TRANS

lighthouses

MORE THAN GREEN

Lighthouses
of transformative
nature-based solutions
for inclusive communities

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Towards Reciprocal Human-Nature Relationships in Nature Based Solutions?

Deliverable report on human-nature relationship in Nature Based Solutions

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Executive Summary

This report is a Deliverable 2.4 of the project TRANS-lighthouses (More than green - Lighthouses of transformative nature-based solutions for inclusive communities). The report presents a conceptual framework to enhance the understanding of human-nature relationships in Nature-Based Solutions (NBS) with the aim of guiding the work on the nature dimension in the TRANS-lighthouses project. The framework is developed through a literature review and its translation into practice through the collaborative work with TRANS-lighthouses Living Knowledge(s) Labs (LKLs), in the form of workshops and questionnaires.

The report synthesizes perspectives from anthropocentric, ecocentric, and relational approaches to human-nature relations to create a preliminary typology of NBS practices observed in the TRANS-lighthouse Living Knowledge(s) Labs. These practices are categorized into three empirical-analytical types:

- **NBS compensating extractivist production with nature protection** (Anthropocentric–ecocentric NBS type)
- **NBS designing spaces for interaction with nature** (Anthropocentric–relational NBS type)
- **NBS enabling nature regeneration through human practices of care** (Relational–ecocentric NBS type)

The report discusses how these NBS types can be understood in relation to their underlying ontological assumptions and orientations toward human-nature relationships. By offering this reflexive framework, the report provides a tool for critically assessing and evolving LKL strategies in the TRANS-lighthouses project. This dual aim supports the collaborative enhancement of LKL practices and the empirical refinement of the framework's applicability. The deliverable report provides a theoretical framework that can be applied in practice further in the project, especially in relation to the empirically oriented task 3.5 "Human-nature relations: behavioural and cultural meanings attached to nature" that works with data collection on meanings and values of nature.

Preface:

The TRANS-lighthouses project aims to understand the strengths and limitations in the design and implementation of nature-based solutions (NBS) and to contribute to rethinking and reframing the main elements that compose the complexity of creating socially and ecologically just solutions.

The project is funded by the European Union under the Horizon Europe programme (grant agreement 101084628) lasting from May 2023 to October 2026 with a budget 5.9 million euros.

TRANS-lighthouses strengthens socio-politics as part of the public agenda for nature-based solutions towards systemic change. TRANS-lighthouses also integrates a network of "lighthouses" in urban, rural, coastal and forest areas. The "lighthouses" are a metaphor for a set of local governance arrangements and instruments, within multi-stakeholder networks and concerted groups. They are aimed at improving the contributions of nature-based solutions and achieving, in an integrated way, ecological, social and economic objectives. To this end, new governance models will be tested, as well as approaches and tools for co-creation in small scale but big picture projects that can be upscaled over time.

Accordingly, each lighthouse is composed of Living Knowledge(s) Labs, assessment cases, pilot cases and international associated partners. In these spaces, the interaction of different knowledge, experiences and roles will support the assessment of ongoing solutions and the testing of new ones. In this way, it is intended to prioritize the perspectives of citizens, in dialogue with other interested actors for their co-creation.

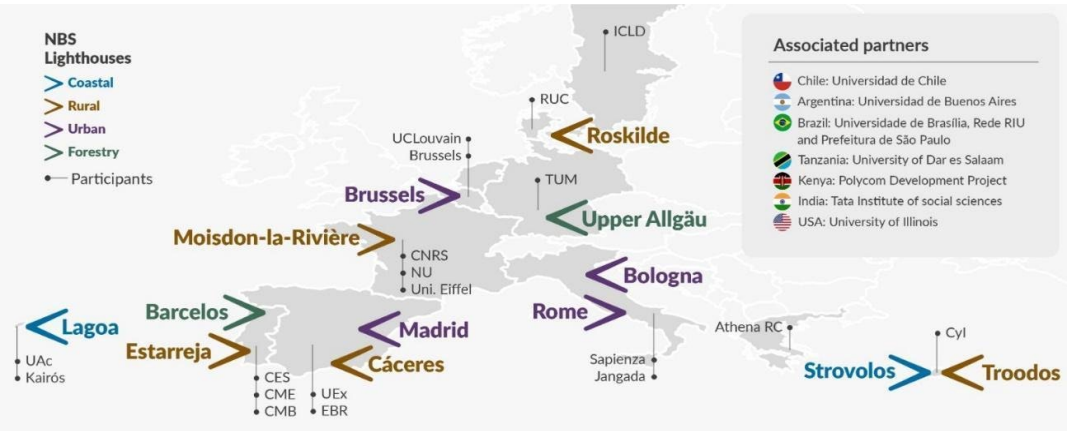
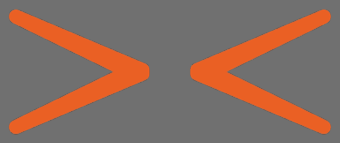


Figure 1: *Map of NBS lighthouses in the project.*



1. Introduction:

The need for reciprocal human-nature relations

Extractivism – exploitation of natural resources for economic gain, has led to significant environmental degradation and the disruption of ecological systems. It prioritizes short-term economic benefits over long-term environmental sustainability. Extractivism has been particularly detrimental to the Global South, where it is often intertwined with histories of colonialism and continued economic dependency (Acosta 2017; Svampa 2019).

But more than resource extraction, extractivism can refer to the overall crises of human-nature relations – *"relations between humans and their wider ecologies: in human, social and ecological relations constituting those living livelihoods we are inherently part of; the way we understand and conceptualize these relations; and in the way, we organize ourselves embedded in these*" (Egmose et al. 2021, p. 1). Extractivism represents a disconnect from viewing humans as deeply embedded in and interdependent with broader ecological systems. Instead, it favours a mindset of control and mastery, as if ecosystems can be fully mastered and exploited. Umantseva & Egmose (2023) highlight how extractivist practices are fundamentally unsustainable because they ignore the necessity of nurturing and sustaining the very environments that support human life. Ideas of sustainability such as living within "planetary boundaries" although highlighting that the current use of resources is unsustainable, often do not change the dynamics of alienation from the ecologies we are embedded in (Artmann 2023). Acknowledging that sustainability cannot be achieved within the framework of extractivism, we have further argued for the need of transformations towards practices that emphasize reciprocity and care (Umantseva & Egmose 2023).

Hence, the crucial question is what relations of reciprocity can mean and how they can be supported by academics and practitioners. Following Egmose (2021) what can be called 'a regenerative turn' can be observed at the margins of industrialized production and farming systems in the Global North, as well as re-emerging interest in many practices of the Global South that demonstrate human-nature relations characterized by responsiveness and care for the ecologies we are embedded in.

The possibility of a regenerative turn towards care and reciprocity is faced with a number of important challenges. Firstly, related to the epistemological foundations of what knowledge and practices of human-nature relations are seen as valid and credible in Western and industrial societies, there is a need to acknowledge and create dialogues

with practices which have long been marginalized in science and society (Artmann 2023: Egmose 2021).

Further, the need to approach changes in human-nature relations is inseparable from broader societal and economic changes. In both urban and rural spaces, we are dependent on systems based on extractivism. How can reciprocity be found when co-living with nature becomes uncomfortable for people, and human action to manage, control, separate or even eradicate is required. How can these practices be re-thought through the lens of care and reciprocity? What does human well-being mean if relations with nature are to be fundamentally reconsidered? These are key issues to be considered when addressing the overarching question for this report: Does NBS practices change human-nature relations?

2. Does NBS change human-nature relations?:

Different views on nature in NBS

NBS has been defined by The International Union for Conservation of Nature (IUCN) as "actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well–being and biodiversity benefits" (Cohen-Shacham et al. 2019, p. 21). The European Commission provides a more extensive description, defining nature-based solutions as "Solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions" (European Commission, n.d.).

Following Woroniecki et al. (2020), the framings of nature and human-nature relations by researchers and public institutions in NBS projects play an important role in defining the objectives, outcomes as well as citizens' role in NBS, since how nature is defined can shape and alter the thoughts and practices in relation to that nature. Following Mercado et al. (2023) and Welden et al. (2021) the embeddedness of the concept of NBS in certain ontological and epistemological assumptions may either reproduce extractivist human-nature relations or enable a paradigm shift towards more reciprocal relations.

In the below, we will review different perspectives on NBS and reflect on the ways they approach the role of NBS in working towards changing human-nature relations. We identify the general categories of anthropocentric, ecocentric and relational approaches to nature in NBS.

2.1 Moving from anthropocentric to relational approaches?

Anthropocentrism, ecocentrism and relational ontologies are three different philosophical strands or ontological viewpoints which consider different understandings of the relationship between humans and nature. However, it is important to note that, firstly, there are no clear boundaries between these three approaches. For example, many anthropocentric views recognize non-instrumental values of non-human beings thus integrating ecocentric considerations, and vice versa (Kortetmäki 2013). Hence, the association of NBS literature with these three approaches is not intended as a clear-cut categorization, rather its intent is to demonstrate how the conceptualization of NBS is changing alongside the broader historic developments in understanding of human-nature relations.

2.2 Anthropocentrism

Anthropocentrism can be defined as regarding humans as separate from and superior to nature. It argues that the intrinsic value of human life justifies using nature as resources for the benefit of humans (Kortetmäki 2013). Anthropocentrism can be traced back to early philosophers, for instance, in medieval theology, and even long before then, for instance to Aristotle. Thomas Aquinas, heavily influenced by religious thoughts, justified human dominance over other life forms with the belief that man is a reflection of God (Kortetmäki, 2013). Some argue that anthropocentrism, especially the notion of mastery over nature, is predominantly of European origin (Pattberg 2007). Following Pattberg (2007), Europe's "step ahead" period from 1450 to 1750 was crucial in solidifying the ideology of domination over nature, cross-related with the influence of the Christian religious tradition, development of scientific method, and the rise of early capitalism. The development of "the scientific method", emergent in the 17th century, contributed to the idea that humans could control nature to their benefit through understanding the laws of nature, scientific discovery and technological advancement. For example, Francis Bacon formulated the concept of mastery over nature as a new scientific and practical enterprise. Similarly, Rene Descartes, as proponent of the mechanistic worldview, suggested that by understanding the mechanical principles governing nature, humans could manipulate it for practical reasons (Pattberg 2007). The "age of discoveries" provided for its world-wide application through travel and exploration, the rise of homo economicus and the Industrial Revolution, have thus been argued to elevate an ideology of domination as guiding for human behavior (Pattberg 2007). As argued by Fraser & Jaeggi (2018) exploitation of natural resources can be seen as advanced extractivism in modern industrialism treating nature as merely resources for human exploitation.

