates reinforcive power in the way the project intermediates for the purpose of embedding prefigurative ideas into the science-policy interface.

Table 5 Transformative Power and the link with the BIOTraCes' ToTC.

Challenges for cross-analysing transformative power in BIOTraCes

In BIOTraCes, our cases can be primarily understood as systems of relations. These relations can exist between and across different logics of power like institutions, impact-sectors, people, nature, economy, culture, ideologies, frames and the more than human world (the list is potentially endless). From the perspective of transformative power, the question is relevant if the relations are controlled by power exerted by the high impact sector, or if they lead to change beyond control (Stirling, 2015). This presents us with the challenge on how we can synthesize divers logics, without disregarding the richness that each unique case has to offer. Another challenge is that we believe that certain power shifts are necessary to effectively achieve nature positive societies. However, we do not have a clear vision of what nature positive society exactly looks like. Therefore, our reference point for power shifts is unclear. Such shifts also imply that less powerful or marginalised stakeholder perspectives are given the 'capacity to transform.' How this is done is likely to differ between all case studies considering the different contexts, timelines and scale of each case. Outcomes of our research can therefore be situational and not necessarily reflect structural barriers or lock-ins.

Key workshop questions

Question 1: “How can we analyse power across different high impact sectors?”

Question 2: “Which logics of power are most prevalent in your work?”

Question 3: “How to you want to conceptualize power in our ToTC?”

In preparation of this workshop, we asked all participants of the workshop to carefully read this document and discuss it with their case-study teams.

4.4 Workshop 2. Cross-analysing power: Results

Date: October 10th , 15:00-16:30 (Amsterdam time)
Attend by: Zoë van Eldik (facilitator), Roel During (host), Amy Wortel, Rosalie van Dam, Liam Oriada, Julia Neidig, Audra Balundé, Oscar Jacobsson, Bàlint Sàndor, Crina Petrescu, Unaï Pascual, Luciane Lucas Santos.

Energizer
To invite people to think about power, the workshop starts with a question to everyone: *name an example of a lock-in in your case.* Each participant is given the change to give an example (Figure 11). The answers illustrate that lock-ins come in large variations, both within and across cases.

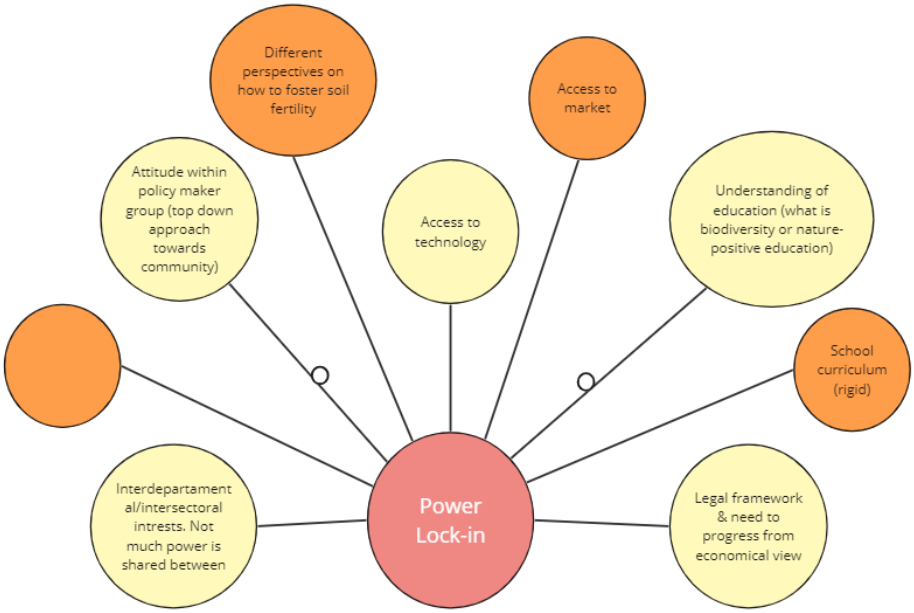

Figure 11 Examples of case lock-ins

Logics of power

The first part of the workshop involves the question: *"Which logics of power are most prevalent in your work?"* In conclusion, participants express that in most cases, different logics can play an apparent roll, albeit in different levels of visibility and at different points in time. Some logics, such as actor-centred logics and institutional logics can be more easily identified while others, like structural logics and discursive logics, might require a much deeper understanding of how power is attributed to certain actors/institutions/sectors etc. It can be an option to choose one logic as departure and expand to others. It is not required nor preferred to all take the same logic to depart from. Multiple entry points are possible, depending on what suits the context of each case. However, it is important to remain coherent.

Case examples given by participants
Two participants give an example of how their case is very much embedded in institutional logics (e.g., rules and school curriculum) as well as structural (e.g., the way kids are taught certain behaviours) and discursive logics (e.g., city marketing reinforcing urban greening).

Another participants says: Institutional logics are prevalent at first glance. Mainly because the Lithuanian government is driven to align with European guidelines in terms of river dam removal. However, when looking deeper into the case, people who live near the river dam are largely ignored. This might be because of more structural causes.

A participant shares their view on their case: The focus will likely be most in structural logics (although this is an estimation). A clear relation to institutional logics is also there (e.g., policy and regulations for the logging industry).

Another participant explains: Every logic can be addressed in our case. There are different steps to be taken that align to different logics. As a first step, an actor-centred logic would be most simple since we aim to understand the opinion and behaviour of different stakeholders. This will likely we followed up with a more structural analysis.

Another participant says: all logics seem important. It is hard to say one is more important than another. Also, some elements have overlapping logics. For example: social norms are attributed power by discursive processes and influence institutional logics.

Another participant agrees that logics will likely intertwine. For example: structures like class, age and gender play a role in which actors have obtained a certain position and/or make up the rules. Havin the four different logics is interesting because it forces you to think about the different manifestations of power. However, for the overall analysis, it would be nice to focus on how they all intertwine or relate to each other.

Another participant explains: Various logics are relevant in the Wageningen case. Actor centred logics seem easiest analyse first but won't touch upon more deeper structures that uphold certain power relations. We'll probably use all. A personal preference goes to discursive logics.

Another participant share they have worked a lot on inequalities, this of course relates a lot to structures of power. The Multi-Actor Perspective (MaP) might be a very helpful tool to use. However, it is impossible to not also look at structural/discursive logics. This concerns how power is legitimized (e.g., politics of power). Especially, for us, is would be relevant to look at the counterhegemonic modes of dismantling power. If we want to use Ostrom, institutional logics are a first consideration together with the collective capacity to transform. In relation to the Mertola case, institutional logics are a clear focus - the goal is adjustment of institutions. However, the way this is done concerns addressing many structural barriers, e.g., the procedural access of elders. Eventually the aim is to support the collective dimension that strengthens the power to transform.

Reflection by host
One logic does not exclude the others. However, is important to stay coherent in our analysis. This can be done by having at least a common understanding of power.

Analysing power across different impact sectors.

