Chapter 5

Chapter **5**

THE ROLE OF DIVERSE VALUES OF NATURE IN VISIONING AND TRANSFORMING TOWARDS JUST AND SUSTAINABLE FUTURES[1,2]

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1. This is the final text version of Chapter 5.
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THIS CHAPTER SHOULD BE CITED AS:
Martin, A., O'Farrell, P., Kumar, R., Eser, U., Faith, D.P., Gomez-Baggethun, E., Harmackova, Z., Horcea-Milcu, A.I., Merçon, J., Quaas, M., Rode, J., Rozzi, R., Sitas, N., Yoshida, Y., Ochieng, T.N., Koessler, A.K., Lutti, N., Mannetti, L., and Arroyo-Robles, G. (2022). Chapter 5: The role of diverse values of nature in visioning and transforming towards just and sustainable futures. In: Methodological Assessment Report on the Diverse Values and Valuation of Nature of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. Christie, M., Balvanera, P., Pascual, U., Baptiste, B., and González-Jiménez, D. (eds). IPBES secretariat, Bonn, Germany.
https://doi.org/10.5281/zenodo.6522326

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THE ROLE OF DIVERSE VALUES OF NATURE IN VISIONING AND TRANSFORMING TOWARDS JUST AND SUSTAINABLE FUTURES

EXECUTIVE SUMMARY

The chapter assesses the role of nature's diverse values in supporting social-ecological transformations towards more just and sustainable futures. This is approached as a two-fold and mutually complementing task: a) assessing the diverse values that have been considered in developing and creating visions for, and scenarios of the future, particularly those relating to more just and sustainable futures; and b) assessing how interventions to incorporate more plural valuation into decisions can serve as leverage points for enabling and governing transformation towards just and sustainable futures.

There is a substantial and well-established body of specialised literature on visions and scenarios of socio-ecological futures. A systematic review methodology was employed to assess the role of values and the types of values contained within this body of work. The protocol for this review operationalises the key concepts of "values of nature", "justice" and "sustainability" elaborated within the wider values assessment and in this chapter. This review of published science is complemented with reviews of grey literature and creative arts.

The specialised literature on transformations and transitions to sustainability is comparatively recent and is diverse in terms of its primary concepts and units of analysis. For this reason, a two-stage process of literature review was adopted involving a) expert review to identify and synthesise the main concepts and relationships found in expert selected literatures followed by b) a systematic review using qualitative content analysis and c) a case study of how values are treated in National Biodiversity Strategies and Action Plans (NBSAP) interventions.

The decision-making typology and framework for the values assessment introduced in Chapter 1 is used as a basis for mapping governance forms and their associated characteristics (such as regime fit, scale and interplay, and the degree to which they – foster adaptiveness, knowledge co-production, and emergence of new actors) in the context of governing the uptake of diverse values of nature as part of a process of transformation towards just and sustainable futures.

These broader reviews and analyses are complemented by expert-led case studies exploring the role of values and valuation in four alternative pathways of transformation: green economy, degrowth, earth stewardship, and nature protection.

Understanding the main concepts: futures, transformations, sustainability and justice

1 **Recognising and incorporating diverse values of nature can help ensure that efforts to bring about sustainability are integrated with commitments to advance justice *(established but incomplete).*** Transformations to sustainability involve changes to relationships among present generations as well as to relationships with future generations and other-than-human nature. Whilst it is widely agreed that sustainability will be best served by more just relationships, this has not yet been widely practised. Interventions to recognise diverse values of nature can help achieve this synergy, providing a bridging mechanism between sustainability and justice. For example, recognition of option values makes it clear that sustainability is central to doing justice to future generations {5.1, 5.5.5}. In many cases, the conditions underlying justice and biodiversity conservation are found to be closely aligned. For example, the condition of territorial integrity underlies the wellbeing of indigenous peoples and peasant communities whilst also providing the basis for nurturing and acting on values of care for nature {5.5.4}.

The values of Nature and Nature's Contributions to People, found in just and sustainable futures

2 **Futures thinking and its different types of approaches and methods such as scenario planning,**

and analysis, are powerful tools which can be used to learn about personal and shared values and to motivate value-inclusive decision-making *(well established)*. It can help decide the path to follow and the types/diversity of values that require incorporation in order to get there. Visions of futures integrate and/or balance nature's diverse values and nature´s contributions to people in different ways and to different degrees. The review highlights that certain value mixes will likely result in more just and sustainable futures compared with others. The value mix within the dominant global discourse or business as usual (as it relates to trade, business and environment) will not lead to just and sustainable outcomes in the future. If a just and sustainable future is to be achieved, then this value mix (which is connected to decision-making and actions) needs to change. Futures works provide some indication of which values underpin alternative future development {5.5.2}.

3 Just and sustainable futures are characterised by a strong societal focus and a balanced pursuit of material and non-material benefits *(established but incomplete)*. It was possible to group studies according to seven different future archetypes considered in the IPBES Global assessment on biodiversity and ecosystem services; these being Regional sustainability (29% of the studies assessed), Global sustainable development (20%), Economic optimism (20%) Business-as-Usual archetype (15% of futures), Regional competition (4% of futures), Inequality (3%) and Breakdown (2%). Assessing the relative weightings of instrumental, intrinsic and relational values enabled the allocation of archetypal futures into value foci. Archetypal futures, and their values mixes, which are most likely to lead towards just and sustainable futures (as mapped out according to the multiple SDGs they incorporate) have a strong societal focus, have equally high regard for both material and non-material benefits of nature, are concerned with the diversity of life options, and socio-ecological resilience. Those archetypes that are focused on material accumulation and individual benefit, were found to be the least sustainable, singularly focused on instrumental values, and incorporated a very narrow range of SDGs {5.2.2}.

4 The majority of futures articles do not explicitly address nature, nature´s contributions to people and good quality of life as separate specific but related concepts *(established but incomplete)* but address them either individually, as separate issues or in combinations, such as nature and nature´s contributions to people without a direct link to good quality of life. Nevertheless, the futures reviewed in this assessment included only studies which addressed elements of the IPBES conceptual framework, at least implicitly. The reviewed futures ranged from purely qualitative to quantitative modelling studies {5.2.2}.

5 A vast majority of accessible futures work was created within the research and academia context *(well established)* {5.2.2}. Quantitative assessments of values underpinning different futures are frequently carried out for economic values, while other types of values tend to be assessed qualitatively, e.g., through participatory approaches. Most defined futures are underpinned by multiple types of values. None of the reviewed futures were underpinned by, or explicitly address only a single type of value. Studies explicitly addressing multiple types of values for nature, nature´s contributions to people and good quality of life originated predominantly from local and to a lesser degree, national contexts. The proportion of value-oriented futures studies from global context was minimal {5.2.2}.

6 Futures works have engaged to a degree with stakeholders, but whose values are being promoted is unknown *(well established)*. Information is available on the stakeholders included in scenario development and whose concerns are included. Stakeholders were included in the development of approximately half of the futures, mostly including authorities, individuals, communities and organized groups. Those futures which were co-developed with stakeholders generally addressed how values underpin potential future developments more explicitly, while futures designed solely by researchers or experts generally mentioned the role of values but did not assess their explicit influence on the future, or used some type of valuation but did not explicitly reflect on what types of values these capture. These studies included no information on whose voices were not included in developing the futures and whose concerns and underpinning values are thus not included {5.2.2}. Information is not available on who are the winners and losers under different futures (no explicit information was included in 201 out of 257 reviewed futures). There is a lack of information on whose values are explicitly incorporated into these defined futures, how these would change when different actors are considered, and what the likelihood is of different actors and their alternative values and desired futures being considered. The futures literature rarely provides information on specific actors responsible for individual actions influencing future development (133 futures included no information on specific policies, decisions or actions, and 70 futures included no information on who acts in the specific scenario, vision or pathway) {5.2.2}.

7 The understanding of possible futures is limited by a lack of focus on certain regions and environments *(established but incomplete)*. While the futures encompassed various geographic and temporal scales from local to continental, and years to millennia, most futures capturing trends in nature, nature´s contributions to people and good quality of life while also taking into account values, focus on the local level. The coverage of futures from selected regions, particularly Africa, and futures covering

marine environments, is very weak. Most futures do not include evidence regarding cross-scale interactions (152 – 59%), and in many cases on cross-sectoral interactions (95 – 37%) {5.2.2}.

8 Information about different kinds of future trade-offs is limited *(well established)* (no explicit information was provided in 92 of 257 futures (36%)). Information on trade-offs is largely limited to trade-offs between different kinds of land uses, sectors and nature´s contributions to people/ecosystem services. Trade-offs between different types of livelihoods, interest groups or societal groups were only rarely made explicit in the reviewed futures. Novel thinking on futures is rare, and descriptions of disruptions of different kinds or radically transformative futures, as well as their underpinning values are rare (no information on tipping point/thresholds/ feedbacks in 230 out of 257 reviewed futures; no transformative elements in 233 out of 257 reviewed futures). Justice and equity have only been considered in a limited way in futures works (38 out of 257 futures cases). These relate to general summaries of the inequality levels under different scenarios {5.2.2}.

Mobilizing values of nature to enable transformative change

9 Values are widely considered to be a deep-lying foundation for societal change *(well established)*. IPBES[3] defines transformative change as *'a fundamental, system-wide reorganization across technological, economic and social factors, including paradigms, goals and values'.* The role that diverse values and valuation of nature can play in enabling such profound and necessary change is explored through a review of academic literature on transitions and transformations to sustainability. Values can intervene in societal change in two ways {5.3.2}. Firstly, interventions can try to change or shift people's values, promoting the incorporation of sustainability-aligned values and reducing non-sustainable-aligned values. Secondly, when people already hold sustainability-aligned values but due to prevailing contexts are not free to act on them (e.g., due to competing motivations, lack of resources, or physical constraints), then interventions can aim to create favourable conditions that enable people to act in ways consistent with their values {5.3.2, 5.3.3, 5.3.4}.

10 Working with values can promote both incremental and transformative change by operating at different levels and spheres of society *(established but incomplete)*. Broad values are associated with points of deeper leverage: aspects of society such as worldviews that may be difficult to change but where relatively small shifts can produce large, comparatively stable and potentially transformative change. Mobilizing more diverse ways of valuing relationships between humans and with other-than-human nature is considered as a necessary (though not sufficient) condition for producing fundamental and system-wide change, for example to the primary goals by which a society measures progress. The kind of values that are dominant in society is determined by power relations, for example because economic and political interests determine which values – and whose values – have most traction in decision-making. Mobilizing alternative and more diverse values therefore involves changing power relations, empowering those whose values have been rendered less visible {5.3.2, 5.3.3}.

11 Transformative change is likely to be served by working to pluralise values and valuation at three broad levels and spheres *(well established)*: firstly, more diverse and inclusive valuation of nature and uptake in practical measures such as incentive schemes; secondly, reforms to institutions that enact more plural and balanced values within system-wide structures; and thirdly, initiatives that link more to the "inner dimensions" of sustainability including individual and social beliefs and worldviews. Change to this subjective and intersubjective domain is considered important for bringing about shifts to societal goals and paradigms, for example if there is to be a system-wide shift in goal away from growth in material consumption. Whilst movement towards sustainability can begin in any of these domains, change is only likely to be transformative if it spreads across all these societal spheres and leverage points {5.3.2, 5.3.4}.

12 Transformation to sustainability is found to require a) a rebalancing of human-human values, away from the dominance of individualism and economic profit towards sustainability-aligned values of collectivism, care and justice; and b) a rebalancing of human-nature values, away from the dominance of instrumental values, towards inclusion of values based on care and respect for other-than-human nature *(well established)* {5.3.2, 5.3.3, 5.5}. The term "sustainability-aligned values" refers to those broad values (e.g., care for nature, solidarity among humans) that are found to be either associated with future scenarios linked to achievement of SDGS or to processes or outcomes of transformative change towards just and sustainable futures {5.2.3, 5.3.2}. Because there are different ways of defining sustainability it is inevitable that there will be different ideas about which values are aligned with sustainability {5.5.1}. Despite this diversity of sustainability scholarship there remains considerable agreement about the kind of broad values that are most aligned with sustainability and the kind of balance of values that is necessary.

3. IPBES. (2019). *Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services.* IPBES Secretariat. 978-3-947851-13-3.

13 Deliberative procedures are found to be a promising form of intervention that can explicitly mobilize and bridge nature's diverse values *(established but incomplete)*. Currently sustainability science is reaching agreement that social values are an important factor in transformative change and an action-oriented strand of this literature identifies ways to engage with diverse values as a contributory process for transformations to sustainability. There is relatively little knowledge about how values operate as a process – as leverage points to promote transformation. The literature emphasizes the role of deliberative processes and co-creational approaches to knowledge production that systematically bring diverse values to the surface and encourage values transparency and associated public dialogue {5.3.3}. This mobilization of diverse values can be challenging, for example where many competing values are surfaced. But it can also produce at least three types of positive contributions towards transformation: (i) richer knowledge, (ii) empowerment of marginalised groups, (iii) reflexivity and social learning {5.3.3}.

14 Behaviour change interventions can close or "bridge" the gap between values and behaviour by ensuring that the various conditions are met that together enable people to act consistently with sustainability-aligned values *(well established)*. Policies for biodiversity conservation will be more effective if they specify the individual behaviour they seek to change and evaluate the potential to influence this behaviour. The psychology literature views values as basic goals that transcend specific situations and affect people's beliefs, attitudes, norms, intentions and eventually their behaviours. It is well established that the holding of values is not a sufficient condition for predicting behaviour, hence scientific research sometimes speaks of a "value-action-gap" {5.3.4}. Behaviour change interventions can "bridge" the gap between values and behaviour by ensuring that various conditions are met. These conditions can be categorised as providing (i) capability, (ii) opportunity and (iii) motivation to act. Integrated frameworks, such as the behaviour change wheel can help unpack which behaviour change interventions are appropriate for targeting these different determinants of behaviour, as well as the policy categories to support specific intervention functions. The analysis of ten National Biodiversity Strategies and Action Plans selected from across the globe shows that while the full range of behaviour change interventions and policies is proposed some intervention types are more prominently used and others tend to be neglected. Many action plans do not specify clearly enough whose and which behaviours are to be addressed in order to meet biodiversity conservation objectives {5.3.4}.

Governing the mobilization of diverse values of nature for change

15 Value choices, on the nature of society desired to live in and to leave for posterity, are linchpins of governance for just and sustainable futures *(well established)*. Governance definitions and frameworks are normative and carriers of values and value systems, with some embracing consensus and empathy, others entrepreneurship and others authority and control. Different governance modes are built around ways in which people consider other peoples' values such as: hegemony (one's values consider as superior to others); separatism (not willing to be confronted with the implications of other people's values); pluralism (being co-responsible for protecting other people's values); tolerance (being sympathetic to other people's values despite knowing that one's values are superior) and indifference (abstaining from intervention due to lack of interest in other's values). Governance choices can become "easy", "moderate" or "hard" due to (in) compatibility, (in) comparability, and (in) commensurability of these values, thus highlighting the significance of meta-governance in setting the values, images and principles as the backdrop to transition towards just and sustainable futures. Incommensurable values, or conflicting and incompatible images and principles may underpin persistence of "wicked environmental problems" {5.4.2}.

16 Governance for sustainability has to cope with fundamental uncertainty and possibility of unintended consequences, while navigating through realms of fragmented power across actors and societal subsystems *(well established)*. The capability of governance regimes to address uncertainty and complexity is enhanced by being: a) interactive (consciously interacting with power centres to define as well as realise goals), b) reflective (reassessing practices and adjust steering mechanism); c) reflexive (calling into question the governance foundations and envisioning alternatives and reinventing aned shaping the foundations); and d) supported by democratic institutions, participation and policy coherence. From a values perspective, governance modes which are flexible, transparent, and promote collaboration, participation, and learning underpin their capability to address complexity and uncertainty. In certain situations, hybrid forms of governance (such as co-management, or partnerships between state and non-state actors) may help address uncertainty, although risks of window dressing in absence of consideration of diverse values and different ethical perspectives remain {5.4.3}.

17 Transformative governance towards just and sustainable futures requires radical, systemic shifts in values and belief, patterns of social behaviour, and multilevel governance *(established but incomplete)*. Transformative governance relies on values that guide action towards transformation and that are embedded in the

selected methods and means of governance (design); and on values embraced on goals, expectations, and societal priorities of the envisioned new system. Central to the consideration of diverse values in transformative governance is a multi-actor approach that widens the scope of participation to a broad set of values and beliefs within society and that guarantee effective participation of the involved ones. Leadership of nested institutions (complex, redundant, and layered) and institutional diversity (a mix of public, private and civil society actors) at the local, regional, and state levels, connected by formal and informal social networks is an important lever for such transformation. Creating space and autonomy for local experiences ("niches") and encourage innovative interventions and the emergence of arrangements inclusive of diverse values within systems; creating an environment for questioning existing values, knowledge and structures; and giving opportunity to experimentation of new ways of governance based on knowledge co-creation and social learning processes are key enablers to manifest a transformation. Transformative governance may be impeded by cognitive limits of humans, inertia of embedded political power relations, and absence of catalytic upscaling mechanisms for nested personal and social transformations {5.4.3}.

18 The promotion of social learning processes is crucial for governance systems that intend to contribute to the creation of just and sustainable futures *(well established)*. Fostering a culture of learning through processes of participatory reflection, decision and action implementation as well as collaborative production of knowledge across different social actors, groups and networks contribute to the recognition, mobilization, weaving, integration and co-creation of diverse values. The recognition and incorporation of diverse values in governance depend on each system's culture of learning and integrative capacities. These capacities generally involve: a) processes of plural valuation linked to negotiation and decision-making outcomes; b) integration of various types of knowledge in governance; c) explicating and reflecting on the often implicit "normative frames of reference" that actors with various backgrounds have; and d) identification and awareness of "the different epistemological beliefs which underpin knowledge claims". Social learning processes for diverse values and plural valuations can be enabled by: a) knowledge co-production; b) creating venues for social interaction with multiple participation in cross-scale linkages; c) fostering time and space for collective reflection and dialogue; d) establishing methods, agreements, facilitation and routines for collaboration and integration of diverse values; and e) fostering attitudes of openness for a transformative experience {5.4.4}.

19 Learning with, from and for diverse values of nature that are held by indigenous peoples and local communities can support governance for just and sustainable futures since IPLCs have key long-term place-based knowledge and values of biodiversity *(well established)*. Creating opportunities for dialogue and direct learning among different social groups can help prevent and resolve conflicts related to environmental injustice as well as promote inclusive and participatory decision-making through the recognition, mobilization, weaving, integration and co-creation of diverse values. Governance models which build on recognition of human rights law and biocultural approaches to conservation can contribute to achieve effective and just conservation outcomes while addressing erosion of both cultural and biological diversity {5.4.4}.

Case Studies of value-centred pathways to sustainable futures: green economy, degrowth, earth stewardship and nature protection

20 There is no single pathway towards just and sustainable futures *(well established)*. Even where nations are able to overcome differences to sign up to a common set of goals (i.e., the SDGs), there are still multiple and contested pathways to achieving these, which stem from different underlying worldviews and values, different views about leverage points for transformative change, and politics. A pathway to transformation is defined as a strategy for getting to a desired future based on a recognisable body of sustainability thinking and practice, driven by an identifiable coalition of researchers, practitioners and advocates. Pathways are differentiated by the kinds of solution framework they propose in response to the biodiversity and climate emergencies. These framings arise from the emphasis placed on different bodies of academic theory as well as different normative positions – knowledge and values are co-constructed within pathways {5.5.1}. Analysis of pathways reveals how complex ways of working with values are pursued in practice, through knowledge-value coalitions that help to give traction to calls to diversify or balance those values that are recognised, measured and incorporated into institutions and policies {5.5.6}.

Four co-existing pathways to sustainability are reviewed. Green economy represents a "nature for society" pathway based on economic theory and leaning towards instrumental values of nature. Nature protection represents a "nature for nature" pathway based on conservation sciences and leaning towards intrinsic values of nature. Earth Stewardship and biocultural diversity represents a "nature as culture" pathway based on sustainability science and local knowledge, leaning towards relational values of nature. Degrowth and post-growth represents a more cross-cutting pathway, based on ecological economics and political ecology, and pluralist valuation {5.5.1, 5.5.2, 5.5.3, 5.5.4, 5.5.5}.

21 Different worldviews and sets of values are prioritised across different pathways *(established but incomplete)*. *Green economy* emphasizes solutions based

on reform to economic performance metrics, institutions and technologies. This solutions framework is underpinned by a conception of nature as an asset to be managed for human wellbeing, highlighting nature's instrumental values {5.5.2}. *Degrowth* is a pathway that emphasizes strategies that reduce the material throughput of society, protecting human wellbeing through better distribution of material wealth rather than growth. This solutions framework stems from a central value to sustain life in all its forms and for humans to live by the value of sufficiency {5.5.3}. *Earth stewardship* is a pathway that emphasizes the strengthening of local sovereignty, including agrarian reform. This solutions framework is underpinned by prioritisation of solidarity, between humans as well as between humans and other-than-human nature. Linked to the science and ethics of Biocultural Conservation this pathway promotes the goal of biocultural flourishing {5.5.4}. *Nature protection* is a pathway that calls for a greatly expanded network of nature conservation areas (such as protected areas) to ensure a future for all life on earth. This position prioritises intrinsic over instrumental values, with protection of biodiversity for its own sake seen as an essential condition for restoring balance between humans and nature {5.5.5}.

22 Each pathway strongly advocates the need to recognise and act upon more diverse and balanced ways of valuing nature as a foundation for transformative change *(well established)*. These four pathways all accept that biophysical boundaries have to be respected, albeit with different views about whether there is still scope for economic growth within these boundaries. All pathways also pay attention to social justice, especially between generations, albeit that the nature protection pathway views this as a separate goal that is secondary to saving biodiversity, whilst other pathways see greater degrees of integration between justice and sustainability. Pathways also tend to emphasize different social justice principles such as maximising utility (green economy), minimum and maximum consumption thresholds (degrowth), rights and empowerment (earth stewardship) and option values (nature protection) {5.5}.

23 Constructive dialogue between these and other pathways, based on transparency and recognition of the diverse values underlying different positions, will itself be crucial to transformative change *(unresolved)*. Each of these pathways has much to offer. All foreground sustainability aligned values and all seek a more balanced future for nature and people. Matching paths to selected or specific opportunities will become a critical task if society starts making shifts towards just and sustainable futures. No single path is presented here as superior over the others. And whilst some crucial common goals are highlighted, there is no agenda to resolve all conflicts between pathways and eliminate differences {5.5.6}.

5.1 INTRODUCTION

5.1.1 Foundation of the chapter

In this chapter the focus is on looking forward, exploring the potential to create a more desirable future, one that is just and sustainable. The chapter defines what is meant by just, and sustainable, and explains the rationale in adopting these goals, which is based on the emerging findings from previous IPBES assessments, these being the Global and Regional Assessments of Biodiversity and Ecosystem Services and the Assessment of Pollinators, Pollination and Food Production, as well as other global assessments (such as GEO, the Global Land Outlook, World Water Development Report, the Global Wetlands Outlook and others) (IPBES, 2016a, 2018a, 2018b, 2018c, 2018d, 2019; Ramsar Convention on Wetlands, 2018; UNCCD, 2017; WWAP & UNESCO, 2019). All these documents highlight critical aspects relating to this context: the current global socio-economic system is eroding both certain social and institutional structures, and biophysical underpinnings (biodiversity and collectively ecosystems and their associated processes), at a variety of scales. IPBES assessments have also found that deep-rooted *transformative* change will be required to address the twin requirements of justice and sustainability in a timely manner. Furthermore, they highlight a role for values in transformation and that scenario planning or futuring processes can assist in surfacing multiple values, creating spaces for negotiating and assessing trade-offs and synergies to identify opportunities for transformation. Instrumental, relational and intrinsic values of nature are currently not effectively evaluated, considered and integrated into the varied and multiple decision-making contexts (both formal government process and informal, and from local to global scales) that shape both our environment and our collective future (Balvanera *et al.*, 2020; Harmáčková *et al.*, 2021; Pascual *et al.*, 2017; Vásquez-Fernández & Ahenakew pii tai poo taa, 2020; Zafra-Calvo *et al.*, 2020).

The chapter assesses the role of diverse values of nature in supporting socio-ecological transformations towards more just and sustainable futures. This is approached as a two-fold and mutually complementing task addressing the following key questions:

- What are the diverse values that have been considered in developing and creating visions for, and scenarios of the future, particularly those relating to more desirable futures – ones that are more just and sustainable?
- How have interventions to introduce more diverse values and valuation of nature been undertaken and how can these serve as leverage points for enabling transformation towards just and sustainable futures?

5.1.2 Unpacking the theoretical building blocks for the chapter

In this section, the importance of future visions and works is explained, as well as the need to better understand transformative change in order to contribute to a rapidly emerging social and environmental agenda focused on directing us towards more sustainable trajectories. Whilst one of the primary purposes of the chapter is to identify how diverse values can be mobilized for transformative change, it is likely that not all values can be equally accommodated if a kind of future that humanity can collectively desire is to be achieved. It is for this reason that linked concepts of justice and sustainability are introduced. Justice sits above the more contingent world of specific values, enabling us to establish parameters relating to the kind of values that humanity wants, in particular when striving for a common future based on principles of sustainability. As such justice and its links to sustainability are introduced and defined.

5.1.2.1 Why explore futures visions and works?

Painters, writers, dancers, designers, economists, musicians, politicians and people from all fields of study have engaged in thinking about, capturing, portraying, expressing and sharing their visions of the future. Studies of futures works provide us with a diverse collection of material that captures their thinking, preferences, beliefs, and fears for the inevitability that is the future. Generally, the goal of futurists and futures works, engaged in prospective thinking, are about making the world a better place to live (Bell, 1997). Futurists explore alternative futures, the possible, the probable and the preferable (Bell, 1997). Given the pace of global change and the interrelatedness of changes, people need to become more literate within this futures space (Masini, 2011).

Why engage in these issues within the context of this values assessment? Future visions such as scenarios have the potential to create spaces for discussion about what matters, and what would be the implications of not properly assessing nature and its contributions to the quality of human life. Establishing a vision for the future can be equated with establishing a target, or series of targets and goals to be achieved over a determined time horizon. This has three effects: Firstly, it establishes a values-based future state(s) or target(s) enabling us to transform from present. Secondly, it provides us with new potential directions and purposes, requiring us to focus actions and articulate policies for meeting these; these visions or scenarios thereby opening the possibility for more just and sustainable futures. Finally, it enables the building of constituencies for change (alliances, partnerships, social movements). Without these spaces for exchange and interrelation between actors and stakeholders, it is not feasible to achieve transformation towards just and sustainable futures.

Within this chapter interest is focused on understanding what the types of values are that underpin these different visions of the future. Given the nature of this assessment, the focus is primarily on written works, in particular published work explored in detail through formal review, the values associated with different future visions and scenarios, and how these lead to varying outcomes for nature, its contribution to people and a good quality of life. In this chapter, the focus is primarily on visions and scenarios within the environment and development space, and particularly those associated with sustainability and justice goals. Here the intention is to elucidate the values that underpin these visions, including how sustainability and justice are themselves conceived so that this learning can be integrated into driving transformative change towards more just and sustainable futures.

5.1.2.2 Justice and sustainability in creating a common future

At the 1972 Stockholm Conference, the Secretary-General of the United Nations Maurice F. Strong stressed the need for *'new concepts of sovereignty, based not on the surrender of national sovereignties but on better means of exercising them collectively, and with a greater sense of responsibility for the common good'* (United Nations, 1972, p. 45). Since then, the world community has repeatedly committed to visions of a *common* future (United Nations, 1987, 1992a, 1992b, 2015). Documents such as "Our common future" or "The future we want" can, in a first approximation, provide criteria for evaluating possible futures as desirable or undesirable. These visions reflect a shared concern for human development and the protection of the natural environment. They demand the integration of sustainability and justice into visions of a better future (i.e., a future that is more desirable than the one that is to be expected if business as usual were to be continued). In view of the global transformation of the planet through human activity in the Anthropocene, it has recently been suggested that biodiversity and the ecological and evolutionary processes it underpins should be considered the new "Global Commons in the Anthropocene" (Nakicenovic *et al.*, 2016).

This IPBES values assessment highlights the diverse values of nature and its contributions to people. Values are plural and subjective to varying degrees (Chapter 2). Specific values may vary from one culture to another as well as between individuals and groups (IPBES, 2015). Despite this variety of values, there is a clear need to facilitate collective action with regard to global commons. A shared understanding of which possible futures are

desirable and which are not is a necessary first step. Justice and sustainability have become core elements of such a shared understanding, as evidenced by their status within international commitments such as the SDGs. Justice and sustainability are broad and universally shared values. Whilst specific, concrete claims about what constitutes justice will always remain plural and contested (Miller, 2012; Sen, 2009; Smith, 1790), appeals to justice refer to generally accepted principles about what is owed to each other (Eser *et al.*, 2014; Mazouz, 2006). Justice is less contingent than specific values because you do not need to share the same value systems or preferences as others to agree, for example, that discrimination is wrong.

Sustainability is defined here according to the Millennium Ecosystem Assessment (MEA) definition, *'A characteristic or state whereby the needs of the present and local population can be met without compromising the ability of future generations or populations in other locations to meet their needs'* (MEA, 2005). This definition clearly refers to the way sustainable development was defined by the Brundtland Commission (United Nations, 1987) but is more explicit about the intra-generational aspects. This idea of sustainability is both evaluative and normative **(Box 5.1)**, incorporating the implicit value-judgement and normative claim that it is good (right) to meet the needs of the present and local populations and it is bad (wrong) to compromise the needs of the future and the geographically distant. Although sustainability can reasonably be interpreted as a boundary object with different meanings in different contexts (Star & Griesemer, 1989) it maintains its common identity across all contexts through the idea of justice within and between generations.

The principle of sustainability contains three objectives of justice: (a) justice between different people of the present generation (intra-generational justice), (b) justice between people of different generations (intergenerational justice), and (c) justice between humans and nature (ecological justice) (Baumgärtner & Quaas, 2010; Eser *et al.*, 2014; Stumpf *et al.*, 2015). These three objectives differ in their level of consensus. The moral rights of current humans are well established in the universal declaration of human rights. The rights of future generations are a contested issue in philosophy (Birnbacher & Thorseth, 2015; Düwell *et al.*, 2018) but consensus is now emerging that *'sustainability is about the future, our concern toward it and our acceptance of responsibility for our actions that affect future people'* (Norton, 2005, p. 304). In contrast, the rights of other-than-human entities remain controversial. Views related to this differ between diverse cultures, schools of thought and traditions. The IPBES conceptual framework recognises the importance of worldviews that do consider other-than-human entities as deserving of justice. This is reflected in the recognition of both intrinsic and relational values of nature, in addition to instrumental ones. This assessment, therefore, considers ecological as well as social justice (Annex 5.1).

5.1.2.3 Why transformative change

The terms "transformative" and "transformations" are increasingly used to denote the kind of deep-rooted change that is needed if humanity is to successfully navigate towards a safer and more desirable, or common future. At its broadest level, these terms indicate the need for game-changing shifts in society-nature relationships, rather than incremental change or change that is restricted to specific managerial practices (Patterson *et al.*, 2017). Folke *et al.*, (2010) state that transformative change involves profound shifts in *'perceptions and meaning, social network configurations, patterns of interactions among actors including leadership and political power relations, and associated organizational arrangements'.* The profoundness of required transformation is further emphasized when more concrete examples of *what* needs to be transformed are considered. For example, two things that are frequently stated as in need of transformation are (i) the pursuit of development goals based on the continuous increase in material consumption (Dryzek, 1997; Hickel & Kallis, 2020;

Box 5 1 **On evidence with regard to facts, values, and norms.**

1. **Factual statements** make claims about what's true or false. They can be supported or refuted by empirical evidence. Examples: *'Biodiversity is decreasing', 'A multiplicity of values exist that vary not only across cultures and contexts, but also across individuals'.*

2. **Evaluative statements** involve value-judgments that are beyond the scope of empirical sciences. They make claims about what's good or bad. The validity of these judgements cannot be derived from empirical evidence alone, but needs to be underpinned by (more or less) subjective values. Examples: *'The loss of biodiversity is bad', 'Taking into account the diversity and complexity of these diverse values is good'.*

3. **Normative statements** are prescriptive, i.e., they make claims about what actions are right or wrong. Like evaluative statements, they cannot be justified empirically, but need to be underpinned by intersubjectively acknowledged values. Examples: *'Biodiversity ought to be preserved', 'IPBES must integrate the values of different stakeholders'.*

IPBES, 2019); and (ii) the systematic production of social inequalities (Harvey, 2010; United Nations, 2017). This is a position that has been also reported by IPBES (2019) and this acknowledgement that transformation requires such fundamental societal changes brings it into the realm of political economy.