Following Kortetmäki (2013), the old form of anthropocentrism that justified the free exploitation of nature with philosophical arguments is different from what can be viewed as current anthropocentrism. Contemporary anthropocentric views are concerned with environmental issues and acknowledge that exploitation of nature is excessive, and there is a need for change through protection of the environment. However, it can be argued that contemporary anthropocentrism still views nature as a resource, asserting that humanity currently uses these resources and ecosystem services in an unsustainable way, which threatens human well-being. Environmental obligations are justified by what is good for humans, implying that anthropocentric concern for the environment arises distinctively from human-oriented motivations.

2.3 Ecocentrism

Ecocentrism emphasizes inherent (intrinsic) value in all of nature itself, beyond its value for human preferences and valuation (Washington et al. 2017). Some of the most known thinkers who developed ecocentric ideas were, among others, Aldo Leopold who framed the "Land Ethics", Henry David Thoreau and John Muir, who is considered a prominent figure in inspiring early nature conservation movements (Kortetmäki 2013).

One of the most known thinkers of ecocentrism is Arne Naess (1974) who developed *deep ecology,* a philosophical reasoning based on ecocentric considerations. Some of the main principles of deep ecology are the inherent value of human and non-human life. Every part of the biosphere, have an equal right to live and cannot be thought of without reference to their mutual relationships and the ability to coexist and cooperate. The value of non-human life-forms does not depend on their value for human needs and humans have no right to decrease the diversity of non-human life forms except to satisfy their basic vital needs (Naess, 1986).

Ecocentric approaches as a general term comprize a variety of philosophical ideas with varying degrees of hierarchization or egalitarianism between different species and entities, meaning that there are different approaches in ecocentric thinking to whether human needs can be placed above needs of non-humans, and to what degree (Kortetmäki 2013).

2.4 Relational approaches to human-nature relations

The current ecological crises, and the realisation of profound influence people have on the planet in the epoch of Anthropocene[1] has led to particular focus on human-nature relations in contemporary societies. We suggest that the focus on relations can be understood as a standalone approach different from purely anthropocentric or ecocentric approaches. Although it shares with the more ecocentric approaches the understanding of nature as more than instrument for human well-being, it shifts away from the focus on nature's intrinsic value and highlights the need to understand the complex and dynamic relations between humans and nature.

[1] The Anthropocene is a proposed geological epoch in which human activities have become the dominant influence on Earth's climate and environment, significantly altering its natural processes (Crutzen and Stoermer, 2000).

We can identify several strands of literature which feed into the relational approach. Firstly, the "relational turn" in humanities and social sciences (Latour 2007; Haraway 2013; Barad 2007) that views relations as more important than the entities, - "rather than processes and relations being derivative of entities, they are constitutive of entities" (West et al. 2020, p. 306). For example, Actor-Network Theory (ANT) developed by Bruno Latour proposes that humans and non-humans (animals, plants, objects, etc.) are part of networks where all entities (actants) have agency. This theory dissolves the boundaries between nature and society, highlighting how both are co-constructed in relational networks (Latour 1993). These theories exemplify flat ontologies which position humans and non-humans as having equal agency within networks. erasing hierarchy between social and natural entities; rather, all are interconnected and mutually constitutive. This approach flattens traditional ontological distinctions between humans and non-humans, emphasizing the relational networks they form.

However, in our view of relational approaches to human-nature relations we suggest stepping away from flat ontologies and focus on recognizing the unique needs, vulnerabilities, and responsibilities of different beings, rather than treating all entities as ontologically equivalent. Following Head (2016, p. 5) "conceptualization of human-nature relations must recognize both human power and its embeddedness within material resources". This acknowledgement of the crucial role of humans, perhaps, brings the relational approach closer to the anthropocentric views, however, not in terms of instrumental use of nature, but rather in recognizing the role and responsibility of people in living in the relational world. There is a need for acknowledging that humans are embedded in, interfering with, and having profound impact on the living ecologies they embedded in and dependent upon, and a need for renewing ways of relating, different from mastery (Egmose et al. 2021).

In this report we particularly consider how indigenous and eco-feminist scholarship can provide valuable insights into conceptualizing relational approaches to human-nature relations. Turning to indigenous knowledge in reconceptualizing human-nature relations demonstrates that there is a need to consider not only changes in theories and methods in scientific inquiry, but also challenge the very epistemological and ontological foundations of human embeddedness in the world. Indigenous worldviews and practices introduced the concepts of "kincentric ecology" (Salmon, 2000), Buen Vivir, reciprocity and stewardship (Ranta, 2020), showing ways in which human-nature relations constituting an extended community with the roles of various beings (including humans, animals, plants)

within a larger, interconnected web of life (Kimmerer 2013). This invites scholars to explore the possibilities of translation and dialogue of indigenous and Western approaches for renewed socio-ecological organizing (Kimmerer 2013).

One of the key insights from indigenous knowledge systems is focus on re-thinking the role of humans in human-nature relations. Approaching co-living of humans and non-humans from the perspective of interconnectedness entails responsibilities to care for and maintain the balance within this extended community. Following Kimmerer (2013), this co-living can be harmonious, because *taking from nature doesn't mean depleting nature*. Rather human taking from nature if done respectfully and attentively can actually stimulate nature's prosperity, creating symbiotic relations. This suggests a different view that challenges the divide between ecocentric and anthropocentric approaches, and the idea that the use of nature for human well-being depletes nature and has to be offset with conservation measures.

Eco-feminism is another approach that emphasizes the interconnectedness and interdependency of human and non-human entities, however, while flat ontologies seek to map out the interactions within networks, eco-feminism is explicitly concerned with power dynamics. The idea of mastery and control of nature was coined by Val Plumwood, (Plumwood 1991, 1993) who, through her eco-feminist writings aimed at dismantling the idea of humans as conquerors of nature, and promoted a more inclusive, respectful, and interconnected approach to our environment. Plumwood criticized the dualistic and hierarchical thinking that separates humans from nature, positioning humans as superior and nature as inferior. This perspective allows for the exploitation of nature, as it justifies the belief that humans have the right to dominate and control the natural world. Puig de la Bellacasa (2017) argues that viewing nature through a lens of care challenges the conventional exploitative and extractive attitudes. Care, reproduction, and regeneration involve a deep emotional and ethical engagement with the more-than-human world, valuing the well-being of all entities, including non-human beings and ecosystems, creating a sense of interconnectedness.

2.5 Anthropocentric views in NBS: the ecosystem services approach

The development of the NBS concept is closely related to the conceptualization of ecosystem services (ES). The term ecosystem services is generally used to describe how natural environment provides services and benefits to people (Pereira et al. 2023) – "model

for linking the functioning of ecosystems to human welfare" (Fisher et al., 2009, p. 643), for example how green areas in cities provide recreational, wellbeing and health benefits to people, or how natural systems can protect populations from floods or other environmental ills. Following EC (n.d), nature-based solutions "support the delivery of a range of ecosystem services". NBS have been strongly associated with an innovative way to supply a wide range of ecosystem services, especially in addressing urban challenges (Pereira et al. 2023), and are discussed as a more preferred way to deliver and maintain ecosystem services in comparison to other methods, for example, engineering solutions (Keesstra et al. 2018). Following the literature review of NBS-related publications conducted by Hanson et al. (2020), most of these publications use the NBS concept in association with both the ecosystem service and green infrastructure concepts.

The concept of ecosystem services stresses the relevance of ecosystem structures and processes to mental and physical well-being (Grunewald & Bastian 2014). It describes both the supply and demand of services for humans. According to the Millennium Ecosystem Assessment (MEA 2005), there are supporting services (such as soil formation, photosynthesis), provisioning services (such as food), regulation services (such as erosion control) and cultural services (such as landscape aesthetics as basis of recreation and tourism). Especially the global assessment by the Millennium Ecosystem Assessment (MEA 2005) and the "Economics of Ecosystems and Biodiversity" (TEEB 2010) studies had a considerable influence on policy debates and policy making as the degradation of ecosystems and their ability to provide goods and services would also lead to negative consequences and economic costs for society (Costanza et al. 1997). The attractiveness of the ES concept is based on its integrative, interdisciplinary and transdisciplinary character, as well as its linking of environmental and socio-economic elements (Müller and Burkhard 2007).

Initially, the term ecosystem services emerged as a pedagogical and awareness-raising concept to draw attention to the fact that humanity's well-being and survival overall are dependent on the ecosystems we live in, and the need for transformative changes in the condition of rapidly deteriorating and disappearing ecosystems (Gómez-Baggethun et al. 2010). However, with the solidification of the concept in research and development, there has been a shift from the original pedagogical intent for biodiversity conservation efforts towards a growing focus on the monetary evaluation of ecosystem services as market commodities (ibid). The use of ecosystem services in framing ecological concerns in a utilitarian manner has been raising critical concerns about the danger of ecosystem

services framework to reinforce utilitarian human-nature relations (Ojeda et al. 2022; Welden et al. 2021). Despite work on re-thinking ecosystem services as a less unidirectional concept, for example, developing the approach of reciprocal contributions between people and nature (Ojeda et al. 2022), or "Nature's contributions to people" framework that incorporates relational values into analysis (Díaz et al. 2018), it can be argued that a strong focus on the instrumental dimension remains.

Following Eggermont et al. (2015), and Schröter et al. (2014) positioning the ecosystem services perspective at the centre of NBS conceptualization can pose a danger of reproducing human-nature relations based on instrumentalization and extractivism, by reducing NBS to developing nature-based tools for human use and well-being. Following Silvertown (2015), although the field of ecological economics supports the monetization of ES serves as a means to connect the need for biodiversity preservation with policy making, there are also many critiques. These critiques mainly point to the reduction of multi-faceted values of nature to monetization, as well as failing to generate change in human-nature relations from viewing nature as a resource (ibid).

Although here we position ecosystem services into the section about anthropocentric views on NBS, ecosystem services cannot be described as purely anthropocentric. Ecosystem services (as well as other NBS approaches), as complex practices and institutional arrangements, combine anthropocentric views with both ecocentric and relational approaches. We need to underline that the combination of three perspectives is not a strict analytical model, but a way to position different approaches identified in the literature. And accordingly, a way to identify how these connotate different approaches and meanings to working with NBS. In section 4 this report will provide a more nuanced model of NBS approaches to nature, that discusses the situatedness of different NBS according to the spectrum between different ontological views.