In the next part of the workshop, we discussed the question *how can we analyse power across different high impact sectors?* In order to stimulate a train of thought, A participant is asked to share

the ideas they have shared via email, prior to the workshop. The proposal of them was to take a stepwise approach that centres on the questions: what buttons to push to enable a transition and how to push these buttons? The first step in their proposal is to determine which logics of power are relevant. The second step is to determine the type on influence that is present (e.g. good or bad influence from the point of view of our common objective). Step three could be to determine what you want to do with this power source, compared to current situations and to where we want to be (though this is still unclear). Finally, the last step relates to how we can enable transition, e.g., empower certain groups and/or perspectives. The way these steps can be followed mythologically can differ (examples from the preparatory document could be followed). It is very hard to think from the perspective of everybody.

In reaction to the challenge of finding a common perspective, someone proposed to maybe analyse across cases **for whom is it easy to decide, and for whom it is difficult**. For example: in Lithuania it is hard for communities to be in charge, while for institutions it is much easier.

A participant adds that they have also thought about how power can be analysed across cases. For many of us, it will be interesting to know how power is defined by our stakeholders/case related actors (e.g., marginalised (perspectives, values, identities, groups). These perspectives will likely all be very different, but **a commonality between them could be that they all come from a place where they feel less powerful**. Maybe it is wise not to overtheorize about this.

The host proposed it might be interesting to look at the relations between high impact sectors. For example: **how power migrates from one impact sector to another**. How do they exert their power? Is your case imprisoned by one high-impact sectors or are there other sectors? Relations can also go passed high impact sectors, for example, how do high impact sectors influence the prospects in relation to SDGs or economic development? In other word: can we find similarities in the mechanisms of power we find in each case?

A participant remarks that we talk a lot about power as something people have, but maybe it is more on **what people do** (e.g., Foucault) and **how you relate to other entities**? However, this does not necessarily touch upon the high impact sectors that are mentioned in the questions. The facilitator beliefs high impact sectors can also be included in this view: there could be a pattern in how high impact sectors shape the way people act and how they perceive themselves in relation to others (incl. more than human entities).

Another participant contributes to the conversation by pointing out that many cases also want to empower certain groups. It could be nice to analyse **in what way impact sectors want to collaborate in attributing power to marginalised groups** to achieve their goals, or how they stand in the way of empowering nature positive perspectives.

Another participant has interpreted the question on terms of 1) How do we intend to analyse power in methods? And 2) How do we think we can connect cases to have a systematized idea on how power manifests (also related to tsk 2.4)? And 3) How can we analyse the power and connections between high impact sectors? From her perspective, MaP could be of help for this kind of analysis, especially to analyse how power effects the relations between high impact sectors. However, her preference goes to using **discourse analysis.** This can be done by analysing the consistence between documents and decisions. To connect cases, a systematic framework can be chosen like **SES** or **MaP**. However, these do not represent structural, underlaying power barriers. Therefore, and additional intersectional analysis could be helpful. For example, in Mertola, the focus is on **participatory action research** with co-governance initiatives. However, the aim is to combine this with a **multi-species ethnography**. So far, it is not entirely clear how this is going to be done, but two approaches that will be considered are SES, and **intersectionality.** The aim is to understand the lock-ins than come from consistent systematic frames while considering **different positionalities** (e.g., Rural and urban perspectives).

Conceptualizing power in our Theory of Change

In the last 10 minutes of this workshop, a short discussion on how we want to conceptualize power in the ToTC takes place. However, a common agreement is that this question is too big to answer at this stage. An additional question that the host poses, is whether we view power as characteristic from certain structures and institutes or if we view power as something that manifests in relations and actions? Reactions to this question are:

- Power is not something I view as something inherit to a certain entity. Much more as something that can be levered to achieve something. It is something that is constantly changing, looking at it as a relation fosters the idea that power is dynamic.
- If we take this point of view, then how do we look at transformative change? To put in a question: if power is purely relational, what exactly is transforming?
- This is an interesting question, and very hard to answer. Both perspectives might be two sides of the same coin. Maybe it is wise not to choose but reflect on the dialectic relationship between the two sides. Both sides might need to be transformed, therefore the focus might be on what can be generated or catalysed between the two.

As the conversation continues, the relevance of this question is further explored. The host illustrates that the question relates to an epistemological understanding of power. Can we incorporate both structural and post-structural interpretations in our ToTC or do we risk being incoherent? To clarify: do we view power as something that is always situational and constructed by language? Or is power something that is structural, that shapes society with rules and regulations, and should this be what we want to change? This is an ambivalence in our project. On the one hand, we try to be inclusive of all kinds of marginalised perspectives, which is on the discursive side of power, and on the other hand, we want to be transformative which is on the structure side of power. Can they be compatible? Reactions to this question are:

- Doesn't the discursive level also reinforce the structural level? Is seems they quite naturally go hand in hand. It is quite hard to say power is only embedded in structures or only emerges in relationship.
- This is a hard question. You might say that discourse is still quite an abstract form that finds it's embodiment in structure. But it's not always this way. Language is a way of incarnating something, making something real. That is also what makes discourse dangerous; it can make people believe a reality that is contradicting. Including both sides of the coin was maybe a way to make the project comfortable for most of us, but maybe we have still been 'too modern' in our ambition to mainly change structures while we want to include much more personal viewpoints as well. I don't necessarily see a solution.

4.5 Workshop 3. Harvesting narratives for the ToTC

Introduction

This chapter is meant to prepare the workshop on narratives. It partly builds on the results of the previous workshops. The three topics are key to an overall analysis and synthesis of the cases. This overall analysis is needed to underpin the theory of transformative change, BIOTraCes is aiming at.

In this paper we will focus on the narrative approach within BIOTraCes. A narrative approach which aims at synthesizing the lessons learned and observed mechanisms from the cases. A good narrative can generate power (Abma, 1997): Yanov (2000, page 58) mentions George Orwell's *Shooting an Elephant* for lessons in authority.

There is no separate task dedicated to informing the narrative analysis of the cases. We presume that every case has a story to tell. We also presume that each partner does their research with their societal partners in their own way. This heterogeneity implies that we must prepare for a secondary analysis (i.c. synthesis) of the case studies that will lead to a scientifically consistent and coherent result. However, the more the partners keep an eye to the overall synthesis of case studies, the better results may be expected. The people and groups we are engaging with have stories to tell, that are often not well-represented in dominant political narratives. These are real life stories, embedded in emotions and experiences. This has consequences that are discussed below.

Aim of this document

The workshop on narratives aims to harvest the knowledge and experiences on a narrative synthesis of a plurality of cases, to outline an overall synthesis of stories told. This document is meant to inform the workshop and highlight some choices to make and risks to avoid. We hope that it will contribute to a vivid and inspiring discussion.

Relation between narrative and Theory of Change in general

By narrative we refer to a summary of a theory of change that explains the pathways of change, highlights some of your major assumptions, justifications, and interventions, and presents a compelling case as to how and why your initiative expects to make a difference (see: www.theoryofchange.org). A narrative may also contain some information that is additional to what is in the theory, such as an overall vision, the history of how an initiative came to be, and some community context. The purpose of the narrative is twofold: (1) to convey the major elements of the theory easily and quickly to your target group; (2) to better understand how the elements of the theory work as a whole.[8]

For BIOTraCes it is interesting to document stories for each case and create a short narrative. Definitions of what a story is vary, but a recurring feature is that it is an organization of experiences around a series of events. A narrative is a combination of stories that is characterized by its telling. The narrative puts events in a logical order that remains close to the stories. A story is what you are told by the partners and the narrative is a logical combination of stories that you cocreate with the partner. Combining narratives would allow a further synthetic step in the project that synthesizes the case bound stories into an overarching narrative of a nature positive society. It could be an inspiring attempt to put them all in a coherent framework.