A distinction between "transformations" from "transitions" is considered through reference to the scope and nature of the kind of change under consideration. "Transitions" has mainly been used to refer to change to specific sub-systems, sometimes referred to as a sectoral or meso level focus (Hölscher *et al.*, 2018; Köhler *et al.*, 2019). For example, there are bodies of sustainability research that focus on transitions to the energy, mobility, food, water and forest sectors. By contrast, this chapter follows the precedent of defining transformations as emphasizing systemic changes that involve changes to society itself, including the redistribution of power in ways that benefit marginalised social groups and ensure that *'no one is left behind'* (Few *et al.*, 2017; Martin *et al.*, 2020; Patterson *et al.*, 2017; Scoones *et al.*, 2015). As the conducted review of published research reveals, there is increasing evidence that achieving this depth and breadth of change will have to involve interventions that work with values, including more plural forms of valuation.

This call for "transformative" change – the view that profound societal change is necessary to escape from the current nexus of environmental emergencies (biodiversity, climate, novel diseases) – has rapidly become accepted within United Nations science-policy assessments as well as wider government and non-government bodies. For example, the IPBES 2019 Global Assessment calls for transformative change that emphasizes addressing consumption and inequality as root causes of an unsustainable future. It lists effective interventions including: *'enabling visions of a good quality of life that do not entail ever-increasing material consumption'*, and *'addressing inequalities, especially regarding income and gender, which undermine the capacity for sustainability'.*

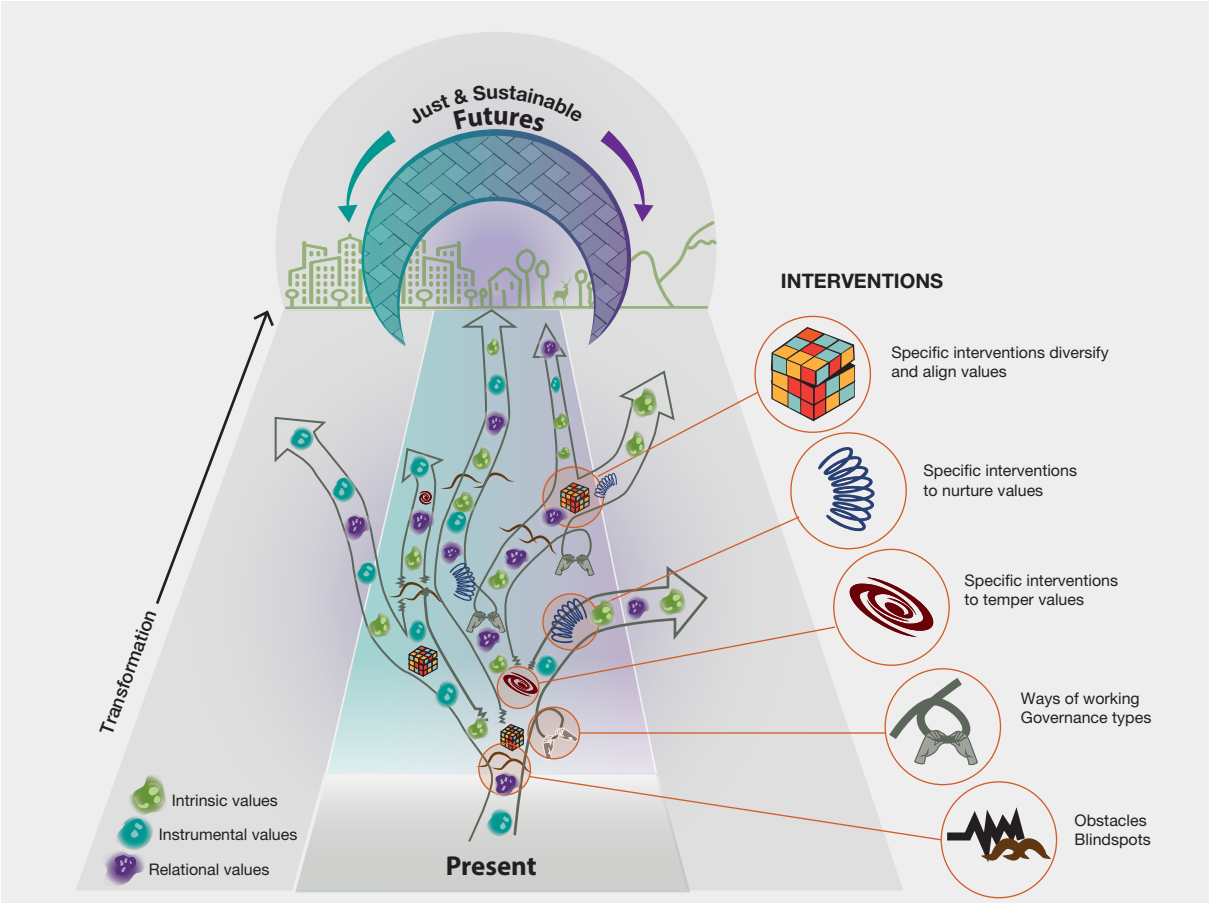


Figure 5 1 **Values underpinning transformative pathways to a just and sustainable future.**

The Global Assessment (IPBES, 2019) also identified the role of values of nature, proposing these could be *unleashed* in support of transformative change. A key part of the agenda here is to look deeper into this possibility – to progress the understanding of how the recognition and incorporation of more diverse values of nature can be a game-changing process; and to identify the political-economic challenges involved in seeking to govern such mobilization of diverse values. This is likely to involve transformations to governance itself. In an increasingly telecoupled world, the complex networks of connectivity pose challenges to governance solutions that are scale or sector-specific (Boillat *et al.*, 2018; Carrasco *et al.*, 2017). In global conservation governance, there is increasing recognition and emphasis on conservation action along ecological networks, transitioning away from a model of conservation based on area-based, high-value sites and landscapes. Justice framings of governance can bring to the fore the power dimensions in tele coupling, and elucidate causes of inequity in conservation (Boillat *et al.*, 2018). Recent governance analysis for addressing the continued loss of freshwater biodiversity has called for joined-up solutions at various levels. These include international agreements stimulating effective policy and management interventions, and the national and local state and nonstate actors playing central roles in defining context-specific portfolios of measures that address synergistic threats to freshwater biodiversity (Tickner *et al.*, 2020). Such governance challenges call for careful analysis of values underpinning institutional interactions, and indicate possible response options for enhancing "institutional and governance fit" along transformation pathways.

Justice and sustainability are qualities of a desirable future (section 5.1.2.2). Which values (of nature) individuals and society focus on shapes the pathways to the future **(Figure 5.1)**; only certain combinations of values, i.e., those that are balanced, are aligned with paths to a desirable future (section 5.2). Thus, defining and creating pathways to a just and sustainable future requires recognising and balancing these diverse values so that marginalised values can emerge or be acknowledged (e.g., relational values held by marginalised groups such as indigenous communities). Those values that are aligned with just and sustainable futures may need to be nurtured and enabled, while those that are not, or which have become too dominant, may need to be tempered or shifted (section 5.3). Institutional design and governance can facilitate these interventions by helping to overcome obstacles and enable those values that favour transformations towards more just and sustainable futures, and guide individual and collective action (section 5.4).

5.1.3 Outline of the chapter

The section explores in detail, if and how, having a clearer and more nuanced understanding of the multiple and various values people hold for nature, and the contributions nature provides to people, can facilitate, and possibly enable transformative change towards more just and sustainable futures. In this way, this chapter builds on the work of previous chapters: from Chapter 2, focused on current understanding of what kinds of values exist, Chapter 3 how can these values be measured, and how they are reflected in current decision-making in Chapter 4. This chapter analyses to what extent diverse values, together with more plural approaches to valuation, are reflected and expressed in futures work (such as scenarios and visions of the future – identified from multiple and varied sources), what range and types of values and valuation are most strongly associated with both process towards, and outcomes of, preferred futures, what role an extended range of recognised values can play in shaping pathways towards just and sustainable futures, and what are the leverage points for advancing and governing such pathways of transformative change.

The Chapter 5 assessment work has been organized into four sections, each addressing different aspects of the issues outlined above. Section 5.2 asks what and whose values have been considered in developing and creating visions for, and scenarios of the future, particularly those relating to more just and sustainable futures? This question is addressed from multiple perspectives, using a systematic review, scrutinising visions of the future in scientific scenarios as well as in other kinds of literature and in creative arts media. The review focuses on identifying the roles that different kinds of values (and valuation) play in these visions, both as part of the process towards envisioned futures and as outcomes (as changed (sets of) values). In doing so the chapter draws on the normative framing (above) that specifies justice and sustainability as qualities of better futures. The different values of nature present in visions are explored but also the conceptualisation/use of justice and sustainability as claims to common futures and agendas. The main output of this section is a general understanding of how values are considered within future visions (and as part of the pathways towards these), and the identification of what values – and what ways of handling diverse values – are strongly associated with preferred (just and sustainable) futures and preferred pathways towards these. Archetypical futures and archetypal values grouping are used in linking values to different futures.

Section 5.3 addresses the issue of how more diverse values and valuation of nature can be mobilized for enabling transformative change towards just and sustainable futures. It employs qualitative content analysis of literature on individual and societal level transitions/

transformations towards pro-environmental behaviour and sustainability. This produces findings about the role of values in emerging theories and frameworks of transformative change, about ways of intervening to enable individually held values to translate into pro-environmental behaviour, and about approaches to environmental knowledge production and decision-making that mobilize diverse values in ways that enrich understanding, empower groups of actors and facilitate reflexive learning. The bridge between individual and social mobilizations of values is also considered, especially through social norms that are seen to be a condition that enables or constrains the value-action chain.

In light of the leverage points, opportunities and challenges for mobilizing diverse values towards transformative change, Section 5.4 explores the kind of governance that can support this process. It employs expert literature review to assess the enabling role of governance, with a specific focus on governing transformations and the related needs of interagency coordination, working across scales, knowledge systems and capacities. The decision-making typology and framework for the values assessment is mapped onto governance forms and issues, to unpack the role of diverse values and plural valuations in explaining the degree of fit of a governance mode in enabling more just and sustainable futures (using depth, breadth and pathways as the frames of enquiry). The consequences of tele coupling are also examined from the lens of institutional and governance interplay, specifically unpacking the role of diverse values and plural valuations. In this way the chapter connects to Chapter 6 which explores stakeholder capacity needs in advancing these concepts.

Finally, in Section 5.5 the experience of the "real world" complexity of working with values is explored, learning from how different coalitions of scholars, practitioners and citizens address the challenges and opportunities for transformative change across system scales. This involves a focus on four selected pathways of current transformation – the green economy, degrowth, earth stewardship and nature protection. Exploring these pathways develops an understanding of the political economy of conceiving and governing pathways of transformative change: the existence of plural pathways towards preferred futures; the contested nature of these alternative pathways; and the role of power and vested interests in resisting change.

5.2 VALUES OF NATURE AND NATURE'S CONTRIBUTIONS TO PEOPLE, FOUND IN JUST AND SUSTAINABLE FUTURES

This section identifies what types of values underpin described futures, and what the futures outline in terms of impacts on nature, nature´s contributions to people and good quality of life. There are different approaches that have been developed and applied in defining aspects of the future, or developing futures works. These straddle all academic fields within both the sciences and arts, for example, forecasting, modelling, developing works of art and fictional writing. Each of these products or outputs have their own niche and audience and are either very specific or generic and speaking to either a short or long-term timeframe. Futures works are therefore seen to incorporate any form of evidence, including peer-reviewed or grey literature, arts-based or material from indigenous and local knowledge that is future-orientated including future visions and scenarios.

Future visions include different articulations of the future surfacing in peer-reviewed literature, policies, institutional documents (e.g., corporate/non-governmental organizations visions), arts-based practices and visions of the future in indigenous and local knowledge.

Scenarios, and scenario development **(Box 5.2)** is a futures output that has been applied to many different fields becoming a mainstream activity following the 1972 Meadows publication, Limits to Growth (Meadows *et al.*, 1972; Pesonen *et al.*, 2000). Scenario development has now been extensively used in the science-policy development space (IPBES, 2016b), in helping to address issues of uncertainty and complexity (Ash *et al.*, 2010). Scenarios are representations of different possible futures from a defined starting point (IPBES, 2016b; Mahmoud *et al.*, 2009). They are focused on highlighting or exploring drivers of change and the impacts of changes in these over a specified time frame. In doing so they enable decision-makers to anticipate potential changes and develop timely responses to these (Mahmoud *et al.*, 2009). Scenario development has emerged as an important tool for exploring complex issues within science policy stakeholder dialogues. Within the science-policy development arena, three types of scenarios have been defined and developed (IPBES, 2016b): Exploratory scenarios (the most common), that examine plausible different futures based on select direct or indirect drivers, are often based on storylines or narratives and are used in agenda setting; 2) intervention or policy scenarios that consider alternative management approaches of policies around specific actions (this scenario type can be divided into two groups, those scenarios that are target seeking or normative describe agreed-upon desirable

Box 5 2 Approach to planning or co-developing scenarios.

Multiple studies have defined approaches to planning or developing scenarios, with many of these having very similar core features and design stages. The approaches proposed by Alcamo *et al.* (2005); Bishop *et al.* (2007); Bradfield (2008); Dong *et al.* (2013); Henrichs *et al.* (2010); IPBES (2016b); Kok (2009); Kok *et al.* (2011); Mahmoud *et al.* (2009); Pesonen *et al.* (2000) and Reed *et al.* (2013), were synthesized to develop a generalized approach for scenario development. This approach consists of 5 distinct stages outlined below.

1. **Establishing the scope:** Constitute a scenario development group or team that identifies the focus and objectives, core region or area of interest, time horizons and boundaries (biophysical, socio-economic, and political) within the exercise;

2. **Stakeholder roles:** Identify the stakeholders included in the process and select appropriate participatory techniques. Participatory methods (such as workshops, discussion forums and meetings) allow stakeholders (including scientists, policymakers, citizens and local and indigenous communities) to be directly involved in defining complex problems, and assessing and evaluating different futures (IPBES, 2016b; Kok *et al.*, 2011). Participation here allows for the emergence of issues, broader inclusion of different perspectives and worldviews and a more holistic suite of values that people place on nature (IPBES, 2016b). Expert-based approaches are a specific form of participatory method, where practitioners in select fields are invited to provide input into scenario construction processes (IPBES, 2016b) based on their knowledge. The degree to which stakeholders are engaged in the process, ranging from a supportive role to leading the design, influences the scenario team's role, which in turn can shift from leading to supporting (Henrichs *et al.*, 2010);

3. **Determine baselines and indicators:** Understand the current baselines of the socio-ecological system. Identify key measurements and potential direct drivers of change (e.g., land-use change, climate change, pollution, natural resource use and exploitation, invasive species) and the indirect drivers of change (economic, demographic, socio-cultural, governance and institutions, technology). Establish an understanding of causal relationships within the socio-ecological systems and between drivers using expert knowledge, modelling, literature and stakeholder engagement;

4. **Explore and assess trajectories:** Identify likely future developments, a full range of potential future trajectories and likely changes (particularly for biodiversity and ecosystem services) and highlight key uncertainties and assumptions. Assess the relative strength of each of the drivers and focus preliminary scenario development on these relative strengths. If required, select axes based on stressors on which to develop preliminary scenarios. Clarify desired policy end-points of each of the developed scenarios;

5. **Articulate scenarios:** Draft the final scenarios, following an appropriate review process involving stakeholders. The end products benefit from being fit for purpose, both in terms of content and format.

futures, and may include alternative pathways for reaching these targets though decisions and actions; and those that are policy screening); and 3) policy review scenarios (or retrospective policy evaluation scenarios) that evaluate past policy efforts so as to understand successes and failures against intended impacts (IPBES, 2016b). The first two approaches are most commonly developed and used.

The guiding questions of this section are:

- *What types of values of nature underpin different future scenarios and visions* (particularly those visions that include dimensions of justice and sustainability), leading to *what kind of outcomes for nature, nature's contributions to people and a good quality of life?*
- Are *different types* of values of nature (e.g., instrumental, relational) and their dynamics (e.g., singular / plural, level of diversity, dominance of one / balance), associated with *particular types of futures* (e.g., undesirable / desirable, unsustainable / sustainable, unjust / just)?
- Can the incorporation of plural *(versus unique) values in decision-making* be detected with regard to *just and sustainable futures?*

5.2.1 Scope and methodology for assessing futures works and their inclusion of values

In assessing what types of values underpin different types of futures (including future impacts on nature, nature´s contributions to people and good quality of life), and how these relate to just and sustainable futures, various types of futures works were reviewed, including exploratory scenarios and target-seeking (normative) scenarios.

Multiple data sources were assessed based on a guiding review framework[4], specifically:

4. Systematic review of association between values of nature, nature´s contributions to people and good quality of life and futures in scenarios, visions and pathways (https://doi.org/10.5281/zenodo.4359655).

1. Peer-reviewed literature,

2. Grey literature (policy and planning documents, reports originating from science-policy processes, business, international organizations, non-governmental organizations, etc.),

3. Arts-based materials,

4. Materials based on indigenous and local knowledge.

Complementary review approaches included:

A systematic keyword-based search of peer-reviewed and grey literature supplemented with:

   a. Snowball-sampling and a refined keyword-based search to fill gaps identified in the systematic keyword-based searches (particularly regarding grey literature, ILK based materials and arts-related materials), and

   b. Incorporation of review results from the previous IPBES assessments (particularly Chapter 4 and 5 of the Global Assessment, and Chapter 5 of the Europe and Central Asia Regional Assessment, which carried out targeted reviews of future exploratory and target-seeking scenarios, including pathways).

In total, 460 future scenarios were systematically assessed and synthesised from 159 peer-reviewed studies and grey literature reports[5], including 342 peer-reviewed scenarios and 118 scenarios from grey literature. In addition, evidence from snowballed-sampled arts-based and ILK based materials was included.

The review and synthesis took into account only futures works which addressed impacts on all three components of IPBES Conceptual Framework – nature, nature´s contributions to people and good quality of life, while elaborating on values at the same time. This criterion eliminated a vast majority of existing futures works.

Futures works, identified through the searches for peer-reviewed literature, grey literature and ILK literature were entered into databases and coded. Several lenses and filters were applied in analysing the developed databases and coded information, based on selected operational approaches and thematic issues presented in Chapter 1 (justice), Chapter 2 (types of values) and Chapter 3 (types of valuation approaches). In eliciting and making sense of the values captured in reviewed databases, the review builds on (1) the work developed in Chapter 2 thereby ensuring consistency with the typology of values presented, (2) the IPBES Preliminary Guide on Values (IPBES, 2015), and (3) additional typologies of values (Díaz *et al.*, 2015; IPBES, 2020). In addition, the review draws on the valuation approaches and methods presented in Chapter 3.

In each of the identified future scenarios or visions of the future, it was distinguished which types of values underpin these different futures (these values were expressed both implicitly and explicitly) and which values are expressed/articulated as the outcomes of the futures (e.g., through monetary or biophysical valuation). The assessment results presented in the following sections, are based on quantitative and qualitative analyses of data from these databases.

5.2.2 Values underpinning different types of futures

5.2.2.1 Incorporation of values in futures works – key influencing factors

a) Geographic coverage and scales

The identified and reviewed futures works originated primarily from local-scale studies (44.3%), followed by the national scale (16.7%) **(Figure 5.2 (I))**. The scale of the futures works did not appear to determine whether they explicitly engaged with underpinning values: underpinning values were addressed explicitly in 26% of global futures works, 13% of regional (continental), 16.7% of national and 44.3% of local futures works. In terms of IPBES regions, 26% of the studies focused on futures of Asia-Pacific, followed by Europe and Central Asia and the Americas (**Figure 5.2 (II)** and **(III)**). Only 7% of the futures focused on Africa. Whilst there is strong disparity across regions in terms of focus on futures, there was however, no obvious pattern between the geographic region of futures' and the focus or justification of values underpinning them.

b) Scenario development approaches, focus and stakeholder engagement

The vast majority of futures works were initiated within research and academic contexts **(Figure 5.3 (I))**; only 25% of futures works, developed by academia, had no stakeholder engagement. On the contrary, 55% of futures works originating from academia were participatory or policy-driven. The vast majority of futures works were developed as exploratory scenarios, uncovering a variety of pathways of potential future development **(Figure 5.3 (II))**.

The reviewed futures incorporated both qualitative and quantitative studies (ranging from narrative analysis to

5. Systematic review of association between values of nature, nature´s contributions to people and good quality of life and futures in scenarios, visions and pathways (https://doi.org/10.5281/zenodo.4359655).

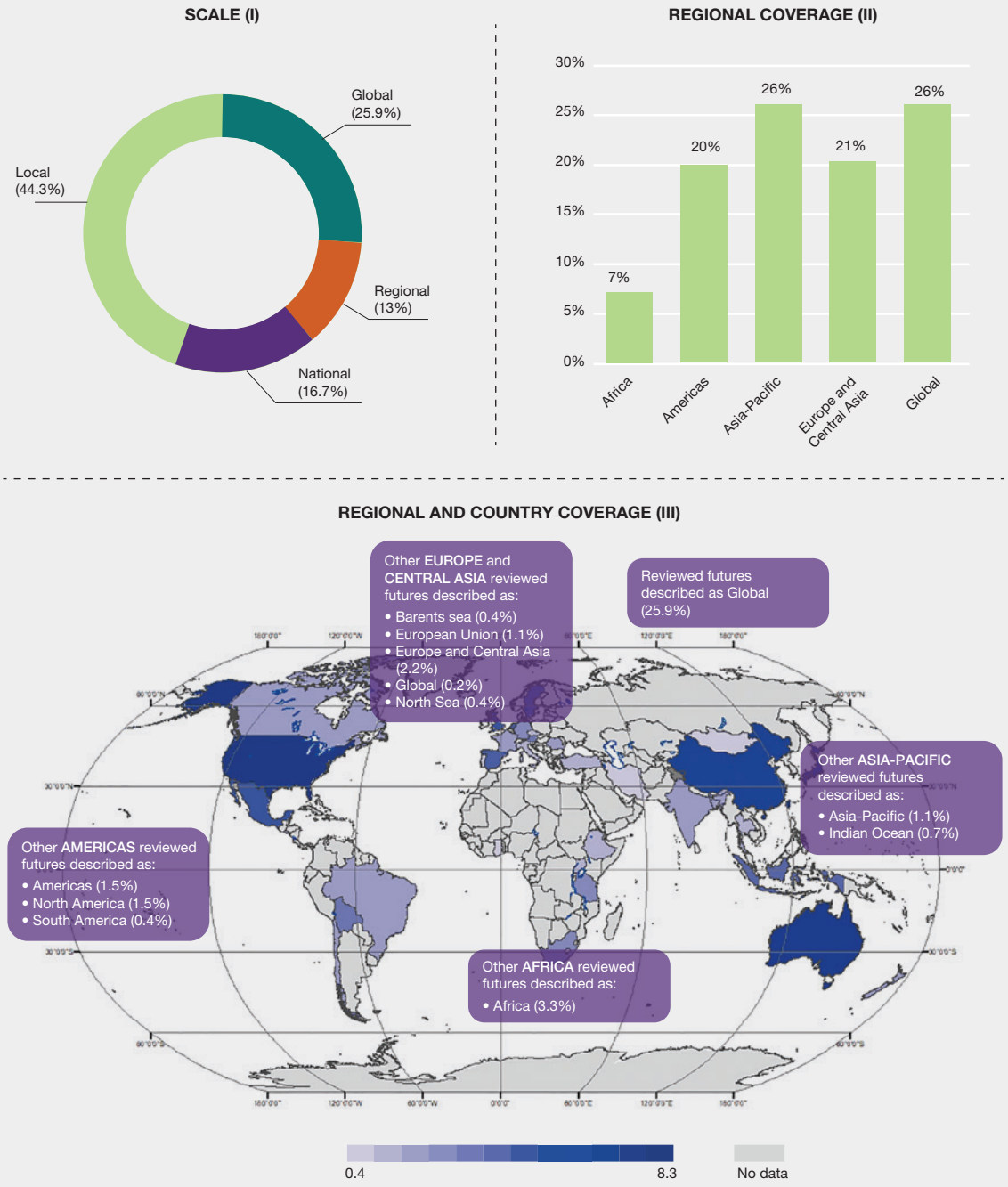


Figure 5 2 **Selected descriptive characteristics of the 460 reviewed futures works** (future exploratory scenarios, target-seeking scenarios/normative visions and pathways as sequences of decisions and actions leading to future goals).

modelling). The majority of the reviewed futures studies were outlined in quantitative terms **(Figure 5.3 (III))**. Overall, there were more quantitative studies identified (45%) than qualitative studies (23%). However, of the qualitative studies identified, 74% addressed values explicitly, in contrast with the quantitative studies where 45% of these explicitly considered values. Most frequently, quantitative studies assessed biophysical and economic values (31% of quantitative studies), followed by standalone biophysical and economic valuation (22% and 14% of quantitative studies, respectively). Other types of values tended to be assessed qualitatively, e.g., through participatory approaches (49% of qualitative studies and 16% of mixed-methods studies focused on the elicitation

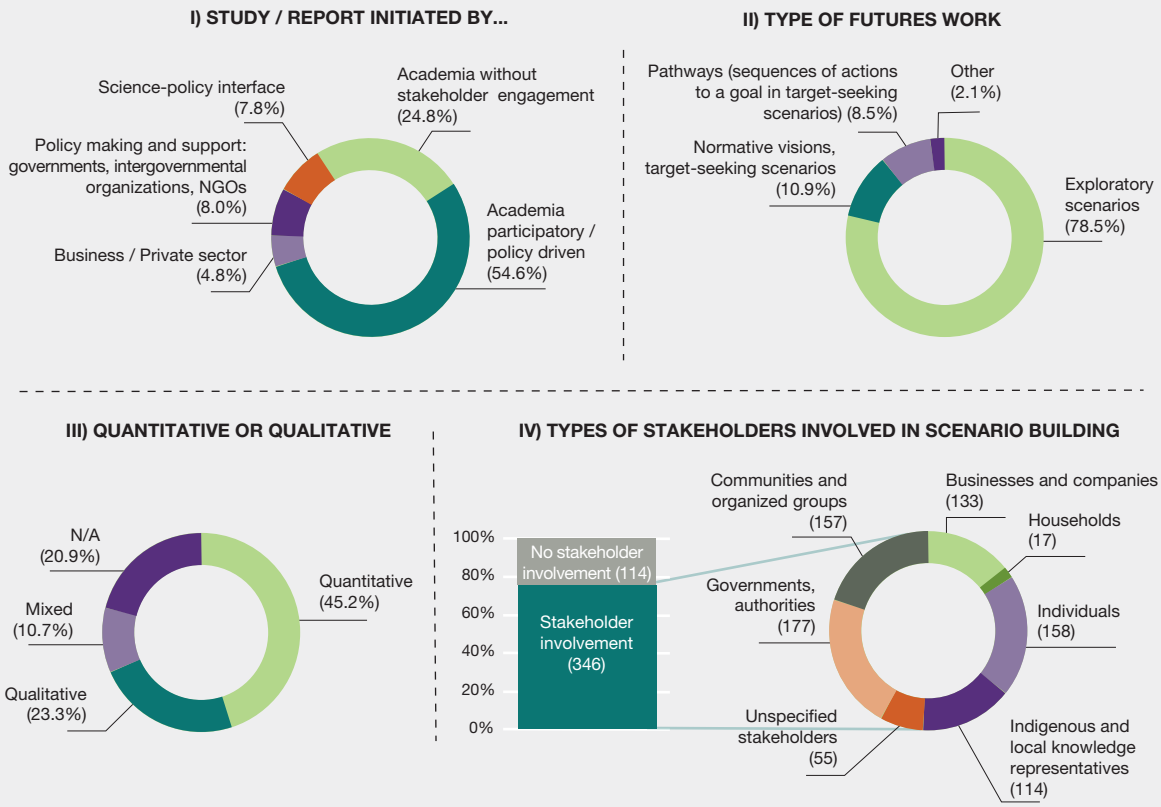


Figure 5 3 **Selected descriptive characteristics of the 460 reviewed futures work**, (I) highlights who initiated the study, (II) types of futures work – future exploratory scenarios, target-seeking scenarios/normative visions and pathways as sequences of decisions and actions leading to future goals, (III) nature of the study – qualitative or quantitative, (IV) types of stakeholders involved in each study (values in the right side pie chart are not mutually exclusive, multiple types of stakeholders were included in most studies).

of socio-cultural values or holistic, indigenous and local valuation).

Stakeholders were involved in the development of about 75% of futures works, mostly including various individual stakeholders, communities and organized groups, governments and authorities at different decision scales, and businesses **(Figure 5.3 (IV))**. No relationship was evident between the variety of stakeholders involved in the development of the futures and the depth to which values were addressed in them. The intention of the leaders of the futures development to explicitly include values in the scenario-building process and final products appears to have had more influence than stakeholder involvement *per se*.

In terms of recognising different knowledge holders (which were considered to be linked to notions of recognitional justice), holders of indigenous and local knowledge (ILK) were involved in the development of 114 out of 460 futures. Of the 102 peer-reviewed scenarios that included ILK, the majority of studies (n=45; 57%) were aligned with value combinations that were balanced with a dominant societal focus, followed by those that were moderately individualistic and materialistic (n=26; 35%), with only 8 studies being linked to deeply individualistic and materialistic value combinations (10%).

c) Engagement with policy instruments

The vast majority of futures works were not concerned with policy instruments or did not make this an explicit **(Table 5.1)**. Future works that did include a policy component tended to focus on Legal and regulatory issues and to a lesser degree on economic and financial issues. Rights based and customary issues, and social and cultural issues received negligible attention.

Table 5 1 **Proportions of assessed futures works including different types of policy instruments.**

The colour coding on a blue-white-red scale is used to highlight the most common (blue) and least common (orange) policy instruments and their combinations.

	Legal and regulatory	Rights-based and customary	Economic and financial	Social and cultural	No policy instruments specified
Legal and regulatory instruments	29%	3%	8%	4%	
Rights-based instruments and customary norms		4%	2%	2%	
Economic and financial instruments			13%	3%	
Social and cultural instruments				8%	
No policy instruments specified					62%

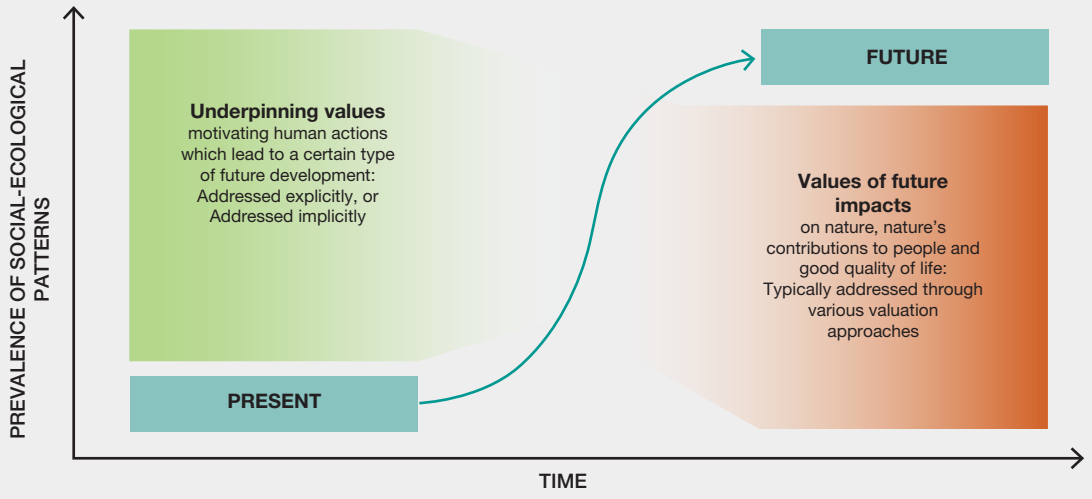


Figure 5 4 **Schematic illustration of two different ways that values were approached (from the present and future perspective) in the assessed futures works.**

5.2.2.2 Types of values addressed in futures works

This analysis set out to establish which values have been addressed (or missed/neglected) in the established visions of the future related to nature, nature´s contributions to people, and good quality of life. Additionally, it determined the degree to which multiple/diverse values have been captured, and if particular values have tended to be overlooked.

The futures works assessed in this chapter have (a) focused on values underpinning human actions while expressing/articulating them either explicitly or implicitly (by mentioning the values aspect of futures thinking but not assessing underpinning values in detail), or (b) performed a certain type of valuation of potential future impacts on nature, nature´s contributions to people or good quality of life without explicitly addressing the role of values in underpinning human actions shaping future development **(Figure 5.4)**.

Figure 5 5 **Selected descriptive characteristics of the 460 reviewed futures works** (future exploratory scenarios, target-seeking scenarios/normative visions and pathways as sequences of decisions and actions leading to future goals).

The assessment shows that there is a continuum of the extent to which values are explicitly recognised as a driving force of the future. Out of a total of 460 futures works, 247 explicitly reflected on the values underpinning certain types of future development **(Figure 5.5 (I))**. With the same degree of frequency, the assessed futures works included a valuation of the futures impacts (e.g., resulting future economic, biophysical or socio-cultural values).