2.6 Moving towards ecocentric perspectives in NBS

More recently, critical voices have focused on the need to transition away from instrumental approaches and include ecocentric considerations in NBS framing and planning, highlighting the value of nature in itself outside of human use (Pineda-Pinto et al. 2022; Maller 2021). Ecocentric perspectives have been the most prominent in conceptualizations of NBS in relation to ecological justice. The theory of ecological justice extends dimensions of social justice (human focus) to include non-human nature. Hence,

non-human nature in the view of ecological justice is not just an instrument for delivering social justice, but an entity in itself (Grabowski et al. 2022; Pineda-Pinto et al. 2022 ; Pineda-Pinto, Frantzeskaki, Chandrabose et al., 2022). Ecological justice emphasizes the agency of non-human elements and the rights of nature to exist and thrive (Grabowski et al. 2022) – including ecological agents within decision making processes and working with rather than against ecological processes. Ecological justice in NBS implies that just and inclusive transformations cannot happen without "reframing human-nature relationships around the capacities of nature recognizing the inherent agency and self-assembling properties of ecological systems" (Grabowski et al. 2022, p. 178).

The incorporation of the ecological justice framework in NBS is quite recent, and there is a need for further development to understand how and to what extent the ecological justice framework can contribute to changing human-nature relations. The framework has mostly been applied to discussion about urban nature (Pineda-Pinto, Frantzeskaki, Chandrabose, et al. 2022 ; Maller, 2021) in relation to green spaces and biodiversity or lack of thereof in the cities, calling for the need to incorporate justice for non-human species in the planning of urban infrastructure. Therefore, ecological justice has a potential for introducing intrinsic values into the discussion on urban planning and infrastructure. However, how ecological justice can be applied in regard to transitions in broader human-nature relations including daily practices, socio-economic organizing and governance practices remains an open question.

2.7 Call for a paradigm opening for relational approaches in NBS

Focus on changing human-nature relations

We suggest that re-orientation of NBS from the dichotomy between valuing nature for people and valuing nature for itself (Welden et al. 2021), is needed to focus on relational values in NBS. A relational turn in sustainability thinking suggests a turn towards "conceiving of humans and nature as interconnected within hybrid systems" (West et al. 2020). Hence, repositioning NBS from a relational perspective would imply positioning the questions of justice and changing human-nature relations at the centre of NBS.

The call for a relational turn in NBS is rather recent (Mercado et al. 2024; Welden et al. 2021). A review of literature demonstrates that the main directions the authors identify for re-positioning NBS towards a relational perspective are, among others, focus on socio-ecological relations and societal transitions. The key departure of the relational approach

in NBS from both instrumental and ecocentric is arguably the shift of the focus to social–ecological relations, rather than primarily on ´nature alone or on the benefits people get from nature' (Welden et al. 2021, p. 968). Following Mercado et al. (2024), a shift towards changing human-nature relations requires, firstly, working with ways of re-organizing daily practices, and wider socio-economic and technological transformations to accommodate those. And secondly, focus on governance and inclusion – "creating governance spaces within which alternative but often marginalized worldviews can influence decision-making" (ibid, p. 89).

Relational values

Following the IPBES report (2022), the ways nature is perceived and valued in economic and political decision-making is closely linked with the causes of the global biodiversity loss and climate change, as well as ways these challenges can be addressed. The report emphasizes the need to work towards transitions from values that focus on short term and individual material gains to cultivating sustainability-related values across society (ibid). Values can be defined as "different ways in which nature, ecosystems or ecosystem services are important to individuals or social groups" (Feucht et al. 2023, p. 2392).
Feucht et al. (2023) distinguishes between the main types of nature values:

- **intrinsic** (values of nature as ends in themselves, independent of their utility to humans), which relates to **ecocentrism**
- **instrumental** (the value of nature as solely a means to an end), related to **anthropocentrism**
- and more recently conceptualized **relational** values (responsibilities between humans and between humans and nature) (Arias-Arévalo et al. 2017), linked to the relational approach

What relational values mean and what are the implications of focusing on relational values in examining values people assign to nature is a broad growing discussion in the fields of sustainability studies, ecological psychology and ecological philosophy (Chan et al. 2018; Ghijselinck 2023; Mattijssen et al, 2020). Recognition of relational values in nature perceptions is a shift towards moving beyond identifying values of nature as either a resource for human use or as something which should be valued for its own sake (Chan et al. 2018; Mattijssen et al. 2020). Attention to relational values shifts focus towards valuation of a human-nature relationships in themselves, and the qualities of these

relationships, in addition to the instrumental/intrinsic dualism (Jax 2018; Mattijssen et al. 2020).

Relational values is an emerging concept, and hasn't been free from criticism. For instance, one critique points to the vagueness when it comes to translating relational values into empirical phenomena, sometimes making it into an empty concept (Pratson et al. 2023). Or it has been suggested that the use of relational values is often a mere reinterpretation of instrumental values, but with a more focus on cultural and well-being benefits for people, instead of monetary value (Piccolo et al. 2022).

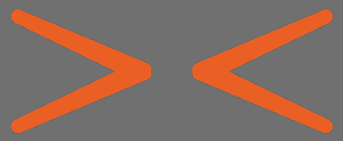
Despite the criticism, relational values can be a useful concept for exploring possibilities for re-thinking the dualism between anthropocentrism and ecocentrism in framing nature values in NBS. It can be helpful in order to position NBS along questions about how people and nature shape and affect each other. Moreover, introducing the concept of relational values can help to avoid dichotomization of different types of values, and rather explore the plurality of values that individual people and groups have (Arias-Arévalo et al. 2017). People embody multiple, often conflicting values simultaneously, even in relation to the same ecosystem (ibid). Focusing on the intersections of dynamic and often conflicting plural values can create a space for (un)learning and re-negotiations in human-nature relations.

More-than-human thinking in NBS

The term "more-than-human" indicates a shift towards viewing humans not as independent and separated from nature but interconnected with multiple non-human entities (Maller 2021). Latour (1993) viewed "more-than-human" through the perspective of a network of relationships formed collectively by humans and non-humans (animals, plants, objects), thus creating hybrid agency. Haraway's notion of "natureculture" blurred the boundaries between nature and culture, emphasizing the co-construction and co-evolution of human and non-human entities (Haraway 1985).

Maller (2021) and Herrmann-Pillath (2023) integrate the concept of more-than-human thinking in reflecting on how NBS can shift away from anthropocentric approaches. Maller (2021) suggests moving towards recognition of agencies and rights of non-humans in the context of urban NBS and focusing on needs of non-human besides human in the NBS processes by, for instance, understanding urban greening not only as a human need for green spaces but as an opportunity to increase biodiversity. Some of the points made by

Maller go in line with the more ecocentric approaches in NBS mentioned above, while also appealing to relational approaches and turning towards viewing cities as spaces of reciprocity between humans and non-humans.



3. Reciprocal human-nature relations – in theory and practice

The notions of reciprocity, care and stewardship are some of the central concepts in scholarship that seeks to conceptualize and empirically explore possible paths towards changing contemporary human-nature relations. This section explores convergence and divergence of these notions. While care, reciprocity and stewardship originate from different theoretical strands, they intersect in ways that invite critical exploration.

3.1. Positioning of care, reciprocity and stewardship within theory and practice

Reciprocity with nature are practices which take inspiration from indigenous traditional knowledge and relations with the environment to emphasize that humans can engage with nature not as dominant entities exploiting resources, but as participants in a reciprocal relationship, including giving back and contributing to the well-being of the natural world in exchange for what is taken; treating nature as a partner and expressing gratitude; and furthering a sense of interconnectedness (Kimmerer 2013; 2011).

Conceptualizing reciprocal human-nature relations predominantly builds upon practices and worldviews of Indigenous groups (Kimmerer 2013) or local communities practicing subsistence economy (Bresnihan 2016). Building on these practices, reciprocity with nature originates from a particular kind of community's view on their place and role within the social and natural world, referred to as 'kinship relations', "relations, in which caring for the natural world is a form of caring for family, who in turn help people to feed their human families" (Diver et al. 2019, p. 403).

The concept of reciprocal human-nature relations, mainly stemming from Indigenous and local subsistence-based communities, places a strong focus on the need for recognition and revival of knowledge and practices of groups who are carriers of traditional ecological knowledge. It emphasizes the need for acknowledging historical injustices and rights of groups for access and control over territories and their management (Kimmerer 2013, Diver et al. 2019). Besides formal rights of access and ownership (of land, water, etc.), changes in socio-relational mechanisms also affect access and recognition of knowledge, markets, capital, self-identity, etc. (Diver et al. 2019). De Sousa Santos (2015) introduces the notion of "epistemicide" – erasure of knowledge systems, practices and experiences often those of indigenous, local, or non-Western cultures because they are not aligned with predominant Western-centric epistemologies. Similarly, Escobar (2016) talks about "ontological occupation" and ontological struggles that involve many indigenous and

peasant groups that comprise struggles for territories – access, decision-making, ownership – as well as struggles for worldviews and knowledge paradigms.

The question of human-nature relations has also been central within several strands of feminist thinking, including ecofeminism and feminist political ecology (Mies & Shiva 1993). The concept of care is central in feminist theorization of transformations in human-nature relations, where care labour (often considered as gendered) is viewed as undervalued and exploited within the predominant understanding of economy as rational action with the purpose of profit maximisation (Bauhardt 2018). Maria Puig de la Bellacasa has played a significant role in introducing the "ecological turn" into care conceptualization (Puig de la Bellacasa 2012; 2015; 2017), taking up Joan Tronto's (1993, p. 103) conceptualization of care as "species activity that includes everything we do to maintain, continue and repair our world", and combining it with readings of post-human thinkers as Latour (2007) and Haraway (2013). Puig de la Bellacasa (2017) explores questions of what it means to care in the context of the more-than-human world. She notes that "care is human trouble, but this does not make of care a human-only matter" (ibid, p. 2). In her reading, she goes beyond perceiving care as a normative stand encouraging humans to care for the more-than-human nature. Rather she understands care as an ontological condition of being in a relational world and hence care is unavoidable. The question is then: how can we care? And what transformations in thinking and relating, and in socio-economic organising are needed to be able to care?

3.2 Roles of humans and nature in reciprocal human-nature relations

One of the key questions in theorization of human-nature relations is re-thinking the roles of humans and nature. For instance, this issue is central in the scholarship on how people's values affect human-nature relations, prominent in environmental sociology and philosophy. The scholarship on NBS also engaged with this question, in the dilemmas between conservation and sustainable management.

Reciprocal relations highlight *mutually beneficial* relationships and *mutual responsibilities* to nature (land, water) (Diver et al. 2019). Kimmerer (2013) argues that reciprocity builds on inherent relations of mutual interdependence and mutual respect: "The ethic of reciprocity embodies the idea that the land provides for the people and the people, in turn, must care for the land" (Kimmerer 2013).