Below a short intermezzo is given on narrative analysis and narrative research.

A bit of theory on narrative analysis, just to get acquainted for those who have never worked with it:

Narrative analysis (NA) focuses on understanding lived experience through stories (Clandinin & Connelly, 2000). NA studies stories as objects of study and uses narratives to capture and understand lived experience. Narrative analysis is often part of narrative research. Narrative research (NR) has similarities with other forms of qualitative research, such as the focus on language in discourse analysis, but it has several unique properties. First, narrative researchers focus on the story. A second characteristic of NR is that narrative researchers often invite participants to (re)construct experiences together with the researcher(s) in the form of a narrative. A third characteristic is that narrative researchers are mainly interested in private knowledge: local, time- and context-related knowledge. It is assumed that the large is contained in the small: through singular experiences we learn, directly or indirectly, about generalities.

When dealing with marginalised groups that have a unique relationship with nature, one may deploy the narrative research in a hermeneutic tradition. Narrative hermeneutics starts from the idea that people lead narrative lives, they are 'expressive agents'. In mutual contact and through the exchange of language, people shape and organize experiences into a meaningful whole (Schiff, 2006). From a hermeneutic perspective, the world and ourselves are closely interrelated. Interpretation of what is happening occurs through a process of 'coming home to a situation and responding to it' (Gadamer, 1975: 254). There is no direct, 'raw' experience of reality, but through conscious and preconscious (Widdershoven, 2001) experiences, meanings are created that are wrapped in stories and stories in turn generate collective meaning. From the perspective of narrative hermeneutics, events do not have a standalone meaning, but they acquire meaning in the context of a human life because we surround ourselves with certain people in certain situations. Interpretations fluctuate and distort as someone

[8] https://www.theoryofchange.org/what-is-theory-of-change/how-does-theory-of-change-work/glossary/

gains new experiences. Experiences cannot be completely 'known' because the meanings we give to them continuously change. According to Gadamer (1975), narrative analysis is a continuous, dialectical process, in which 'understanding' or 'insight' is achieved dialogically. At the same time, that insight has a temporary character. There is, as it were, simultaneous 'knowing' and 'not-knowing'.

The practice of narrative analysis is outlined in five phases. These five phases are an integration of the narrative interpretative analysis method of Riessman (2008), the work of McCormack (2000a, 2000b) and insights from narrative hermeneutics. Riessman distinguishes five steps in a narrative analysis: (1) active listening, (2) re-transcribing, (3) coding, (4) retelling and (5) reconciliation and closure (Riessman, 2008).

According to McCormack (2000a, 2000b), the analysis process consists of two parts, each consisting of several steps: (1) reading the transcript from multiple perspectives and (2) developing an interpretive story that does justice to those perspectives.

Important for BIOTraCes: case bound narratives can be co-created with the societal partners.

The construction of a meta-narrative out of micro-narratives

Stories are told and can be analysed. Narratives are created/synthesized from a combination of stories. A meta-narrative is a narrative that overarches different narratives of meaning, experience, or knowledge. It can offer the legitimation for transformative change, based on an innovative idea or game-changer. By constructing a meta-narrative, we ourselves are becoming co-narrators and coproducers of a specific version of the narrative. This required thoughtful considerations of the different ways a meta-narrative can be created.

Below we discuss three different strategies to create a meta-narrative. The first strategy is based on the idea of recontextualization, knowing that a case narrative necessarily loses quite a bit of its context for the sake of brevity (no one would like to hear a theory of change with a narrative that resembles a complete book). A second way of synthesizing could be based on a thematic approach. A third way is to specifically create a narrative from the angle of transformative change. We will discuss all approaches very briefly below.

Decontextualization and recontextualization as an overall action across cases

Recontextualisation is a process that extracts text, signs or meaning from its original context and reuses it in another context. Since the meaning of texts, signs and content is dependent on its context, recontextualisation implies a change of meaning and redefinition.

The context in the case bound narratives will vary from case to case. Some cases are embedded in local governance, others are struggling with European regulations or are in the middle of a worldwide economic struggle for life. Often, context here is similar to the system a group is resisting to surrender to. BIOTraCes case narratives will be about epistemic, conceptual, and justifiable innovations, social ecological relations, system responses to bio-innovations, mechanisms of change, leverages, lock-ins, and the work of power.

Recontextualization is possible from a governance perspective, changing the meaning of events to become relevant for the science policy interface for biodiversity. The most important questions then will be how the governance system (sense latu) should change to become more inclusive for marginalised perspectives, values, identities, and groups. Inclusiveness and nature positivity will go hand in hand. The cases can provide substance to the idea of nature positivity and how this differs from non-negative nature? Just to explain the opposition here: non-negative means the intention not to harm nature in any way, nature positive would mean to include nature in any way respectless its outcome. One example of nature positivity can be found in a food-forest. The forester activates and uses natural processes, without knowing what sort of nature will emerge in due time. It's an oppositional difference between protecting known and valued patterns or activating processes towards an unknown end result. Instead of "fitting" these results in the rather technical SES approach of

IPBES (which aims at being non-negative), we could add it as an extra dimension. The new meaning will then lay in the idea of nature positivity.

Thematic synthesis

Thematic synthesis is a method for identifying, analysing, and reporting patterns (themes) within data. It organizes and describes the data set in rich detail and interprets various aspects of the research topic. It can be used within different theoretical frameworks, and it can be an essentialist or realist method that reports experience, meanings, and the reality of participants. It can also be a constructionist method, which examines the ways in which events, realities, meanings, experience, and other aspects affect the range of discourses.

For BIOTraCes we could identify several themes that run through the cases. The use of local knowledge could be such a theme, or the tight fit between social and ecological values.
The patterns connected to the themes can be about mechanisms of change. Within the constructionist method, the themes can have the shape of micro-narratives.

Synthesising narratives of change

A way to specifically emphasise the transformative potential and capacity of a narrative is to use a narratives of change approach (Wittmayer et al. 2019). Within this approach, strategies such as decontextualising and recontextualising and thematic analysis can still be incorporated, but with a specific focus on identifying obstructions of change in the present and ways to reach ideal visions for the future. It is in the space between these obstructions and ideals that transformative change can happen, regardless of how the change process is shaped.

Within BIOTraCes, the way we want to analyse stories and create narratives is inherently relational: stories within our cases challenge the mainstream and exercise prefigurative power with ideas, concepts and discourses about nature positive societies that defy the status quo. This is what makes our cases potentially transformative, albeit not all stakeholders in our cases might not necessarily seek to advance transitions. Wittmayer et al. (2019) distinguishes 3 important ways in which narratives can be analysed in relation to their transformative potential:

1. The content of narratives: this involves how stakeholders envision alternative ways of living with nature and organising systems in support to nature. The content of narratives can involve actors, institutions, markets etc., the reasoning why they must change (rational) and how they could change (plot). Outcomes can be thematically organised, for example: changes in financial systems, institutional systems, and normative value systems.
2. The construction of narratives: this involves the process of identity formation, and the way stakeholders construct new social realities through acting, communicating, and thinking with others in alternative ways. Examples are ways in which tasks and contributions are divided according to equitable capabilities and putting communal growth and fair livelihoods over individual gains. Or creating a unique community skillset and knowledge base which is shared through organising workgroups, meetings, lectures and attending seminars. This allows a community to grow by connecting with people who hold similar values.
3. The role of narrative: this involves how narrative provide a guide for action. For example, by teaching, setting an example or protesting.