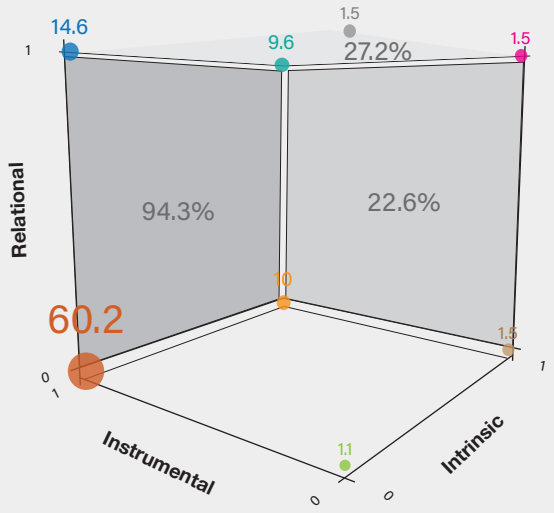
The most common approach to value potential future impacts on nature, nature´s contributions to people and good quality of life was biophysical modelling, economic evaluation and socio-cultural assessment (e.g., participatory assessment) **(Figure 5.5 (II))**. These approaches were combined in (33%) of the assessed futures to gain a more holistic perspective. Futures rarely incorporate valuation of impacts on human health (eight futures out of 460) and holistic, ILK based valuation (two futures out of 460).

"Value" in the reviewed studies mostly represented a preference (for something or for a particular state of the world) or a measure (e.g., monetary value, biophysical value such as the number of species). Only in the minority of cases did "value" refer to a principle or a core belief **(Figure 5.5 (III))**.

Most futures were underpinned by multiple value foci, i.e., study participants valued multiple aspects of nature, nature´s contributions to people and good quality of life at the same time (91%). Values for nature (e.g., individual organisms, biophysical assemblages, biophysical processes and biodiversity) underpinned approximately 32% of the futures, while the rest did not account for this focus of values. Values for nature´s contributions to people underpinned the majority of future visions, in 86% of the futures focusing on material nature´s contributions to people. As for values for aspects of good quality of life related to nature, these underpinned most futures, with a 68% focus on individual quality of life, e.g., individual well-being, learning or security. 54% of the futures focused on societal aspects of good quality of life, and only 26% on cultural aspects.

Almost all futures were driven by instrumental values for nature (94%), either solely (60%) or in combination with other value justifications (34%). Only a minority of futures were underpinned by intrinsic (22%) and relational (27%) values for nature, most often in combination with instrumental values. Only 1.5% of futures were solely focussed on intrinsic values, and only 1.5% solely by relational values. Most common interaction was between instrumental and relational values (in 15% of the futures) **(Figure 5.6)**.

In terms of the life value frames – "living from nature" (or considering nature as a resource) and "living with



VALUE JUSTIFICATION	% OF ASSESSED FUTURES WORKS
All value justifications	9.6%
Solely instrumental	60.2%
Instrumental + intrinsic	10.0%
Instrumental + relational	14.6%
Solely intrinsic	1.5%
Intrinsic + relational	1.5%
Solely relational	1.5%
No value justification included	1.1%
Total	**100.0%**

Figure 5 6 **Proportion of assessed futures underpinned by different value justifications** (i.e., instrumental, intrinsic and relational values; see Chapter 2 for a full definition).

nature" (or considering nature as "the other", e.g., through conservation) were the value frames most commonly underpinning potential futures (with respectively 94% and 36% of futures scenarios and visions), followed by "living in nature" (considering nature as surroundings people relate to, e.g., through place attachment or cultural landscapes; 26%) and only in (3%) of the cases "living as nature" (considering no distinction between humans and nature)[6].

5.2.2.3 Future outcomes, archetypal futures and underpinning value types

The future is likely to unfold within the wide range of possibilities and trajectories that futures studies present. Whilst this is recognised, it is useful to try to distil and simplify this range of future trajectories down to a smaller number of possible futures in understanding and assessing the potential implications of different trajectories or future pathways.

The chapter draws on *seven broad types of potential future development* identified as "scenario archetypes" as developed and discussed by Hunt *et al.* (2012) and van Vuuren *et al.* (2012), which have been widely used across IPBES assessments (IPBES, 2016b; Sitas *et al.*, 2019): (1) Business as Usual, (2) Economic optimism, (3) Global sustainable development, (4) Regional sustainability, (5) Regional competition, (6) Inequality and (7) Breakdown (**Box 5.3**, **Table 5.2**, **Figure 5.7**).

These scenario archetypes are used as a synthesis tool applied to the reviewed futures works describing potential future developments and their relation to underpinning values (based on n=460 scenarios from peer-reviewed studies and grey literature)[7].

The assessment presented here illustrates how different archetypal futures are underpinned by different combinations of value types; specifically, three key types of value combinations or foci have been identified: (A) deeply individualistic and materialistic, (B) moderately individualistic and materialistic (or low societal / business as usual), and (C) balanced with dominant societal focus (or collectivism/ equity / justice) **(Figure 5.7)**.

The following subsections summarise the types of futures that can potentially occur or future archetypes, and which combinations of values seem to underpin these future developments (archetypal combinations of value types).

5.2.2.3.1 Archetypal futures

Future trends in nature, nature´s contributions to people and good quality of life from multiple types of future scenarios, visions, policy documents, reviewed in this assessment have been summarised based on the overall "archetypal" future

6. It should be noted that **none** of the futures works explicitly used the Life Frames of Nature's Values or the Nature Futures Framework. These frameworks were applied only *ex post* as a lens to assess the futures works during expert (yet subjective) interpretation, conducted to keep coherence with other Chapters as well as other IPBES assessments and processes. Thus, these results need to be interpreted with caution.

7. Differences between future archetypes – (text similarity analysis) (https://doi.org/10.5281/zenodo.4380980).

Box 5 3 Making sense of recurring patterns in scenario studies – scenario archetypes and archetypal futures.

Scenario archetypes have been defined as being overarching, global, macroscopic images of alternative future states of the world (Fergnani & Jackson, 2019). Archetype approaches used to develop an understanding of recurrent patterns, drivers and processes in socio-ecological systems and from these form explicit generalisations based on contextual and normative conditions (Hunt *et al.*, 2012; Oberlack *et al.*, 2019; Sietz *et al.*, 2019). Archetype approaches are extremely useful within scenario analysis, particularly those linked to science policy processes, enabling the distillation of scenarios into core or overarching archetypes, from large amounts of unstructured textual data, thus enabling comparison between diverse collections of scenario studies (Sitas *et al.*, 2019). Here typically scenario studies are designated as aligning or falling into a specified scenario archetype by a panel of experts and reviewers. Fergnani & Jackson (2019) have even gone so far as to suggest four predetermined generic archetypes: continued growth, collapse, discipline, and transformation. While the scenario archetype approach in general allows for the synthesis of large amounts of diverse information they have been criticised as being subjective and simplistic (Sitas *et al.*, 2019).

Table 5 2 Overview of the original set of global archetypes and their underlying assumptions that were used as a starting point to classify scenarios within the Intergovernmental Science-Policy Platform for Biodiversity and Ecosystem Services (IPBES) regional assessments.

The first column contains attributes typically used to describe scenario archetypes. Economic optimism scenarios focus on competition, efficient market, and economic growth; reformed market scenarios are similar to economic optimism but corrected for market failures; global sustainable development scenarios focus on environmental protection and reduction of inequality through global cooperation, lifestyle change using efficient technologies; regional sustainability scenarios highlight globalization and international markets that are seen to erode traditional values and social norms; regional competition scenarios feature regional self-reliance, national sovereignty and regional identity but also involve tensions with other regions; and finally business-as-usual scenarios that assume continuation of historical trends (IPBES, 2016b; van Vuuren *et al.,* 2012). These were rationalized in the IPBES regional assessments (IPBES, 2018a, 2018b, 2018c, 2018d) (from Sitas *et al.*, 2019).

ATTRIBUTE	SCENARIO ARCHETYPE					
	Economic optimism	Reformed markets	Global sustainable development	Regional sustainability	Regional competition	Business-as-usual
Economic development	Very rapid	Rapid	Ranging from slow to rapid	Medium	Slow	Medium
Population growth	Low	Low	Low	Medium	High	Medium
Technology development	Rapid	Rapid	Ranging from medium to rapid	Medium to rapid	Slow	Medium
Environmental technology development	Rapid	Rapid	Rapid	Ranging from slow to rapid	Slow	Medium
Main objectives	Economic growth	Various goals	Global sustainability	Local sustainability	Security	Not defined
Environmental protection	Reactive	Both reactive and proactive	Proactive	Proactive	Reactive	Both reactive and proactive
Trade	Globalization	Globalization	Globalization	Trade barriers	Trade barriers	Weak globalization
Policies and institutions	Policies create open markets	Policies targeted at market failures	Strong global governance	Local actors	Strong national governments	Mixed
Vulnerability to climate change	Medium-high	Low	Low	Possibly low	Mixed	Medium

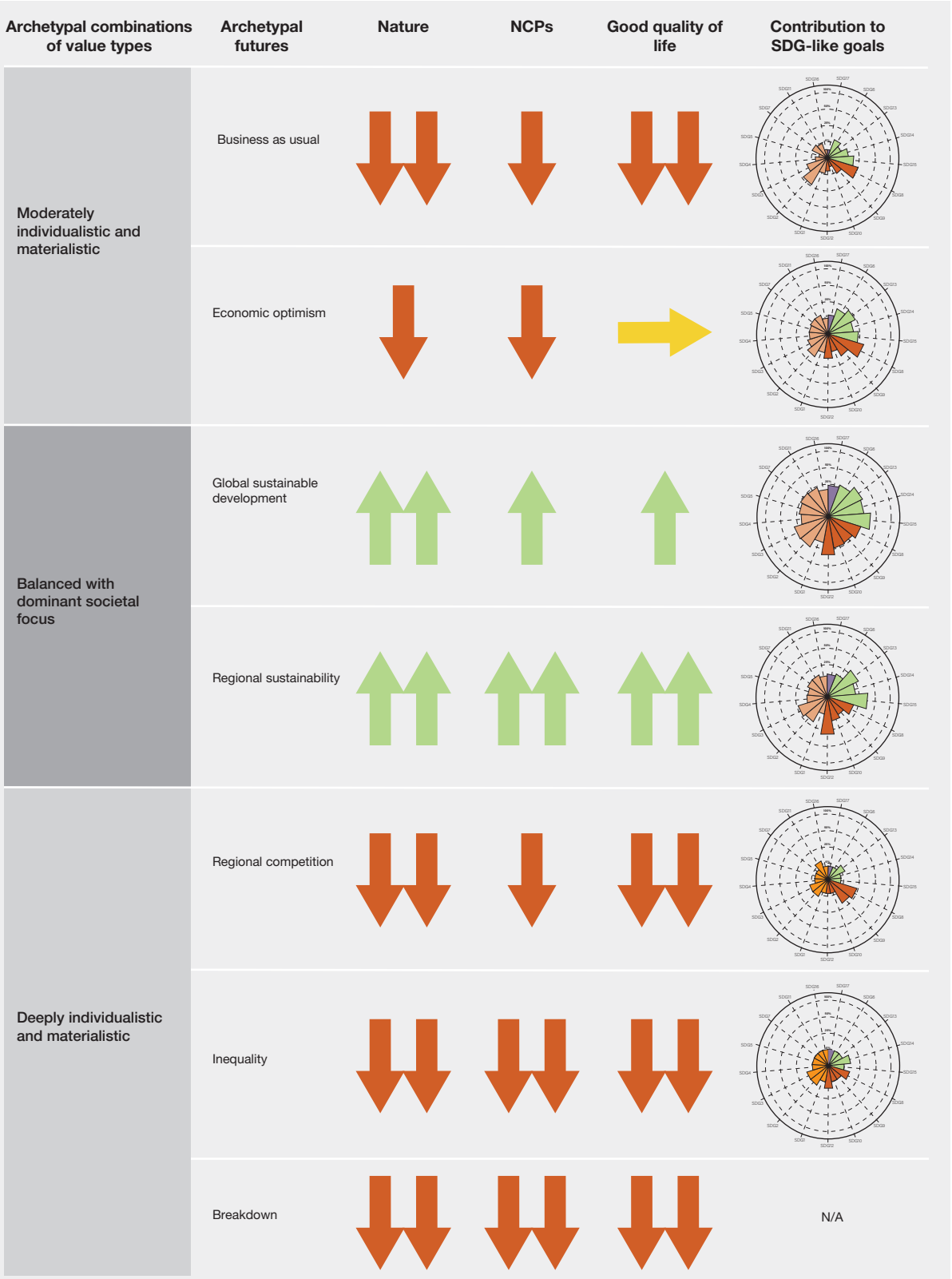


Figure 5 7 **Different future archetypes, grouped by key combinations of values, in relation to sustainable state of nature, nature's contributions to people, a good quality of life and contribution to SDGs.**

Red = widespread failure in the achievement of policy targets; green = widespread achievement of targets; yellow = mixed achievement of targets. For detailed information on the contribution to SDG-like goals see Figure 5.9.

they describe[8]. While **Table 5.2** and **Figure 5.7** summarise the typical dynamics of each future archetype, and the outcomes for nature, nature´s contributions to people and good quality of life such futures might lead to, the next subsections summarise to what extent the archetypal futures are sustainable and just.

The vast majority of the reviewed futures belonged to Regional sustainability (28%), Global sustainable development (25%), Economic optimism (20%), and the Business-as-Usual archetype (12% of futures), which provided enough material for their robust description and summary **(Figure 5.8)**. However, descriptions of futures are scarcer for the Regional competition archetype (5% of futures), Inequality (3%) and Breakdown (2%); their summaries are therefore based on limited evidence.

Almost half of the futures that included ILK were found to be aligned with the regional sustainability archetypes (n=51; 45%), followed by global sustainable development (n=20; 18%), economic optimism (n=17;15%) business as usual (n=13; 11%) with regional competition, inequality and breakdown archetypes each only represented by a handful of studies (5 (4%), 3 (3%) and 2 (2%) respectively).

Sustainability in archetypal futures

The archetypes differ vastly in the degree to which they contribute to fulfilling sustainability goals, e.g., the 2030 Agenda for Sustainable Development (SDGs; United Nations, 2015). While only a minor proportion of the future scenarios and visions covered SDGs explicitly (72 out of 460 futures), most of them addressed goals that could be linked to specific SDGs at least implicitly (257 out of 460 futures). Only the proportion of the 460 reviewed future scenarios and visions that led to reaching goals equivalent or similar to different SDGs was assessed.

The most SDG-like goals can be reached under futures from the Global sustainable development and Regional sustainability archetypes **(Figure 5.9)**. Should the future development follow the Business-as-Usual or the Economic optimism archetype, the most likely SDGs to be fulfilled are SDG 8 Decent Work and Economic Growth, followed by SDG 2 Zero Hunger and SDG 3 Good Health and Wellbeing. In addition, the Economic optimism archetype also seems to contribute to SDG 13 Climate action and SDG 15 Life on Land, in contrast to the Business-as-Usual archetype, under which the fulfilment of these goals is unlikely. The Regional competition and Inequality archetypes of future development show negligible level of contributing to SDGs.

On the contrary, the Global Sustainable Development and Regional Sustainability archetypes show the highest potential for achieving SDGs, and also to contribute to multiple SDGs in parallel. In this respect, Global Sustainable Development shows even higher potential. High proportion of the futures under these two archetypes contribute to SDG 12 Responsible Consumption and Production (33% under Regional Sustainability and 34% under Global Sustainable Development), SDG 13 Climate Action (30% under Regional Sustainability and 37% under Global Sustainable Development), SDG 14 Life Below Water (34% under Global Sustainable Development) and SDG 15 Life on Land (41% under Regional Sustainability and 46% under Global Sustainable Development). In addition,

8. Differences between future archetypes – (text similarity analysis) (https://doi.org/10.5281/zenodo.4380980).

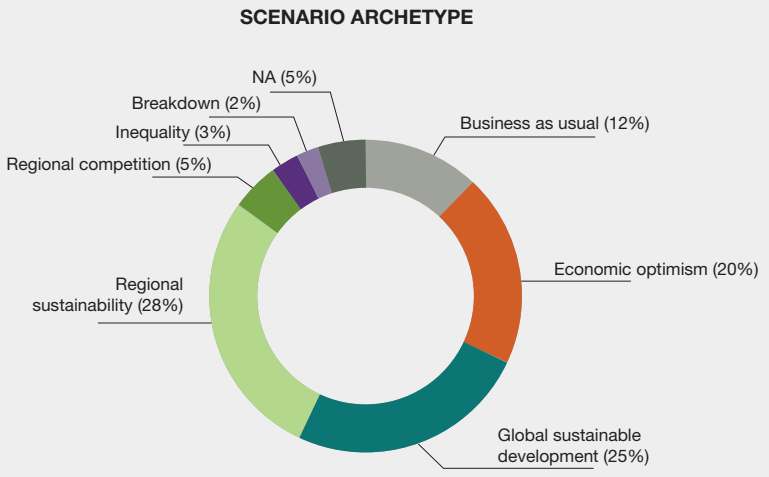


Figure 5 8 **Representation of different scenario archetypes among the reviewed futures [n=460].**

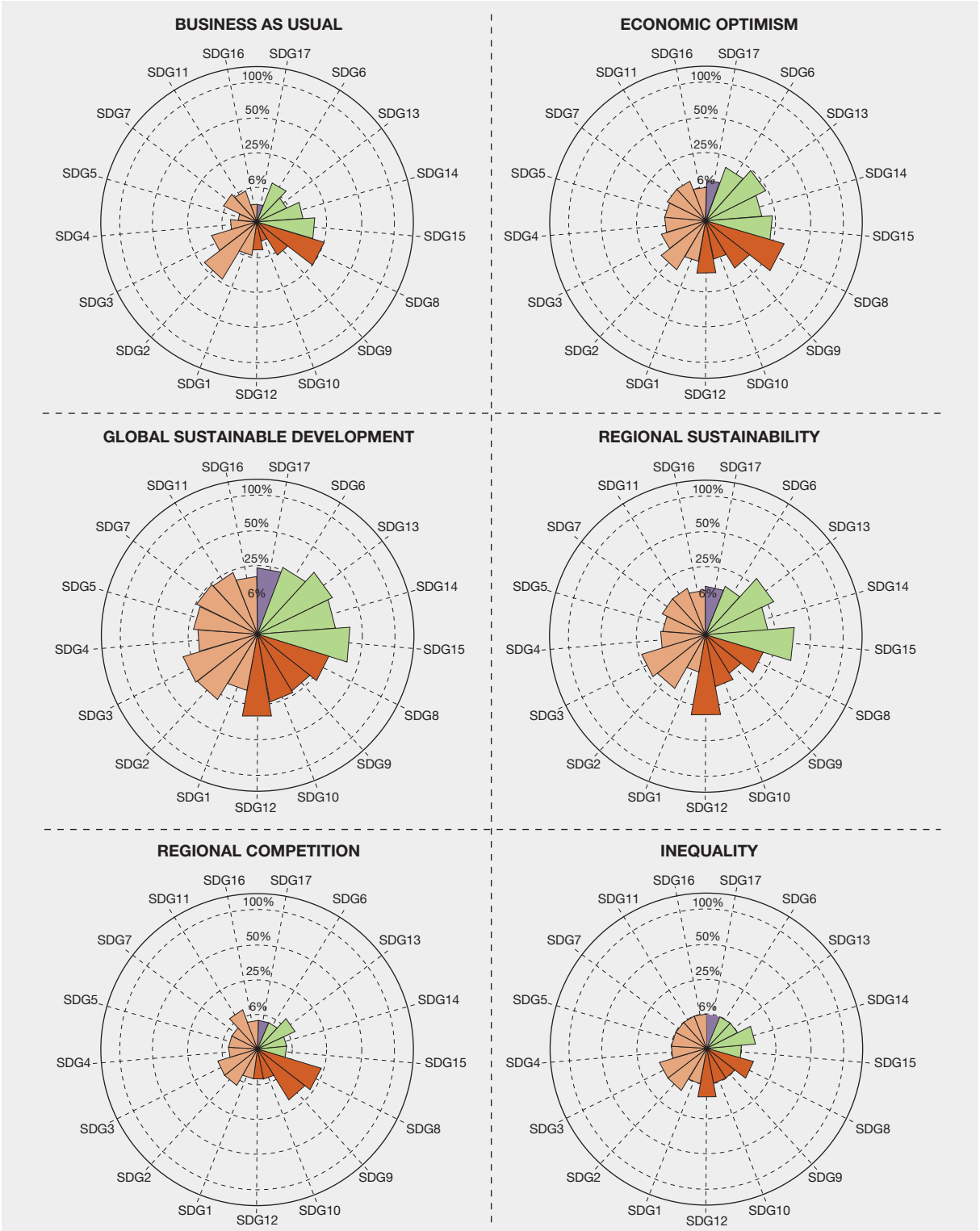


Figure 5 9 **Coverage of goals corresponding to the Sustainable Development Goals by future visions, scenarios and pathways (n=460), originating from the global to the local level.**

The bars are colour-coded based on their dominant character – economic (red), biophysical (green), social (yellow), global partnership (purple) (based on Folke *et al.*, 2016). The size of the bar towards each Sustainable Development Goal shows the proportion of futures targeting the respective goals (or their alikes), ranging from 0% (goal not targeted by any future scenario) to 100% (goal targeted by all future scenarios). Note the visions often concern a different timescale to the Sustainable Development Goals (longer-term, beyond 2030) (the Breakdown archetype has been omitted from the visualisation due to very scarce evidence).

these archetypes are strong in contributing to SDG 2 Zero Hunger, SDG 3 Good Health and Well-being, SDG 6 Clean Water and Sanitation and SDG 8 Decent Work and Economic Growth.

Dimensions of justice in future archetypes

Issues of justice were addressed to only a limited extent in the available scenarios. Our analysis showed that 27% scenarios (n=130) from peer-reviewed and grey literature, were coded to include dimensions of justice and equity. Of these studies, 38% (n=49) surfaced issues linked to (in) equity, with 32% (n=41) specifically referring to social or ecological justice. Ten percent of scenarios (n=13) mentioned the importance of fairness when considering outcomes, with another 10% (n=13) highlighting issues relating to inclusivity. Six studies (4% (n=5)) referred specifically to trade-offs between different actor groups in relation to justice dimensions, and only 6 studies (5%) explicitly mentioned a human rights-based approach as being central to more just outcomes, with two scenarios explicitly highlighting the importance of trust, and one scenario foregrounding dignity as an important consideration. The scenarios that included dimensions of justice or equity were mostly associated with the Global Sustainable Development archetype (32%, n=42) followed by Regional Sustainable Development archetypes (27%, n=35) and Economic Optimism (17%, n=22). Three scenarios had an explicit focus on indigenous rights and knowledge (Brown *et al.*, 2016; Meyer *et al.*, 2016; Outeiro *et al.*, 2015) which were all associated with positive gains for nature, nature´s contributions to people and good quality of life and were associated with the Regional sustainability archetype and balanced with dominant societal focus in terms of value combination.

Distributive justice

The issue of trade-offs between those who benefit and those who lose in different futures is largely understudied. Trade-offs were explicitly coded for in 188 (40%) of the scenarios, with the majority focusing on trade-offs between ecosystem services (n=48), followed by trade-offs between different land-uses (n=33) and ecosystem services / nature´s contributions to people and dimensions of human wellbeing / good quality of life (n= 26). This analysis showed that 18% (n=55) of the scenarios explicitly accounted for winners and losers. Eighteen scenarios were coded in ways that couldn't account for winners and losers, these were summarised as those where the *powerful* (in terms of economic, political or socio-cultural power) *win*, the *powerful lose* and those that are mutually *beneficial to both powerful and non-powerful* actors. Of these, it was found that the majority of scenarios where powerful actors won (n=9) were associated with increases in negative impacts on nature, nature´s contributions to people and good quality of life and only associated with instrumental values, with more deeply individualistic and materialistic value combinations, followed by moderately materialistic and individualistic and only one example where the values were more balanced with dominant societal focus.

Of the scenarios where non-powerful actors won (n=10), overall the impacts for nature, nature´s contributions to people and good quality of life were mostly positive, followed by medium impacts and only a few examples where nature, nature´s contributions to people and good quality of life were negatively impacted. In addition, these scenarios were associated with Regional Sustainability or Global Sustainable Development (with 1 Business-as-Usual) and showed a much more diverse spread of values where instrumental still dominated, but there were equal other measures of intrinsic and relational values associated mostly with more balanced with dominant societal focus.

5.2.2.3.2 Archetypal futures and value foci

This section defines the key value combinations underpinning different archetypal futures based on value focus, i.e., the level of priority given to existing IPBES conceptual framework, particularly nature, nature´s contributions to people and good quality of life **(Figure 5.10)**. It highlights inter-value relationships, commenting on values that are more or less compatible with others and identifying which values cluster together in directing future developments and development pathways.

1. Value combination A: Deeply individualistic and materialistic

This value combination (found in 10% of the futures) is characterised by a vast dominance of individualistic and materialistic values. People prefer individual aspects of wellbeing, focusing on their individual health and personal-wellbeing, education and relations. They are also particularly concerned about their own security and livelihoods. This is echoed by valuing primarily material nature's contributions to people for the provision of food, water, materials such as fibres and timber, and energy. These value foci are only very rarely complemented by other types of value foci (namely the value focus on regulating nature´s contributions to people).

2. Value combination B: Moderately individualistic and materialistic

This value combination is similar to the previous one in terms of the dominance of individualistic and materialistic value foci (in 32% of the futures). However, unlike in the previous case, these value foci are accompanied by others (although weaker), these being the value focus on nature, regulating and non-material nature's contributions and aspects of quality of life beyond the individual. As this combination of values is characteristic of Business-as-Usual futures, representing an extrapolation of current trends, this

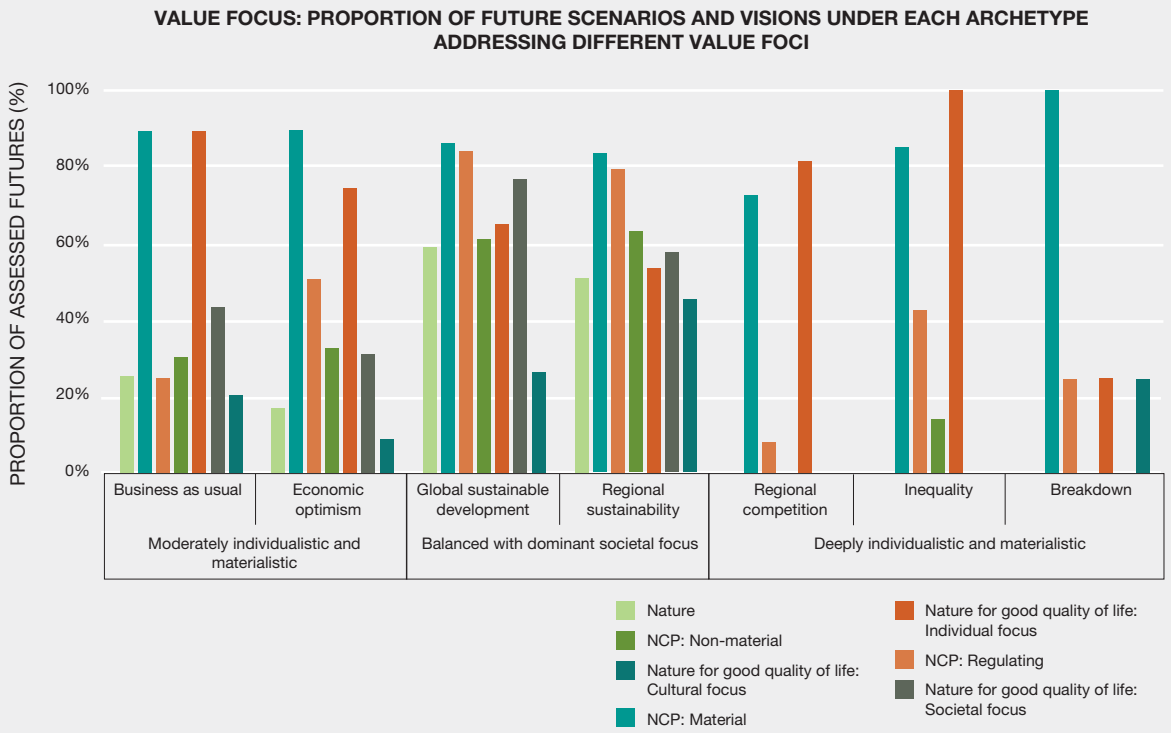


Figure 5 10 **Representation of different value foci across archetypal futures.**

Figure 5 11 **Representation of different value justifications across scenario archetypes.**

Instrumental values refer to values for substitutable means to a human end (e.g., water is used as a means to mitigate thirst, but it does not matter which particular water is used, it can be substituted for different water). Intrinsic values of nature refer to values of nature itself, without reference to humans. Relational values refer to non-substitutable relationships to nature (e.g., valuing a particular animal or tree that cannot be replaced by a different one). Please see Chapter 2 for a more nuanced explanation.

combination of values can be summarised as the one seen to dominate current global development patterns.

3. Value combination C: Balanced with dominant societal focus

The third key combination of values is rather different from the previous two (found in 53% of the futures). Most importantly, among the value foci that people appreciate the most in terms of good quality of life, the societal focus seems to be important, and surpasses the individual focus. Thus, people value justice, equity and functioning governance delivering these. In addition, people value the diversity of life options, as well as the overall socio-ecological resilience and multiple dimensions of sustainability -social, economic and environmental. Among nature´s contributions to people, values held for regulating and non-material contributions are much higher than in the previous two key value combinations. Finally, unlike in the previous two cases, values for nature and cultural links to nature are strong, including values for the existence of individual organisms, ecosystems, biodiversity, ecosystem processes and functions, the biosphere as a whole, etc. In addition, this archetypal value combination is also the only one with a stronger consideration of intrinsic values **(Figure 5.11)**.

5.2.2.3.3 Summarising archetypes of values and future development

Based on the quantitative and qualitative synthesis of potential futures and their underpinning values above, the future archetypes can be grouped based on the overall level of their sustainability (according to their overall narrative and potential to reach the SDGs, see above) and their underpinning values, as follows:

- Unsustainable archetypes underpinned by deeply individualistic and materialistic values: Inequality, Regional Competition, Breakdown;
- Less sustainable archetypes underpinned by moderately individualistic and materialistic values: Business as Usual, Economic Optimism;
- Sustainable archetypes underpinned by balanced values with dominant societal focus: Global Sustainable Development, Regional Sustainability.

5.2.3 Capturing values embedded in alternative visions and futures

In order to capture a plurality of values, in addition to the assessment of grey and peer-reviewed literature (section 5.2.2), the review also surfaced values embedded in alternative visions and futures that featured in ILK materials, artistic approaches, creative arts and United Nations documents.

5.2.3.1 Notions of futures and related values in ILK resources

A complementary approach to the peer-reviewed literature and grey literature assessment was conducted, reviewing IPLCs futures works. This consisted of a refined keyword-based search of peer-reviewed and grey literature, supplemented by snowball sampling of illustrative materials and a review of materials submitted through the IPBES call for contributions on ILK. Additionally, a "Philosophies of good living" cross-chapter case study reviewed literature specifically focused on how IPLCs' philosophies articulate sustainability-aligned values of nature was drawn on.

The scenarios identified in the systematic keyword-based search included local communities (e.g., farmers, urban dwellers, agro-pastoralists) mostly from Canada (Creed *et al.*, 2019), China (Xiong *et al.*, 2020), Germany (Delmotte *et al.*, 2017; Schmidt & Hauck, 2018), Japan (Kabaya *et al.*, 2019) and the Unites States (Burdon *et al.*, 2018). May *et al.* (2019) provide an African perspective related to the linkages between land use in the Greater Serengeti-Mara ecosystem, biodiversity and the delivery of wildlife-related ecosystem services. However, they also state that *'local variability in certain factors may decrease levels of confidence of the predicted outcomes… [thus], the extent to which this model represents the beliefs of local inhabitants or managers of the protected areas, would be an interesting further development of this model'* (ibid). Similarly, Reinhardt *et al.* (2018) conducted a systematic evaluation of sustainable scenarios across four African case studies (Tunisia, Uganda, Mali, and South Africa) and also emphasized the importance of including local perspectives and active engagement in scenario building.

To specifically find and assess indigenous peoples' visions or indigenous knowledge in the scenario process and to fill the gaps left by the systematic searches, a snowball sampling of ILK sources was conducted by searching for other articles by the same author and sampling similar keywords found in systematically searched articles. A further 17 peer-reviewed papers, including 49 ILK future scenarios and visions were added to the database. Although not all these sources met all the criteria used in the previous search methods, namely an extended time horizon, multiple scenarios or explicit mention of nature, nature´s contributions to people, or sustainability-aligned values, they still provide insight on how the future is conceptualised or envisioned and how indigenous knowledge is incorporated into the process. Both the refined keyword-based and snowball search results produced futures work from research and academic contexts. Although they mention the importance of including local knowledge through

stakeholder engagement, and the scenarios often incorporate cultural identity, collective welfare, collaborative governance and stewardship, only five papers took participatory approaches by involving local communities, farmers, or fishermen in the formulation of the scenarios. Of these scenarios, overarching themes included consideration of traditional lifestyles, collectivism, subsistence and sufficiency. An excerpt from Kabaya *et al.* (2019, p. 83) mentions nostalgia in futures regarding nature and nature's contribution to people: *'Old fashioned lifestyles and bonds of local communities are preferred among citizens to modern high technologies and individualisms [...]. Nostalgia encourages proactive management of local landscapes as done in the past (e.g., Satoyama)'.*

Responses from the call for contributions on ILK were assessed, and one description of ILK future scenarios and visions was obtained which demonstrates human nature values links very clearly **(Box 5.4)**.