Ojeda et al. (2022) build on the idea of mutual benefits to conceptualize the notion of 'reciprocal contributions between people and nature'. The authors intend to conceptually intervene with the widely used notion of 'ecosystem services' and more recent terminology of nature's contributions to people (Díaz et al. 2018), framed by IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services established by the United Nations), by suggesting that while these approaches highlight the benefits of nature to people, there is a need to focus on how people can contribute to nature, taking point of departure from existing practices in indigenous and subsistence-based communities. The authors define reciprocal contributions that "encompass actions, interactions and experiences between people and other components of nature (considering people as part of nature) that result in positive contributions and feedback loops that accrue to both—directly or indirectly—across different dimensions and levels" (Ojeda et al. 2022, p. 4).

Caretaking, stewardship or guardianship

However, reciprocity implies that the role of humans is not to 'leave nature alone' and let it take its turn (Salmón 2000) but rather to be one part of the ecosystem, where natural elements have other important roles, understanding relations with nature in terms of caretaking, stewardship or guardianship of the land (Whyte et al. 2016). Taking an example from the land management practices in indigenous communities of the Americas, the human role is seen as deciding and executing various caretaking activities, for example, tending to which plants need to be harvested or thinned and which should be given time; which plant species should be intermixed with each other and which should be grown separately; which soil needs to be disturbed and which left unmoved, etc. (Salmón 2000).

The crucial characteristic of this role is to take decisions and carry out the manipulations not based on one need – e.g. collecting and increasing crops for human use - but based on the needs of thriving of the whole ecosystem, including crops for humans, vitality of plants, health of the soil, etc. (Salmón 2000).

Symbiotic relationship

The reciprocal relationship views the role of humans as very important, and reciprocity does not imply human withdrawal or inactivity, - they are active participants in the "natural community" (Salmón 2020). Rather the human role can be understood as symbiotic (Mazzocchi 2020) – developing practices that sustain human needs and contributing to nature caretaking, and striving for the balanced relations where human presence is

beneficial rather than destuctive for nature. Kimmerer (2011) describes these relations of symbiosis with an exploration of sweetgrass harvesting, a plant that provides resources for local crafts. Sweetgrass thrives best if harvested using traditional techniques rather than being untouched, hence human interference and disturbance of the plant, if done correctly, makes the sweetgrass population strong and abundant. Kimmerer suggests that the human role in this symbiotic relation is not taking too much from nature, but also, *not taking too little.* This thinking questions the dualism between non-interference with nature for preservation and using nature for resources, where the way to care for nature means creating spaces for wild nature and allocating other natural areas for human needs. Instead, reciprocity implies that human role in nature can be actually living within and with it and contributing to its well-being while sustaining human needs.

Shifting from the mindset of control to a complex web of relations, however, also results in emergence of ambiguities – questioning the role of humans in the web of relations and realizing that there are no easy and clear answers. As described by Seymour & Connelly, (2022) shifting to a relational mindset brings forward the often-paradoxical sense of human agency – being a part of the interdependent web of relations and simultaneously exercising power to change and influence the eco-systems.

3.3 Place of care and reproduction in society

Care, stemming from feminist theories, is closely related to the concepts of (re)productive labor and social reproduction, and the central but undervalued role of care in society (Tronto 1998). In line with feminist political ecology and feminist economy, there is a need to re-think economy in terms of "caring economies" where reproduction – activities of sustaining, restoring and regenerating human and more-than-human lives – become the primary principles (Egmose et al. 2024; Biesecker and Hofmeister 2010; Biesecker et al. 2014). Feminist thinking raises concerns for the social and political implications of engaging in care and questions of injustice and exploitation in terms of both providing and receiving care, highlighting the often-invisible labor and emotional work involved in care. Hence, thinking of human-nature relations in terms of caring and caregiving also implies thinking about how caring human-nature relations can currently be incompatible with economic practices based on efficiency and extractivism.

However, Bellacasa invites thinking and engaging with care in a non-predetermined way, but proposes a notion of *speculative ethics of care.* She acknowledges the necessity of attention to exploitation and inequalities in care labour, but also suggests the need for

imaginative approaches to care that go beyond traditional norms, boundaries and predefined roles (Bellacasa 2017). Bellacasa leaves us "with the trouble" in space between practical, embodied realities of care and speculative commitment of reclaiming care as a way to move towards transformations in socio-ecological relations (Bellacasa 2017), between reproduction as a "relationship of labour and exploitation and a source for creating bonds with the material foundations of life" (ibid, p. 32).

Engaging in matters of care in this sense means rediscovering and renegotiating care in every specific situation that involves care, with attention to what are the needs and possibilities in the caring relations. Bellacasa (2017) does not advocate for a particular way of caring but highlights the context dependent everyday practices and experiences of care. This suggests approaching roles in human-nature relations not as predefined categories but invites for relearning how to care.

The concept of care introduces ambiguity and need for collective negotiation and exploration of the needs of different participants in the care network, as well as limits of care (Krzywoszynska 2019). Thinking of human-nature relations in terms of care also invites reflecting on inherent tensions and open questions in the idea of caring for nature, for instance dilemmas about productivity and profitability in transitioning to caring practices (see e.g. a study about farmers' dilemmas while introducing soil care in agriculture in Krzywoszynska (2019).

Insights from literature on reciprocity and on care about human-nature relations invite rethinking the role of humans in the world in terms of interdependency and connectivity and call for developing practices and modes of thinking which make care and caregiving an integral part of co-living of people and nature. The two streams of literature, however, diverge in their point of departure. While literature on reciprocity provides insights grounded in existing practices, based on specific knowledges and worldviews, speculative ethics of care suggests that we need to reinvent how to care and how to define roles. It suggests the necessity of viewing care as a messy and open-ended process that requires continuous hands-on process of recreation and regeneration of care. Despite certain divergencies, approaches of reciprocity and care compliment each other and have strong implications for influencing how reconciling humans and nature can be approached in practical terms. From this review we distinguish two central points: to explore and re-negotiate the roles in human-nature relations; and, to explore situated and

context-specific conditions needed for transitions to caring and reciprocal human-nature relations.

4. NBS approaches to human-nature relations and implications for research and practices

4.1 Model of human-nature relations types in NBS

As we demonstrated in the analysis of approaches to nature in NBS, different views on NBS depend on ontological views on nature and the role of humans in nature. Following Campbell & Gurney (2024) there is a need for recognizing and negotiating ontological differences in environmental action. Attention to ontological differences is important because actors with different ontological views may agree, for example, on the need for nature protection, however, their understanding of what nature is and what are the reasons and ways of this protection can be fundamentally different, which can lead to disagreement on apropriate action, grounded in differences in ontological viewpoints (ibid). Following Campbell & Gurney (2024), ontological differences are interrelated but are not equal to epistemic divides, where different groups can have different preferences or motives for a certain way of using or treating nature. From an epistemic perspective, people have different needs and opinions about nature (e.g. a river or a forest), understood as a singular entity. Ontological divides are about what nature means for different groups and people, and what multiple ways of understanding reality they have.

In this section we will 1) develop a model of nature approaches in NBS based on analytical categories of nature ontologies 2) provide the early-stage analysis of TRANS-lighthouses NBS cases following the framework of nature ontologies. And 3) discuss strengths and pitfalls of these approaches and possible strategies and approaches for change.

To do so we have combined the analytical categories discussed in section 2 (anthropocentric, ecocentric and relational orientations) with an initial analysis of the empirical data from the case studies in the TRANS-lighthouses project, in order to identify three types of nature relations in NBS (Figure 2). The elaboration of these types is inspired by Weber's "ideal types" (Weber 2012 [1904]), a conceptual tool used to analyze social phenomena by constructing theoretical models that represent the essential features of a particular phenomenon (Weber 2012 [1904]). These models serve as a reference points for comparing and analyzing real-world cases, though they do not claim to represent reality in its pure form. The ideal types are constructed through the process of identification and intensification of meaningful elements differentiating some phenomenon from other phenomena in ways relevant to the particular research interest (Rosenberg 2016). The types are referred to as ideal in a specific methodological sense, not because they represent an optimal reality, but because they serve as abstract models that highlight the essential characteristics of a particular social phenomenon.

The following types were identified:

1. **Anthropocentric-ecocentric type. NBS aiming to compensating extractivist production with nature protection**
2. **Anthropocentric-relational type. NBS aiming to design spaces for interaction with nature**
3. **Ecocentric-relational type. NBS aiming to enable nature regeneration through human practices of care**

These types which were developed using analytical categories and empirical data, are based on the analysis of two sources of data, collected within the TRANS-lighthouses project consortium:

1. *Results of the workshop 'Enabling Reciprocal Relations with Nature'.* To better understand how anthropocentric, ecocentric and relational approaches to nature play out in practice, a collaborative workshop on 'Enabling Reciprocal Relations with Nature' was held with TRANS-lighthouses assessment and pilot cases as part of the TRANS-lighthouses Annual Meeting in Rome, 28th February 2024. Taking place early-stage in the project, the purpose was not to conduct a full evaluation but an exploratory study to better understand to what extent and how underlying anthropocentric, ecocentric and relational approaches to nature were at stake in the TRANS-lighthouses cases with a particular focus on challenges faced by case coordinators and proposed NBS strategies to meet these. In the first phase of the workshop participants were asked as per case to reflect upon and identify key dilemmas they are facing, followed by identifying key dilemmas *across* cases. In the draft analysis of the workshop a number of crosscutting key themes could be identified. In the second phase of the workshop participants were asked in groups to identify key themes and potential strategic steps to apply in the cases. From the draft analysis themes have been formulated based on these keywords (Annex 1 provides a detailed description of the workshop methodology and results).

2. *Survey "Transforming Human-nature relations in NBS".* An internal qualitative survey was conducted in spring 2024 as a part of the task 2.2 "Human-nature relations in participatory NBS". Pilot cases coordinators (or coordination teams) were the survey respondents. The objective of the survey was to invite pilot cases in the project, working with NBS in diverse contexts, to reflect on what changes in

human-nature relations are envisioned in the pilot cases, and what strategies and methodologies can be developed to facilitate these changes (Annex 2 provides a description of the servey). In total, we received survey responses form 7 pilot cases.