The problem of essentialism

Seeing the narrative merely as the essence of a case may lead to oversimplification. BIOTraCes adopted the PEPE framework and should keep this in mind when creating a meta-narrative out of micro-narratives. The narratives and the meta-narratives should be proportionate in the information they convey. Each case should show the role of power and its intersectional manifestations. This alone requires quite some explication.

Under construction, under debate: points to discuss during the meeting

- Do you know of other methods to synthesize the case bound narratives to a meta-narrative?
- What themes do you consider relevant to create a meta-narrative out of our cases?
- What new meanings can BIOTraCes generate with recontextualization (e.g. nature positive society; just transitioning)?
- How can we avoid the narrative analysis to become too simplistic?
- Any other advice for the overall analysis after this final workshop?

4.6 Workshop 3. Harvesting narratives for the ToTC: Results

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Energizer

We proposed to create a story together, where we all imagine a nature inclusive society. The exercise is to follow up on each other with: “Yes, and…”. The result can be found in the picture below (Figure 12)

I live in an urban environment together with an self-organizing society that takes care of their environment and is inclusive

YES AND I have many trees around my house

YES AND All people in my neighborhood think and feel nature is something they belong to and are intertwined with

YES AND there are asymmetries, that are not yet solved (but that we are seeking!)

YES AND I am living in a 3D printed kley house with animals that i am no longer afraid of. In my free time I experiment ith nature -> We get to know each other better

YES AND I buy my food from a local farmer where my children also go to school in order to experience biodiversity

Figure 12 Energizer: creating a story together

Discussion of the paper

What did appeal to you?

A participant expressed that they like the idea of a narrative analysis because it allows for different perspectives and freedom to interpretate. A combination of both contextualizing and thematic analysis is preferred by them and that these can be combined under synthesizing narratives. What themes do you consider relevant to create a meta-narrative out of our cases?

The idea of co-creating a narrative really appeals to another participant, as it is easier to express and communicate about all the things that are happening in our case. There are different stories from policy makers, local communities, stories from communities that are no longer in the region but did have a great influence, which are all very valuable to our case.

➔ Discussion: Cross analysing narratives is in my opinion not related to producing transformative change.

Do you know of any other methods?

One participant shares a very original method of applied theatre (AT). According to O'Connor and O'Connor (2009), AT is a broad term for unconventional forms of theatre that go beyond traditional Western understanding of theatre. It intentionally engages with unconventional spaces or marginalised groups, blurring the lines between actors and spectators. Often a response to social or political challenges, applied theatre sees itself as a transformative process that addresses issues through creative means. One of the possible ways how the AT works is theatre director collects stories from community members and analyzes social and community-based issues to build a play around these stories. Then the community is invited to watch their own stories being performed. After the performance there is room for discussion, to debrief and give space to community members to reflect on their own and other stories. In AT community members can perform their own stories too (e.g., LNDT, 2017). They are thinking this could be a beautiful method to connect plural ideas among stakeholders. Other participants responded enthusiastically but had some critical notes as well. This included a question on how to do justices to stories of actors that are marginalised? This is something to consider when designing the play, and something they are very aware of and will discuss with the director.

Another participant expressed: Narrative analysis is a good way of detecting many clues we are searching for. However, it is important to consider the different ways in which narrative analysis can be done. We need content analysis for sure, but we also need critical discourse analysis (Van Dijk, 1993, 2001; Reisigl & Wodak, 2001; Zavala & Back, 2020) because I think that this idea of focusing "on the story" should be balanced with the perception that a common story could not be possible in the cases. Why should it be important? Because we are expected to unveil vested interests and make visible (at least to us) the ways in which minorities' interests and rights can remain unseen.

It is also important to have in mind that a nature positive society discourse does not mean reduction of environment-based asymmetries. It is important to give the floor to the analysis of incoherent discourses when compared to prevalent (non-positive society) practices.

In respons to the workshop report the Feral Atlas by Tsing et al. was mentioned. It provides a dynamic, horizontal way of bringing different stories together. The Atlas states: "*playful, political, and insistently attuned to more-than-human histories, Feral Atlas does more than catalog sites of imperial and industrial ruin. Stretching conventional notions of maps and mapping, it draws on the relational potential of the digital to offer new ways of analysing—and apprehending—the Anthropocene; while acknowledging danger, it demonstrates how in situ observation and transdisciplinary collaboration can cultivate vital forms of recognition and response to the urgent environmental challenges of our times.*"

Themes to create a meta-narrative

One participant shared that they would like to look at what would be the different contents of the narratives themselves and how those, the different narratives in each of our cases, how they coincide and how they differ from each other when it comes to the different alternative ways of doing things that our stakeholders envision. I think that if we can create some kind of metanarrative around that, that it would be very fruitful.

A participant expressed: The historical context is important to me. I think there's an iterative way to create the meta narrative first to develop narratives that are similar enough in type of content. So, this this then be about connecting the future to the to the past because we are thinking of narratives that could in the end contribute to a series of transformative change. Now, I cannot tell you specific topics, but I think it is good to find these topics together, so that I will focus on them while performing the case studies.

The answers different participants expressed were noted in a Miro board, (Fig 13)