5.2.3.2 Artistic approaches to future scenario development to incorporate multiple types of values

To determine how artistic and arts-based approaches relate to incorporating multiple types of values in future scenarios, 13 papers from peer-reviewed literature examining the use of a wide diversity of artistic approaches (storytelling, performance, paintings, exhibitions, etc.) in future scenarios across different contexts worldwide were assessed. In particular, the evidence was focused on papers with arts-based scenario developments connected to ecosystem services and biodiversity conservation[9]. The assessment focused on exploring three questions:

- How are the arts embedded in scenario-building processes?
- What are the contributions of arts to scenario planning?
- How can the arts foster engagement with values when thinking about sustainable futures?

5.2.3.2.1 How are the arts embedded in scenario-building processes?

Among the assessed scenario-building experiences, audio-visual arts (e.g., drawings and illustrations, exhibitions, video, design) were the most applied artistic disciplines (Bendor *et al.*, 2017), closely followed by the performing arts (e.g., theatre, dance and movement) (Heras *et al.*, 2016; Jiménez-Aceituno *et al.*, 2016). Literary and narrative arts (e.g., science fiction prototyping, storytelling and/or literary works) were, in contrast, less represented (Merrie *et al.*, 2018).

In terms of artistic scenario-building goals, research orientation was frequent, as well as public and/or community engagement. Consequently, arts-based scenarios have been used to involve a diversity of stakeholders, from policymakers and governmental representatives to local communities, academics, civil society representatives or the private sector **(Figure 5.12)**.

All the assessed studies integrated artistic practices using participatory approaches to futures work, seeking active interaction with participants. However, not all the experiences were entirely participatory: in four of the experiences, participants interacted with already created artworks, while in nine, participants were themselves the creators of artworks or artistic expressions.

9. Systematic review of association between values of nature, nature's contributions to people and good quality of life and futures in scenarios, visions and pathways (https://doi.org/10.5281/zenodo.4359655).

Box 5.4 Case study example: the relationship between people and nature in the Alaska Arctic.

In the Alaskan Inuit Food Security Conceptual Framework: How to Assess the Arctic from an Inuit Perspective: Summary Report and Recommendations Report (Inuit Circumpolar Council Alaska, 2015), the connective nature of the Alaska Arctic is stressed and the report illustrates the connections and cumulative impacts of the relationship between people and nature.

'*There is a strong link between sea ice thickness, walrus location and health; between benthic species distribution and health (a key food source for walrus); between a young person taken out to learn how to hunt for walrus, being taught his language, accessing knowledge from older generations, and providing a first catch to an Elder, becoming a provider. The connection continues between the self- and cultural identity rooted in these practices and sea ice thickness. And through the processing of the caught walrus, as community members come together to assist in the processing and storing of the food. Here again, education and language are passed to younger generations as youth learn how to make clothes and art. The feasts, celebrations and games that follow build social cohesion. The connection runs through our economic system and back to our ability to hunt. We rely on parts of this animal to make art. The art created is often sold, and the cash received supports the obtaining, processing and storing of foods through the purchase of items such as fuel, tools and bullets'* (Behe, 2013).

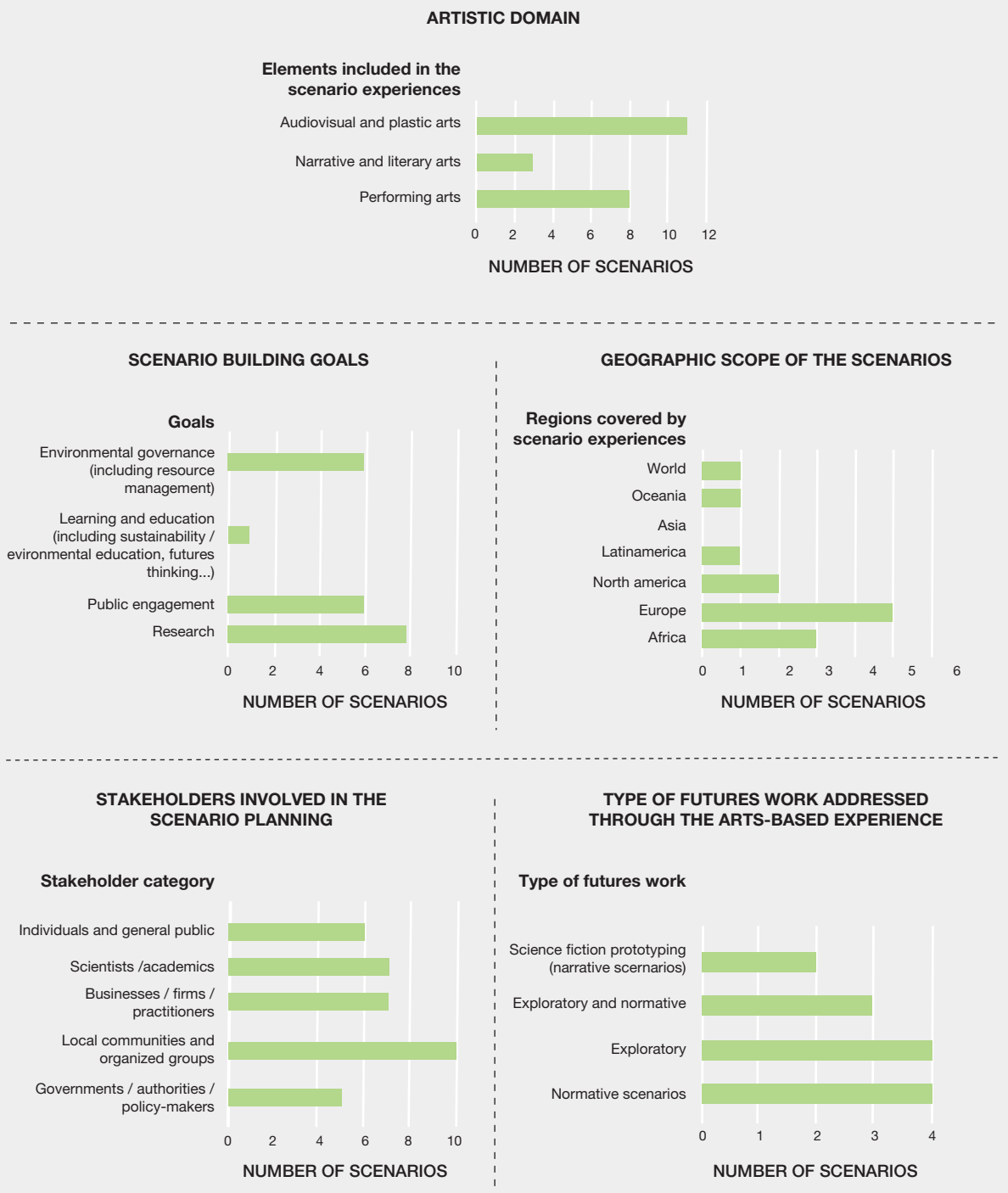


Figure 5 12 **Summary of the assessed artistic scenario-building experiences.**

In participatory art experiences the arts were applied as expressive means for participants, using artistic techniques and tools to create their own outputs related to the future (e.g., performing, drawing, building an artistic artefact). In these experiences, the arts were used both as inputs of and mediums for exploration and discussion of current socio-ecological trends and future projections (Heras *et al.*, 2016; Johansson & Isgren, 2017; Pereira *et al.*, 2020; Selin, 2015).

In those interventions in which participants interacted with artworks created by artists, these were mainly used as creative inputs for reflection, inspiration and discussion (e.g., paintings, sculpture, designed artefacts or to create immersive experiences) (Bendor *et al.*, 2017; Galafassi *et al.*, 2018; Lederwasch, 2012; Pelzer & Versteeg, 2019).

5.2.3.2.2 What are the contributions of arts future scenarios?

Most of the literature assessed proved that arts helped bring together **different knowledge systems**, through integrating different disciplines and including both scientific and tacit, traditional, local and indigenous knowledge of multiple stakeholders into the co-production process. Furthermore, artistic experiences acted as boundary objects to overcome rational ways of knowing and thinking, individually and collectively, and engaging experiential learning as well as aesthetical, affective and emotional knowledge (Bendor *et al.*, 2017; Johansson & Isgren, 2017; Lederwasch, 2012).

Though legitimacy of multiple voices is achieved, in most of the arts-based experiences of scenarios, power issues are not often explicitly addressed. In general, engaging people through artistic practices is recognized to empower participants to take ownership of their own present and future and it may spark collective transformative actions (Galafassi *et al.*, 2018).

Embracing complexity and uncertainties was also recognized to be potentiated by arts (Galafassi *et al.*, 2018; Heras *et al.*, 2016; Pereira *et al.*, 2019) and engaging the imagination in creative processes may increase the capacity to embrace unexpected and generate innovative futures and responses (Pelzer & Versteeg, 2019; Pereira *et al.*, 2018).

While none of the scenarios had an explicit policy-making purpose, the combination of artistic-led experiences and science-led knowledge contributed to exploring the trade-off consequences of decision-making at different scales and for different stakeholders (Galafassi *et al.*, 2017; Lederwasch, 2012; Pereira *et al.*, 2020), and reflected on pathways for transformative change (Galafassi *et al.*, 2018). In some other cases, the exhibition of artistic production (e.g., painting, installations) showed the potential to influence policy design and new collaborations (Johansson & Isgren, 2017; Merrie *et al.*, 2018) **(Figure 5.12)**.

5.2.3.2.3 How can the arts foster engagement with values when thinking about sustainable futures?

Artistic interventions engaged scenario participants with preferences, aspirations and desires mainly related to instrumental and relational values dealing with nature´s contributions to people & good quality of life issues through interactive installations and storytelling (Bendor *et al.*, 2017; Pereira *et al.*, 2019).

By contrast, the potential of the arts to engage with those values inherent to nature seems to be far from being used to its full potential. Only two studies report on how people's intrinsic values can be unlocked through the arts, specifically by using participatory theatre but, interestingly, differently applied throughout the scenario-building process (Heras *et al.*, 2016; Pereira *et al.*, 2020).

Embracing the arts in scenarios is a challenging endeavour. Extra time and resources are needed, as well as engaging expert artists in the process to deal with technical difficulties and disciplinary prejudices (Bendor *et al.*, 2017; Pereira *et al.*, 2018, 2019, 2020). Other challenges were related to how to represent different aspirations and interests in one artwork, how to use applied theatre beyond focusing on immediate facts to address multiple dimensions and action scales contributing to a between understanding of the tensions between values and desires (Heras *et al.*, 2016; Johansson & Isgren, 2017).

Despite these challenges, artistic approaches have potential for successfully exploring and addressing tensions between different types of values, and particularly between intrinsic and anthropogenic values that can lead to further conflicts and deter from achieving sustainable futures. Moreover, beyond the elicitation of values, the experiential and aesthetical encounters offered by the arts can delve into people's bonds with such values and futures elicited. Through these engaging encounters, in which relational, emotional and personal dimensions are brought into play, a sense of the future and connection can be created, potentially infusing action towards the wanted futures.

5.2.3.3 Multiple types of values and depictions of future incorporated in creative arts

In order to understand how multiple types of values and depictions of futures are incorporated in creative arts practices, an assessment was conducted that looked at creative art practices, in their multiple and varied formats, be it an online exhibition, sculpture, film, poem or artefact, that enable us, as gallery goers, or readers (in a broad sense of the term) to engage the imagination in the exercise of envisioning other possible worlds and alternative ways of living. The key results are summarised in **Box 5.5**. with more information provided in the supplementary material[10].

10. Systematic review of association between values of nature, nature´s contributions to people and good quality of life and futures in scenarios, visions and pathways (https://doi.org/10.5281/zenodo.4359655).

Box 5 5 Multiple types of values and depictions of future incorporated in creative arts.

This box summarises evidence on the connection between values and futures based on literature within the creative arts.

In the increasing absence of security and permanence it is necessary to draw on human desire, motivation and imagination to provoke individual and interdependent action from within the collective. As Neimanis *et al.* (2015) state,

> *'Any policy or action aimed at ameliorating environmental problems must take into account human desire, motivation, and values; a deep understanding of the environment cannot be divorced from human imagination, culture, and institutional and social practices'.*

To understand the political, social and economic complexities of ongoing environmental problems cultural forms are needed. Cultural forms assist in connecting geographies to injustice, seemingly casual instances of poverty to global capital and in bringing attention to the ongoing degradation of sensorial engagement with the surroundings.

Four key terms were found to encapsulate the *main values recurring in the consulted material*, in order to move away from naming historical trajectories, or using discipline-specific terminology, which might be opaque to those outside the disciplinary subject area. These terms include issues related to:

- Interdisciplinarity: A plurality of approaches and collaborations are needed to tackle climate change/ environmental crisis (Hessler, 2018; Serres, 1995, p. 216; Yusoff & Gabrys, 2011).
- Sensorial approach: Generating empathy as a future value (Davis & Turpin, 2015, p. 11).
- Interspecies entanglement: The future value is to reconnect with kin, to think beyond human boundaries (Haraway, 1988).
- Social justice: to enact/practice decolonisation/reparation (DeLoughrey, 2019, p. 195).

5.2.3.4 Overview of the private sector visions and values

Visionary documents and corporate reports from ten Global Fortune 500 companies, industry associations, civil society thought leaders, and an alternative trade network conveyed values and implied future outcomes. While individual corporate visions tend to focus on business strategies, public commitments, proposed actions and targets, those that envisioned humanity's future at the global scale recognized complex, adaptive systems and the intertwined nature of society and nature.

Leading global companies and business agglomerations increasingly recognize climate change and loss of nature as risks to business, the global economy, and ultimately, humanity (WEF & Alphabeta, 2020). They further attribute these losses to flaws in the global economic system and formulate visions that diverge from the "business-as-usual" approach of "shareholder profit maximisation".

The corporate visions were more instrumentalist in their view of nature, seeing nature as the provider of materials and services for humanity. Explicit attention on nature's intrinsic value is lacking. Of the corporate cases explored, the most recent went furthest in terms of addressing issues such as human rights (Natura & Co, 2020). Only the alternative trade network emphasized issues of justice, equality, rights, and the redistribution of power and wealth, or addressed development not only of economic growth but also wellbeing, ILK, and non-monetary work (RIPESS, 2015). All documents engaged with the need to decouple the economy from fossil fuels and for new measures of wealth and progress.

5.2.3.5 Values underpinning visions of the future in relevant United Nations documents

Existing United Nations resolutions provide a rich body of evidence for what futures are considered desirable, sustainable, and just. To find out which values of nature and nature´s contributions to people underpin these futures, United Nations resolutions bearing "future", "nature", "environment", "biodiversity", or "rights" in their title were examined. A keyword search for "value" or "valu*" and "nature" or "natur*" was performed within the documents under scrutiny. The following documents were reviewed: Human Rights Declaration (United Nations, 1948); World Charter for Nature (United Nations, 1982); Our common future (United Nations, 1987); the Rio Declaration on Environment and Development (United Nations, 1992a); the Convention on Biological Diversity (CBD, 1992); Declaration on the Rights of Indigenous Peoples (United Nations, 2007); Transforming our world: The 2030 Agenda for Sustainable Development (United Nations, 2015).

The United Nations documents analysed here present a strong justification for the protection of nature based on instrumental, relational and intrinsic values. According to these resolutions, the recognition of diverse values of nature is considered as an integral part of a desirable, sustainable and just future by political decision-makers worldwide.

5.2.4 Key identified gaps highlighted by review of futures works

Evidence is lacking for the following issues related to future scenarios, visions and pathways. More evidence for these aspects in the future would substantially advance the understanding of the link between the underpinning values, potential future development and impacts on nature, nature´s contributions to people and good quality of life:

Content-related aspects:

- To a limited degree, the futures works provide information on which values underpin alternative future development. However, there is a lack of information on whose values these are, how they change when different actors are considered, and the likelihood that different actors and their values and desired futures would be considered. In particular, information was not available on who the winners and losers under different futures (no explicit information in 361 out of 460 reviewed futures) were;
- The information about different kinds of future trade-offs is limited (no explicit information was provided in 271 of 460 futures), and where present, information on trade-offs is largely limited on trade-offs between different kinds of land uses, sectors and nature´s contributions to people/ecosystem services. Trade-offs between different types of livelihoods, interest groups or societal groups were only rarely made explicit in the reviewed futures;
- A large proportion of the futures did not explicitly include any information on justice and equity in outlined future developments (334 out of 460). In most cases where this information was included, it was in general summaries of the inequality levels under different scenarios;
- The futures rarely provide information on specific actors responsible for individual actions influencing future development (287 out of 460 futures included no information on specific policies, decisions or actions, and 123 out of 469 futures included no information on who acts in the scenario or pathway);
- Most futures do not include evidence regarding cross-scale interactions (337), and in many cases on cross-sectoral interactions (280).
- The coverage of futures from selected regions, particularly Africa, and futures covering marine and urban environments, is very weak.

Process-related aspects:

- There is information on who the stakeholders included in scenario development were and whose concerns were included, but no information on whose voices were possibly not included in developing the futures and whose concerns and underpinning values are thus not included;
- The futures tend to fall into archetypal patterns described by the future archetypes. Novel thinking on futures is rare, and descriptions of disruptions of different kinds or radically transformative futures, as well as their underpinning values are rare (no information on tipping point/thresholds/feedbacks in 423 out of 460 reviewed futures; no transformative elements in 415 out of 460 reviewed futures).

Analysis-related aspects:

- Repositories of grey literature, reports and strategic documents are currently not sufficiently developed to allow for an analysis as systematic as the one for peer-reviewed evidence;
- When searching for futures works focusing on impacts on nature, nature´s contributions to people and good quality of life, the requirement of having these elements be addressed in parallel proved limiting and decreased the number of futures eligible for analysis. The focus on only futures explicitly or implicitly addressing values represented a further limitation. This shows that futures explicitly or implicitly addressing values represent a small proportion of all available futures works.

5.3 MOBILIZING VALUES OF NATURE TO ENABLE TRANSFORMATIVE CHANGE

5.3.1 Introduction

A key premise of this chapter is that *'bending the curve of biodiversity loss'* (Leclère *et al.*, 2020) must involve transformative as well as incremental processes of change. This is in line with the first draft of the upcoming Post-2020 Global Biodiversity Framework which is a plan *'to bring about a transformation in society's relationship with biodiversity'* and *'to galvanise urgent and transformative action'*. IPBES (2019) defines transformative change as *'a fundamental, system-wide reorganization across technological, economic and social factors, including paradigms, goals and values'*. The "depth and breadth" (foundational and systemic) definition of transformative change was adopted and the role of values as part of the process and outcomes of such change were explored for this chapter **(Table 5.3)**. This section, based on a systematic review of literature, begins by summarising current knowledge about the role that values and valuation play in processes of transformative change. It then explores in more detail some specific ways in which values and plural valuation of nature can be mobilized to galvanise transformative change towards a preferred future associated with justice and sustainability.

5.3.2 Understanding the role of values in transformative change

At the 2015 United Nations Sustainable Development Summit, nations agreed on 17 global Sustainable Development Goals (SDGs). The aim of the SDGs is to guide action in areas of critical importance for humanity and the planet. However, these goals refer only to external socio-ecological conditions and do not establish goals relating to the more subjective domain of values. Considering the relevance and impact of values to our motivations and decision-making, this might be considered a major oversight.

The role of values is sometimes referred to as part of the "inner dimension" of sustainability, meaning the inner world of individuals, including mental models, beliefs and emotional connections (Grenni *et al.*, 2020; Horlings, 2015; Ives *et al.*, 2019; Sacks, 2018). To our understanding these are all closely related to values because the distinction (introduced in Chapter 2) between "broad" values as principles (e.g., purposive values, traditional values, altruistic values) and more context-dependent "specific" values as preferences or priorities (e.g., motivations, attitudes, worth, specific goals) was employed. However, values are not confined to the inner realm, they are made explicit in our external lives, for example in advertising campaigns, and they are expressed at different societal levels, from group norms to the laws that govern society. Two ways

Table 5 3 **A values perspective on incremental and transformative change.**

	Incremental Change	Transformative Change
Overview	Actions for sustainability that are accommodated within existing system structures and goals, *e.g., actions that maintain societal goals aligned with material wealth but increase the efficiency of material production and product life-cycle through better valuation of nature that enables improved incentives and regulation.*	Actions for sustainability linked to processes of systemic change that reconfigure human-human and human-nature relations, *e.g., actions that shift societal goals beyond material wealth by changing the set of broad values that underpin notions of human progress.*
Spheres of intervention	Valuation interventions that are applied in the practical sphere of production, exchange and consumption. These can be scaled up – becoming more transformative – by embedding in institutions. *E.g., interventions to recognise and account for diverse values of nature can be institutionalized through systems of accounts, policies or legal instruments.*	Change that may begin in one sphere of society, such as the practical, but spreads to other spheres to become system-wide, across practical, structural, personal and cultural spheres that collectively shape human-human and human-nature relations. *E.g., interventions that give voice to alternative worldviews and values, with longer-term potential to change societal norms and goals.*
Values as leverage points	Working with values as shallow leverage points. This includes interventions to directly shift specific values such as consumption preferences through changes to practical system parameters (e.g., taxes, quotas, standards, land use planning). This is where the majority of work on values and valuation in recent decades has been seen, especially through progress in environmental economics to inform the design of incentives for pro-environmental behaviour.	Working with values as deep leverage points. This includes interventions to mobilise broad values for sustainability, such as care for nature and concern for justice. Operating such deep, underlying value levers is considered to be difficult, but with the potential to galvanise system-wide and more stable change. Shifting societal norms in ways that enable changes to societal goals and paradigms is inseparable from issues of power because it changes whose values count.

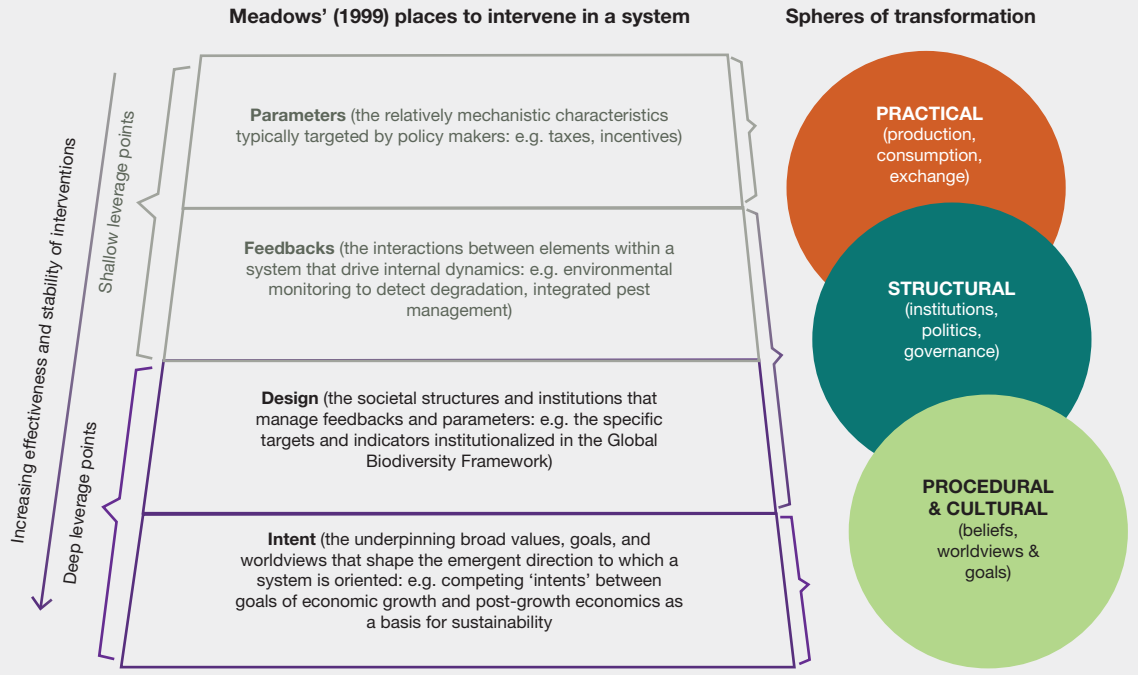


Figure 5 13 **Types of leverage points for system interventions (adapted from Abson *et al.*, 2017) aligned with spheres of transformation (based on O'Brien, 2018).**

of working with values are considered. One is about shifting and enabling those broad or specific values that are aligned with sustainability (see below the notion of "mobilizing sustainability-aligned values")[11]. The second is about promoting a more plural valuation of nature that allows expression and incorporation of the diverse ways in which people value and relate to nature. These two ways are connected, in the sense that plural valuation can be expected to enable values by increasing their visibility and influence for individual and societal decision-making.

Faced with the objective of transformative change, one of the crucial questions to be asked is to what extent societal transformations can be designed and governed. Historically, major transformations such as those accompanying industrialisation and the widespread commodification of nature were not envisioned and intentionally directed. However, the environmental crisis provides a context in which the future of humanity now seems dependent on such directed transformation (Fazey *et al.*, 2018). Whilst there is not yet agreement about the extent to which such direction is possible, there is general agreement that values operate as an enabling factor for sustainability transformations (Chan *et al.*, 2018; Demski *et al.*, 2015; Loorbach *et al.*, 2017) and that shifts in the kind of values that dominate decision-making will be necessary for both initiating and driving sustainability transformation (Ajibade, 2019; Vivero-Pol, 2017). Shifts in values are often found to come about as adaptive responses to socio-ecological conditions (Manfredo *et al.*, 2017), including response to crisis (Kenter *et al.*, 2019). Importantly, however, there is also evidence that values can be more proactively worked with, for example by using deliberative dialogue methods to explore values and even promote changes in values (Kenter *et al.*, 2016). Furthermore, changes in institutions (such as education, legal and taxation systems) can shift which values are formally articulated and widely acted on. This capacity to intentionally work with values (e.g., to shift values, to develop shared values or to change the salience values via institutions) is why researchers consider values as important leverage points for transformation.

5.3.2.1 Values as leverage points for transformation

Building on the definition of transformative change (IPBES, 2019), leverage points were considered to be those places in socio-ecological systems where interventions can contribute towards fundamental and system-wide reorganization (Abson *et al.*, 2016). Furthermore, broad values were considered as particularly associated with points of deeper leverage: places where relatively small shifts can produce large and comparatively durable movements. Abson *et al.* (2017) discuss four types of

11. Role of values in transformational change (https://doi.org/10.5281/zenodo.4363069).

leverage points: the parameters, feedbacks, design, and intent of a given system **(Figure 5.13)**. "Parameters" and "feedbacks" are considered as shallow leverage points. These are easier to implement but only bring about incremental change, resulting in "little change to the overall functioning of the system" (Abson *et al.*, 2016). *Design* and especially *intent* are deeper leverage points that include the values, goals and worldviews that shape and guide the overall behaviour of systems (Abson *et al.*, 2017; Fischer *et al.*, 2012; Meadows, 1999). Corresponding with this typology of intervention points, broad values are associated with transformative change, with a role to play in foundational and system-wide change. Specific values would mainly be associated with shallow intervention points, for example, changing consumption preferences towards a more sustainable product might be achieved through actions to change "parameters", through the use of taxes, subsidies or standards. Such shallow leverage points are an important part of our response to the nature crisis but – in the absence of deeper forms of change – they are unlikely by themselves to bring about the transformative change that is now needed.

The evidence does not suggest a simple, linear connection between broad values and transformation. Rather, there is a cyclical, non-linear relationship in which values are part of both the process of change and the outcome of change. For example, when Polanyi (1944) described industrialisation in England as *'the great transformation'*, he was referring not only to a profound economic and technical transformation, but also to a shift in mentalities, including from collectivist to individualist values, that was both process and outcome. Equally, contemporary scholarship on the role of values in sustainability includes calls to revive values of collective solidarity – again as both process for and outcome of transformative change **(Box 5.6)**.

Paying greater attention to the role of values in sustainability is also about recognising the value of non-Western paradigms and worldviews, including efforts to decolonise conservation (Chilisa, 2017; Vásquez-Fernández & Ahenakew pii tai poo taa, 2020). For example, the *intent* for area-based conservation has traditionally been defined by biodiversity conservation, for example the IUCN's 2008 definition of protected areas includes the intent *'to achieve long term conservation of nature with associated ecosystem services and cultural values'*. A shift towards recognising alternative worldviews, including those rooted in more relational values, is associated with the emergence of a new "conserved area paradigm" where the primary management objective might not always be conservation *per se* (e.g., it might be caring for ancestors or cultural revitalisation), but where effective conservation is an outcome (Jonas *et al.*, 2014; Laffoley *et al.*, 2017). Such a shift in goals, reflecting more diverse values of nature, could produce important gains for future effectiveness. For example, such recognition can help to build on the comparative success of indigenous and community models of conservation (Dawson *et al.*, 2021) and to avoid the potential harms that could arise from expansion of a "protected area" paradigm that continues to employ a narrow set of values (4.5.2).

5.3.2.2 Values and spheres of transformation

The concept of "spheres of transformation" is used to explain the required breadth or "system-wide" nature of transformative change. Systemic socio-ecological change is understood as change that spreads across different "spheres" of society, such as technology, the economy, culture and politics (e.g., Harvey, 2010; Kothari, 2018; O'Brien & Sygna, 2013; Pelling *et al.*, 2015). An adapted typology developed by O'Brien & Sygna (2013) was pared down to three broad societal spheres of transformation **(Figure 5.13)**:

- **The practical sphere** consists of actions that directly manage everyday practices of production, exchange and consumption, for example through systems of incentives to change individual consumption choices or technology choices by businesses. In relation to values of nature, this sphere consists of valuation practices (from singular to diverse) and their uptake in practices such as the design of market-based interventions, subsidies for green technologies or local land use plans.

- **The structural sphere** consists of the formal and informal institutions that contribute to the design of socio-environmental systems and which "structure" human-human and human-nature interactions. Institutions, such as markets, shape the relationship between individuals and organizations in ways that produce regular and predictable patterns of decision-making behaviour. Formal institutions such as legal systems, together with informal institutions such as gender norms, express and operationalise underlying values. The design of institutions thereby gives force to those values they reflect whilst at the same time making it hard to express and act in accordance with those values that they don't. As has been emphasized in earlier chapters, formal institutions currently articulate a narrow range of instrumental values of nature, at the expense of more diverse values of nature. As such, institutions are an important target for transformative change because they currently lock in values that produce unsustainable outcomes and changing them has the potential to mobilize values more aligned with sustainability.

- **The personal and cultural sphere** consists of the subjective and intersubjective "inner" realm of society. This includes the identities, beliefs and worldviews that

contribute to shaping how humans relate to nature and to each other. This sphere of individual and social beliefs is strongly associated with the normative (what future should be pursued) and therefore influences the kind of futures that can be envisioned as possible and desirable, contributing to societal capacity to change goals and to transcend paradigms. As such, the personal sphere also influences how people respond to institutions and institutional changes.

Analyses of historical transition and transformation tell us that change can begin in any sphere of society, but it will not be transformative (fundamental and system-wide) if it remains confined to a single sphere (Geels, 2002, 2014; Harvey, 2010; Kothari, 2018; Pelling *et al.*, 2015). This means that practical interventions such as technology innovation, expansion of the protected area network, removal of fossil fuel subsidies or payments for ecosystem services might be important contributors to (incremental) change, and could even be at the vanguard of transformative change. However, whilst such practical actions may be crucial, they will not themselves be transformative of the biodiversity crisis without accompanying changes across other spheres. This implies that transformative change requires working with values at different levels – valuation as a basis for changing incentives; institutional reforms that enable the normalisation of decisions consistent with sustainability-aligned values; and societal changes that empower more diverse worldviews and shifts in societal norms and goals (Benatar *et al.*, 2018; Christie *et al.*, 2019; Grenni *et al.*, 2020; Kendal & Raymond, 2019).

Currently, most action for sustainability targets the practical sphere due to the relative ease of this type of intervention (Abson *et al.*, 2017; Meadows, 1999; O'Brien, 2018). For example, efforts to improve valuation of carbon storage have supported practical interventions such as carbon offsetting and payments for ecosystem services. Whilst working with values at the level of "parameters" (Meadows, 1999) provides some of the necessary conditions for effective interventions in the practical sphere, these are considered unlikely to transform society's relationships with nature if they are not linked to wider changes across institutional and personal-cultural spheres (Holt *et al.*, 2012; Melathopoulos & Stoner, 2015; Saarikoski *et al.*, 2018; Tadaki *et al.*, 2020). But equally, working with values at the level of intent (5.3.3) – in the personal sphere – can also be insufficient, for example where personal motivation to purchase "green" products is constrained by system design that renders these products unavailable or unaffordable (Steg, 2003).