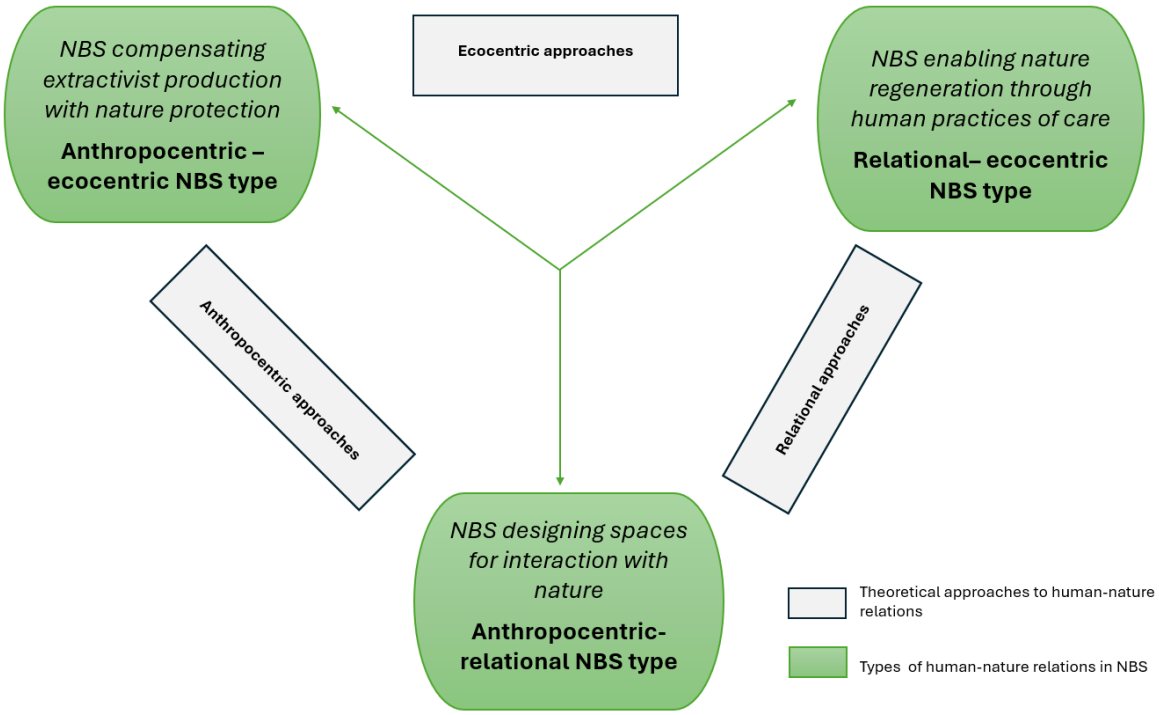


Figure 2: Types of human-nature relations in NBS

In what follows we will identify the key characteristics of the three identified NBS types and discuss their strengths and weaknesses, demonstrating advantages of these approaches, as well as challenges that arise. It is important to note that all types seem motivated by working for and with nature as the end of their activities. However, they differ in their point of departure and means of doing so. Antropocentic point of departures in this sense means working with human and social needs and conditions as the starting point for changing human-nature relations, still with the aim of protecting nature or environment.

1. NBS compensating extractivist production with nature protection (Anthropocentric-ecocentric type)

Key to some NBS cases is that these are situated in contexts with instrumental use of nature in which human needs in the urban fabric or production needs in rural areas are providing the framework conditions for NBS. In some cases, coexistence of instrumental and intrinsic values seems to be an integral part of the NBS cases. This can be exemplified by one of the key dilemmas identified during the workshop – *"Conservation vs. production"* (workshop theme). Reflecting on this dilemma during the workshop demonstrated that some envision a possibility of a balance between production and conservation "*To have space for both production and biodiversity – both can win?"* (workshop theme).

> *"Since the production dimension is widespread and frequent in the territory, either through farming and forestry, the extractivist perspective is often the most common. A more reciprocal human-nature relation could be the introduction of measures and solutions that enable a "give-back" to nature. This could be done for instance through the adoption and dissemination of good practices or the allocation of spaces for biodiversity conservation, balancing the scales between production and nature conservation" (survey, Estarreja)*

The objectives we situate at the anthropocentric-ecocentric intersection are those which aim to find a way to compensate or neutralize productivist-oriented use of nature with activities aimed at nature preservation. This dynamic can more clearly be seen in rural contexts, where there is an ambition to counteract the wide-spread production (extractivist methods) by strengthening conservation efforts and creating spaces for wild nature and biodiversity, as shown in the textbox example. However, this dynamic can also be observed in urban NBS, for example, in mediation between *"civilization and wild nature"* (workshop theme), or between dense urban spaces and wild nature.

Direction of change:

- From extractivism for human benefits as a predominant approach to nature to creating spaces where nature is protected from human activities.

Key characteristic:

- Compensate extractivist production with nature protection.

Reasoning:

- It is possible to sustainably manage nature by spatial seperation of places for production and for nature protection.
- Policy regulations often privilege this approach of "delimitation" and "compensation".

Risks and challenges:

- Production is delimited whilst modes of production remain unchanged.

- Human needs are prioritized over nature's needs.

2. NBS designing spaces for interaction with nature (Anthropocentric-relational type)

Several cases can be described as situated at the crossroad of the anthropocentric and relational approaches. Whilst still aspiring to work for the environment, the point of departure is to create spaces and conditions for interaction between people and nature. Some examples which were included in this type are for instance, integrating elements of nature into the design of educational facilities (e.g. schools, playgrounds) or transforming urban areas such as squares into green public spaces which can be used by students as extension of the classroom, or by citizens in general. The focus is placed on creating experiences and interactions with nature. These examples are situated in people-oriented spaces, such as cities or schools, which shapes the objectives and orientation of nature-based solutions.

We position these examples at the intersection of anthropocentric and relational approaches because they aim at generating connections between people and nature, replacing alienation by taking the very outset in the human living conditions. In short, this implies working for the environment with the starting point of working with humans and the places in which they meet and interact. This process of reconnection is aimed at developing environmental awareness, as well as improving physical, mental and emotional well-being. However, the rethinking of the relationship to nature in these cases can be rather limited, and more emphasis is placed on changing social relations, hence these examples have a rather pronounced anthropocentric angle. It should be noted that these examples are often situated in people-oriented spaces, such as cities or schools, which shapes the objectives and orientation of nature-based solutions.

Other examples which are informing this type can be characterized as aiming to change the way citizens interact with a natural entity (e.g. river), promoting transitions from lack of interaction or harming the entity (e.g. polluting) to recreational, educational and well-being activities (walks, cycling, gardening, etc.) and protection of the entity. Such examples are particularly challenging to categorise as one "type", because their positioning will depend on the nuanced understanding of the NBS objectives. Some aspects of anthropocentric-relations and of ecocentric-relational type can be observed in these examples, depending on the interpretation of their objectives. For such cases the use of this typology can offer a reflection about what changes in human-nature relations underline their cases, and what direction of change the cases provide.

By implementing nature-based solutions in school playgrounds, we will be using nature as a tool for climate adaptation. Furthermore, integrating nature into playgrounds promotes integral well-being and daily changes, allowing for a day-to-day life where nature is present and changing the perception of human-nature relationships" (Survey, Barcelos)

"…particular relevance has been given to the relationship between education and nature, through the creation of a green classroom that is dedicated to education in, on and about nature for young kids and students of all ages. In this way, the relation between human and nature in an urban environment, will overcome the one of passive appreciation from the people side to become an active way to learn". (Survey, Rome)

Direction of change:

- From absence of nature in people's everyday life and/or non-interaction with nature to awareness spaces for human-nature interactions.

Key characteristics:

- Creating everyday life interactions with nature through NBS design of people-oriented spaces (cities, schools).
- Changing perceptions of nature and raising environmental awareness.
- Changing the way citizens interact with a natural entity: from non-interaction or damaging to recreational, well-being activities and environmental awareness

Reasoning:

- In the current society there is a strong alienation of people from nature, and creating spaces of interaction can contribute to addressing societal issues such as emotional and physical health.

- Designing people-oriented spaces with nature can generate and increase knowledge and awareness of nature, hence promoting pro-environmental behaviour.

Risks and challenges:

- Danger that the changes can be limited to the social and aesthetic level, without significantly changing underlying material or strucural conditions.
- It can be challenging to create connections between isolated sites of interactions with nature, and to create change at scale.

3. NBS enabling nature regeneration through human practices of care (Ecocentric – relational).

This approach stands out distinctive from *anthropocentric-ecocentric,* because instead of compensating extractive practices with increasing/improving practices of ecological preservation, it focuses on changing the modes of production and the overall societal relations with nature. Moreover, *the ecocentric-relational type* does not strictly differentiate between spaces/practices of nature for human use/well-being, on the one hand, and nature for biodiversity, on the other hand. Rather it aims for transitions towards making human presence and interaction with nature beneficial to nature, rather than destructive.

The ecocentric-relational view has a strong focus on changing human-nature relations in activities and spaces where extractive mode of interaction with nature is considered a well-established norm necessary for acquiring resources for human well-being. This contrasts with

We can see characteristics of the ecocentric-relational type in several cases in the TRANS-lighthouses project. For instance,one case iis aimed at changing practice of local residents and the municipal policies of organic waste management, and transition from centralized waste disposal in the landfills to community-composting with organic compost to be used by local farmers. There is a strong focus on changing nature practices from control and mastery by industrialized waste management to "Changing peoples' everyday life practices with nature; Changing use of nature in production; Changing societal and political approaches to nature" (survey, EBR). Besides aiming at changes in social practices around nature (e.g. collaboration between citizens and farmers), there is active engagement in re-thinking practices involving nature itself "Composting allows you to combine different waste streams to reduce the impact, and convert structured carbon, enriched with nitrogen, phosphorus, potassium and other nutrients, into fertilizer to feed the land that feeds us" (EBR, survey).

anthropocentric-relational approach that aims for stronger integration of nature into human-oriented spaces and activities, where normally nature is not present or present to a limited extent (e.g. cities, schools, etc). Ecocentric-relational type underlines the necessity of not only promoting and generating interactions with nature but understanding that humans *are* embedded in and interfering with living ecologies, in which we are dependent upon inherent capacities. It suggests that despite the established views and practices ecosystems cannot be mastered, and hence a renewed way of relating is needed.

The examples of relational-ecocentric approach in NBS cases can be seen in cases oriented towards transitions from productivist-oriented farming to regenerative farming; development of community-based waste management and composting activities.

Direction of change in human-nature relations that this NBS type implies:

From mastery and control as a way to extract resources from nature to reciprocal relations: re-thinking how practices through which human life and well-being are sustained can be done in partnership with nature and aligned with nature regeneration.