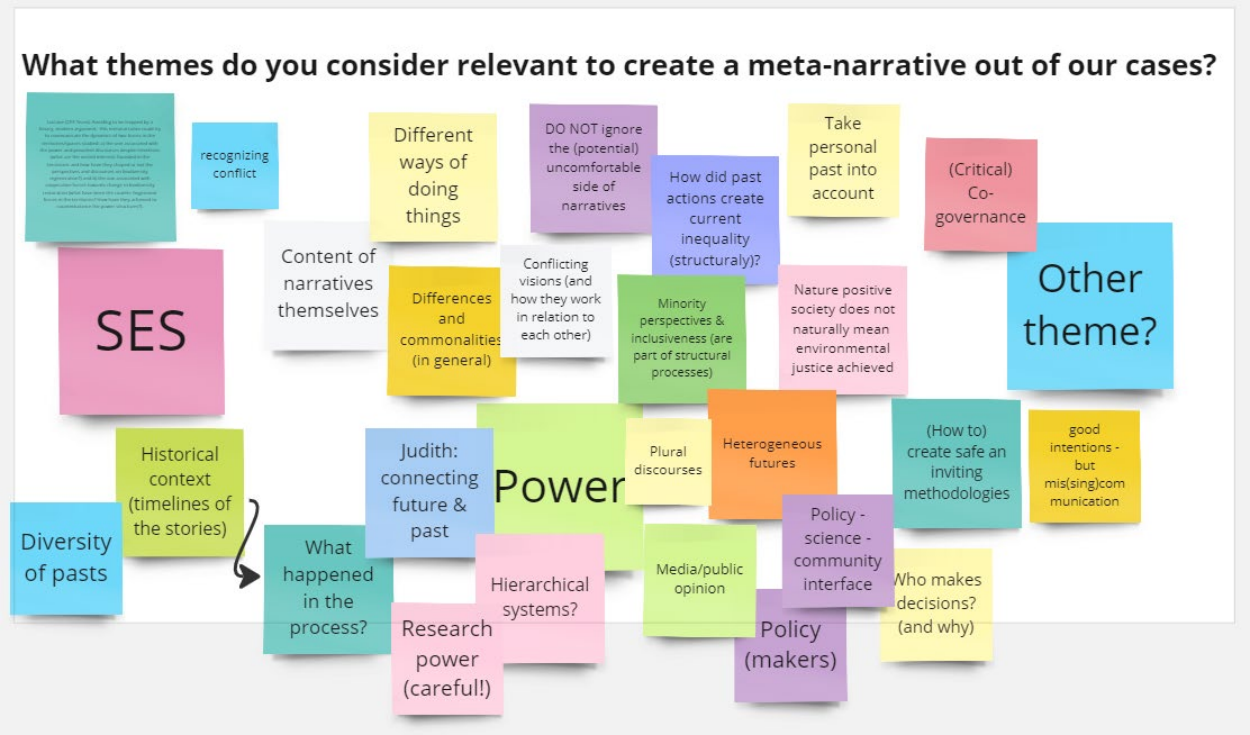

Figure 13 Answers provided by participants to the question of themes

Remark on NA and including marginalised voices:

One participant expressed their concern during our discussion on the meta narrative. She expressed: "Every time I listen about building up a common future, I'm scared, totally scared of this perspective because they're always a risk of choosing a perspective that's more suitable to most people, forgetting the perspectives that are less comfortable or less nice in terms of fitting into this idea of future. (…) I would like to put this remark because I think that it's very common in many projects and I think that we are concerned in not doing this. We can unwittingly reinforce invisibilities and just to end up that minorities here are part of the European construction, minorities are not people who are not guests that we invited to be with us sometimes. (…)

And I'm talking about minorities not because I'm talking about social issues, but because I'm talking about environmental issues. The way people are facing environmental issues and material constraints might be completely different. And what I am trying to say is that sometimes we are referring to marginalised people as being only marginalised and some somebody to be put together with us. But this invitation to be together might be influenced by the way we are considering the past lived by these people in Europe. If we forget about that, it will be very difficult for us to have a real common construction of future.

Since we are talking about past and future, I think that we should have considered the past continues to design the present and the possible futures for people. And sometimes the futures or the imaginations of futures might not be put together simply because the way the past has been addressed by the different actors does not allow people to have the same future. And I think that sometimes this might be forgotten extensively. And in this sense, I mentioned that I think that narrative analysis is a very good way of doing things."

This feeling was shared among other participants as well.

The risk of oversimplification

The last question that was asked during this workshop was: "*How can we avoid the risk of oversimplification? (between decontextualization and recontextualization)"*

One participant expressed that we should not be made blind because of the complexity of our cases. We should go for the essence of the story and then we can probably list general issues and we have to find a balance. "*Therefore, we even must oversimplify something because the essence of the changes happening now and in a transformative change situation are very similar*".

Another participant responded that indeed, generalization is necessary, but it is also needed to show the different complexities in different ways and in perhaps in different outputs as well. Again, a balance in both formalizing general conclusions and give an impression of more detailed and complex analysis needs to be found together. This requires a lot from us as researchers; as translators, from the contextualized stories to a story or multiple stories that we can tell people at other levels. In this translating task that lies ahead of us, we could think along the lines of 'Pluralizing, politicizing, embedding and empowering'.

Another participant explained two ways of avoiding the risk of oversimplification:

1. Be attentive to the different positionalities that are the product of a context.
2. Consider that even we can have biases, because of our class, because of our age, because of our formation, because of our race, etc. So, consider to what extent we can think that we are neutral without being neutral.

4.7 Workshop conclusions

Based on the results of the workshops several conclusions will be drawn here, that help to shape the overall analysis. The workshops have shown some insights in the way the partners foresee the work on their case and the theoretical embedding of their work. The overall image is one of great methodological diversity, which can be a rich source of insights about inclusion and power mechanisms. On the other hand, this also implies a risk of theoretical inconsistency. The conclusion that needs to be drawn here is that there will be a need for a secondary analysis, which will put the outcomes of the case analyses in the consistent theoretically embedded narrative.

Another important conclusion can be made about the use of grounded theory. There seems to be a tension between using grounded theory in the cases and applying theoretical concepts that bring along a compelling theoretical framework. Among others, a clear example is the concept of a Social Ecological System. This concept is embedded in a paradigm of system thinking, with drivers of change, underlying causes of change and so forth. This reductionist perspective may collide fundamentally with the way societal partners conceptualize their relationship with nature. Societal partners or actors may use a more holistic perspective to look at nature and society. These kinds of theoretical concepts should not stand in the way of careful listening to them and discovering the full potential of their perspectives for a nature positive society. For the overall analysis this implies that the set of cases should not solely be analysed from the perspectives and theories in use in the actual science policy interface, because this could only reiterate what's already accepted a useful and relevant knowledge. If there is a choice of theories to make, the more open theories, that can be aligned with grounded theory, such as working with the concepts of commons, may be preferred.

The overall analysis should go beyond the idea of transitional change. The overall analysis should make a clear distinction between transitional and transformative change. According to Stirling (2015) when change is transformative; the process is less controlled by the power structures of the vested interests and invisible sources of power are recognized and addressed. This might be a clue to take on board when making the distinction in the overall analysis.

The last conclusion we want to make here, is about narratives. Narratives can be a great help to convey the message of the cases. But there is also an inherent risk about meta-narratives. Who writes the meta-narrative? A meta-narrative may contribute to simplification of the image of a nature positive society and as such exert power over those who have other ideas. In the overall analysis we must pay attention to decontextualization which would run at odds with our principle of pluralization. Instead, the

overall analysis should pinpoint the relevance of positionalities of those voices and perspectives that governance should open up for.

5 Back-casting a Theory of Transformative Change

Given the fact that the EU strives for a nature positive society, BioTraCes' aim is to contribute by means of a theory of transformative change that may open new pathways of re-relating to nature in the most positive way imaginable. The concept of a nature positive society differs fundamentally from the actual way society deals with nature. Therefore, radical changes are required, and new pathways must be explored. These new pathways require existing sources of power, their structures and interplay, to transform.

The pathways are explored by -until now- marginalised perspectives, values, identities, and groups, who, however, are getting stuck in the way power is sustaining the privileges of those affecting nature. BIOTraCes empowers these marginalised voices to find out where the lock-ins are situated (figure 14). By doing this, BioTraCes uses the perspectives and the actions of marginalised groups, who are involved in lifestyle innovations or bio-innovations, to better understand the way power structures withstand the innovations and to find leveraging mechanisms that create conditions for transformative change. This understanding of blockage and leverage will find its way in the theory of transformative change.