5.3.2.3 Mobilizing values for transformative change

The role of values in transformative change has so far been described in terms of the depth of value-based leverage points and thus the potential for galvanising system-wide change. Here, this process is described as "mobilizing values" which is defined as actions that either change values or enable values **(Table 5.4)** in ways that increase the salience of diverse values, including those widely agreed to be aligned with prevailing ideas of sustainability (such as the SDGs) and those previously marginalised due to power inequalities (such as values of indigenous peoples and local communities). Changing values can operate at the level of broad values, for example through education that might eventually shift principles relating to human-nature interactions (e.g., how animals are treated). It can also operate at the level of specific values, for example through improved systems for the economic valuation of nature, shifting consumption preferences. Enabling values

Table 5 4 **Mobilizing values for transformations to just and sustainable futures.**

	Broad Values	Specific Values
Changing Values	Actions to shift deeply held principles that shape human-nature relationships. *For example formal and informal systems of "education for sustainability".*	Actions to change preferences and priorities related to production and consumption behaviours. *For example, payments for ecosystem services that shift land use preferences in ways that conserve biodiversity.*
Enabling Values	Actions that enable existing values aligned with sustainability to be articulated and/or acted upon. This requires forms of politics and governance that are more inclusive, linked to uptake of more diverse values in formal and informal institutions that shape everyday practices. *For example, rights-based declarations that recognise alternative knowledge and values held by indigenous peoples and local communities.*	Actions that overcome barriers to acting on existing pro-environmental preferences such as green consumerism. Again, such actions need to target institutions such as legal systems or property rights, in ways that create the contexts that allow people to act in ways consistent with these values. *For example, financial incentives that make greener and fairer consumption options more affordable.*

can also operate at different levels. Structural interventions that empower marginalised groups of people, such as the institutionalisation of rights-based approaches to conservation, can enable recognition of more diverse values, including systems of values linked to relational worldviews. More practical interventions such as better labelling of consumer products can enable individuals to enact their preference for green consumerism.

Mobilizing values for transformations to sustainability requires some understanding of the types of values wanted to be mobilized. The values assessment makes a general case for mobilizing a greater diversity of values of nature, especially to overcome the relative neglect of relational values. But as reported in Section 5.2, visions of sustainable futures tend to be aligned with particular combinations of values. While people can hold and/or express many broad and specific values, only some of these are considered to be aligned with sustainability outcomes such as achieving SDGs. For example broad values based on care and stewardship for nature are considered to support sustainability (Namazkhan *et al.*, 2019) whereas egocentric values are not (Kendal & Raymond, 2019).

5.3.2.4 Sustainability-aligned values

The term *sustainability-aligned values* is used to refer to those broad values (e.g., care for nature, solidarity among humans) that are found to be associated with future scenarios linked to achievement of SDGS or to be more generally supportive of transformations towards just and sustainable futures. The plurality of knowledge and worldviews is acknowledged, and therefore the different ways of viewing sustainability and different ideas about the sets of "sustainability-aligned values". However, there is noteworthy agreement among researchers that pathways to sustainability will require shifts from broad values of individualism and economic profit to sustainability-aligned values of collectivism, care and equality. Though relationships between values and behaviour are complex, mobilizing sustainability-aligned-values (e.g., through shifting values and enabling values **(Table 5.4)**) is likely associated with sustainable behaviour **(Box 5.6)**. Pathways to sustainability can be supported by actions that help to mobilize both human-human values (such as solidarity) as well as human-nature values (such as stewardship).

Mobilizing sustainability-aligned values often involves confrontation with dominant values and with the powerful actors whose interests are entwined with these. For this reason, changing power relations is widely identified as a core requirement of transformative change (Harvey, 2010; Healy & Barry, 2017; Holland, 2017; Martin *et al.*, 2020; Pelling *et al.*, 2015; Scoones *et al.*, 2015; Stevis & Felli, 2015; Temper *et al.*, 2018). Power relations are crucial in determining which values and whose values dominate decision-making, including what values are subject to formal valuation procedures, what values gain traction in decision-making and whose visions of the future influence policy-making (Feola, 2019; Fernandes & Guiomar, 2016; Geels, 2002; Hakkarainen *et al.*, 2020; Tschakert *et al.*, 2016).

The process of mobilizing values through efforts to *enable* sustainability-aligned values involves giving salience to and institutionalising values that have previously been marginalised. This involves changing the balance of power away from incumbent regimes, whether that power is exerted through economic, political or discursive forces (Geels, 2014; Holland, 2017; Newell, 2015; Scoones *et al.*, 2015). For example, the granting of legal rights of personhood to rivers in New Zealand, Colombia and India has been praised by many as a process that has enabled existing sustainability-aligned values of indigenous peoples and local communities to be recognised and enacted. Enabling this shift in the salience of values (which and whose values influence policy) had involved networks of actors struggling for these rights in the media and in the courts, in the face of competing political and economic interests. The achievement of more plural valuation of nature can therefore be seen as inseparable from ecological democratisation and empowerment (Ajibade & Adams, 2019; Katrini, 2018; Miller *et al.*, 2014; Stirling, 2015; Vivero-Pol, 2017). *'Transformative governance thus is in essence about changing power dynamics to emancipate those stakeholders who hold transformative sustainability values'* (Visseren-Hamakers *et al.*, 2021, p. 24).

One of the most powerful constraints on mobilizing sustainability-aligned values is a prevailing paradigm of development that prioritises economic growth. The economic structures serving this societal goal are observed to drive unsustainability whilst also increasing social inequalities. Maintaining current economic growth relies on increasing the material throughput of the economy, with poorer regions of the world disproportionately bearing the resultant costs of ecosystem degradation (Martínez-Alier *et al.*, 2016). This unequal environmental exchange (Rice, 2007) raises questions with regards to the plausibility of sustainability transformation within the constraints of the growth paradigm, and the associated disconnection from nature and from other humans (Villido, 2018). Improving knowledge of these unsustainable and unjust outcomes is leading to growing questioning of the paradigm of economic growth (Future Earth, 2021; PECS, 2021; Resilience Alliance, 2021). But whilst this understanding points to alternative futures associated with values such as enoughness, sufficiency, and frugality, such sustainability-aligned values don't even get represented in high level visions of "sustainability". For example, the value of "sufficiency" is typically omitted from future scenarios, in favour of the more growth-friendly value of "efficiency" (Feola, 2019). Again, this reinforces the finding

Box 5 6 Sustainability-aligned values reported in transitions and transformations literature.

Sustainability-aligned values are broad values concerning those human-human relationships (1) and human-nature relationships (2) that are often associated with transformations to just and sustainable futures. Among the reviewed papers which explicitly identified values belonging to a sustainability transition or transformation, 73% specified human-human values and 27% specified human-nature values (concerning human relations with other-than-human nature).

1. Human-human sustainability-aligned values

The creation and recognition of values concerning the relation to other humans are described as crucial steps towards transformations to sustainability (Vinnari & Laine, 2017). These values are seen to move beyond individualism (e.g., Feola, 2019) and material wealth (e.g., Katrini, 2018) and focus on care, unity and justice.

a) Care: love, solidarity, responsibility (I care for you)

- with the synonyms *solidarity, caring or care, compassion, altruism, generosity, love, responsibility, honesty, tolerance, reciprocity, trust and loyalty* (Ajibade, 2019; Benatar *et al.*, 2018; Choy, 2014; Christie *et al.*, 2019; Ives *et al.*, 2019; Katrini, 2018; Kenter *et al.*, 2019; Kothari, 2016; Millet & Casabianca, 2019; Vinkhuyzen & Karlsson-Vinkhuyzen, 2014; Vinnari & Laine, 2017; Wensing *et al.*, 2019).

b) Unity: (sense of we)

- with the synonyms *empathy*, unity, sense of "we", Guanxi (characterised by thinking of what is better for the group, not the individual), sense of community, consideration of all living beings* (Choi, 2018; Choy, 2014; Christie *et al.*, 2019; Ives *et al.*, 2019; Vinkhuyzen & Karlsson-Vinkhuyzen, 2014; Vinnari & Laine, 2017).

*Empathy is listed here under "unity", since empathy is understood in the literature as *experiencing another being's feelings*, while compassion describes caring and acting upon this concern.

c) Equity and justice (You have the same rights and duties as me)

- with the synonyms *justice, equity, equality, fairness, commons perspective, diversity, and democratic struggle* (Ajibade, 2019; Benatar *et al.*, 2018; Christie *et al.*, 2019; Edens & Lavrijssen, 2019; Jenkins *et al.*, 2018; Kenter *et al.*, 2019; Stirling, 2015; Vinkhuyzen & Karlsson-Vinkhuyzen, 2014; Vivero-Pol, 2017).

d) Participation and democracy (Rights to be included),

- with the synonyms *participation, democracy, democratically negotiating diverging interests, equal access to decision-making* (Fernandes & Guiomar, 2016; Horcea-Milcu *et al.*, 2019; Jenkins *et al.*, 2018; Turhan, 2016).

2. Human-nature sustainability-aligned values

With regard to broad values concerning society's relationship with other-than-human nature, the literature on transformations and transitions emphasize the importance of general pro-environmental values (Leiserowitz, 2006; Wensing *et al.*, 2019). Where particular broad human-nature values are specified, they consistently refer to *care and respect for the natural environment* with the synonyms *environmental stewardship, concerned by all forms of life, empathy for non-humans* (Ajibade, 2019; Antadze & McGowan, 2017; Christie *et al.*, 2019; Vinnari & Laine, 2017).

that dominant values are linked with power relations and that mobilizing sustainability-aligned values will require rebalancing whose values count – to enable previously marginalised values often means to constrain some more dominant values. Equally, it reinforces the claim that the *intent* of the system is an important place of leverage for promoting transformative change **(Figure 5.13)**.

5.3.2.5 Working with values

For values to act as leverage points two main premises should be understood: firstly, that values correspond in some way to social and ultimately individual behaviour and secondly, that values are changeable. The individual behaviours of particular relevance to this assessment are those that directly benefit biodiversity, for instance via stewardship, consumption, social or lifestyle choices, and donations (Selinske *et al.*, 2020). Many other behaviours may, however, have an indirect link to nature and to just and sustainable futures.

As discussed in Chapter 2 Section 2.5., value formation is a process of maturation that takes place early in life (Keil, 1922; Piaget, 1952), but value change can occur across a lifetime depending on individual experiences and interactions with society and the environment, such as formal and informal education, social practices, group conformation processes, or socio-ecological events (e.g., natural disasters) (Kendal & Raymond, 2019; Manfredo *et al.*, 2020). There is strong agreement in both the sustainable futures literature (see 5.2) and the sustainability transformations literature that *mobilizing broad values that are aligned with sustainability and constraining those that are not* is needed. Nonetheless, working to increase

the salience of these sustainability-aligned values can be extremely challenging. When dealing with broad values, they are relatively slow to change, and relatively stable (Ives & Kendal, 2014). Furthermore, there are significant barriers to change for example the above-mentioned power structures and the political economies that support them.

Interventions to increase the salience of sustainability-aligned values need to be based on an understanding of how to mobilize (cultivate or activate) those values that support sustainable outcomes (Horcea-Milcu *et al.*, 2019; Miller, 2013). According to O'Brien (2018), this '*implies less attention to altering or manipulating people's behaviour, and more on creating the conditions that promote the development and expression of social consciousness and futures consciousness'* (but see also Westley *et al.*, 2011). Interventions that aim to enable sustainability-aligned values may refer to removing barriers (e.g., Gregori *et al.*, 2019; Nassl & Löffler, 2019), fostering pre-existent ethics or equity principles (e.g., Soto & Sato, 2019), or creating contextual conditions that enable people to act on their values (e.g., Choy, 2018). The literature that explicitly discusses working with values to promote transformations to sustainability remains relatively small. Our review identified an equal split between those addressing the need to change values and the need to enable values (15 publications each)[12].

In summary, there are two main value-related pathways through which interventions can galvanise transformative change. First, they can try to change people's values (promoting the incorporation of sustainability-related values and reducing non-sustainable-related values). Second, when people already hold sustainability-aligned values but due to other conditions or barriers do not act on them (e.g., due to competing motivations, lack of resources, or physical constraints), then interventions can aim to create favourable conditions that render people free to act in ways consistent with their values. In that sense, behaviour change interventions can close or *bridge* the value-action gap. The following sections further explore how this has been addressed.

5.3.3 Mobilizing values in societal interventions for sustainability transformations

Large-scale changes in behaviour can be driven by shifts in social norms, defined here as the shared understanding of what behaviour is considered socially acceptable in particular contexts (Cialdini *et al.*, 1990; Nyborg, 2018; Ostrom, 2000). By acting as a link between the individual and the world around them, social norms can support pro-environmental behaviour, when reinforcing sustainability-aligned values collectively. Illustrative examples for the power of social norms are the growing popularity of plant-based food, changing attitudes towards (short-haul) flights in some western countries and the growth of climate justice activism such as the Fridays for Future youth movement. Social norms may be adaptive to changing social and ecological conditions but can also be influenced through political interventions, either directly through active norm management or indirectly by increasing the visibility and impact of socially desirable behaviour (Farrow *et al.*, 2017; Kinzig *et al.*, 2013).

Research findings lean towards the potential for bottom-up, participatory and civil society oriented methods for empowering shared cultural practices linked to sustainability-aligned values (Daskalaki *et al.*, 2019; Milchram *et al.*, 2019; Moore *et al.*, 2015; O'Brien & Sygna, 2013; Zhou *et al.*, 2018). The methods found to be effective involve co-creation of shared norms and include social learning across small-scale community initiatives (Kothari, 2016), community performance of alternative practices (Daskalaki *et al.*, 2019), disruptive practices and resistance (Stirling, 2015; Temper *et al.*, 2018), social movements (Christie *et al.*, 2019; Temper *et al.*, 2018). The participatory development and promotion of positive alternative practices is one key strategy (Kothari, 2016; Temper *et al.*, 2018). For example Daskalaki *et al.* (2019) present evidence from grassroots networks in Greece, in which (in the context of economic crisis) shared values co-evolve with the development of new collective practices, in this case alternative, non-monetary systems for exchanging goods and services.

Processes of deliberating and co-producing values can have an important reflexive effect on the personal and collective inner dimension of sustainability. Values that are co-produced during participatory and deliberative processes can trigger critical consciousness of the failings of existing system qualities, a reflexive social learning process that some scholars consider an important premise for transformative change (Grenni *et al.*, 2020; O'Brien & Sygna, 2013; Popa & Guillermin, 2017; Tschakert *et al.*, 2016; Villido, 2018). However, some publications also refer to national level interventions in policies and governance (Kaye-Zwiebel & King, 2014; Schösler *et al.*, 2013), environmental education measures (Liobikienė *et al.*, 2020), or greater access to information that is expected to shape values (Millet & Casabianca, 2019).

To transformations literature emphasizes the process-oriented nature of working with values, including frequent discussion of processes of reflexivity and values transparency (22 publications). This may refer to: being transparent and explicit about the values that are shaping decision-making and that underpin alternative transformation pathways (Feola, 2019; Turhan, 2016); exercising personal awareness and practising critical

12. Role of values in transformational change (https://doi.org/10.5281/zenodo.4363069).

reflexivity (Popa & Guillermin, 2015; Villido, 2018); developing or identifying explicit ethical principles based on critical reflection of human-nature relationships (Benatar *et al.*, 2018; Novikova *et al.*, 2019; Schmidt, 2019), and more broadly challenging assumptions about the world (O'Brien, 2018). For example, the examination of social values is key to understanding how the local use of forest resources changes (Nassl & Löffler, 2019), how public acceptance of energy systems (e.g., wind energy) forms (Demski *et al.*, 2015), or how shared values underlie alternative agriculture models such as agroecology (Plumecocq *et al.*, 2018). Systematically bringing to the surface and being explicit about the values underpinning ideas and decisions can contribute to transformative change in some contexts (Pereira *et al.*, 2018). This is also applicable to research itself, where it is important to be aware of how values can (consciously or unconsciously) shape the choice of scientific models and approaches (Horcea-Milcu *et al.*, 2019) and thus how personal factors including epistemology can shape scientific inquiry (van der Hel, 2018).

Other frequently mentioned process-based interventions in relation to the mobilization of values for transformative change are deliberative processes (15 publications) and knowledge co-production (10 publications). Authors link deliberation to opportunities for empowerment (O'Brien, 2018) and representation of marginalised groups (Hakkarainen *et al.*, 2020) by making the diversity of values more visible. For example, sustainable models of urban resource co-management depend on extended participation at all levels of decision-making (e.g., Katrini, 2018; Thornton *et al.*, 2019), despite some authors also pointing out the shortcomings of deliberation such as the lack of accountability (Melathopoulos & Stoner, 2015). The co-production of knowledge literature is one field of science where the literature has a more substantial track-record on the relationship between values and desirable change, by for example recognising that it is necessary to inquire about values rather than simply generate actionable knowledge in order to achieve transformative change (Miller *et al.*, 2014; Seidl *et al.*, 2013).

Processes that bring a plurality of values to the surface can enrich dialogue and increase legitimacy and resilience of decisions. However, it is also recognised that such diversity can have a paralysing effect. For example, the Flemish Nature Outlook 2050 (Michels *et al.*, 2019) gives an account of both positive and negative effects of stakeholder participation when developing and debating alternative pathways. Whilst the negotiation of contested values is an important step towards sustainability (Scoones *et al.*, 2015), this process is deeply connected to power relations (Patterson *et al.*, 2017) and can therefore be complex and unpredictable. Differences in values between stakeholders can be a driver of competition and conflict (Ajibade, 2019; Busch *et al.*, 2018; Christie *et al.*, 2019; Milchram *et al.*, 2019; Patterson *et al.*, 2017; Sharpe & Barling, 2019; Turhan, 2016; Vinnari & Laine, 2017) and can undermine the acceptability of policy interventions (Choi, 2018; Demski *et al.*, 2015; Millet & Casabianca, 2019; Mok & Hyysalo, 2018; O'Brien & Wolf, 2010). Again we must consider that, such conflicts play out in the context of asymmetrical power relations, in which values that act against sustainability (such as individualism) can prevail because they are embedded in, and protected by, dominant political-economies and incumbent resource regimes (Christie *et al.*, 2019; Feola, 2019; Fernandes & Guiomar, 2016; Geels, 2014; Melathopoulos & Stoner, 2015; O'Brien & Sygna, 2013; Plumecocq *et al.*, 2018; Temper *et al.*, 2018; Vinnari & Laine, 2017).

5.3.4 Mobilizing values to enable individual behaviour change for sustainability transformations

At the individual level the link between values and human behaviour has been made by a diversity of behavioural theories, for example the values-belief-norm model (Steg & Vlek, 2009) and the cognitive hierarchy model (values-attitude-behaviour) (Fulton *et al.*, 1996; Ives & Kendal, 2014). Chapter 2 of this assessment reviewed 134 behaviour change theories and found that 91% of these include at least one value-related concept as an influencer of behaviour. However, whilst people's values are regarded as a crucial factor underlying individual and social environmental behaviour, this is not a linear relationship by any means. Two main causes can explain this. Firstly, people hold a myriad of broad and specific values, some of which are directly or indirectly responsible for the loss of biodiversity. Key examples of such competing values, ideologies and worldviews are those that drive economic growth, consumerism and land expansion, such as the pursuit of personal wealth, status, egoism, etc. (Gifford, 2011; Heath & Gifford, 2006; Lindenberg & Steg, 2007; Nordlund & Garvill, 2002). Secondly, values are just one of the elements that condition behaviour. This topic has been addressed in the "value-action gap" concept (Antimova *et al.*, 2012; Babutsidze & Chai, 2018; Barr, 2006; Blake, 1999; Gifford, 2011; Young *et al.*, 2010) which describes that the link between values and behaviour may be relatively weak due to the various other factors that influence behaviour.

In Section 5.3.3 it was reported that mobilizing sustainability-aligned values can be necessary for transformative change towards sustainability. However, when looking at specific, individual pro-environmental behaviours (rather than system-wide transformative change), then sustainability-aligned values *on their own* are neither a necessary nor a sufficient condition for such behaviours to occur. This distinction is important when thinking about interventions and policies and an example is presented as

follows. A person with sustainability-aligned values may be more inclined to act pro-environmentally, for instance by buying organic tomatoes instead of conventional ones, and this may be reinforced when the organic tomatoes also taste better (Steg *et al.*, 2016). However, this person might still buy conventionally grown tomatoes when the organic ones are regarded as too expensive or when buying them requires additional effort to go to another shop. Similarly, a person with sustainability-aligned values may not separate plastic waste when no recycling bins are available or use the car when public transport options are not frequent enough (Steg, 2003). In these cases, the physical conditions to engage in pro-environmental behaviour are unfavourable to acting on sustainability-aligned values. Sustainability-aligned values are hence not a sufficient condition to pro-environmental behaviour. On the other hand, a person can act pro-environmentally even without holding sustainability-aligned values, when pro-environmental behaviour is in line with other values, goals or motivations such as saving money, making a good impression, or following a social norm. If an electric car is cheaper than a diesel or petrol car, then even a person whose only concern is to save money may make a pro-environmental choice (Stern, 2000; Stern *et al.*, 1999). Similarly, a farmer may preserve trees on her property not because of her pro-environmental values, but because tree cutting is illegal and would result in a fine. These examples show that sustainability-aligned values are also not a necessary condition for pro-environmental behaviour, and that particular regulatory approaches (those that address the "practical sphere", see 5.3.3) may substitute for mobilizing values. However, behaviours merely induced by regulation may not galvanise system-wide or durable change and would not by themselves be transformative (Abson *et al.*, 2016; Manfredo *et al.*, 2020). It is therefore crucial to understand how public policies can generate the enabling conditions for changes in underlying individual sustainability-aligned values (the "personal sphere") and for appropriate institutional and social arrangements that change and express social values (i.e., the "structural sphere" (Rare and The Behavioural Insights Team, 2019)).

5.3.4.1 The behaviour change wheel framework as a tool for linking values, behaviour and sustainability transformations

Integrative behaviour change frameworks can help policymakers handle the complex links between values, behaviour, interventions and policy (Klöckner, 2013). This section introduces the behaviour change wheel (Michie *et al.*, 2011, 2014; PHE, 2020) as an integrative framework that systematizes factors that enable or hinder behaviour change and provides guidance on how to design and evaluate targeted interventions and policies. Although originating from the health sector, the behaviour change wheel has been applied to pro-environmental behaviour change (Axon *et al.*, 2018; Gainforth *et al.*, 2016; Wilson & Marselle, 2016) and conservation behaviour related to pollinator protection (Marselle *et al.*, 2020).

The behaviour change wheel has three layers **(Figure 5.14)**. At its centre is a "behaviour system" involving three essential components involved in enabling behaviour: Capability, Opportunity and Motivation (COM-B). Changing any behaviour of an individual, group or population involves changing one or more of these three components (Michie *et al.*, 2014). The COM-B components are defined and exemplified in **Table 5.5** below. The COM-B components are surrounded by different types of interventions (the red middle layer) and policy options (the grey outer layer). The intervention types (e.g., education, rewarding, restrictions, enablement)[13] are the means by which an intervention can change behaviour. The outer layer of the wheel includes the policy options that can deliver or support the implementation of the interventions. **Table 5.6** provides definitions and examples of the different intervention types and policy options. It is important to highlight that there is no one-to-one correspondence between the policy options, intervention functions and the COM-B components. Rather, specific COM-B components can be influenced by a range of intervention types and any intervention type can influence several COM-B components. Similarly, a specific policy can support several types of interventions and any intervention type could be delivered by different policy options.

As argued in Chapter 2 of the assessment, the concept of "values" is in itself complex, comprising many different constructs that relate to "broad" and "specific" values. Furthermore, whilst values are important, they need to be understood in terms of their link to behaviour in order to achieve the desired impact for sustainability and conservation. For this reason, **Table 5.5** maps how each component of COM-B relates to the concept of values and to plural valuation. The most direct relations are that knowing about something (as Psychological Capability) is a prerequisite for valuing it, and that values affect people's preferences and beliefs (Reflective Motivation). Another important relation is that values are expressed in social and cultural norms, which in turn shape people's values (Social Opportunity). Moreover, when policies or institutions provide the physical opportunity for pro-environmental behaviour, they express the social values held or enacted by these policies and institutions.

13. Some category labels and definitions were adapted by the authors from the original behaviour change wheel such that they better align with terminology and categorizations used in biodiversity policy (e.g., Jack *et al.*, 2008; OECD, 2018; POLICYMIX, 2014). Within the intervention types, the original used the labels 'Incentivization' (now 'Rewarding') and 'Environmental Restructuring' (now 'Environmental & social restructuring'). Within the policy options, the original behaviour change wheel framework used the terms 'Fiscal measures' (now 'Economic & financial instruments'), 'Regulation' (now 'Voluntary agreements and standards') and 'Service provision' (now 'Service & knowledge provision').

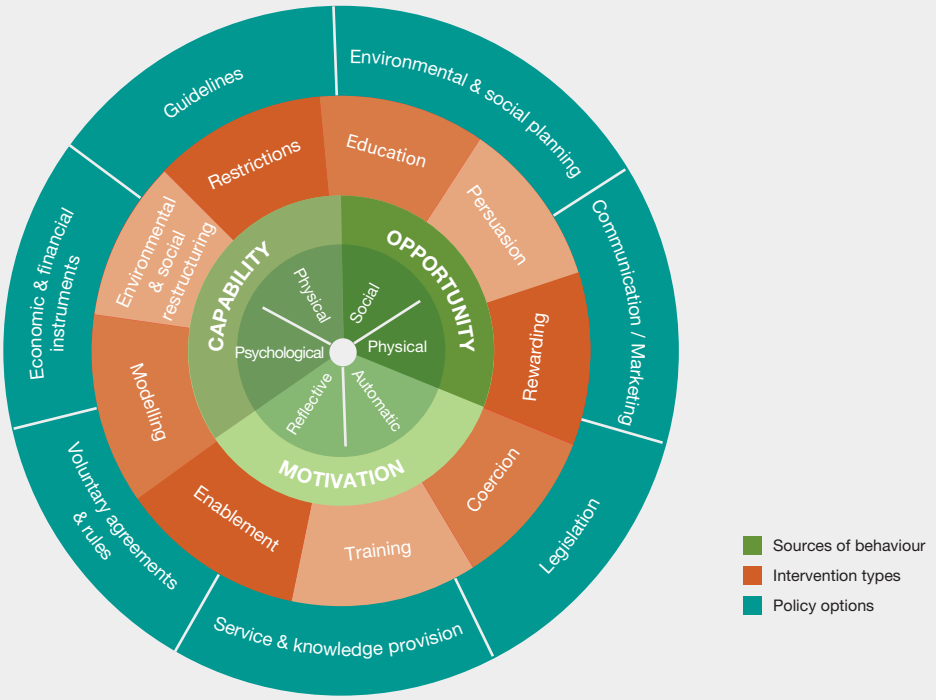


Figure 5 14 **The Behaviour Change Wheel (adapted from Michie *et al.*, 2011).**

5.3.4.2 Applying the behaviour change wheel framework to assess international biodiversity policy

The behaviour change wheel framework was applied to analyse National Biodiversity Strategies and Action Plans **(Table 5.6)**. The analysis focused on the specific actions for biodiversity conservation proposed by the action plan sections of the policy documents. A total of 1306 actions from ten National Biodiversity Strategies and Action Plans, balanced across world regions, were coded via a directed content analysis using predetermined categories (Hsieh & Shannon, 2005). We coded for the three layers of the behaviour change wheel framework (policy options, intervention types and COM-B components), and additionally whether the action specifies an individual behaviour change (i.e., conservation-related behaviour that can be undertaken at the individual level), and if it includes the group of individuals whose behaviour is being changed. The analysis enables the identification of possible gaps and missed opportunities in the actions considered by biodiversity policy. The results were linked back to the role of values and valuation. The analysis demonstrates how behavioural science can be applied directly to the evaluation and development of policy and intervention strategies for biodiversity conservation.

The results show that 83% (n=1080) of the actions specified a policy option, 48% (n=624) an intervention type, and 13% (n=168) could be related to a COM-B component. Only 11% (n=148) of the actions specified individual behaviours and 22% (n=290) mention the (group of) individuals whose behaviour is being targeted. From a behaviour change perspective an action would ideally specify all five elements. This is the case for only 3% (n=40) of the actions. In other words, only 3% of the actions proposed in the National Biodiversity Strategies and Action Plans specified whose behaviour needs to change and how, and outlined a targeted intervention to bring about that change along with a policy to deliver or reinforce it. As a first conclusion, the National Biodiversity Strategies and Action Plans generally fall short of appropriately specifying pathways for individual behaviour change for biodiversity conservation, since most actions could not be considered specific enough and would likely not change people's behaviour (PHE, 2020). Due to the nature of these higher-level policy documents, it may not come as a surprise that few of the actions are behaviour specific. Nevertheless, for policy to incorporate a behaviour change perspective and lead to actual impact on behaviour this would certainly be desirable.

Those 148 actions that specified the individual behaviours and could therefore be deemed sufficiently "behaviour-specific" from a behaviour change perspective were analysed. Behaviours related to conservation or management of natural areas and resources were the most frequently mentioned (n=47, 32%), followed by changing agricultural practices (n=29, 20%), and hunting and fishing practices (n=25, 17%).

Table 5.5 **Definitions of the COM-B components (adapted from Michie *et al.*, 2014) and their connection to values and plural valuation.**

		Definitions	Connection of COM-B to values	Connection of COM-B to "plural valuation"
Capacity	Psychological	Knowledge and capacity to engage in the necessary thought processes including memory, comprehension, and reasoning.	(Direct) knowing about why something is important is the prerequisite for valuing it.	The results of valuation can increase people's understanding of the importance of nature, increase their capability to contemplate different perspectives, and possibly overcome resistance to conservation.
	Physical	The physical ability to execute the behavior including the physical strenght, skills and stamina.	(Indirect) often skills for an activity are develooped because people value the activity or the outcomes, or because the skills are valued by society and individuals internalize these societal values.	
Opportunity	Social	Opportunity afforded by interpersonal influences, social cues and cultural norms that influence the way that we think about things.	(Indirect) collective values are manifested in societal norms and institutions. They create or enhance the social opportunity for behavior and can also shape people's individual values.	Stakeholder-inclusive valuation processes can enhance mutual understanding of people's diferent relationships with nature. This can increase the social acceptance of conservation behavior and potentially foster social norms for conservation.
	Physical	Opportunity afforded by the environment involving time, resources, locations, cues, physical 'affordance'.	(Indirect) institutions and policies reflecting on collective values often provide physical opportunities in terms of resources, infrastructure, etc.	Valuation results can justify allocation of public resources and personal efforts for conservation.
Motivation	Automatic	Emotions and impulses that arise from associative learning and/or innate dispositions.	(Indirect) values can manifest in people's habits and/or they are expressed in emotional and automatic reactions.	Including plural values of nature in campaigns, visualization, and discourses can trigger emotions and positive associations attached to conservation behavior. In the longer term, valuation processes that can foster norms of conservation can be internalized and result in automatic compliance.
	Reflective	Reflective processes involving plans (self-conscious intentions) and evaluations/beliefs about what is good and bad (i.e., values, preferences), about consequences, of an action, or about capabilities.	(Direct) values affect personal preferences and beliefs about what is good or bad, which enter deliberate reasoning and evaluation processes.	Valuation results can influence people's beliefs and motives for conservation and include them in planning and action. The impact on reflective motivation may be stronger for inclusive valuation proceses that can ensure credibility and legitimacy (in particular via participation and buy-in from those who are supposed to adapt their behavior).

Table 5.6 **Definitions and examples of behaviour change wheel intervention types and policy options.**

The examples are selected from National Biodiversity Strategies and Action Plans.