Key characteristics:

- Focus on changing practices, rather than separating production and preservation..
- Human presence and interaction with nature to be beneficial rather than destructive to nature.

Reasoning:

- Need for regeneration through and with human practice.
- There is a need to move beyond mastery and control in human-nature relations.
- The argument is that there is a possibility to live in harmony with nature.

Risks and challenges:

- Implies transformations in individual and collective economy and lifestyle.
- Requires engagement of community (social organizing, mutual help and sharing).
- Change at scale is often a challenge.
- Relational view might overlook structural preconditions for change.
- Policy regulations are often more targeted at production-conservation paradigm.

4.2 Approaches to change - Examples

This section will discuss possible strategies and approaches to change in relation to nature dimension in NBS. Based on the analyzed data (workshop and survey) we put forward several strategies identified by coordination teams of NBS cases. We will discuss these strategies, emphasizing the diverse ways these strategies can be interpreted and acted upon, depending on different ontological positions.

Making nature a stakeholder

A key aspect of TRANS-lighthouses strategies is to make nature a stakeholder in NBS planning. However, this can be done in many different ways. Some examples which were identified in the workshop and survey results are using data to provide nature a voice; enable people to make experiences with being part of nature; and making visible how people are changing relationships with nature. In several cases raising awareness is a key component.

> *"In the pilot case of Rome, particular relevance has been given to the relationship between education and nature, through the creation of a green classroom that is dedicated to education in, on and about nature for young kids and students of all ages. In this way, the relation between human and nature in an urban environmen will overcome the one of passive appreciation from the people's side to become an active way to learn*" (Survey, Rome).

In this way some NBS cases build on the underlying assumption that changing awareness of nature will also change nature relations. This raises the question what the implications of this awareness is and what consequences it might have for tangible changes at personal, institutional, structural levels.

Reflexive questions:

What can "making nature a stakeholder" mean viewed from different ontological and governance approaches?

- Making space for protection of wild nature and biodiversity to offset use of nature for human well-being?
- Making nature an essential element to be integrated into human spaces, and raising nature awareness?

- Changing roles of humans to be stewards or helpers to nature's processes, with attentiveness and responsiveness to the capacities and needs of nature's elements.

What implications do these approaches have for changing human-nature relations at personal, institutional and structural levels?

What implications do these approaches have for transforming extractivist human-nature relations?

Approaching nature as a commons

Approaching nature as a commons is mentioned by several cases as a key approach. However, across the cases different approaches can be found, echoing theoretical discussions of commons, in particular whether this should be approached from a nature management perspective in which nature commons are enclosed to protect them, or as questions of commoning, in which citizens are part of revitalizing commons, through altering eco-social relations. Two distinct approaches to conceptualizing commons can be identified. The commons, as articulated by Ostrom (1990) refers to shared resources that are accessible to a defined group of people and are managed collectively to prevent overuse and depletion. Ostrom's work focuses on the institutional arrangements and rules that govern these resources to ensure their sustainability. The key characteristics of commons in this perspective include clearly defined geographical or resource-based boundaries, that delineate who has access to the resource and who does not, to prevent overuse and deterioration; as well as collective management – a group of users who have

established rules and norms to govern the use and maintenance of the commons (ibid). On the other hand, commoning, shifts the focus from the static notion of commons as a resource or delimited space to the dynamic, relational, and value-driven process through which commons are created, maintained, and transformed (Angelis & Harvie 2018; Singh 2017). Commoning emphasizes the social practices, relationships, and values that underpin the co-existence of humans in the ecologies, rather than management of protected spaces. In many cases NBS planning is taking place across public and private ownership and access. This in particular raises the questions, to what extent and how nature can be approached as commons.

The example below demonstrates one approach to creating commons as a part of nature-based solutions. In this case, commoning means approaching a natural entity as a "common good". The aim is to transition from using the natural entity as extension of private property to treating it as a common area of nature protection, biodiversity enhancement and space for raising environmental awareness.

"The main challenges in how people relate to nature in the Strovolos Pilot include the tendency to use riverbanks as extensions of their property, converting these areas into urban allotments. This practice reflects the broader issue where nature is not always regarded as common good to be cared for collectively but rather as resource to be exploited. Additionally, in the linear park, which serves as a habitat for felines, there is a lack of awareness and appreciation for biodiversity. Instead, the presence of these animals is often viewed as the main representative of fauna (nature), thus receiving care but, leading to neglect of the impact of felines on the biodiversity of the area. Furthermore, riverbanks, being public spaces, are frequently misused as dumping ground, exacerbating environmental degradation and highlighting the need for better public awareness and stewardship of natural resources" (Survey, Strovolos)

Reflexive questions:

What can "approaching nature as commons" mean viewed from different ontological and governance approaches?

- Creating nature commons as areas of nature protection?
- Creating nature commons as an approach to public (urban) space facilitating citizens' interaction and benefitting from nature?
- Creating nature commons as a space of citizens common responsibility to develop reciprocal nature practices?

What implications do these approaches have for changing human-nature relations at personal, institutional and structural levels?

What implications do these approaches have for transforming extractivist human-nature relations?

Changing governance of human-nature relations

Governance models play a significant role in NBS implementation (Martinet al. 2021; Van Der Jagt 2023) with a strong emphasis on collaborative and participatory governance where citizens play a strong role in NBS co-design (Malekpour, Tawfik, & Chesterfield 2021). Besides cross-sectoral partnerships, another question arises - how can NBS governance consider turning nature itself into a stakeholder and what this might imply (see e.g. the case of Mar Menor in Spain in Giménez & Ortuño (2024)?

Across cases in the TRANS-lighthouses project a motivation to change the way humans impact on nature can be found. This both implies listening to communities and traditional relational knowledge, whilst also taking a leading role in the way human-nature relations are socialized, planned, and technically carried out, implying calls for holistic approaches to governance. From a practitioner perspective, however, we find that anthropocentric, ecocentric and relational approaches might imply rather distinct approaches to NBS governance.

"Nature should become a stakeholder, because of that it is necessary to reflect about other ways of governance and citizens participation" (survey, Azores)

"New forms of governance can be tested in order to strength democratic practices that are threatened worldwide" (survey, Azores)

Reflexive questions:

What can changing governance of human-nature relations mean for NBS?

- Governance is aimed at changing practices and regulations to create areas of nature protection?
- Focusing on bringing nature into the design of public spaces to facilitate and encourage interactions with nature?
- Changing nature practices (e.g. production, consumption, agriculture) to make human activity and use of nature beneficial for nature?

What implications do these approaches have for changing human-nature relations at personal, institutional and structural levels?

What implications do these approaches have for transforming extractivist human-nature relations?

Care, reciprocity and stewardship

Several questions in the survey were dedicated to exploring what relations of care, reciprocity and stewardship would mean in the NBS cases. Care, reciprocity and stewardship are generally seen as desired and essential ways of re-framing human-nature relations. However, depending on the context and objectives, the meanings of what care and reciprocity are, vary. Understandings of what care and reciprocity are and what practices of care might imply can also differ depending on the anthropocentric, ecocentric and relational approaches.

Reflexive questions:

What can relations of care, reciprocity and stewardship mean viewed from different ontological and governance perspectives:

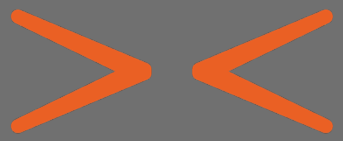
- Regulate and limit the use of nature for human resources and well-being to allow sustainable use of nature resources and preservation of biodiversity?
- Interaction with and care for nature contributes to human emotional and physical well-being?
- Interaction with nature that is neither control nor withdrawal of human agency, but symbiotic co-living with responsiveness and attention to the needs and abilities of nature?

"More caring relationships can lead to greater openness and awareness of the importance of playing in nature and all the benefits for the child's integral development. This is a crucial point in our pilot. Achieving an understanding that the stimulus of playing in nature brings out creativity and imagination, and provides a relationship of greater care and solidarity with the environment" (survey, Barcelos)

"...a caring human-nature relation in the region would mean that the community and main actors know and care about the natural values enough to involve themselves in protecting them and adopt different behaviours or practices that are less impactful to nature. However, we believe this is difficult to achieve at a global scale, since there is a common lack of interest and consequent lack of knowledge regarding local biodiversity" (survey, Estarreja)

What implications do these approaches have for changing human-nature relations at personal, institutional and structural levels?

What implications do these approaches have for transforming extractivist human-nature relations?



5. Testing the model

In this chapter we will outline how practitioners of NBS assess the model and how they see its potential applicability. This section is based on the workshop that was held during the annual meeting of the TRANS-lighthouses project in October 2024, in Caceres, Spain. In the workshop the model was presented to the NBS case coordination teams, after which they were invited to position their cases on the model where they think they fit best. This exercise was followed by group discussions and a plenary session guided by the following questions:

1. *Where do you situate your case on the model? Why? Give your reasoning while considering the main objective(s) of your case in terms of human-nature relations?*
2. *What emerges from the discussions? What does the model allow to see? What is lacking?*