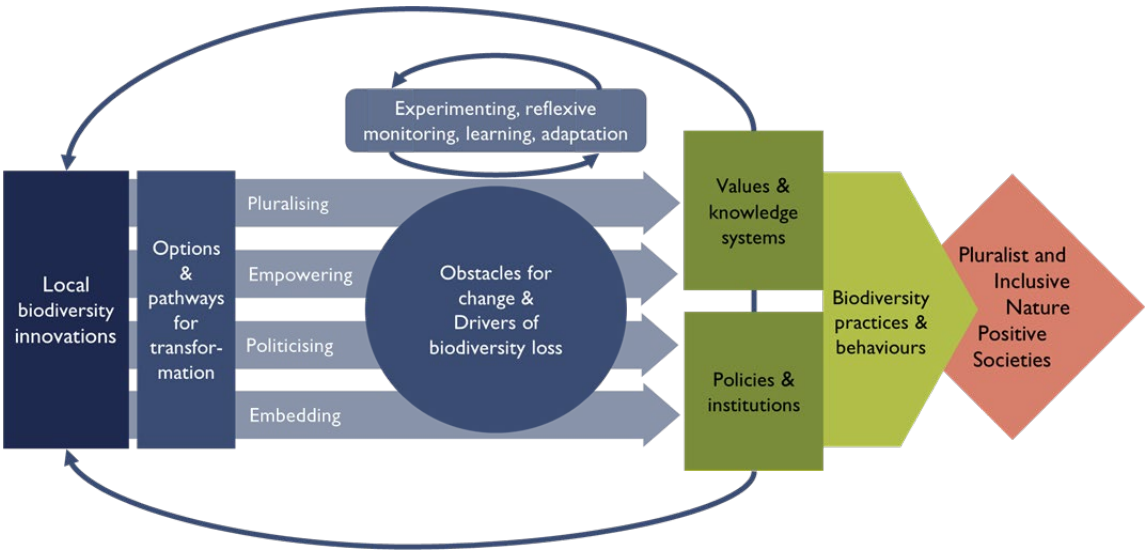

Figure 14 The illustration of a ToTC from the project proposal

BIOTraCeS embraces marginalised ideas and ideals from groups that defy business as usual and challenge current power structures, in search of a nature positive society. BioTraCes collects them as epistemological, moral, and conceptual innovations and uses them as building bricks for a nature positive society, enabled by lifestyle innovations and bio-innovations. At a fundamental level, calling for transformative change, this requires much more reflexivity and relationality in the way society incorporates nature-positive in our thinking and doing. Based on the images of a nature positive society present in our societal partners, the so-called prefiguration[9], BioTraCes looks at the actual state of the art of the social-ecological systems and biodiversity strategies in the biodiversity science

[9] https://www.anthroencyclopedia.com/entry/prefigurative-politics

policy interface and enlightens novel avenues and pathways to that prefigurated society. This will be taken up in our Theory of Transformative Change.

The key result of the BIOTraCes project will be a Theory of Transformative Change. A theory of Change is essentially a comprehensive description and illustration of how and why a desired change is expected to happen in a particular context. It is focused on mapping out or "filling in" what has been described as the "missing middle" between what a program or change initiative does (its activities or interventions) and how these lead to desired goals being achieved. It does this by first identifying the desired long-term goals and then works back from these to identify all the conditions (outcomes) that must be in place (and how these related to one another causally) for the goals to occur. These are all mapped out in an Outcomes Framework.[10]

A theory of change is an articulation of the outcome you aim to achieve and the logic on which this outcome can be achieved. A thceory of transformative change strives for the same outcome, knowing that the change will be transformative (disruptive, beyond complete control). In the case of BIOTraCes the ToTC at least will consist of a:

- Description of the assumptions underlying the ToTC
- Description of emergent reparative practices on the ground that may foster a nature positive society
- Description with of the social/ecological relations at stake in each case study to grasp how changes in representation of nature affect or may high impact sectors
- Conditions for change (governance and knowledge)
- Description of the mechanisms and pathways, with lock-inns and leverage, that contribute, inhibit or accelerate the turn towards a nature positive society
- Indicators showing the effects of change on behaviour and in nature
- A convincing story how a nature positive society can emerge or become the result of the inclusion (according the principles of the PEPE framework of bio-innovations (perspectives, values, knowledge, identities) that can have a positive effect on biodiversity (the narrative)

Using the results of the workshop and casting back on the image of what a theory of change entails, we created a table about the implications for the analysis. The table describes the relation between power and innovation. This relation is particularly interesting considering the assumption of BIOTraCes that inclusion or marginalised perspectives may lead to structural changes in power landscapes.

Innovation / Power	Epistemic	Moral/ethical	Conceptual
Intersectional	Bypassing, changing, or using intersectional power structures to establish new relationships with and understanding of nature (e.g. on the level of identity)	Embedding moral or ethical innovations (e.g. giving rights to nature) in multiple interacting power structures	Creation of safe public spaces for new domains of knowledge (e.g. holistic) about living in harmony with nature: pluralizing Input for task 3.3

[10] https://www.theoryofchange.org/what-is-theory-of-change/

	Input for task 3.4	Input for task 3.4	
Lock ins	Identifying and breaking down the lock ins that stand in the way of epistemic innovations Input for task 3.2	Politicizing initiatives that shift the baseline of what's moral or ethically (un)acceptable Input for task 3.4	Unentangle the power-knowledge interface and embrace citizens science on nature positive ideas Input for task 3.3
Enabler/leverage	Empowering lifestyle innovations and bio-innovations (e.g. with regulations) Input for task 3.1	Empowering initiatives of just transitions Input for task 3.1	Create enablers that combine pluralizing and leveraging Input for tasks 3.3 and 3.1

Table 6 How power and bio-innovations can analytically be related and taken up in subsequent tasks (in green the elements of PEPE).

To back-cast in short, the Theory of Transformative Change will among other elements consist of a system (system of relations between man and nature), logics (mechanisms and power) and a narrative (meta-narrative). The overall analysis of the cases must provide the proof that this Theory of Transformative Change will work. So, the project must create a level of reference describing the business as usual in biodiversity policies and show the added value of incorporating marginalised voices and perspectives in human-nature policies.

6 Outlining the cross-case analysis and synthesis

Based on the methodological considerations in the previous chapters, it makes sense to organise the final cross-case synthesis analysis and across case synthesis in three steps: starting by reviewing all cases as systems of relations in which bio-innovations emerge, become successful or fail; then looking closer in the way power works in the set of case studies and finally try to extract the proof that could substantiate the theory of transformative change. It is proposed here to finally embed the case findings in a post structural research paradigm, because this paradigm seen most adequate to address visible and invisible sources of power, that interact to adopt or withstand innovations from unheard voices and unrecognized perspectives. The outline is very brief, to avoid details overthrowing the essence of the analysis. More information on the questions and sub themes can be found in this report.

6.1 System analysis of case studies

In the first step of the analysis the case studies are seen as systems of relations, acknowledging that relations build systems and that systems are simplifications of reality made by the researcher. BIOTraCes works with the societal partners to understand how the inclusion of marginalised voices, perspectives, values and identities can affect human-nature entanglements.

The research question here is:

How do human-nature relations and entanglements change in response to the inclusion of marginalised perspectives, values, knowledge, identities (bio-innovations) in each high impact sector and what actual and potential steps in terms of human-nature relations are made towards a nature positive society?