	Terms and definitions	Examples based on the actions of the NBSAPs
Intervention types	**EDUCATION** Increasing knowledge or understanding	• Prepare educational and informational materials on biosafety and agrobiodiversity • Foster continuing education for teachers in species knowledge and pedagogy in biodiversity issues • Promote the creation of educational "platforms" (e.g., clubs, workshops, temporary and permanent exhibitions) at permanet providers of informal biodiversity education, such as protected areas, museums, libraries and youth centres
	PERSUASION Using communication to induce positive or negative feelings or stimulate action	• Package and sell the economic case for the importance of biodiversity to key decision-makers • Strengthen the idea of the outdoor activities and recreation as integral to the national identity, and emphasise the positive health impacts derived from the natural environment and its recreational use • Appoint well-known local artists as 'biodiversity embassadors' to raise awareness of biodiversity values

Table 5 6

	Terms and definitions	Examples based on the actions of the NBSAPs
Intervention types	**REWARDING** Creating an expectation of additional gains or reduced cost to increase the likelihood of behavior	• Payments for environmental services • Awards scheme for best practices • Eliminate subsidies and contradictory tax incentives that are harmful to biodiversity
	COERCION Creating an expectation of punishment or cost to decrease the likelihood of behavior	• Taxes • Fines and sanctions for violations of environment protection legislation • Confiscate gear and issue appropriate fines engaging in illegal and destructive fishing practices
	TRAINING Imparting skills	• Increase the capacity of licensing and permit-issuing units through training • Train farmers in sustainable rice cultivation techniques and certification • Training in the preparation of proposals and implementation of projects financed by bilateral and multilateral donors • Training to support the development of a community water monitoring network
	RESTRICTION Using rules to reduce the opportunity to engage in a target behavior or to increase a target behavior by reducing the oopportunity to engage in competing behaviors	• Banning fishing by bottom trawling • Designating areas to be protected • Ban any GMOs whose use may have an adverse impact on biodiversity • Prohibit the import of non-native breeds of bees
	ENVIRONMENTAL OR SOCIAL RESTRUCTURING Changing the physical or social context, including institutional and governance changes	• Create, expand or connect natural habitats • Restrict damage to forestry, agriculture and transport caused by game animals through preventive measures such as fencing repellents, game bridges, subway tunnels and salt blocks • Creation of regional committees with partnerships between public, private and community sectors • Increase involvement of stakeholders-especially of local communities (with due regard to gender equality)-in the management and planning of protected areas
	MODELING Providing an example for people to aspire to or imitate	• Best practice approaches for land degraded by mining • Promote the conservation of forest biodiversity, including genetic diversity, through the development of a forest certification programme and best practice guidelines for ecosystem-based sustainable forestry • Conduct pilot projects that demonstrate sustainable grazing methods and modern approaches that help reduce grazing pressure on the forest
	ENABLEMENT Increasing means/reducing barriers to increase capability (beyond education and training) or opportunity (beyond environmental restructuring)	• Scheme for loaning cattle for nature management • Strengthen local NGOs, CBOs and local women's groups and encourage their involvement in the decision-making in and monitoring of development projects as well as in biodiversity conservation and resource-use planning • System of wood tracking to ensure timely detection of illegal logging • Develop or improve mechanisms enabling the identification and monitoring of threatened, rare or vulnerable species
Policy options	**COMMUNICATION/ MARKETING** Using print, electronic, telephonic or broadcast media	• Prepare and distribute informational materials (newsletters, brochures, newspapers, internet articles, documentaries, advertisements, banners, TV shows, etc.) • Implement a communication strategy on the economic values of biodiversity and ecosystem • Organize special biodiversity conservation events for the International Day of Biodiversity, Wetlands Day, etc. • Publish catalogues and an atlas of coastal marine biodiversity
	GUIDELINES Creating documents that recommend or instruct practice	• Develop and implement an action plan for wetlands • National Biosafety Strategy for the Management of Biological Risks • Establish government green procurement programme targets • Develop guidelines for farmers on good practices of biodiversity conservation and sustainable use
	FINANCIAL OR ECONOMIC INSTRUMENTS Measures to provide financial resources and/or monetary incentives	• Payment of Environmental Services for Conservation of Ecosystems of Strategic Interest • Identify and reform subsidies that are detrimental to biodiversity • Create efficient financial tools and mechanisms for biological diversity and natural ecosystems' conservation activities • Increase budget allocation for combating illegal logging
	VOLUNTARY AGREEMENTS OR STANDARDS Establishing rules or principles of behavior or practices based on voluntary compliance, or at least outside of a legal framework	• Partnership schemes and strategic agreements for regional development • Bilateral and multilateral agreements • Develop, monitor and enforce minimum national standards on soil, water and air quality as well as occupational health • Improve the recognition of crop and animal landraces and traditional products on the market through the development of certification schemes

Table 5 6

	Terms and definitions	Examples based on the actions of the NBSAPs
Policy options	**LEGISLATION** Making or changing laws or other forms of compulsory regulation that entail enforceable rules and obligations	• Update the Protecton of Nature Act • Command and control insturments • Strengthen permit system, regulations and implementation of Inland Fisheries Act • Develop and adopt regulations (or relevant changes therein) for participation in the preparation of biodiversity-related policies and legislation
	ENVIRONMENTAL OR SOCIAL PLANNING Designing and/or controlling the physical or social structures, including institutional and governance changes	• Metropolitan Strategic Land-Use Plan • Establish national park/protected areas/forests • Mechanisms of social and community participation in PA planning, management and creation • Register communal land
	SERVICE OR KNOWLEDGE PROVISION Delivering a service, including support services and tools or generating knowledge	• Establish a local community communication network • Database to register school environmental projects • National Biodiversity and Ecosystem Services Monitoring System • Develop geo-spatial tool to identify key biodiversity areas
		PA: Protected area GMO: Genetic Modified Organism NGO: Non-governmental Organisation CBO: Community Based Organisation

Table 5 7 **Types of individual behaviours targeted, frequency and examples found in the action plans of the ten National Biodiversity Strategies and Action Plans.**

Behaviour type	Share in %	Examples of individual behaviours identified in the actions of the National Biodiversity Strategies and Action Plans
Conservation actions and management of natural resources	32%	Restoration of degraded areas, management of protected areas and income-generating opportunities therefrom, reduce conflicts between forms of land use, mitigate/eradicate marine eutrophication, monitoring and management in Ramsar sites and wetlands, water quality monitoring, monitor and manage the risks associated with the handling, transport, use, transfer and release of living modified organisms, fighting invasive species, control the import of non-native bees, control of giant hogweed and keeping raccoon dogs, fire use.
Agricultural practices	20%	Restore/create shelter beds, adjust crop rotation, fertilization and anti-erosion protection systems, minimize the use of agrochemicals, increased adoption of conservation agriculture, organic agriculture and other climate resilient forms of agriculture, small scale drip irrigation, increase the cultivation/animal distribution of indigenous livestock breeds and drought-adapted crop cultivars.
Hunting and fishing	17%	Regulations, increase control and reporting of wildlife crime and offenses.
Participation in public deliberation processes and environmental engagement	16%	Increase local participation in decisions related to biodiversity conservation and use, involvement in monitoring of development projects as well as in biodiversity conservation and resource-use management and planning, regional information sharing on biosafety issues, increase participation of indigenous peoples and local communities in the generation and addition of value, and exports of products derived from native biodiversity, increase the ability to find funding for biodiversity conservation activities, participation in decision-making processes on genetically modified organism-related issues.
Consumption behaviours	5%	Conservation of water in urban consumption, commercial use of non-timber plant resources, use low pollutant emitting technologies, control over waste pollution, strengthen community biodiversity-based enterprises, adoption of the "reduce, reuse and recycle" principle.
Educational practices	5%	Increase species knowledge and pedagogy in biodiversity issues, include biodiversity issues in educational activities for different age groups.
Research practices	3%	Increase research on biodiversity issues, data collection, management and analysis.
Recreational activities and voluntary work	3%	Cycling, outdoor activities and recreation, management of holiday cottage gardens, voluntary work in a nature centre or a café at a nature reserve, mowing hay meadows, help in nature management and communication tasks.

Therefore 79% of the individual behaviour actions are aligned with tackling the direct drivers of biodiversity loss. **Table 5.7** below illustrates the types of individual behaviours the National Biodiversity Strategies and Action Plans identified and addressed in their action plans. From these percentages, it seems noteworthy that the individual behaviours addressed by National Biodiversity Strategies and Action Plans also relate to indirect drivers of biodiversity loss such as production and consumption patterns of the mainstream economic system and a western lifestyle. This is important because for transformative change typically those are said to require most changes (Chan *et al.*, 2020).

Figure 5.15 shows the policy options, intervention types, and COM-B components proposed for the 148 actions that specified individual behaviours. It is important to highlight that one action could propose more than one policy option, intervention type and COM-B component. The *policy options* aimed at supporting the individual behaviour change interventions were largely focused on service and knowledge provision (34%, n=50), legislation (16%, n=23) and environmental and social planning (14%, n=21). The policy options of communication and marketing (4%, n=6) and financial instruments (3%, n=4) were least frequently mentioned. The most frequently

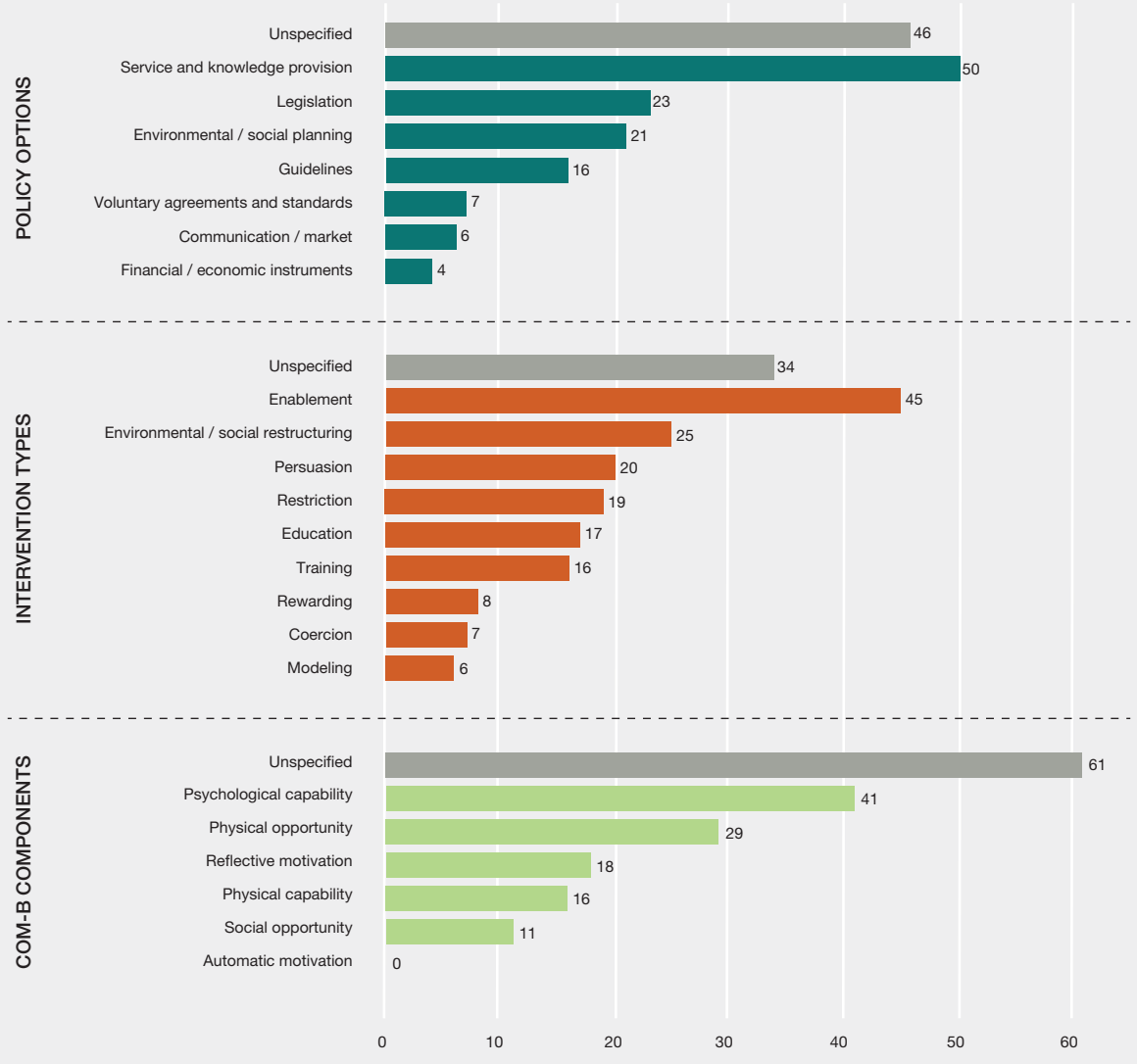


Figure 5 15 **Frequency of the policy option, intervention types and COM-B components associated with the actions that specified individual behaviour change identified in the ten National Biodiversity Strategies and Action Plans; relative frequencies in percentage of the total number of actions (n=148).**

Note that an action can address more than one policy option, intervention type, or COM-B component.

coded *intervention types* for changing individual behaviour were: enablement (30%, n=45), environmental and social restructuring (17%, n=25) and persuasion (14%, n=20). Intervention types of rewarding (5%), coercion (5%) and modelling (4%) were mentioned least often. Only about half of the individual behaviour-specific actions (n=87, 59%) could be coded for how they would influence behaviour along COM-B components. Most of these actions focus on enhancing "psychological capability" (28%, n=41), followed by "physical opportunity" (20%, n=29), "reflective motivation" (12%, n=18) and "physical capability" (11%, n=16).

These results are interpreted in light of the wider literature on behaviour-based policies and transformative change. The "behaviour specific" actions align with the recommendations in the literature in so far as they reveal an emphasis on service and knowledge provision (at policy level) and enablement (at intervention level). Our coding of enablement included providing information, tools, and resources, supporting researchers, and promoting voluntary work or other engagement in nature protection **(Figure 5.15)**. At the level of COM-B components, these interventions link to the most frequent categories of psychological capability (mainly via information provision) and physical opportunity (via provision of resources and social structures). The aspect of creating social spaces is also in line with the relatively strong occurrence of actions that propose social planning (at policy level) and social restructuring (at intervention level). All this reflects the need for enabling conditions propagated in the transformation literature, such as provision of information flows and access to information (conceptualized as deep leverage points within the design level in Meadows, 1999), promotion of resources and distributional justice (Milchram *et al.*, 2019), leveraging human-nature relationships (Abson *et al.*, 2016; Martinez-Harms *et al.*, 2018), and fostering safe spaces where conflicting viewpoints can be turned into a fertile ground for innovation and enable people to act upon their existing values for nature (Temper *et al.*, 2018; Vinnari & Laine, 2017).

In contrast to findings in the academic literature, our analysis reveals that behaviour-specific actions understate the potential of increasing people's motivation as a pathway to support transformative change. Rare and The Behavioural Insights Team (2019) advocate interventions that generate positive emotions for conservation. This relates to the COM-B components of "automatic motivation", which was not made explicit in any of the actions of the National Biodiversity Strategies and Action Plans. Similarly, relatively few actions in the ten national biodiversity strategies propose to influence "reflective motivation" through the provision of incentives, either in form of rewards or coercion. Although the interactions between external motivation from material incentives and pre-existing values remain controversial (Rode *et al.*, 2015, see also Chapter 4), the need to change the incentive systems in order to better account for the diverse values of nature is widely recognized (Dasgupta, 2021). Cultivating pre-existent values may be done through mechanisms that reward and validate "endogenous" values, and mitigate the influence of "exogenous" value systems, especially its impact on farmers' self-esteem (Horcea-Milcu *et al.*, 2016, 2018). Finally, the low frequency of the "social opportunity" category also understates the importance of cultural and social norms for shaping behaviour.

To conclude, the analysis of National Biodiversity Strategies and Action Plans actions from the behaviour change perspective showed that those actions do not sufficiently specify the elements required for effective behaviour change and that they often lack a clear understanding of the mechanisms by which interventions can drive biodiversity-related behaviours, including through working with individual and social values. For those actions that are sufficiently behaviour-specific, interventions mainly address information and resource provision as enabling conditions, but underrepresent the potential behavioural impact of addressing people's motivations (including their values) and their social environment.

5.3.5 Summary findings: working with values to galvanise transformations to sustainability

Working with values is relevant to a range of intervention points for leveraging transformative change. Working with values in the practical sphere of production, consumption and exchange involves more diverse and inclusive valuation of nature as well as the uptake of valuation in practical interventions such as incentives for pro-environmental behaviour. Working with values in the structural sphere of institutions, policy and governance involves changes in the design of society that enable more diverse values (including sustainability-aligned values) to be articulated and acted upon. For example, laws that articulate the rights of nature and thus help enable indigenous peoples, amongst others, to operationalise values of care for nature. Working with values in the personal and cultural sphere involves shifting and enabling beliefs and worldviews in ways that can drive changes in other spheres and that can shift the high-level goals of society. For example, evolving beliefs about what constitutes human flourishing, and what relationships with nature are consistent with wellbeing, might shift societal goals from consumption growth towards sufficiency for *Buen vivir.* All these ways of working with values must take place in the context of asymmetries of power and will require political interventions to empower citizens and to prevent resistance from incumbent powers whose interests may not be aligned with sustainability (Geels, 2014). It is for this reason that reconfigurations of power are frequently

found to be fundamental to achieving transformative change (Patterson *et al.*, 2017).

There is agreement in the literature that values are important in relation to sustainability and sustainability transformation. A subset of this literature can be described as action-oriented and deals with ways to engage with diverse values as leverage points for moving socio-environmental systems towards sustainability. Ways to deliberately mobilize sustainability-aligned values typically include processes that enable expression and enactment of values by changing societal contexts. Ways to engage with non-sustainability-oriented values are referred to as shifting values. Working towards a shared vision for transformation towards just and sustainable futures may require a mix of top-down (e.g., policy interventions) and bottom-up ways of working with values such as citizen empowerment, co-production and reflexive learning. In both cases, including mechanisms to correct for power asymmetries when designing interventions or co-designing processes is essential.

Holding sustainability-aligned values is important, but not sufficient for pro-environmental behaviour, due to the multiplicity of influences that affect behaviour. Sustainability-aligned values may conflict with other values working against conservation. Equally, formal and informal institutions can constrain personal freedoms to act in accordance with values. These issues lead to the frequently observed phenomenon of a "value-action gap". Interventions can be structured in such a way as to reduce this gap and enable pro-conservation behaviour. These can include: actions to increase people's motivation to engage in pro-conservation behaviour; actions to shape people's understanding of pro-conservation behaviours and to help them to develop the required skills (capability); and actions to reduce the material and social obstacles to performing pro-conservation behaviours or to increase the costs of behaviours that harm conservation (opportunity). Biodiversity policy strategies and action plans for conservation would benefit from more attention to this behavioural science framework, and being more explicit about how policy can be directed at enabling pro-conservation behaviour.

5.4 GOVERNING THE MOBILIZATION OF DIVERSE VALUES FOR CHANGE

5.4.1 Governance and values

Governance definitions and frameworks are normative and carriers of values and value systems, with some embracing consensus and empathy, others entrepreneurship and other authority and control (Meuleman, 2019). Governance forms and arrangements are a reflection of how people value others' value. The notion of governance also to some extent has a normative dimension, especially given the fundamental assumption that good governance is important for quality of life of citizens, and important for the success of states, civil society, corporates and other entities in their functioning (Fennell *et al.*, 2008; Peters, 2012).

In governance science and practice, the role of values is often obscure and hidden, despite underpinning decisions, and inspiring the worldviews of those who govern. In an era of rapid environmental change and uncertainty and increased recognition of coupling of social and ecological systems (Frantzeskaki *et al.*, 2010; Schoon & van der Leeuw, 2015), there is widespread realization of limitations of technocratic, top-down, hierarchical governance and management approaches which seek to control key ecosystem variables in order to achieve efficiency, reliability and optimality of ecosystem benefits (Holling & Meffe, 1996). Scholars working on commons have laid the ground of community-based conservation, indicating a shift from expert-based approaches to participatory management approaches, and seeking to balance conservation goals with socio-economic goals (Gruber, 2010), particularly when faced with wicked problems (Berkes, 2004). The work on commons has been influential in setting an institutional crafting framework, especially by laying down design principles for stable community property resources (Ostrom, 1992) and providing frameworks for analysing institutional change (Ostrom & Basurto, 2011). The institutional bricolage scholarship, on the other hand, contests the amenability of local institutions to design, and instead focuses on the socially informed analysis of contents and effects of institutional arrangements (Cleaver & De Koning, 2012; Cleaver & Whaley, 2018). This scholarship stresses that institutions adapt through processes of bricolage, by assembling institutional components from different origins functions, and working and enduring if they are seen as legitimate and meaningful (Cleaver, 2002).

The significance of values in underpinning and shaping governance choices is a central idea for an interactive governance perspective, which focuses on interactions between governance actors (social agencies possessing agency or power of action) and structures (frameworks

within which actors operate), as a key determinant of governability (overall capacity of governance) of the social entity or system (Kooiman *et al.*, 2008). Values, together with images and principles form the deep-ingrained "meta-level" governance elements of those involved in governing, and explain much of differences in governance outcomes, especially their capability to deal with "wicked problems" (Kooiman & Jentoft, 2009; Meuleman, 2019) while navigating towards just and sustainable futures.

This section aims to unravel the role of diverse values and plural valuation in triggering governance transformation towards just and sustainable futures, and the possibility of values being used as leverage points. The assessment focuses on following five questions:

- What is the case for inclusion of diverse values and plural valuation in decision-making processes and governance arrangements?
- What governance arrangements enable the incorporation of diverse values for the creation of just and sustainable futures (or are better aligned with just and sustainable futures)?
- What adaptations in governance may be required for mobilization of diverse values? What are the constraints and opportunities?
- What is the role of capacity development, adaptive learning and experimentation in the incorporation of diverse values for just and sustainable futures? How can it be promoted?
- Is adaptation in governance enough, or do governance systems need to transform for mobilization of diverse values?

5.4.2 Governance forms and arrangements for incorporation of diverse values in just and sustainable futures

The diversity, dynamics and complexity of societal situations in which collective decision-making is done, encapsulating politics, policy and policy dimensions is captured in the discussions around governance forms and arrangements, also referred as governance modes (Pahl-Wostl, 2015; Treib *et al.*, 2007). Various categorizations of governance modes have been suggested, differentiated in terms of idealized forms (hierarchies, markets and networks) (Thompson, 2003), locus on state intervention to societal autonomy continuum (Treib *et al.*, 2007), or on the role of governmental and non-governmental actors occurring in combinations of hierarchical, self and co-governance modes (Kooiman, 2000). In each of these modes, actors acquire power through different processes, for example, in a hierarchical order power is conferred through formal processes, in a network depending on centrality of actor's role, and in a market on the basis of economic resources (Pahl-Wostl, 2015) (Chapter 4).

Different governance modes are built around the ways in which people consider other peoples' values (Meuleman, 2013). Hierarchical values and principles typically include rationality, reliability, risk averseness, and managing by instructions. Values forming the basis of network governance may include partnerships, collaborative learning, co-creation for innovation, or a mutual gains approach, amongst others. Similarly, market governance may be underpinned by values such as rationality, cost-driven decisions, flexibility, competition as drivers for innovation, innovation, and self-determination (Meuleman, 2019). Governance modes differ in the ways in which these encapsulate values such as: hegemony (one's values considered as superior to others); separatism (not willing to be confronted with the implications of other people's values); pluralism (being co-responsible for protecting other people's values); tolerance (being sympathetic to other people's values despite knowing that one's values are superior) and indifference (abstaining from intervention due to lack of interest in other's values; Meuleman, 2013). Hierarchical modes of governance are usually linked with values of hegemony, network governance models are usually linked with pluralism and tolerance and market governance models are usually linked to indifference. The relationship of governance and values can thus be seen as: a) values as determinants of governance, and b) governance framing values by institutionalising decision-making structures and creating power sharing arrangements. It is also argued that governance for nature and nature´s contributions to people is partly ingrained in how people consider other's values – thus calling for broadening values and valuation discourse.

This brings us to the question – what governance modes are suited for transition to just and sustainable futures and what values underpin such governance modes? Discussions on governance for sustainability indicate that value choices – on the nature of society we want to live in and want to leave for posterity are the lynchpins of societal steering decisions, navigating within the realm of fragmented power across many actors and societal subsystems (Meadowcroft, 2007). Available evidence points out to characteristics of modes of governance that are suited in such complex polycentric context: a) interactive (consciously interacting with power centres to define as well as realize goals) and reflective (to reassess practices and adjust steering mechanism) (Frantzeskaki *et al.*, 2012; Meadowcroft, 2007); b) reflexivity in steering strategies, calling into question the governance foundations and envisioning

alternatives and reinventing and shaping the foundations (Voß & Bornemann, 2011); and c) supported by democratic institutions, participation and policy coherence (Glass & Newig, 2019; Meuleman & Niestroy, 2015). From a meta-governance perspective, the value principles of respect (for self-governance mode), equity (for hierarchical mode), and inclusion (for co-governance mode) may be aligned to such conditions (Kooiman & Jentoft, 2009). The decision-making and choices can become "easy", "moderate" or "hard" due to (in)compatibility, (in)comparability, or (in) commensurability of values (Kooiman & Jentoft, 2009), thus highlighting the significance of meta-governance in setting the values, images and principles as the backdrop to transition towards just and sustainable futures. Furthermore, incommensurable values, or conflicting and incompatible images and principles may underpin persistence of "wicked environmental problems" as has been observed in the case of governance of water (Pahl-Wostl *et al.*, 2007a; Weitz *et al.*, 2017), marine fisheries (Song *et al.*, 2013), ecosystem management (DeFries & Nagendra, 2017), and others.

Governance for sustainability has to cope with fundamental uncertainty and possibility of unintended consequences (Voß *et al.*, 2007) due to several factors such as complex interactions between society, technology and nature (Clark *et al.*, 2016), and prevalence of uncertain knowledge (Grunwald, 2007). There is a need, therefore, to champion new approaches that are both flexible enough to address highly contextualized socio ecological systems and dynamic and responsive enough to adjust to complex, unpredictable feedback between social and ecological system components (Chaffin *et al.*, 2014). The value of adaptive governance has been emphasized in these contexts, allowing for policies to be implemented as systematic experiments which are analysed for unanticipated outcomes, and lessons fed back into governance and decision-making processes (Chaffin *et al.*, 2014). Adaptive governance enables connections at multiple governance levels, often self-organizing as social networks drawing on multiple knowledge systems and experiences for development of common understanding of decision-making situations (Folke *et al.*, 2005). The capability of governance regimes to address uncertainty and complexity is also built by facilitating creation of spaces that allow for anticipation of co-evolutionary interdependence (Sachs *et al.*, 2019) for transformations to achieve SDGs and enhance the reflexivity of actors with respect to their embedding in broader system contexts and dynamics (Klinke & Renn, 2012; Voß & Bornemann, 2011). Coordination and stakeholder integration are critical ingredients of governance systems to be adaptive and anticipative in the face of complexity and uncertainty (Boyd *et al.*, 2015).

The need for enhancing fit between ecosystems and governance systems within adaptive governance has been emphasized in the literature, stressing three core connectors, namely, *leadership* by individual actors, using *networks* to coordinate actors across a multilevel governance system, and activating *social memory* stored in such networks (Olsson *et al.*, 2006). The effectiveness of institutions often depends not only on their own features, but also on the interactions between institutions, often beyond their domains (Young, 2005; Young & Underdal, 2004). These interactions, however, can be synergistic or cause disruptions within the organizations (as has been seen in the case of climate governance in particular). Interactions can be horizontal (occurring amongst institutions at the same level of social organization or at the same administrative scale) or vertical (influencing interactions at multiple administrative levels). Broadly, four causal mechanisms are known to influence the interplay between institutions. These are: cognitive interaction, interaction through commitment, behavioural interaction or impact level interaction (Gehring, 2006; Gehring & Oberthür, 2008).

From the values perspectives, governance modes which are flexible, transparent, and promote collaboration, participation, and learning underpin their capability to address complexity and uncertainty. In certain situations, hybrid forms of governance (such as co-management, or partnerships between state and non-state actors) may help address uncertainty, although risks of window dressing in absence of consideration of diverse values and different ethical perspectives remain (Fennell *et al.*, 2008).

The complexity of conservation problems that are faced today require institutions and governance arrangements that can span boundaries and scales that can help bridge the science-action gap and enable production of actionable knowledge that can create outcomes of public value (Gerber & Raik, 2018; Wright *et al.*, 2020). Different stakeholders act upon different values at different spatial, temporal and organizational scales, which in turn is, *inter alia*, influenced by power relations (Chaffin *et al.*, 2016; Cosens & Williams, 2012; Folke *et al.*, 2005; Loorbach *et al.*, 2017; Pahl-Wostl, 2015). Bridging organizations have also been identified as playing a critical role in transformation, by providing opportunities through bringing in new knowledge, resources and incentives for managing the environment (Brown, 1991). These organizations also tend to encompass the function of boundary organizations which assist in communicating, translating, and mediating various knowledge systems, making it relevant for policy and action (Stewart & Tyler, 2019). The role of boundary organizations in bridging science-policy divide and facilitating knowledge integration at multiple scales, and addressing value trade-offs has been found important in the case of marine protected areas (Gray *et al.*, 2016), landscape conservation in the Caribbean (Jacobs *et al.*, 2016), climate change adaptation planning at municipal levels (Graham & Mitchell, 2016), or to international processes such as IPCC on addressing science-policy interface in climate change agenda setting (Gustafsson & Lidskog, 2018).

5.4.3 Transformative governance and diverse values

Repeated calls have been made for transformative governance of biodiversity in order to stem the ongoing decline and degradation (Visseren-Hamakers *et al.*, 2021). According to Chaffin *et al.* (2016, p. 403) *'what defines a true transformation is when the regime shift experienced is a direct result of human vision, planning, and action, in other words, human agency'.* In this way, transformation in socio-ecological systems – as a result of a human-driven process – implies alternative governance models that are prone to promote non-linear change in complex socio ecological systems and that has the capacity to respond, manage, and trigger regime shifts in coupled socio ecological systems at multiple scales (Chaffin *et al.*, 2016).

The goal of transformative governance is to actively shift a socio ecological system to a fundamentally different and more desirable regime by altering the actor organization, institutional arrangements, processes and thereby reorganizing the governance mechanisms of the socio ecological systems. The process to achieve such a goal often requires triggering radical, systemic shifts in values and beliefs; patterns of social behaviour; multilevel governance and management regimes by disrupting dominant entrenched forms of environmental governance and providing space for innovation and framing and setting new agendas (Chaffin *et al.*, 2016).

Transformative governance, hence, relies on (i) values that guide action towards transformation and that are embedded in the selected methods and means of governance (design); and on (ii) values embraced by goals, expectations, and societal priorities of the envisioned new system. Considering transformative governance aims at just and sustainable new systems, which means it is inclusive of diverse values (intent), and that a multiplicity of values is needed in the processes (design) of governance for such transition.

Since current societies are based on an unsustainable organizational (Chaffin *et al.*, 2016) design and *'the rapid trajectory of global change is likely outpacing societal abilities to preserve desirable regimes in many socio ecological systems nested within a global system'* (Chaffin *et al.*, 2016, p. 405), adaptation alone is unlikely enough to achieve a just and sustainable future. Chaffin *et al.* (2016, p. 405) argues that *'there is a further need for models of environmental governance that actively encourage and permit the transformation of current resource-use patterns to create sustainable socio ecological systems at nested scales across the globe'.* Transformative governance is needed when (a) socio ecological systems conditions have become untenable, the system is rapidly approaching a threshold with unknown or undesirable consequences, and the mechanisms of adaptive governance are insufficient to maintain desired conditions; (b) a socio ecological system has crossed a threshold and undergone a regime shift that has altered the socio ecological system to a point of degradation that is no longer desirable to society; or (c) the socio ecological system has developed in such a way that ecosystem services are produced at a low rate and social inequities are high, and more desirable system state with greater production of services and less injustice is envisioned and possible (Chaffin *et al.*, 2016).

Some characteristics of governance models can promote or prevent systems adaptation and transformation to happen. **Table 5.8** presents opportunities and constraints to enable transformative governance that are interrelated and described below in the light of considering diverse values into governance structures to achieve envisioned systems.

Leaders champion critical narratives – that represent certain worldviews and values – to mobilize, arrange, and sustain the necessary social and political capital for change. In order to promote change that considers diverse values and aims for a just and sustainable new system, it is important that multiple sources and different agents and networks act as

Table 5 8 **Opportunities and constraints for transformative governance (Adapted from: Abson *et al.*, 2017; Chaffin *et al.*, 2014, 2016; Olsson *et al.*, 2014).**

Opportunities	Constraints
• Nested leadership • Functioning social networks • Increased and effective public participation • Create space and autonomy for local experiences • Experimentation, reflectiveness and adaptation • Knowledge co-creation • Crises as powerful narratives for change • Flexible institutions • People value nature	• Cognitive limits of humans • Market oriented norms • Inertia of embedded political power relations • Hierarchical governance structures • Upscaling • Long-term and intensive involvement

leaders. Thus, to lever transformation, the governance shall promote the leadership of nested institutions (complex, redundant, and layered) and institutional diversity (a mix of public, private and civil society actors) at the local, regional, and state levels, connected by formal and informal social networks (Chaffin *et al.*, 2014; Dietz *et al.*, 2003). Leaders from indigenous and local communities support the integration of these groups' values and knowledge into governance processes.

Functioning social networks connect individuals and organizations across multiple levels and scales and strengthen the capacity for legitimated participation in decision-making (Chaffin *et al.*, 2014; Folke *et al.*, 2005; Olsson *et al.*, 2006). Networks that comprise diversity are important instruments to empower diverse values into making decisions towards a more inclusive system. Hence, key elements of transformative governance involve fostering, supporting and giving space to social networks, both formal and informal ones. While informal networks are helpful, especially at early stages of transformation, to foster governance experiments at small scales; formal institutions, mainly at later stages of transformation, have the overarching capacity to plan for multiple potential futures in the face of uncertainty and support an effort to force or respond to a regime shift (Chaffin *et al.*, 2016).

Therefore, central to the consideration of diverse values in the transformative governance is a multi-actor approach that widens the scope of participation to a broad set of values and beliefs within society and that guarantee effective participation of the involved ones. A key aspect is the inclusion of non-state actors in participatory approaches for governance, with special attention to aspects such as power inequality (Abson *et al.*, 2016).

Governance for transformation also involves creating space and autonomy for local experiences ("niches") and encourage innovative interventions and the emergence of arrangements inclusive of diverse values within systems. This is exemplified by a growing number of bottom-up approaches to governance, many of them with aspects of self-organization, that have emerged via groups of local actors, social networks, and various collaborations of community leaders looking for alternatives to top-down government and decision-making (Chaffin *et al.*, 2014). In this regard, trust building among stakeholders at the local level, the participation of a diverse array of stakeholders and leadership are essential (Chaffin *et al.*, 2014; Folke *et al.*, 2005; Olsson *et al.*, 2006).