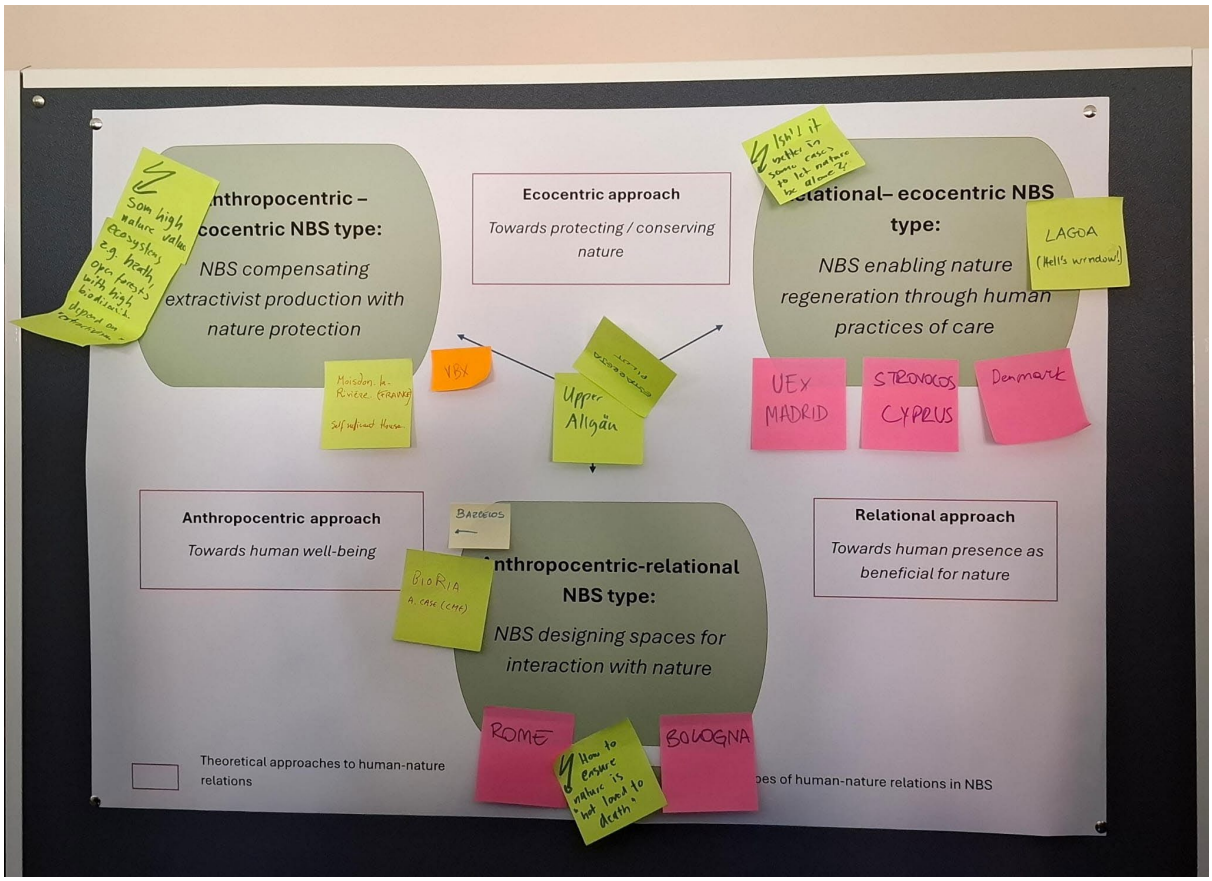


Photo 1: Workshop exercise

The results of the workshop showed that practitioners see the applicability of the model in using it as a meta-reflexive tool to approach, in a critical and reflexive way, the following themes:

- A dynamic way to reflect on human-nature relations in NBS.

- Reflecting on how a particular NBS can move from one type to another depending on political, historical or other factors
- Strategies to engage various citizen groups and other stakeholders in NBS.

Most coordination teams **used the model to look at human-nature relations in their cases in a dynamic, rather than in a static way.** Although at the beginning of the workshop the participants placed their cases within one particular type of the model, in their discussions they used the model as a continuum, suggesting that the NBS cases can move from one type to another depending on different factors.

One of the cases that works with organic waste management and community-led composting used the model to reflect on their case from the perspective of the changing political environment and changing municipal and regional support. They identified their case as an ecocentric-relational type, because when it started, it was mainly motivated and led by grassroot initiatives aiming at changing human-nature relations through changing practices of organic waste management. However it was suggested that this orientation might change because there are a number of changes in the political environment, and now the case might integarte more anthroocentric characteristics (as illustrated in Figure 3).

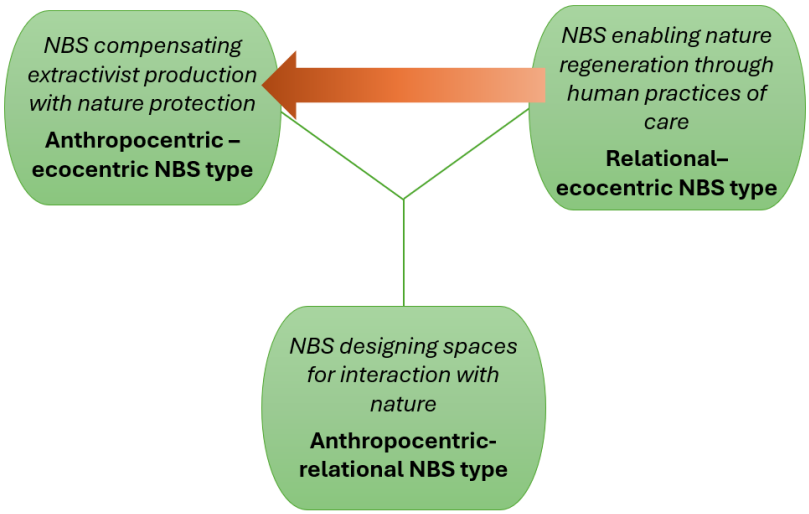


Figure 3. Example of the model application by NBS practitioners.

Another case that works with integration of nature (more natural materials, plants, etc.) into the local educational institutions, also used the model to identify how the orientation of human-nature relations can change for the case. Currently they see their case as

anthropocentric-relational type, meaning that the main focus is on children in the educational institutions, their well-being and their interaction with nature. However, in the mid- and long term, eventually, they plan to divert from only having humans at the center to aiming for transitioning to human presence as beneficial for nature, to the ecocentric-relational type (as illustrated in Figure 4).

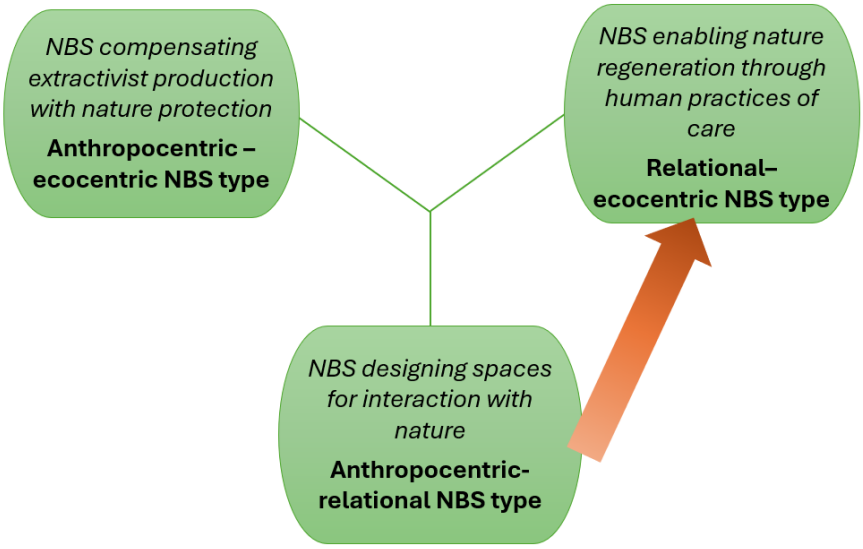


Figure 4. Example of the model application by NBS practitioners.

Some cases **used the model to reflect on strategies of working with different stakeholders**. They suggested that finding strategies to engage different groups of citizens and stakeholders in nature-based solutions requires a certain flexibility of approaches – not sticking to only one type or objective, but trying out different strategies with different groups of people and different stakeholders for a more active engagement.

One of the cases concluded that different aspects of their project correspond to the different types of human-nature relations, since different activities in the project have different objectives: 1) There are some activities that the case coordinators placed closer to the anthropocentric approach – for example, making agreements and partnerships with rural land owners to create spaces for nature 2) The activities in the pilot case which aim at creating spaces for people to explore, understand and experience nature correspond to the anthropocentric-relational perspective. 3) Finally, working with changing practices of human-nature relations in the project corresponds to the ecocentric-relational type. Another case added: "*Rewards can take different forms and therefore be fluid between these dimensions even in the same case".*

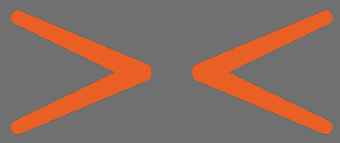
Finally, one of the key ways the practitioners used the model was reflecting upon what these types mean for their cases. This allows for a fruitful exercise where practitioners can bring forward and reflect on internalized assumptions about the role of nature and human well-being in NBS. The model allows the practitioners to think about what the notions of anthropocentric, ecocentric and relational imply for the contexts and objectives they are working with, and often re-interpret the definitions suggested by the model.

For instance, some cases reflected upon the suggested description of **the anthropocentric-ecocentric type, and suggested that it might be approached as people and nature "co-existing" rather than "compensating" extractivism with nature conservation.** This was the case for several cases associating themselves with the ecocentric-anthropocentric type, suggesting that rather than understanding this type as compensating for extractivism, NBS should be approached as providing certain benefits for human well-being (e.g. economic benefits, more pleasant urban public spaces, etc.), and other benefits – for nature (e.g. biodiversity). Hence, some cases preferred not to position themselves as one type, but rather suggested that they simultaneously are working with two approaches: ecocentric (protecting, taking care of nature) and anthropocentric (improving people's livelihoods).

Besides, the practitioners referred more often to the anthropocentric and ecocentric approaches, and less to the relational, indicating not being familiar with or applying this approach. This points to the need to strengthen the dialogues about what relational approach can mean in practice for NBS in order to overcome the binary dichotomies of anthropocentrism and ecocentrism.

These examples demonstrate that working with the model allows us to create a space of critical reflection where practitioners discuss the key notions which are the basis of NBS, which however, often remain unproblematized and taken for granted.

To conclude this chapter, the workshop provided the first preliminary examples of how NBS practitioners envision the applicability of the model. Whilst the results show that it can be difficult to provide a simple categorization of cases, the model proved useful for case facilitators to reflect upon underlying assumptions in different kinds of NBS practices, as well as considering how these could further develop in the concrete context in which they operate. Throughout the duration of the TRANS-lighthouses project the model will be further empirically matured based on the emerging insights from the Living Knowledge (s) Labs.



6. Concluding remarks

The aim of this report is to provide a conceptual framework for expanding human-nature relationship in NBS, which can be further used and empirically matured through the TRANS-lighthouse project. This is done based on a literature review and developing ways of its translation and incorporation into NBS, supported by collaborative work in forms of exploratory LKL workshops and questionnaires.

From a litterature review of antroprocentric, ecocentric and relational approaches to human-nature relations, the report seeks to develop a draft typology of different types of NBS practices identified from the TRANS-lighthouses Living Knowledge Labs, and discuss how these can be understood with regards to underlying ontological assumtions and orientations.

Hence the report identifis three tentative empirical-analytical categories of NBS practices:

- *NBS compensating extractivist production with nature protection* (Anthropocentric – ecocentric NBS type)
- *NBS designing spaces for interaction with nature* (Anthropocentric-relational NBS type)
- *NBS enabling nature regeneration through human practices of care* (Relational–ecocentric NBS type)

Further the report discusses how different types of NBS strategies can be understood with regards to their underlying assumptions and understandings of human-nature relations.

In doing so, the report aims at providing a reflexive framework, by which LKL strategies can reflexively be discussed and continuously developed in the TRANS-lighthouses project, with the dual aim of collaboratively strengthening the work of LKLs and empirically maturing the framework applicability.