Below a more detailed description of the various sub themes within the analysis is provided.

- Description of causes and underlying causes of biodiversity loss in the four high impact sectors.
- Description of bio-innovations in the four high impact sectors, drawn from the cases.
- Interpretation of the relevance or potential of the bio-innovations for a nature positive society.
- Description of the reactions of the respective high impact sectors towards the bio-innovations.
- Mapping moral dispositions of actors in high impact sectors around bio-innovations that lead to inclusion or exclusion:
    - Relational values.
    - Formalized and implicit informal knowledge.
    - Arguments of in- and exclusion.
    - Emotions towards innovations.
    - Path dependencies in behaviour.

6.2 Critical discourse and power analysis of the case studies

The second step deals with a deep dive analysis of power in the system of relations. Critical discourse analysis of what is considered as transformative pathways. The most important research question here would be:

What mechanisms of power, detectable in more than one case, coming from various angles, contribute to leverage or cause blockage of bio-innovations and when does power from marginalised perspectives, values, identities, and groups become transformative?

Below a more detailed description of the various sub themes within the analysis is provided.

- Power analysis
    - Prefigurative power of the societal partners
    - Invisible power mechanisms
    - Intersectional delineation of power influences and mechanisms
    - Leverage and blockage
    - Analysis of transformative power
- Emerging narratives and themes for synthesis

6.3 Cross-case synthesis on human-nature relations

The final step of the analysis deals with the question how inclusion of marginalised perspectives changes existing power relations that create lock-ins; and the synthesis of the logic of bio-innovations as brick stones of a nature-positive society.

The most important research question would be:

What governance principles foster marginalised perspectives on a nature-positive society and how can these help to include other values, knowledge, and behaviour.

- Commonalities in governance that foster or enhance bio-innovations.
- The potential innovation effects of the PEPE framework in governance.
- Narratives: describing human-nature relations with role of values, knowledge, behaviour, significance, and its queerness/otherness (the way they deviate, defy or collide with business as usual in the respective high impact sector).
- Analysis of epistemic, conceptual, and moral innovations.

6.4 Inspiration and guidelines for the overall analysis and synthesis per work package and per task

Having described the cross-case analysis and across-case synthesis, we once again reach out to the work packages and tasks, to indicated where parts of the overall analysis can land. We will be doing that from the ambition of creating critical evidence to enrich/transform biodiversity policies. It must be

ensured that, although the overall analysis and synthesis takes place in different tasks, one coherent framework will be used.

The overall analysis will land primarily in between work packages two and three and inform task 1.1.

It is proposed here that the system analysis and critical discourse and power analysis will be performed in task 2.4. The following subtasks in 2.4 seem relevant:

- Discussing various enablers and disruptors, found in the cases, and how to exploit them.
- Taking stock of the lessons from practices from the partners and stakeholders
- Refection and co-learning on the capacity for pluralising, politicising, embedding, and empowering to include indirect drivers (new ToTC), with feedback workshops with the partners and stakeholders of a case.

The overall synthesis can land in task 2.1, under the subtask of “synthesize lessons learned over de cases”. Task 2.1 can build upon the results of task 2.4.

The tasks 1 to 4 in work package 3 are supposed to use the results of the cross-case analysis and across-case synthesis. In response to this report, and in response to the plans for these tasks, they may formulate the terms of reference to ensure that the basis will be solid and consistent.

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Annex: I: Literature review

a. Concept: Social-ecological network

#	Database	Query	# Results	Used on date:	Used literature	Comments
1	Scopus	TITLE-ABS-KEY ("social ecological system" OR "socio ecological system")	7,922	8/8/2023	(Folke, 2006; Ostrom, 2009; Smit & Wandel, 2006)	Sorted by: cited by highest
2		TITLE-ABS-KEY ("social ecological system" OR "socio ecological system") AND (LIMIT-TO (SUBJAREA , "SOCI"))	3,016			
3		TITLE-ABS-KEY ("social ecological system" OR "socio ecological system") AND (LIMIT-TO (SUBJAREA , "ENVI"))	5,730			
4		TITLE-ABS ("social ecological system" OR "socio ecological system") AND ("grounded theory") AND (LIMIT-TO (SUBJAREA , "ENVI") OR LIMIT-TO (SUBJAREA , "SOCI"))	161	8/8/2023		Sorted by: cited by highest. Used articles that were cited 100+; resulted in 12 articles
5		TITLE ("social ecological system" OR "socio ecological system") AND (anthropocene)	315	16/8/23	(Reyers et al., 2018)	Sorted by: cited by highest.
6		TITLE ("social ecological system" OR "socio ecological system") AND ("frameworks") AND ("comparison")	342	16/8/23	(Binder et al., 2013; Folke, 2006)	

		Via snowball			(Epstein et al., 2013)	
7		TITLE-ABS-KEY ("Social ecological system framework") AND ("ecology")	212	16/06/23	(Partelow, 2018; Villamayor-Tomas et al., 2020; Vogt et al., 2015)	Sorted by: cited by highest.

b. Concept: Power

This document is based on literature study: first on works of Avelino et al. in relation to transformative change and power and second on additional academic literature. To illustrate the knowledge on power the most cited articles in the Scopus data-base were reviewed, using search terms “power analysis", "cross-case power", "comparing power", "power structures", "power systems”, "social innovation", "eco", "empowerment", “transition”, “transition pathways”, “transformative change”, "intersectionality" and "comparative case studies". While it is acknowledged that some of these papers do not explicitly relate to power in relation to nature positive societies, they represent the most prominent research in the field of power and transitions.

#	Query TITLE-ABS-KEY	# Results	Used on date:	Comments
1	("power analysis" OR "cross-case power" OR "comparing power" OR "power structures" OR "power systems")	347.502	01-08-23	
2	("Social innovation" OR "Eco" OR "empowerment")	210.374	01-08-23	
3	("Transition" OR "Transition Pathways" OR "Transformative Change")	2.218.930	01-08-23	
	#1 AND #2	909	01-08-23	Scrolled around until page 10. Found 2 articles that might have some relevant information, but most of it is very technical (in relation to power as in energy). Weirdly also lots of medical articles.
	#1 AND #3	6.531	01-08-23	
	#1 AND #2 AND #3	5	01-08-23	Nonrelevant
4	("intersectionality" AND "power")	1815	01-08-23	
	#4 AND #2	83	03-08-23	Methods: Forum Theater (Olvera Hernandez 2023) Interesting concept: Eco-cultural identity ('the Handbook of of Eco-cultural Identity') e.g. Parks "critical eco-cultural intersetionality" (2020) Book: Environmental Justice in the Anthropocene. Some interesting chapters
5	("Intersectionality" AND "comparative case studies")	8	03-08-23	Maybe one that is relevant
6	("Intersectionality" AND "nature")	609	03-08-23	
	#6 AND #4	116	03-08-23	Book: Linking ecology and ethics for a changing world: values, philosophy,

				and action. Some interesting chapters
7.	("Lock-ins OR Enablers")	31.649	03-08-23	
	#7 AND #4	3	03-08-23	One relevant (Etherington 2020)
	#7 AND #1	319	03-08-23	
	#7 AND #1 Limited to Environmental & Social Science	37	03-08-23	Nonerelevant
	#7 AND #1 AND #2	3	03-08-34	Nonrelevant

c. Concept: Narrative Analysis

Literature study is executed in Google Scolar, using search terms "narrative analysis", "meta-narrative", "narrative inquiry". Next to this, "The MSP Guide; How to design and facilitate multi-stakeholder partnerships" was used (Brouwer, Herman & Jim Woodhill 2015).