Experimentation, reflectiveness and adaptation play a fundamental role in promoting change, given the uncertainties associated with rapid and global environmental change. Governance arrangements, thus, would benefit from being open to questioning existing values, knowledge and structures. Also, it would benefit from giving opportunity to experimentation of new ways of governance bringing up non-dominant perspectives and values, and novel and adaptive models, to manifest a transformation. In this regard, decision-making can be viewed as the exercise of implementing multiple technical, social and organizational options (Karpouzoglou *et al.*, 2016). Intrinsically to the experimentation process, the act of continuously reflecting on what has been done and learnt – as new information comes and knowledge is built through interactions of multiple actors -, may allow insights to adaptations and improvements of institutional functioning, which can, in turn, lead to systemic transformations (Cundill *et al.*, 2014). Institutionalizing such mechanisms in governance (IPBES, 2016b, 2018a, 2018b, 2018c, 2018d, 2019; Newig *et al.*, 2016; Ramsar Convention on Wetlands, 2018; UNCCD, 2017; WWAP & UNESCO, 2019) promotes a "learning by doing" process and leverage transformative change (Abson *et al.*, 2016). Decentralized and informal processes are more prompt and able to experiment, adapt and deal with socio ecological systems dynamics.

Therefore, learning and knowledge are essential to the transformation. In the same way, adequate information about resources (ecological), values (social), human-environment interactions and up-to-date information on uncertainty are enablers of transformative governance (Dietz *et al.*, 2003; van der Molen, 2018). If governance arrangements are based on past information and consolidated knowledge structures, it is less likely it will design options different from the business-as-usual trajectory. The governance for transformation, thus, needs to acknowledge the values and worldviews embedded in knowledge production that inform various societal conceptualizations of socio-ecological systems, as well as the importance of determining whose values define a desirable regime. This aligns with the call for rethinking knowledge production, flow and use through systems of interest (Abson *et al.*, 2016), which leads to knowledge co-creation and social learning processes. Socio-ecological system issues are too complex to be managed by a single entity and leads to the need to integrate and legitimize different types of knowledge, from different actors, worldviews and values systems. From social learning processes new knowledge and joint solutions emerge, leading to changes in practice (Kristjanson *et al.*, 2013). Moreover, knowledge is argued to constitute and imply power, as the exercise of power in a governance context necessarily involves knowing (van der Molen, 2018). The co-creation of knowledge from diverse values systems is one form of empowerment of the diversity of actors involved.

Moreover, crises can be powerful narratives for change as they can represent a pressure to reflect, reorganize, learn, adapt and trigger values and behaviours change, both

at individual and institutional level. At institutional level, a key lever then lies in ensuring institutions are designed to be flexible and open to the potentially transformational learning and adaptation opportunities invoked by crises (Eburn & Dovers, 2015). At an individual level, how people perceive, value and interact with nature influences environmental values and behaviours and shapes the goals and paradigms underpinning human action and may influence the design of socio-ecological systems (Abson *et al.*, 2016). Therefore, it might work as a lever encouraging governance modes to acknowledge humanity's reliance on the natural world and require valuating and strengthening material and immaterial links between people and nature in local ecosystems in decision-making processes (Abson *et al.*, 2016).

In contrast to the mentioned factors above, the following factors are constraints, barriers and challenges that prevent transformative governance from occurring. Addressing them appropriately is paramount to creating conditions for transformative governance.

Humans often lack the innate ability to question dominant socio-structuring paradigms and conceptualize ideas beyond the physical senses (cognitive limits of humans; Chaffin *et al.*, 2016), which means there are constraints for going beyond established worldviews and values and the dominant values tend to be maintained. The actual dominant world economic system is capitalism. As, in some cases, transformation of socio-ecological systems may go against market-oriented values and norms and dominant political systems, such transformation can represent a great challenge. The nested nature of socio-ecological systems is likely to require a restructuring of local economies, self-organization and decision-making autonomy related to natural resources use and conservation (Abson *et al.*, 2016; Chaffin *et al.*, 2016).

Likewise, disrupting the inertia of embedded political power relations that govern most contexts is challenging as dominant power relations can keep the system resilient to change from an unsustainable trajectory. Difficulties in coordinating among institutions are considered a major barrier for operationalization of governance to change (Karpouzoglou *et al.*, 2016). Exposing the limitations of deeply entrenched power relations can illuminate pathways for transformation. In this sense, hierarchical governance structures put decision-making far from the actual contexts where decisions are made, resulting in decisions that may not be comprehensive of the diverse values of natural resources users and leaving behind innovative ideas lost in the information flow between levels of the hierarchy. On the top of such pyramidal structures there are few responsible for decision-making, usually with a recurrent profile, meaning low diversity of values represented (Abson *et al.*, 2016).

While small scale experiences of transformation have enhanced the emergence of new governance models in some cases, the scale at which paradigmatic shifts in societal values, beliefs, vision, and ideology are necessary to legitimise transformative governance is likely to be much greater. The capacity of transformative governance to gain scale is restricted. Understanding and providing catalysts and mechanisms for nested personal and social transformations at the collective scale and scale the socio-ecological system as a function of collective skills, relationships, institutions, and network structures are key components of governance for change.

Lastly, in order to promote a transformative governance considering the plurality of values, there is the challenge of long-term and intensive involvement of various groups of actors with diverging values and interests to sustaining flexible, adaptive and dynamic governance arrangements (van der Molen, 2018).

5.4.4 Social learning in governance for just and sustainable futures

The promotion of social learning processes is crucial for governance systems that intend to contribute to the creation of just and sustainable futures. Social learning refers to changes in understanding that are generated through interactions within social networks, going beyond the individual to affect wider social units or communities of practice (Reed *et al.*, 2010). Along with social learning, the coproduction of knowledge and knowledge dissemination contribute to initiate change, to build, and to sustain the system's adaptive capacities (Karpouzoglou *et al.*, 2016; Pahl-Wostl *et al.*, 2007b; van der Molen, 2018), providing a continuous flow of information to coordinate decisions and actions across scales (Cosens & Williams, 2012; Folke *et al.*, 2005). Since social learning is based on cycles of reflection and action (Fisher *et al.*, 2016; Freire, 2000), knowledge co-production and joint analysis can lead to collective decisions, implementation, and change, which in turn lead to new cycles of evaluation, reflection and action (Kristjanson *et al.*, 2013), thus contributing to governance systems with effective participation and well informed decisions.

Fostering a culture of learning through processes of participatory reflexion, decision and action implementation as well as collaborative production of knowledge across different social actors, groups and networks contribute to the recognition, mobilization, weaving, integration and co-creation of diverse values. Social learning for just and sustainable futures can thus be understood as a process through which public, private and civil society actors learn with, from and for each other's values of nature, through the recognition and incorporation of diversity as an underpinning

value that links justice and sustainability. The recognition and incorporation of diverse values in governance depend on each system's culture of learning and integrative capacities. These capacities generally involve: (i) processes of plural valuation linked to negotiation and decision-making outcomes (Zafra-Calvo *et al.*, 2020), (ii) the integration of various types of knowledge in governance, for instance, by joint knowledge creation processes in which various actors *'cooperate in the exchange, production and application of knowledge'* (Hegger *et al.*, 2012, p. 53); (iii) explicating and reflecting on the often implicit *'normative frames of reference'* that actors with various backgrounds have (van Buuren, 2009, p. 215); and (iv) identification and awareness of *'the different epistemological beliefs which underpin knowledge claims'*, such as beliefs concerning *'the validity and reliability of different knowledge claims'* (Raymond *et al.*, 2010, p. 1775).

Learning with, from and for diverse values of nature that are held by indigenous peoples and local communities can support governance for just and sustainable futures since IPLC have key long-term place-based knowledge and values of biodiversity (Benedict, 2019; Inuit Circumpolar Council Alaska, 2015, 2018). In this sense, policies on environmental planning, management and conservation significantly benefit from the inclusion of ILK. Moreover, creating opportunities for dialogue and direct learning among different social groups can help prevent and resolve conflicts related to environmental injustice (see 2.2.2, 2.2.3) as well as promote inclusive and participatory decision-making through the recognition, mobilization, weaving, integration and co-creation of diverse values.

Situated learning processes based on the inclusion of multiple social actors face a number of challenges and opportunities, which can be addressed by the consideration of different constraints and enablers.

Barriers to learning processes based on the inclusion of diverse values for just and sustainable futures

Unbalanced power relations represent an important barrier of learning processes that include diverse values (Rodríguez Aboytes & Barth, 2020). They can limit access to information, constraining opportunities for participation of certain actors (Rodríguez Aboytes & Barth, 2020). Power relations between participants may constrain participation and learning from diversity in various ways. For example, open dialogue may aggravate conflicts in governance processes or reinforce dominances inhibiting the participation of other participants. Fundamental differences between values and beliefs that become controversial present constraints for learning (Gerlak *et al.*, 2020); it is thus important to be able to transform conflicts into learning opportunities and possibilities for negotiation. Multi-stakeholder collaboration and participatory processes may prevent or transform conflicts that are rooted in value pluralism.

Another constraint is the availability and mobilization of sufficient resources and capacities to sustain venues that facilitate learning between diverse social actors (Gerlak *et al.*, 2020). As the processes of collaboration and dialogue in decision-making require time, the conditions to do so are not always there, nor the possibilities to hire professional facilitation services. Network governance structures may thus be overly centralized inhibiting necessary information flows for a diverse input and deeper learning levels, or overly decentralized increasing transaction costs of the learning process while facilitating a broader engagement and shared learning (Gerlak *et al.*, 2020). Multi-level network structures may mitigate both dilemmas allowing decentralized networks connected by shared goals, rules and actors; promoting learning across diverse social actors (Gerlak *et al.*, 2020).

Enablers of learning processes based on the inclusion of diverse values for just and sustainable futures

Systematic literature reviews on learning in environmental governance (Crona & Parker, 2012; Gerlak *et al.*, 2017, 2020) and transformative learning (Rodríguez Aboytes & Barth, 2020), complemented by literature on diverse values (Dendoncker *et al.*, 2018; Zafra-Calvo *et al.*, 2020) indicates the following enablers of learning processes that promote the inclusion of diverse values for just and sustainable futures.

Co-production of knowledge

Knowledge co-production has been shown to be a key process to enable learning and adaptation as participants learn to learn through diverse values, knowledge systems, modes of communication, deliberation and social interaction, as well as the uncertainty of social and environmental changes (Armitage *et al.*, 2011; Davidson-Hunt, 2006; Merçon *et al.*, 2018; Tengö *et al.*, 2014). It is important to consider knowledge co-production as a social and political process that often reproduces and even reinforces inequality and exclusion. Effective learning with, from and for diverse values can be enabled by processes of joint knowledge creation that allow for differences to be highlighted and interests to be contested (Turnhout *et al.*, 2020). Knowledge co-production can thus be documented and analysed in order to better understand the mechanism by which such processes foster learning, balanced power relations and effective governance adaptation and change (Akpo *et al.*, 2015).

Including learning from plural actors as an explicit objective

Collaboration and plural participation in environmental governance are essential for learning processes that promote sustainable and just futures (Zafra-Calvo *et al.*, 2020). To better ensure that learning with, from and for diverse values occurs, it is important to include it as an explicit objective of the process of transformative environmental governance (Gerlak *et al.*, 2017). As learning is a very subjective and internal process, it is recommended that its role be visualized as well as the intangible achievements of dialogue and collaboration. The recognition of the limits of our knowledge and the importance of listening to the diversity of actors in order to know their values are key in this process. In this sense, learning can be enabled while procuring the participation of a diversity of voices (Gerlak *et al.*, 2017).

Create venues for social interaction with plural participation in cross-scale linkages

"Venues for learning" are locations, places, decisions processes or forums where learning may take place (Gerlak *et al.*, 2017). Venues such as workshops, focus groups and meetings are considered key enabling factors for learning, followed by multi-stakeholder processes or collaborative forums, as well as multi-stakeholder organizational bodies such as networks. Spaces and processes that provide opportunities for face-to-face interaction and dialogue (Faysse *et al.*, 2014; Gerlak *et al.*, 2017), and include a diversity of stakeholders (Rodríguez Aboytes & Barth, 2020) are highlighted as key learning enablers. It has also been recognized as important to procure a diversity of learning settings including activities in nature and hands-on experiences (Rodríguez Aboytes & Barth, 2020). So called bridging or boundary organizations that link multiple actors through some form of strategic bridging are key in adaptive environmental governance, as they provide an arena for learning, trust building and conflict transformation between different forms of knowledge (Crona & Parker, 2012).

Foster time and space for collective reflection and dialogue

A key condition for transformative learning is the availability of time and space for reflection and dialogue (Rodríguez Aboytes & Barth, 2020). It is important that people can express their values, including emotions, narratives, stories and thoughts freely (Rodríguez Aboytes & Barth, 2020). This can be promoted through a diversity of types of gatherings from small, informal conversations to formal and structured meetings (Rodríguez Aboytes & Barth, 2020). Face-to-face social interaction is crucial as it enhances the understanding of the other and their values (Rodríguez Aboytes & Barth, 2020). Promoting an atmosphere of safety and trust supports the learning process, which could be in the form of network- and community-based organization groups (Rodríguez Aboytes & Barth, 2020). It is important to maintain an open dialogue where new actors can participate and openness to new ideas (Gerlak *et al.*, 2020); this implies also transparency and knowledge diversity (Wolfram *et al.*, 2019).

Establish methods, agreements, facilitation and routines for collaboration and integration of diverse values

Processes based on diverse social actors usually represent a great challenge. Since power relations and conflicts are inherent to these processes, it is important to promote the use of participatory methods for dialogue, negotiation and decision-making, as well as professional facilitation sensible to diverse values and transformative learning processes (Rodríguez Aboytes & Barth, 2020). It is also important to design venues for collaboration and formalize cross-sector and multi-stakeholder decision-making that includes bridging organizations (Gerlak *et al.*, 2020). Furthermore, it is recommended that agreements on methods, rules and routines are established collectively. Routines for sharing, translating and dissemination of information are crucial to build a collective memory of the process (Gerlak *et al.*, 2020).

Foster attitudes of openness for a transformative experience

Predisposition, openness and curiosity for learning with, from and for diversity is an important condition for learning processes that promote the inclusion of diverse values (Rodríguez Aboytes & Barth, 2020). This implies the willingness to include multiple perspectives and values in the decision-making and governance process, as well as a sensibilization of the diversity of values and actors implied by those processes.

5.5 CASE STUDIES OF VALUE-CENTRED PATHWAYS TO SUSTAINABLE FUTURES: GREEN ECONOMY, DEGROWTH, EARTH STEWARDSHIP AND NATURE PROTECTION

5.5.1 Introduction

There is no single pathway towards just and sustainable futures. Even where nations are able to overcome differences to sign up to a common set of goals (i.e., the SDGs), there are still multiple and contested pathways to achieving these which stem from different underlying worldviews and values, different views about leverage points for transformative change, and politics. Alternative pathways to sustainability often share key goals, such as reducing drivers of biodiversity loss, or advancing intergenerational equity, but they differ in the process expected to achieve goals, with implications for the impacts on different groups of humans and other-than-human nature. Understanding alternative pathways, and their constituent values and actors, is a way to avoid bias in an assessment because it aids transparency about which values are articulated in particular policies and practices.

A pathway to transformation is defined as a strategy for getting to a desired future based on a recognisable body of sustainability thinking and practice, driven by an identifiable coalition of researchers, practitioners and advocates.
In the context of the current assessment, pathways are differentiated by the kinds of solution framework they propose in response to the biodiversity and climate emergencies. These differences in proposed solutions can also be linked to differences in underlying knowledge and values, as well as different ways of understanding how transformative change happens. A comparative review of four co-existing pathways to sustainability is presented, each involving a co-production of knowledge and values and each in its own way advocating a potentially game-changing and transformative agenda: green economy, degrowth, earth stewardship and nature protection.

This selection of pathways is not intended to be comprehensive but to represent critical elements of diversity among relatively well established and identifiable coalitions. Pathways were selected through expert judgment based on prior typologies. In particular, the one based on the typology of values perspectives identified in the Nature Futures Framework (NFF) study (Pereira *et al.*, 2020). This includes a "nature for society" perspective based on instrumental values of nature as ecosystem services; a "nature as culture" perspective based more on relational values and the importance of living in harmony with nature; and a "nature for nature" perspective based on intrinsic values and making space for nature (Pereira *et al.*, 2020). The pathways adopted cover this diversity and are more readily identifiable as existing bodies of knowledge, values and practice. Green economy represents "nature for society", earth stewardship represents "nature as culture" and nature protection represents "nature for nature". In addition, the degrowth (incorporating postgrowth) pathway is included as a prominent example of a more cross-cutting perspective that straddles the Nature Futures Framework categories, advocating the meeting of well-being needs through redistribution rather than growth. The inclusion of degrowth is justified by meeting our definition of a pathway, for example the recognisable body of knowledge and associated actors is evidenced by the number of publications (Web of Science, Nov. 2nd 2021 shows 2,981 hits for the search string (degrow* OR "post growth")), and by its own identifiable conferences and journals.

- **Green economy** emphasizes solutions based on reform to economic performance metrics, institutions and technologies. This solutions framework is underpinned by a conception of nature as an asset to be managed for human wellbeing, highlighting nature's instrumental values.

- **Degrowth** is a pathway that emphasizes strategies that reduce the material throughput amongst wealthy societies, protecting human wellbeing through better distribution of material wealth rather than growth. This solutions framework stems from a central value to sustain life in all its forms and for humans to live by the value of sufficiency and within planetary boundaries.

- **Earth stewardship** is a pathway that emphasizes the strengthening of local sovereignty, including agrarian reform. This solutions framework is underpinned by prioritisation of solidarity, between humans as well as between humans and other-than-human nature, with a goal to promote biocultural flourishing.

- **Nature Protection** is a pathway that calls for a greatly expanded network of nature conservation areas (such as protected areas) to ensure a future for all life on earth. This position prioritises intrinsic over instrumental values, with protection of biodiversity for its own sake seen as an essential condition for restoring balance between humans and nature.

The examination of these pathways serves an extremely important function due to the inherent limitations of existing knowledge of transformative change. Much of what has been learned about transformative change draws on

historical cases of technology change, for example the transition from sailing ships to steam ships (Geels, 2002). Such cases are not strictly comparable with the current situation, because they do not constitute directed, governed responses towards a specified goal, and certainly not on environmental grounds (Newell, 2015). Also, hindsight allows a much cleaner and sanitised view of the process of change, which is advantageous for theory development but may miss much contemporary detail. By contrast, ongoing movements for transformations to sustainability, emerging amidst constructive ideological conflict between pathways like green economy, degrowth, earth stewardship and nature protection, provide the "messy" contemporaneous view of contested attempts to direct and govern transformative change.

The review of each pathway summarises its key characteristics, including the broad values characterising human-nature relations, the way values are conceived as leverage points for transformative change, and key policies that flow from these underpinning beliefs **(Table 5.9)**. The comparison of pathways highlights that environmentalists' calls to mobilize more diverse values of nature are themselves diverse and contested. However, the comparison does identify shared agendas, including confirmation that all pathways seek to incorporate more diverse values of nature (albeit different forms of pluralism). All pathways also seek to respect ecological boundaries to pursue a common future that is cognisant of peoples' dependencies on nature. It would be naive to suggest that such common ground is a basis for a single, agreed pathway. Indeed, intense debate across different pathways of environmentalism is an important form of knowledge co-production. However, the presence of meaningful, shared goals is a key condition for such co-production, along with recognition of the knowledge pluralism that underpins different positions and opportunity for quality dialogue between these (Norström *et al.*, 2020).

Table 5 9 **Overview of green economy, degrowth, earth stewardship and nature protection pathways.**

	Green economy	Degrowth	Earth stewardship	Nature protection	All Pathways
Key bodies of knowledge	• Economics • Ecosystem services	• Ecological economics • Political ecology • Post-development	• Sustainability science • Traditional ecological knowledge • Environmental ethics	• Conservation science • Evolutionary ecology • Environmental ethics	• Climate and ecological crisis
Fundamental driver of biodiversity loss	• Institutional failure (especially market failure)	• Material expansion driven by economic growth	• Structural power imbalance blocking diverse values	• Failure to respect and care for other-than-human life	• Failure to respect biophysical boundaries
Key requirement for transformative change	• Enable accounting of values of nature • Incentives for pro-environmental behaviour	• Reducing material throughput of societies • Wealth redistribution	• Local sovereignty linked to territory and agrarian reform • Biocultural conservation	• Recognise intrinsic value of nature • Biodiversity conservation	• Respect biophysical boundaries
Sustainability-aligned values	• Nature as asset • Democracy • Utilitarianism (pareto optimality)	• Diversity • Egalitarianism • Sufficiency • Conviviality	• Responsibility • Care/solidarity across species • Pluralism	• Ecocentrism • Care/solidarity across species • Responsibility	• Intergenerational justice
Core values agenda	• Ensure nature's values inform institutions and incentives	• Rebalance economic with social and ecological values (escape economism)	• Challenge discrimination to mobilise more diverse values	• Recognise and prioritise the intrinsic value of the diversity of life at all scales	• Diversity and balance values of nature incorporated in decision-making
Emblematic policies	• Alternative metric to Gross domestic product • Shift taxation from labour to use of nature	• Work time reduction • Basic income • Green and progressive taxation	• Shift from preservationist to biocultural approach to conservation • Land reforms and IPLC rights	• Major expansion of area-based conservation • 'Half Earth' to be gazetted as protected areas	

5.5.2 Green economy pathway

In almost all parts of the world, market forces play a critically important role in shaping behaviour and decisions. Failure of these market forces to capture nature's diverse values, and the costs associated with their loss, have been identified as a major driver behind the loss of biodiversity and ecosystem services/ nature´s contributions to people (TEEB, 2010). Many costs caused by environmental decline are not included in economic decision-making (giving rise to *external effects*, i.e., benefits or costs imposed on others) and not captured in national accounts or company balance sheets unless states mandate their internalisation or unless damages are claimed in courts. These issues point to the need for a substantial reform of economies. Against this background, a green economy can be defined *'as one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcity'* (UNEP, 2011, p. 16).

Role of values and valuation of nature

Many natural goods and services have characteristics similar to a public good: they provide benefits for many people. According to a classical result from economic theory, the marginal costs of providing or protecting such a public good should be equal to the sum of marginal benefits for all individuals in society in order to achieve Pareto efficiency, i.e., an outcome such that there is no feasible alternative that all would prefer (Samuelson, 1954). In other words, Pareto efficiency requires that all values (defined in this pathway as the totality of anthropocentric values) affected by a change in the provision of natural goods and services need to be taken into account.

One way of accounting for all values in this manner is to issue Pigouvian environmental taxes or subsidies equal to the sum of all values – measured as marginal benefits and costs – of all affected by an activity (Pigou, 1920). One example is to tax carbon emissions at a rate equal to the present value of all climate damages caused by an extra tonne of CO_2, i.e., the social cost of carbon. Another example is to tax the use of pesticides that impose risks to human health and ecosystems (Finger *et al.*, 2017). With a pesticide tax in place, farmers would have an incentive to take the multiple risks of pesticides into account and to substitute for less risky plant protection measures (Finger *et al.*, 2017). Empirical evidence for European countries suggests that such taxes need to be sufficiently high to have a substantial effect on pesticide use (Böcker & Finger, 2016, 2017).

This kind of market intervention also generates social costs, i.e., costs for the government and for market participants, and thus is not always the best solution (Coase, 1960). Alternative to this established green economy approach, there are options to keep essential parts of nature outside the market system. Examples include protected areas or standards of good farming practice that include maximum livestock levels per hectare, compulsory set-aside of farm area for nature or the ban of particularly harmful pesticides or their use in specified contexts, although such measures are often implemented insufficiently (Pe'er *et al.*, 2019).

An equal representation of the diverse values of nature within economic valuations relies on social equity, as expressed in the UNEP (2011) definition of a green economy. This is because individual economic values depend on the individual's income and wealth. As a consequence, aggregate economic values of nature depend on the distribution of income and wealth in society (Baumgärtner *et al.*, 2017; Drupp *et al.*, 2018; Ebert, 2003; Meya, 2020). Baumgärtner *et al.* (2017) show that the global economic value of biodiversity would be 16% higher if income was perfectly evenly distributed. An important element in the green economy concerns its ability to meet the basic needs for all, without undermining the ecological life-support systems on which the economy relies, as stated in the Sustainable Development Goals (SDGs). Currently, however, some rich countries satisfy basic needs, but overshoot ecological boundaries, whereas some poor countries operate within ecological limits, but fail to cover people's basic needs (Dasgupta, 2021; O'Neill *et al.*, 2017). International cooperation is needed to achieve green economies that meet both basic needs and ecological sustainability (Pearce *et al.*, 1989).

Exploiting natural resources generates current economic benefits, but often diminishes future values. In a green economy, these effects on future values need to be taken into account and balanced against current benefits. In economic decision-making, this requires expressing values that accrue in the future in equivalents of present values (or express present values in equivalents of future values). This procedure is termed "discounting". The discount rate for private consumption goods is typically positive, i.e., the present value of consumption benefit decreases the further in the future these benefits accrue. The higher the discount rate, the higher future benefits have to be to warrant current investment. For natural goods and services, the appropriate discount rate is substantially lower than the discount rate for private consumption goods, and may well be negative, i.e., the present value of nature's benefits in the future exceeds the current value (Drupp *et al.*, 2018; Gollier, 2012; Hoel & Sterner, 2007; Weikard & Zhu, 2005). Following this line of argument, the Ministry of Finance in the Netherlands recommends discounting natural goods and services at a one percentage point lower rate than private consumption goods (Koetse *et al.*, 2018). Investments that improve natural goods and services in the future thus are relatively preferred to those that would provide private consumption benefits.

Measuring economic development in a green economy requires a reform of national accounting schemes, because current accounts, in particular measures of gross domestic product, do not adequately include values of nature and their effects on human welfare (Dasgupta, 2021; Stiglitz *et al.*, 2009). As a response, most states committed themselves under the Convention on Biological Diversity (Aichi Biodiversity Target 2) to integrate natural capital into national accounts by 2020, and new international guidelines to do this are on the way (United Nations, 2021; United Nations *et al.*, 2014). However, this has not yet been accomplished in most countries, so that those goods and services from natural capital, that are public and not traded on markets, are still not captured in accounts (see 4.2). For instance, revenues from timber harvesting are included in national accounts, but the opportunity costs of deforestation are not. A prominent example for a juridically enforced damage compensation is the 2010 BP Deepwater Horizon oil spill in the Gulf of Mexico, where the polluter was sentenced to pay $8.8 billion for the damages to the natural environment, which is in line with values stated by affected households (Bishop *et al.*, 2017). In practice, unaccounted costs are often shifted towards future generations (Kapp, 1977; TEEB, 2010), which is becoming a fundamental barrier for achieving sustainable and just futures. To overcome these issues, inclusive wealth accounting has been proposed (Arrow *et al.*, 2003; Dasgupta, 2021; Martinet, 2011). Inclusive wealth measures the social worth of all natural and human-made assets in terms of their contributions to human welfare (Dasgupta, 2021), and thus in particular includes the diverse values that natural assets have for humans.

Main instruments to account for nature's diverse values

To achieve the transition towards a just and sustainable future, material resource use has to be reduced, whenever it goes beyond ecological and environmental carrying capacity, whereas non-material goods and services (e.g., literature, entertainment, software) can continue to grow and increase prosperity (Jackson, 2017).

Economic tools that hold potential for transformation towards a green economy include national accounting systems to account and correct for social and environmental costs; ecological tax and subsidy reforms; directing technical change towards environmentally friendly technologies (Acemoglu *et al.*, 2012), and economic instruments like tradable permits for resource use and pollution, liability law or compensation schemes such as payments for ecosystem services (PES, Engel *et al.*, 2008). These schemes typically consist of compensation from ecosystem service users to ecosystem service providers for the provision of a bundle of ecosystem services, upon the fulfilment of a set of agreed conditions.

A green economy pathway aims to prevent social and environmental cost-shifting and it recognizes and appropriately compensates the stewardship of nature's values (Pearce, 1992). Progress in this direction so far has generally relied on two main principles: the "polluter pays principle" and the "provider gets principle". The "polluter pays principle" aims at preventing negative externalities and cost shifting. It is claimed to be grounded on an ethic of responsibility, according to which the economic agents causing environmental harm pay for the costs of the negative externalities they create. Examples include the taxation of pollution, land use and resource depletion as well as the pricing of pollutants in cap-and-trade systems. The "provider gets principle" aims at incentivising positive externalities through the production, stewardship and protection of values of nature that are ignored by markets and under-recognized in the economy. These may include tax exemptions, green subsidies and payments for ecosystem services mechanisms. One example is ecological fiscal transfers, where regions conserving biodiversity are compensated by financial payments from regions that supply less biodiversity or higher levels of government. For example, in Portugal these transfers have resulted in the extension of protected areas (Droste *et al.*, 2017, 2019, 2018a, 2018b).

Economic instruments can give visibility to under-recognized values and costs, and the incentives they set can act as a powerful driver of pro-environmental behavioural. An example is the tax/price on plastic bags in Ireland and other places, where the enforcement of the economic instrument was accompanied by a sensitization campaign on the environmental harm of plastic that resulted in a massive drop in the use of plastic bags. However, these instruments are not a panacea (Ostrom *et al.*, 2007), and there are also cases where inappropriately designed conservation payments schemes have led to the erosion of intrinsic values and motivations (Rode *et al.*, 2015).

The transition to a green economy remains an enormous challenge. Whereas the above examples show that changes towards a greener economy can be successful, these are mostly piecemeal improvements. By and large, governments, and also intergovernmental organizations like the Organization for Economic Co-operation and Development or the World Bank, have paid considerable attention to economic growth, which has historically been the most important mechanism to lift people out of poverty. Past economic growth, however, has been accompanied by expanding use of natural resources, emissions of greenhouse gases, and depletion of ecosystems (Peters *et al.*, 2011; Wiedmann *et al.*, 2013), although here and there some progress is made (Acosta *et al.*, 2019). The transformation towards green economies requires implementing the envisaged change in accounting systems to fully take into account sustainability concerns and nature's contributions to human well-being (Dasgupta,

2021), ecological tax reforms that promote social equity, and the use of economic instruments that set incentives to preserve and enhance the diverse values of nature affected by economic decision-making.

5.5.3 Degrowth pathway

Degrowth is a political, economic, and social movement based on ecological economics and influenced by anti-consumerist and anti-capitalist ideas. It does not claim one unitary theory or plan of action. Rather, it covers a wide ensemble of discourses and practices aiming to steer transformative change while adopting the sustainability of life as its core value. Degrowth calls for an organized slowing down of society, to minimise harm to humans and other-than-human nature, with a focus on reducing material throughput in affluent societies (Kallis *et al.*, 2020).

Degrowth and post-growth theorists conceive economic growth and associated material expansion as the main driver of biodiversity loss, resource depletion, and environmental degradation (Otero *et al.*, 2020). A central tenet of degrowth is hence that economic growth cannot continue forever in a finite planet (Gorz, 1980; Latouche, 2009). The key postulate is that beyond a certain scale, the economy enter into conflict with ecological life-support systems (Daly, 1996), the costs of growth accelerate (Kapp, 1978), and environmental conflicts multiply (Martinez-Alier *et al.*, 2010). Consequently, degrowth should pursue a downscaling of production and consumption that reduces the throughput of energy and resources in industrialized countries, as a means to achieve global environmental sustainability, social justice and equitable well-being (Kallis, 2017).

In the tradition of "limits to growth" thinking, the degrowth pathway rests on a thermodynamic vision of the economy, first elaborated by Georgescu-Roegen (1971) and later popularized by the field of ecological economics (Daly, 1996; Gómez-Baggethun, 2020; Martínez-Alier & Schlüpmann, 1987). This vision portrays the economy as a subsystem of the biosphere, where the economy depends on ecosystems as both source of resources and as sink for waste (Daly, 1996; Dasgupta, 2021). Industrial metabolism transforms energy and materials into goods and services, in a process that irreversibly converts (low entropy) stocks of resources into (high entropy) waste. The earth is a closed system for materials (except for the negligible event of meteorites) and solar energy enters at a fixed rate, so physical stocks of resources are finite (Georgescu-Roegen, 1971). Recycling is a partial solution but has a high energy cost (Dasgupta & Heal, 1980). Renewable technologies are part of the solution too, but deploying them at the scale required to replace fossil fuels, and expanding them in pace with continued economic growth, would require massive amounts of finite materials, including rare minerals (Vidal *et al.*, 2013). Hence, according to this theory, the economy cannot grow perpetually: the scale of the economic sub-system is limited by the size of the host ecosystem (Daly, 1996; Dasgupta, 2021; Latouche, 2009).