Although the presented types are formulated with the help of the analysis of empirical data from the real-life NBS case studies, the types are not the exact reproductions of empirical reality. They are abstract models which simplify empirical reality, emit some aspects and emphasize others (Rosenberg 2016). The types, therefore, can be used as an analytical and reflexive tool, where NBS practitioners and researchers can engage in an exercise of positioning their NBS actions and approaches according to the suggested typology. This can help identify how concrete NBS cases are situated in the spectrum of

human-nature relations and generate a reflection about what nature-related practices these NBS suggest. Sometimes, and probably more often than not, NBS cases would be positioned in the in-between spaces of these types, or would correspond largely to one type, but deviate from it in certain aspects. Using the typology to analyze concrete NBS objectives and actions can be helpful to identify what direction of change in human-nature relation the NBS envisions, and what could be the challenges and further steps.

Development of this typology is aimed at reinforcing critical thinking about how 'nature' and human-nature relations are approached in NBS practice and scholarship. Although nature is a central concept in the term nature-based solutions, NBS has only to a limited extent engaged with exploring how changes in human-nature relations are conceptualized and addressed in NBS (Welden et al. 2021). Hence, by expanding on different types of human-nature relations and directions of change in human-nature relations, this typology aims to centre the pressing needs of re-thinking the relations of extractivism and mastery at the centre of NBS scholarship and practice. Moreover, the typology invites researchers and practitioners to critically reflect on various strategies and approaches used in NBS practice and scholarship by analyzing their ontological implications.

One of the key contributions of this report is clarifying the ways in which the same concepts and strategies related to the nature dimension of nature-based solutions can be understood and applied differently depending on what approach to human-nature relations the NBS embraces. Hence, the report intends to guide researchers and practitioners in identifying the ontological assumptions underpinning different concepts, governance strategies and NBS practices. For instance, concepts such as care for nature, stewardship, or sustainability may take on significantly different meanings depending on which type is at play.

The report outlines the need for transitioning from extractive to caring and reciprocal human-nature relations and explores the questions this raises for NBS. In the report we develop an analytical typology of human-nature relations in NBS with three types which have their own rationale, as well as challenges and risks. Each of the three types suggests a different direction of change for human-nature relations in NBS. The report invites for a critical reflection about the possibilities and limitations of these NBS types to be a catalyst to changing human-nature relations.

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Annexes

Annex 1. Workshop

To better understand how instrumental, intrinsic and relational approaches to nature play out in practice a collaborative workshop on 'Enabling Reciprocal Relations with Nature' was held with assessment and pilot cases as part of the TRANS-lighthouses Rome Annual Meeting on the 28th February 2024, followed by a qualitative survey on human-nature relations conducted in Spring 2024. Taking place early-stage in the project, the purpose was not to conduct a full evaluation but an exploratory study to better understand to what extent and how underlying instrumental, intrinsic and relational approaches to nature were at stake in the NBS cases with a particular focus on challenges faced by case coordinators and proposed NBS strategies to meet these. In the following we are presenting NBS dilemmas and strategies in the TRANS-lighthouses cases, and reflect, based on workshop and survey results, how instrumental, intrinsic and relational approaches are at stake.

Key dilemmas faced in TRANS-lighthouses NBS cases

In the first phase of the workshop participants where asked as per case to reflect upon and identify key dilemmas they are facing, followed by identifying key dilemmas across cases. In the draft analysis of the workshop a number of crosscutting key themes could be identified.

NBS between urban density, intensified production and space for wild nature

A key theme across the cases considers the contractions across urban density, intensified production and space for wild nature. Underneath conflicting interests seems to lie assumptions on human and nature, civilized and wild. In the urban domain this implies questions of integrating NBS into dense urban fabric, whilst in rural cases questions are raised on space for wild nature, interest in intensified production, and questions of changing human-nature relations. Conflicting approaches to the questions also related to different notions of transforming economies.

- *Domestic urban density vs. space for wild nature*
- *NBS Urban solutions: Wild nature vs. manmade*
- *Civilization vs. wild nature*
- *Attractiveness vs. otherness*
- *Civilized vs. wild nature*
- *Conservation vs. production*
- *Intensification vs. de-intensification*
- *Constructing vs. maintaining*
- *Transforming economy?*

Keywords from the workshop

NBS between civic traditions and technological development

Another key theme is whether NBS solutions should be grounded in decentralized civic traditions or driven by centralized technological developments. This question also raises question on the role of those intending do further inclusive approaches to NBS.

- *Tradition / technology*
- *Citizens / public attitudes vs. technicians*
- *Centralized vs. decentralized*

Keywords from the workshop

NBS planning between public access and private ownership

In the planning of NBS questions of public assess and private ownership is often at stake. Collective planning and NBS efforts might take place on private land taking into account public interests.

- *Collective planning vs. private rights and ownership*
- *Private ownership: +/- for NBS and public access?*

Keywords from the workshop

NBS practitioner roles between listening and leading

For NBS practitioners a key question concerns roles of listening and learning the way in stakeholder engagement. This both implies processes of changing beliefs but also questions of how approaches can be combined, how to find middle ground in dilemmas, and who is taking decisions and how.

- *Listen to people: inform vs listen in stakeholder processes?*
- *Changing beliefs?*
- *Who decides about NBS?*
- *Finding the middle ground in dilemmas?*
- *Nature as a problem or a solution?*
- *Need to combine approaches*

Keywords from the workshop

Key strategies in the TRANS-lighthouses cases

In the second phase of workshop participants where asked to identify key themes and potential strategic steps to apply in the pilots. From the draft analysis themes have been formulated based on these keywords.

Approaching nature as a commons

A key strategic theme for the NBS pilots was to approach nature as a commons, both conceptually, but also in the concrete governance and planning.

- *Approaching nature as a commons*
- *Addressing who pays for the commons (individual, municipal, state)*

Keywords from the workshop

Making nature a stakeholder

- *Treat nature as a stakeholder*
- *Make/experience relations with nature (part of nature)*

Another key theme was how to treat nature as a stakeholder. This can imply different approaches, for people to make tangible experiences being part of nature, practitioners making visible how nature relations and changing, but also using data as a tool for giving nature a voice.

- *Practitioners making visible how they are changing relations to nature*
- *Beyond human-centered: Data giving nature a voice in the discussion*

Keywords from the workshop

Social and biological interconnections

Social organization is a key theme, both in terms of engaging with and raising awareness across citizens, municipalities and NGOs, but also in terms of finding new ways of making social, biological and spatial interconnections. In the urban domain this can imply looking at neighborhoods as systems of relations, whilst in rural areas connecting pieces of land into systems of sites.

- *Social organization (of organic waste)*
- *Engaging with NGOs.*
- *Awareness raising (Citizens, municipalities)*
- *Neighborhood DIY-projects (e.g. on water and plans in/across private gardens)*
- *Urban NBS: Make neighborhoods a system of relations (social and ecological/green)*
- *Connection: Connecting pieces of land to being part of a system of sites.*

Keywords from the workshop

Holistic approaches to governance

Questions of governance is key to strategic efforts. This both applies for spatial administration, legal framework and tools, marketing and incentivizing added value of nature, and finding new ways to combine administration with spatial planning into holistic approaches to working with NBS.

- *Mediate administration of territories*
- *To develop legal and administrative tools*
- *Marketing the added value and benefits of nature (-registration/stamp, -economic incentive)*
- *Local (water)management combined with green space*
- *Combine nature with others dimensions*
- *Holistic approach*
- *Match with changes needed in the context*

Keywords from the workshop

Annex 2. Survey

1. **Part one: Human-nature relations in NBS**

i. The pilots are working with different aspects of relations between humans and nature. What would you mention as the key aim in your pilot in terms of changing human-nature relations? What would be an example of that?

ii. What are the nature-related objectives most relevant in your case. Please <u>select the ones most relevant and prioritise by numbering</u> (1, 2 3…etc.) Please elaborate in the response box. Add new, if anything missing.

- (#) Integrating nature in human environments to support people's well-being.
- (#) Using nature to create benefits for vulnerable groups.
- (#) Using nature as a tool in climate adaptation.
- (#) Nature conservation and landscape use.
- (#) Changing peoples' everyday life practices with nature.
- (#) Changing use of nature in production.
- (#) Building on marginalised, local or traditional knowledges and -practices.
- (#) Changing societal and political approaches to nature.
- (#) Changing how relationships between people and nature are understood.
- (#) Strengthening peoples' active engagement or stewardship with nature.
- (#) Conflict resolution and natural resource use.
- (#) Other (please add and explain)
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iii. What are the main challenges in how people relate to nature in your case? Give example(s).

2. **Part 2. Dilemmas for human-nature relations in NBS:**

During the consortium meeting in Rome workshops on dilemmas, strategic and operational steps related to nature, a number of overarching dilemmas were identified across the pilot cases. Please choose the dilemma(s) which are key to your case. Describe how these dilemmas are relevant in your case (give examples) and describe your strategies for working with these dilemmas.

Dilemmas:

I. Domesticated vs. wild nature
II. Conservation (intrinsic value) vs. production (instrumental value)
III. Value for humans vs. value for nature
IV. Tradition vs. Technology
V. Local vs. large scale
VI. Intensification vs. deintensification
VII. Nature as a problem vs. a solution
VIII. Constructing vs. maintaining
IX. Listen to people: inform vs listen
X. Other (explain)

Possible strategies:

In the Rome meeting a number of potential strategies for transitions towards changing human-nature relations were identified. Below are some of them. Choose strategy(is) relevant for your case, if any, and elaborate on their use in your case. If not, suggest anther strategy relevant for your case.

I. Working towards nature as a commons
II. From singular sites to systems of connections
III. Connecting private and public
IV. Giving nature a voice in the discussion

3. Part 3. Transitions to reciprocal human-nature relations

Following the conceptual framework of the TRANS-lighthouses project we suggest that the task of re-negotiating human-nature relations and transitioning towards practices of reciprocity and care, human-nature relations should be approached as interrelated with the economic, the social and the participatory governance dimensions. In the below, please reflect:

I. What would more reciprocal human-nature relations mean in your case? How (if so) is this approach applicable to working in your case? (what would reciprocity with nature mean in your case?)

II. What would more caring human-nature relations mean in your case, and what could be envisioned as a transition strategy for this? (what would caring human-nature relations mean in your case?)

III. How do economic, social and governance dimensions need to be worked with in your case to enable more reciprocal human-nature relations? Give examples.

IV. How can participatory methods enable transitions in human-nature relations