ANNEX II: Power contestations

Table 2. Power contestations and questions for research on social change and innovation.

Power Contestations	Questions about social change & innovation (hereafter "change")
Power 'over' < > power 'to' (e.g. Dahl, Parsons, Foucault, Morris, Davis, Giddens, Arendt, Gordon, Stewart)	• *Power over*: Who is exercising power over whom? How are which structures of domination/oppression/dependence changed or (re) produced? • *Power to*: How is power exercised for/through/against change? • *Power with*: How do actors collaborate in the exercise of power for/ against change?
Centred < > diffused (e.g. Dahl, Bachrach & Baratz, Lukes, Mann, Foucault, Gramsci)	• How are the three/four faces of power manifested in processes of change? • How is power diffused, (de)centralised and/or recentralised in/by/ for change? Who is included and excluded? • How & by whom is the agenda of change decided? Which issues are kept off the agenda? How are underlying preferences shaped?
Consensual < > conflictual (e.g. Parsons, Arendt, Mann, Haugaard)	• How are both consensus and conflict manifested in change? • Which conflicts are 'hidden' under seemingly consensual processes? • How and to what extent is consensus oppressive and conflict emancipatory (and vice versa) in processes of change?
Constraining < > enabling (e.g. Foucault, Giddens, Clegg, Davis, Arendt, Hayward & Lukes)	• How are both structure & agency manifested in change? • Who/what is enabled and/or constrained by change and how? • How/to what extent are which structures (a) an object of change (to be transformed), (b) a constraint for change, (c) an enabler for change?
Quantity < > quality (Mann, Sewell, Arendt, Avelino)	• How and to what extent are what different kinds of power exercised for/through/against change, by and over whom? • Which actors are exercising more/less power in/of/through change, and how? Who has more/less access to which resources? • How do power relations/dynamics manifest in change (e.g. cooperation, (in)dependence, competition, co-existence, synergy, antagonism)?
Empowerment < > disempowerment (e.g. Boje & Rosile, Hardy & Leiba-O'Sullivan, Follet)	• Who is (dis)empowered in/by change, by whom or by what? • (How) is (dis)empowerment manifested in change as (a) intentional outcome (empowerment as end), (b) constraining/enabling factor (empowerment as means), or (c) object/type of change in itself?
Knowledge as < > prior to power (e.g. Bourdieau, Flyvbjerg, Lukes, Foucault, Barnes)	• Which knowledges, discourses, ideologies underly the process of change? • How is knowledge on change co-evolving with which power dynamics? • How is knowledge mobilised as (a) an object of change, or (b) an instrument for enabling/constraining change?

ANNEX III: Multi-Actor perspective

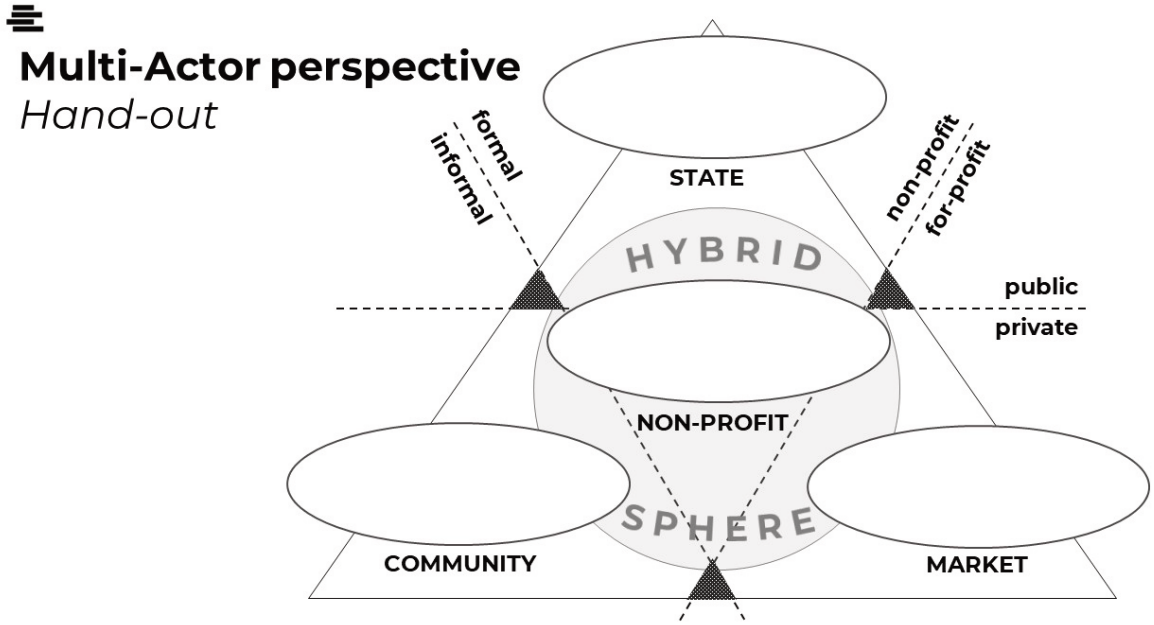

Figure 15 MaP handout to identify actor-centered and institutional logics (Avelino & Wittmayer, 2016, 2017 & 2019)

ANNEX IV: Issues and institutional fields

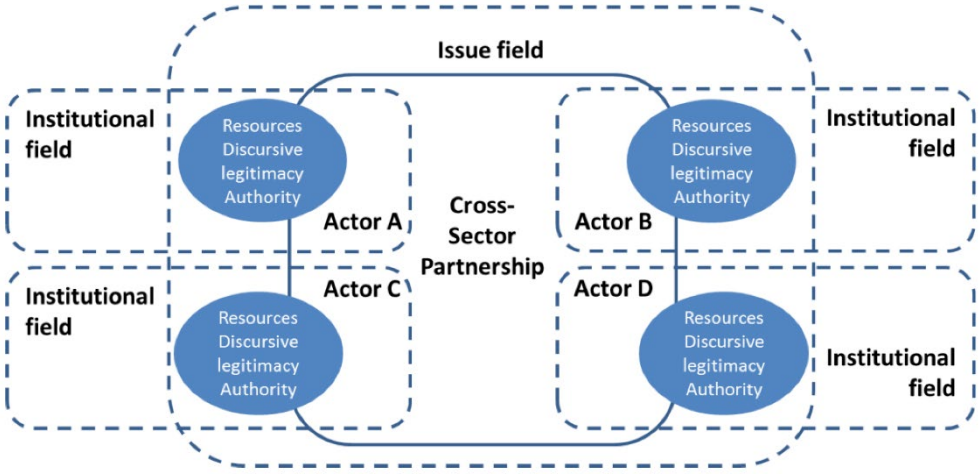

Figure 16 Power sources at the intersection of issues field and institutional fields (De Wulf & Elbers, 2018)