Role of values and valuation of nature

Degrowth envisions transformative change by means of downscaling production and consumption in industrial societies, while mobilizing values and building institutions and relationships that allow human societies to flourish without growth. Core values considered to be aligned with a degrowth transformation towards a just and sustainable future include preferences for diversity over standardisation, durability over efficiency, cooperation over competition, community over individualism, sufficiency over luxury and commoning over commodification of resources. Degrowth rejects some core capitalist values including the value hierarchies established between e.g., productive (paid) and reproductive (unpaid) labour, private and common property, work and leisure, and human and other-than-human life (D'Alisa *et al.*, 2014).

Degrowth conceives the broad values of sustainability and justice as inseparable, requiring integrated strategies. From the degrowth vision, continued economic increase is incompatible with environmental sustainability, so redistribution is favoured over expansion to secure social justice (a good life for all) within environmental limits. This conception of justice prioritises egalitarian over utilitarian principles. As opposed to meritocracy, degrowth conceives egalitarianism not only as a point of departure (i.e., equal opportunities) but as an end in itself, premised on the idea that no one should be deprived from basic human needs while no one should be entitled to appropriate status-seeking amounts of resources and ecological space. Social justice is thereby defined by both minimum and maximum thresholds of consumption and capabilities.

The environmental values of degrowth are rooted in ideas of "strong sustainability", where biodiversity, nature´s contributions to people, and core ecological processes are seen as irreplaceable by technology and built infrastructure. This implies that models of societal progress in which economic growth compromises biodiversity and ecological life support systems are unfit for sustainability. Other core values of degrowth include autonomy, sufficiency, caring, and commoning. Autonomy in the degrowth vision includes multiple dimensions: freedom from large technology infrastructures and the centralised institutions required to manage them; freedom from wage-labour (the sphere of non-paid work where people enjoy leisure and produce for their own use); the ability of a collective to decide its future in common; and freedom from external imperatives, such as the laws of a religion not of one's own choosing, or the laws of the economy (growth) (D'Alisa *et al.*, 2014).

In line with ecological economics ideas (Gómez-Baggethun & Martín-López, 2015; Martínez-Alier & Schlüpmann, 1987), degrowth acknowledges incommensurability of values and the idea that diverse values and valuation languages are needed to capture the multiple ways in which people attribute meaning and importance to biodiversity, nature, and nature´s contributions to people. Degrowth therefore opposes the extension of market values, logic, and language into novel social and ecological domains. Indeed, it argues for de-commodification of both human-human and human-nature relationships (Gómez-Baggethun, 2015). In line with this view, it rejects the "new conservation" model (e.g., Kareiva & Marvier, 2012) that sees the generalized use of monetary valuation and market-based instruments as the solution for environmental protection. Within the prevailing institutional setting in market societies, degrowth theorists argue that a focus on monetary values paves the way for the commodification of human-nature relations, and point to research findings that this can "crowd out" intrinsic motivations for conservation (sustainability-aligned values based on care and stewardship) by inducing a logic of short-term economic calculus (Rode *et al.*, 2015). Degrowth advocates have however defended selective uses of monetary valuations of nature, under conditions where these can promote environmental improvement, distributive justice, value pluralism, and avoid commodification (Kallis *et al.*, 2013).

Main policy proposals for a degrowth pathway

Major policy proposals in the degrowth and post-growth literatures include (i) the adoption of alternative indicators of economic progress, (ii) green and just tax reforms, (iii) subsidy reforms, (iv) work sharing, (v) re-regulating trade, (vi) establish maximum-minimum income ratios, and (vii) secure universal basic needs (D'Alisa *et al.*, 2014; Daly, 2013; Kallis, 2017; Latouche, 2009; Otero *et al.*, 2020; Sandbrook *et al.*, 2020).

First, degrowth makes a case for measuring values differently and adopting alternative indicators of economic progress. Gross domestic product growth has long been criticised as a poor indicator of progress, because it fails to value social and environmental costs, economic inequalities, and domestic work, resulting in overall poor measures of human well-being. The Human Development Index is a step forward in measuring quality of life but ignores environmental sustainability (Hickel, 2020). In a green economy, progress indicators would focus on the well-being of present and future generations. Indicators such as the Genuine Progress Indicator (GPI), the Indicator of Sustainable Economic Welfare (ISEW), the Sustainable Development Index (SDI), and Inclusive Wealth make progress in this direction but remain poorly incorporated in national accounts.

Second, degrowth defends green and just tax reforms. Economic activities and means of transport involving large environmental costs should be taxed. In common with the green economy pathway, this involves shifting the tax base from labour to the entropic throughput of resources extracted from nature (depletion) and returned to nature (pollution) (Daly, 2013). Degrowth also makes a case for taxing and regulating advertisement, conceived as a machinery to artificially build human wants and promote unnecessary consumption. Degrowth also involves reducing waste and confronting planned obsolescence (Georgescu-Roegen, 1975), meaning that repairing products should be a more affordable option than buying new ones. Tax releases on repairs can help moving in this direction. Experiences like the yellow vests movement that shook France in 2018 have shown that environmental taxes and policies that are perceived to benefit the elites are likely to encounter wide societal opposition. A future that is both sustainable and just hence requires that green taxation pays attention to inequalities and is combined with redistributive taxation (Klenert *et al.*, 2018). This can be achieved by combining green taxes with progressive taxes on income, wealth and capital.

Third, revenue from green taxes should be earmarked for further investment in sustainability, including green subsidy reforms. The key principle of a green subsidy reform is shifting subsidies away from activities that degrade the environment and towards activities that protect it. This may include reallocating subsidies and incentives from fossil fuels towards renewable energies, and from soil and biodiversity degrading agroindustry towards agri-environmental schemes that promote sustainable farming (Pe'er *et al.*, 2019).

Fourth, in a degrowth society the volume and distribution of work must be compatible with sustainable futures. Working time drives consumption, which is the strongest determinant of global environmental impacts (Wiedmann *et al.*, 2020). In the degrowth perspective, work time reduction is seen as a key policy measure for reducing environmental pressure, buffering the unemployment effects of automatization, and increasing life satisfaction. This can be achieved by using productivity gains from technological development for expanding leisure time instead of expanding economic output (Kallis *et al.*, 2013).

Fifth, a degrowth pathway involves re-regulating international commerce, moving away from free trade, free capital mobility, and globalisation. Ecological tax reform, and other environmental regulations to reduce or prevent environmental costs will raise prices and put environmentally sustainable economies at a competitive disadvantage in international trade. Compensating environmental tariffs can be a powerful measure to protect policies of environmental cost reduction from standards-lowering competition with corporations that are not required to pay the social and environmental costs they inflict (Daly, 2013).

Sixth, post-growth measures to reduce inequalities in income distribution include the establishment of a minimum income and a maximum income. Unlimited inequality is unfair and unsustainable, undermining the sense of community, democracy or common purpose. Wage ratios between highest earners and median earners in corporations are frequently well over 1000 to 1. But some industrial nations have wage ratios below 25 and limiting maximum-minimum income ratios (say to 100, 50, 20 or 10) would drastically reduce inequality. People who have reached the limit could either work for nothing at the margin if they enjoy their work, or devote their extra time to hobbies or public service. The demand left unmet by those at the top could be filled by those who are below the maximum (Alexander, 2014; Daly, 2013).

Degrowth is not sympathetic to top down population control, but declares sympathy to feminist movements that defends women's right to decide on procreation (D'Alisa *et al.*, 2014). Since degrowth emphasizes material contraction in the affluent parts of the world, where population is stabilising and even expected to decrease, population is not seen as a major barrier for degrowth.

5.5.4 Earth stewardship and biocultural conservation

Earth stewardship refers to responsible use and protection of the land through sustainable practices (Chapin III *et al.*, 2009), as well as values and concepts that guide local initiatives of biocultural conservation (Rozzi *et al.*, 2015). Local environmental stewardship has been studied in different types of habitats, including forests (Adhikari *et al.*, 2007; English *et al.*, 1997; Kilgore *et al.*, 2008; Messier *et al.*, 2015; Rozzi *et al.*, 2012), freshwater (Kreutzwiser *et al.*, 2011; Shandas & Messer, 2008), grasslands and rangelands (Appiah-Opoku, 2007; Henderson *et al.*, 2014; Sayre *et al.*, 2013; Squires, 2012), rural agricultural landscapes (Ellis, 2013; Gill, 2014; Plummer *et al.*, 2008; Raymond *et al.*, 2016; Worrell & Appleby, 2000), urban environments (Connolly *et al.*, 2014; Elands *et al.*, 2019; Krasny & Tidball, 2012; Romolini *et al.*, 2016), fisheries (Gray & Hatchard, 2007; Medeiros *et al.*, 2014; van Putten *et al.*, 2014) and coastal or marine habitats (Ban *et al.*, 2019; Sharpe & Conrad, 2006; Silbernagel *et al.*, 2015). Earth stewardship is, however, a biocultural practice because it operates at the interface of biophysical and cultural domains (Rozzi, 2020). Human languages, cultures and local environments have been moulded co-constitutively throughout the evolutionary histories of our species, *Homo sapiens*. Recent studies have demonstrated positive correlations between biological diversity and linguistic diversity derived from coevolution processes of human groups with their local ecosystems (Loh & Harmon, 2005; Maffi, 2001).

Earth stewardship is a pathway for transformative change that involves the responsible use and protection of biodiversity. With its links to biocultural conservation, Earth stewardship is distinguished by its emphasis on multiple social and environmental values associated with a plethora of ancient and current worldviews and cultures, their attachments to local territories and their religious and philosophical traditions (Callicott, 1994). Hence, the combination of Earth stewardship and biocultural diversity constitute a form of pathway that is attentive to and incorporates worldviews and practices that are already present, in diverse forms, in local practices around the world. Exercising Earth stewardship involves enabling the expression of these existing ways of knowing and living with nature, by removing obstacles.

Role of values and valuation of nature

Key values prioritised by Earth stewardship include responsibility, care, otherness, *balanced/rational* use, reciprocity, belonging, collaboration, innovation and a sense of socio-environmental justice. These values of nature are expressed by different actors involved in practices such as participatory conservation, alternative education, agroecology, and custodianship of biocultural rights. Loss of biocultural diversity and land stewardship practices have a long history, which today are driven by global processes of enclosure and accumulation of land property (land-grabbing) that displace indigenous and peasant communities from their territories. This is accompanied by rapidly expanding agriculture and timber monocultures. The contemporary concentration of food production in a few corporations with global distribution is identified as a driver that supplants the (sustainability-aligned) values and life-habits of local communities, exacerbating their dependence and undermining the material and cultural basis for living well. These processes are driving biocultural homogenization.

Emblematic policies for earth stewardship are rooted in dialogue and local knowledge. Responsible land use requires multi-sectoral negotiation and genuine dialogues that take place with awareness of conditions of inequality and asymmetry of power. There are cases of local resistance to dialogue due to fear of cultural assimilation, or due to limitations to genuine representation of different cultural values and habits. For this reason, the need for recognition, trust, and respect in conditions of power asymmetry need to be highlighted in processes of earth stewardship and biocultural conservation.

Earth stewardship requires a shift from a preservationist (nature protection) model of conservation to one based on biocultural approaches. This approach markedly contrasts with the Half-Earth initiative that calls for keeping half of the world's land and sea as wild and protected from human

intervention or activity as possible (Wilson, 2016). This model of conservation prioritises protection of biodiversity but does not acknowledge the positive correlations found between biological and cultural diversity (Gorenflo *et al.*, 2012; Maffi, 2018). Whether or not conservation has an ethical obligation to benefit rural communities is a question of values to be negotiated and debated from the community level to the forums of transnational conservation (Igoe & Brockington, 2007). But such negotiations and debates are better informed by taking into account the role that diverse communities have played for centuries in the maintenance of biodiversity in different ecosystems, and by the current role played by custodians of biocultural rights (Bavikatte & Bennett, 2015; Rozzi *et al.*, 2018).

Main practical applications of an earth stewardship pathway

The systematic review of earth stewardship and biocultural diversity literature revealed 9 clusters of applied case studies **(Table 5.10)**. The first two of these clusters are summarised below to illustrate the kinds of ways in which earth stewardship ideas are translated into practice (the remaining seven clusters are included in supplementary materials)[14].

14. Earth stewardship and biocultural conservation projects. https://doi.org/10.5281/zenodo.4379171

Earth stewardship applied to protected areas

Engagement and participation of people is central to an approach to protected areas that puts earth stewardship into action (Enkerlin-Hoeflich *et al.*, 2015). Worldwide, there are 245,848 protected areas covering 245 countries and territories (UNEP-WCMC, 2019). However, conservation efforts do not end in the creation of protected areas, and conflicts arise between ecology, economics, culture, and politics (Borgerhoff-Mulder & Coppolillo, 2005). It is essential to broaden debates on the purposes of protected areas in terms of critically contributing to human well-being and socio-environmental justice (Enkerlin-Hoeflich *et al.*, 2015).

As shown in Chapter 4, involving local communities as co-managers or stewards often leads to more socially positive outcomes treating them as mere beneficiaries or excluding all forms of uses as proposed in strict preservationist criteria. For example, preservationist policies that lacked consideration for the values and life-habits of IPLC in national parks in Africa have had negative social and environmental outcomes (Woodhouse & McCabe, 2018). In contrast, in protected areas where multiple uses are allowed there is a greater representation of diverse values of nature held by multiple stakeholders fostering stronger conservation and social outcomes (FAO & UNEP, 2020). Today, however, there are growing conflicts derived from policies that include deregulation of protected areas and displacement of local communities which have had

Table 5 10 **Applications of earth stewardship and biocultural diversity approaches, with associated Web of science research areas.**

Cluster No	Cluster name	Web of science research areas
1	**Protected areas**	Biodiversity conservation, public administration, water resources, archaeology
2	**Education**	Education educational research, information science library science, psychology, communication
3	**Agri-productive stewardship**	Forestry, agriculture, fisheries, food science technology, entomology, veterinary science
4	**Health**	Infectious disease, pharmacology pharmacy, public environmental occupational health, health care sciences services, life sciences biomedicine other topics, nursing, medical laboratory technology, oncology, biomedical social sciences
5	**Legal framework areas**	Government law, developments stud, social issues, international relation
6	**Traditional Ecological Knowledge**	Geography, social science and other issues, anthropology, linguistic, cultural studies
7	**Religion**	Religion
8	**Ethics and values**	History philosophy of science, arts humanities other topics, history, philosophy, arts, literature
9	**Long Term Socio-Ecological Research (LTSER)**	Environmental science ecology, science technology other topic, urban studies, marine freshwater biology, oceanography, remote sensing

consequences on exclusion of populations and have been based mostly on narrow economic values (Agrawal & Redford, 2009; Igoe & Brockington, 2007; West, 2005).

Among models of protected areas that contribute to biocultural conservation and earth stewardship, UNESCO biosphere reserves, other effective area-based conservation measures' (OECMs) now recognized by Jonas *et al.* (2017), and indigenous and community conserved areas stand out (Bray *et al.*, 2012; Enkerlin-Hoeflich *et al.*, 2015; Mackey & Claudie, 2015; Muller, 2003; Rozzi *et al.*, 2015). These are managed with or by indigenous peoples, and foster socio-environmental justice (e.g., United Nations Declaration of the Rights of Indigenous Peoples, United Nations, 2007). Currently, 144 countries have recognized indigenous peoples' rights to self-determination, cultural identity, and free prior informed consent to uses that affect their traditional territory (United Nations, 2007). The biosphere model was created in the 1970s and is coordinated by the UNESCO Man and Biopsphere (MaB) Program (Reed & Price, 2019). Today, the world's 701 biosphere reserves form an international, intergovernmental network that has the potential of conserving landscapes and expanding positive people and nature relationships through biocultural conservation at regional scales (Karez *et al.*, 2016). Biosphere reserves combine biodiversity conservation, socioeconomic development and education, training, research, and monitoring. What is needed is to strengthen interactions among different stakeholders (Ishwaran *et al.*, 2008) to strengthen biocultural conservation (Karez *et al.*, 2016).

In 2003, the indigenous and community conserved areas were recommended at the 5th IUCN World Parks Congress in Durban, South Africa (Corrigan & Granziera, 2010). Indigenous peoples and local communities engage with the environment driven by a combination of utilitarian, spiritual, cultural and aesthetic values (Borrini-Feyerabend *et al.*, 2014), which stimulate voluntary conservation areas subject to local laws and agreements (Berkes, 2009; Kothari, 2006). These conservation areas protect a wide range of species inhabiting agricultural and pastoral landscapes, managed through a wide diversity of institutions and rules by traditional and modern communities alike. These sites range from less than one hectare to entire mountains, lakes or land- and seascapes. While exhaustive information is not yet available, current estimates indicate that some 11% of the world's forests are under community ownership or administration, and that recognizing indigenous and community conserved areas may result in a doubling of the global territory under protected areas (Molnar *et al.*, 2004).

Earth stewardship applied to education

A diversity of educational programs are based on the values defined under the framework of earth stewardship. For example, promoting care, respect, reciprocity, and responsibility towards Earth and the beings with whom humans co-inhabit. Different education approaches promote values and reflection based on a diversity of religious and philosophical traditions, including IPLC philosophies such as good living *(Buen vivir)* in South America, *"ubuntu"* in South Africa, *"satoyama"* in Japan (Albó, 2018; Callicott, 1994; Mamani-Bernabé, 2015; Toyoda, 2018). IPLC philosophies acknowledge diversity and demand genuine intercultural dialogues, for example the core principles of *Buen vivir* education are: (a) intercultural cooperation, (b) reciprocity, and (c) collective action and solidarity (Coral-Guerrero, 2018; Fleuri & Fleuri, 2018; Macintyre *et al.*, 2017; Mboyo, 2019; Weber & Tascón, 2020). Education reaches far beyond the school and is embedded in everyday community life, including close relationships with nature (Bulloch, 2014; Coral-Guerrero, 2018; Fleuri & Fleuri, 2018; Kárpava & Moya, 2016; Macintyre *et al.*, 2017; Mendoza Zapata *et al.*, 2020) guided by indigenous and peasant worldviews and practices (Macintyre *et al.*, 2017; Mboyo, 2019; Meza-Mejía & Anchondo-Pavón, 2019; Noguera & Barreto, 2018; Rajah, 2019; Ritchie *et al.*, 2015; Ullrich, 2019; Valentín *et al.*, 2020; van der Walt, 2010).

IPLC philosophies and *Buen vivir* education foster earth stewardship by (i) balancing personal autonomy with community participation (Fleuri & Fleuri, 2018), (ii) acknowledging the key roles played by women and the pressures they experience (Herrera Acuña, 2016; White, 2010), (iii) teaching values for the preservation of culture and life (Macintyre *et al.*, 2017; Ullrich, 2019; Waghid, 2016; Weber & Tascón, 2020; Wu *et al.*, 2018), (iv) celebrating spirituality that connects humans and nature and heals historical trauma (Ullrich, 2019; Valentín *et al.*, 2020), and (v) connecting different generations (Noguera & Barreto, 2018; Ullrich, 2019). To implement these concepts and practices, formal modern schools will have to undertake intercultural dialogues enabling the participation of indigenous teachers as well as community members in decision-making (Artaraz & Calestani, 2015; Fleuri & Fleuri, 2018). These transformations are necessary to reconnect with nature not as something external to society and to advance socio-environmental justice by integrating biocultural diversity into formal and non-formal education (Fleuri & Fleuri, 2018; Macintyre *et al.*, 2017). Community pedagogy must necessarily be linked to Mother Earth and the cycles of life (Valentín *et al.*, 2020). Education is a tool to include those philosophies of good living in different development models (Kayira, 2015; Macintyre *et al.*, 2017; Woodhouse & McCabe, 2018). However, making effective the incorporation of the economies of good living implies reviewing the concept of sustainability in indigenous knowledge and going beyond the dominant epistemologies (Kayira, 2015).

Gender perspectives highlight indigenous and aboriginal women's movements for ensuring their rights, recognizing the current sufferings that stem from colonialism (Herrera

Acuña, 2016; White, 2010). Storytelling is a core vehicle that transmits values between generations and connects feminine power with the earth embodied in Mother Earth (Wabie, 2019; White, 2010). The biocentric conception is assumed as an inclusive and comprehensive public policy that promotes socio-community values throughout the pedagogical process (Tockman & Cameron, 2014; Valdez-López *et al.*, 2019). In Bolivia, the Plurinational State recognizes the fundamental principles of good living in its National Education Policy. In Brazil, indigenous people seek intercultural dialogues to participate in political, judicial, legislative, cultural and social institutions of the state, while challenging monocultural policies and school models and maintaining their identities as indigenous people (Fleuri & Fleuri, 2018; Rozzi *et al.*, 2018).

From a *local development* point of view, social and economic solidarity are essential (Coral-Guerrero, 2018; Kárpava & Moya, 2016). The *"Sumak Kawsay"* economy promotes a diverse, healthy, sufficient production, to share and trade for self-consumption. Other community development models are based on redistribution, emphasize leadership development, and affirm post-development premises (Alvarez, 2016; Artaraz & Calestani, 2015; Carretero & Baeza, 2017; Jiusto & Hersh, 2009).

Other examples of education programs that support earth stewardship include in Mexico intercultural universities that for over 20 years have included local communities in higher education (Dietz, 2012; Schmelkes, 2009); in the United States multicultural initiatives integrate minority groups and indigenous peoples in environmental studies (e.g., "intellectual diversity" program in the teaching of environmental sciences at SUNY College of Environmental Science and Forestry in Syracuse (Kimmerer, 1998, 2012)), or the Department of Fisheries and Wildlife at Oregon State University that interweaves local knowledge in natural resources curricula (Li, 1996); in Chile, the Program on "Conservation and Management of Sub-Antarctic Natural Resources" at the University of Magallanes, Chile, which emphasizes the interrelation between biological and cultural diversity (Rozzi *et al.*, 2010); in Australia, the Environmental Education Centres (EECs) networks funded by the Queensland Department of Education and Training across the country that has generated place-based education experiences involving inter-institutional programs (e.g., schools and universities) and non-formal education (e.g., recreation and ecotourism) (Casey *et al.*, 2019).

Case studies from area-based conservation and education provide three general lessons. Firstly, it is necessary to overcome a preservationist approach to conservation in order to link biocultural conservation to the well-being of local communities. This requires new conditions for conservation or restoration that support the connections of indigenous and local communities with their territories. This demands the participation of people in the management and care of biodiversity, an approach compatible with the MaB-UNESCO model of biosphere reserves; and other co-management models such as the *indigenous and community conserved areas* that conserve over 10% of the world's forest area (Molnar *et al.*, 2004; RRI, 2015). Secondly, the protection of land by IPLC favours environmental, social, and economic sustainability. Local territories are the root of diverse values of nature, cultural identity, and consequently enhance earth stewardship and conservation of biocultural diversity. Notably, in Africa, Asia and Latin America, the areas with lower deforestation rates are those in which indigenous peoples have secured rights over forest resources through community-based tenure (FAO & UNEP, 2020). Thirdly, education has a fundamental role in conserving or recovering the links between societies and nature. In the 21st century, different educational programs that favour the inclusion of the diversity of knowledge have been developed worldwide. These new educational approaches criticise those educational policies that emphasize universal knowledge over unique local human skills, and recognise different philosophies like *Buen vivir*, as well as biological and cultural diversity.

5.5.5 Nature protection pathway

The hallmark of the nature protection pathway is the belief that successful conservation cannot be underpinned by either instrumental values or relational values alone, and will require much stronger emphasis on intrinsic values (Pereira *et al.*, 2020). Proponents classify this as an ecocentric approach, calling for "the protection of biodiversity for biodiversity's sake" (Soulé, 2013), forming the normative postulates of sciences such as conservation biology (Piccolo, 2017), but also referring to more instrumental cases based on scientific evidence that biodiversity underpins ecosystem functioning in ways that are essential for human cultures and economies.

The nature protection pathway draws on conservation science, providing an evolutionary-ecological view of socio-environmental systems that emphasizes the central importance of biological diversity to ecosystem functioning (Miller *et al.*, 2014). Some important related insights from conservation science include the importance of keystone species, including the role of top predators and grazers in trophic cascades (Estes *et al.*, 2011), the problems arising from habitat fragmentation (Fahrig, 2003) such as the accelerated occurrence of zoonosis (Morand & Lajaunie, 2021), and ecological networks (Montoya *et al.*, 2006). This evolutionary and genetics informed view of the nature crisis underpins the case for protection of biological diversity to be seen as a goal in itself – what Pereira *et al.* (2020) classify as protecting *'nature for nature'*. If protecting nature is only framed in terms of protecting what directly benefits

humans (protecting nature for society), this will lead to failure to protect what is necessary for ecological functioning (for example large predators) and an anthropocentric worldview that further separates humans from nature will be strengthened. On a more instrumental note, there is strong evidence that biodiversity often supports ecosystem functioning in ways that lead to greater productivity and stability of nature's benefits for humans, including resilience to climate change (Cardinale *et al.*, 2012; IPBES, 2019; Naeem *et al.*, 2012).

Saving biodiversity for biodiversity's sake is thus argued to have a stabilizing effect on ecosystem functioning (Loreau *et al.*, 2021) and the secondary benefit of being the best way to ensure a future for humans. This "biodiversity first" perspective accepts evidence for the correlation between biological and cultural diversity (Maffi, 2001) but interprets this as an additional argument for the primacy of saving biodiversity. In this reading, biodiversity is foundational for cultural diversity (with local coevolution less significant) and should be the priority: loss of biodiversity is not only a potential cause of economic decline and instability, but also of degrading cultural and spiritual life. In terms of intergenerational justice, biodiversity – the variety of life – should be valued because humanity cares about future people and the "option value" that biodiversity bestows on them (Faith, 2021).

Role of values and valuation of nature

Nature protection is unique amongst the four pathways described here in its emphasis on human-nature values, with only limited association of these to human-human values. Care and empathy for nature are foreground whilst social values such as justice are not unimportant, but (in the pursuit of a sustainable future) are secondary and separable. This focus on human-nature sustainability-aligned values can be illustrated through two areas of major debate, one about whether conservation should prioritise poverty alleviation and one about whether conservation is best served by sharing or sparing nature.

The conservation-poverty nexus, partly based on geographical overlap between biodiversity and poverty in the tropics, has driven a marked shift from ecocentric to anthropocentric conservation. The Brundtland report characterised poverty as an instrumental constraint on conservation (Adams *et al.*, 2004; United Nations, 1987) whilst later initiatives such as the Conservation Initiative on Human Rights presented a more normative case that conservation must be pro-poor (Fisher *et al.*, 2020). The linking of poverty and conservation goals became embedded in conservation policy through the 2003 World Parks Congress and the subsequent Durban Action Plan that included targets for protected areas to reduce poverty (Fisher *et al.*, 2020). The idea of "integrated conservation and development" gained wide support among donors and practitioners and a survey of nearly 10,000 conservation professionals found that 94.7% were in favour of people-friendly conservation (Sandbrook *et al.*, 2019).

Advocates of a nature protection pathway propose that poverty and biodiversity loss are separate problems (Adams *et al.*, 2004) that are best addressed through separate policy domains. They argue that treating poverty (social justice) and conservation in tandem deflects from the primary evolutionary-ecological goal of saving the genetic variety of life on earth (Miller *et al.*, 2014; Redford *et al.*, 2008; Soulé, 2013). Looking beyond debates about poverty, there is a broader opposition to leaning on an economic rationale for conservation that shares some of the concerns held by degrowth scholars. This position is strongly opposed to green economy thinking, because it is seen to compromise conservation science by leaning towards saving only what humans directly value, or can put a price on, and because it tends to consider continued growth in material consumption to be a good thing.

The second debate is about the need for separating humans from nature and indeed about how much nature needs to be protected from humans. The "half earth" proposal argues that devoting half of the planet to nature protection is needed if the aim is to save sufficient biological diversity (Wilson, 2016), a case disputed by those who emphasize the prospective injustices of expanding protected areas in this way, the colonial origins of this worldview, and who draw on evidence for alternative models (including biocultural and degrowth) for more ethical relationships with the earth (Büscher *et al.*, 2017; Büscher & Fletcher, 2019; Kothari, 2021).

Main policy proposals

The nature protection pathway overlaps considerably with degrowth and earth stewardship in its critique of dominant political-economic ideologies that prioritise consumption growth. Consumption, together with population growth, is seen as a key driver of ecological decline, leading to land use expansion and intensification, habitat fragmentation, climate change, invasive species, over-exploitation and degradation. It differs however in the extent to which ecological sustainability is linked to social justice, tending to argue that they are best addressed as separate problems. For conservation, the key policy response will then be the saving of nature through expanded networks of protected areas, in ways that restore balance between the needs of humans and the needs of non-human nature. Elements of this position can be seen in the draft document of the upcoming Post-2020 Global Biodiversity Framework, including what has so far been proposed as Action Target 1 for 50% of land and sea to be under planning systems that retain existing wilderness areas by 2030, and Action

Target 2 to have 30% of the planet under protected areas or OECMs by 2030. Whilst less radical than the "half earth" call, this "30% by 2030" policy is still proving contentious, with fears that it will conflict with the need to recognise local histories, land rights and values.

5.5.6 Summary: comparative analysis of pathways

Pathways such as green economy, degrowth, earth stewardship and nature protection embody distinct and sometimes contested approaches to mobilizing values of nature for transformations to just and sustainable futures. Scenarios of just and sustainable futures show that sustainable futures are aligned with particular balance and diversity of values (see 5.2). Mobilizing sustainability-aligned values involves changing values but also enabling values to be expressed, acted upon and institutionalised (see 5.3). Analysis of pathways reveals a key-way in which this is pursued in practice, through the development of bodies of science and practice that help to give traction to calls to diversify or balance those values that are recognised, measured and incorporated into institutions and policies.

The pathways presented here show that the global conservation and sustainability community is diverse and characterised by strong and healthy debates about how to achieve shared goals for stopping the loss of biodiversity and ensuring human flourishing within and between generations. **Figure 5.16** shows the generalised positions of the four selected pathways in relation to three core positions identified in the Nature Futures Framework and in the IPBES typology of instrumental, intrinsic and relational values of nature. Whilst green economy, nature protection and earth stewardship pathways are shown as aligned most closely (though not exclusively) with one of these positions, degrowth is more cross-cutting, arguably having more fundamental overlap with earth stewardship (e.g., the call for localisation and knowledge pluralism) but also sharing with nature protection (e.g., the rejection of nature commodification) and with green economy (e.g., reforms to taxation and performance metrics).

Pathways stem from different disciplinary and theoretical traditions, as well as from different actors, leading to their own particular bodies of knowledge intersecting with values. The Green economy pathway prioritises the measurement of instrumental values of nature as a means to implement market-based approaches to sustainability. Earth stewardship draws on both sustainability science and local knowledge to develop a biocultural conception of value that places greater emphasis on relational values rooted in local territories and more community-oriented approaches to sustainability. Nature protection draws on conservation science knowledge about the fundamental importance of protecting the diversity of life on earth, intersecting with an

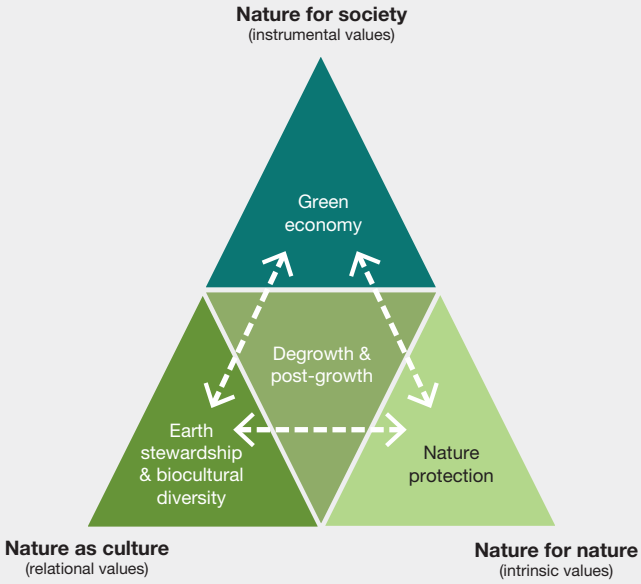


Figure 5 16 **Selected pathways in relation to Nature Futures Framework (Pereira et al., 2020) and IPBES values typology.**

Arrows denote that pathway positions are not absolute but overlapping.

ethic that humans have a duty to other species to make this happen. Degrowth is another distinct body of knowledge and values, prioritising material limits and redistribution, recognising the more biocultural perspective on values but also the need for market reforms.

These four pathways all accept that biophysical boundaries have to be respected, albeit with different views about, for example, whether there is still scope for economic growth within these boundaries. All pathways also pay attention to social justice, especially between generations, albeit that the nature protection pathways views this as a separate goal that is secondary and derivative to saving biodiversity, whilst other pathways see degrees of integration between justice and sustainability. Pathways also emphasize different justice principles such as maximising utility (green economy), minimum and maximum consumption thresholds (degrowth), rights and empowerment (earth stewardship) and option values (nature protection). Above all, each pathway strongly advocates the need to recognise and enact more diverse values of nature as a foundation for transformative change.

Each of these pathways has much to offer. All foreground sustainability aligned values and all seek a more balanced future for nature and people. Matching paths to selected or specific opportunities will become a critical task if shifts towards just and sustainable futures begin. No single path is presented here as superior over the others, although much of the literature reviewed does make the case for one pathway[15]. And whilst some crucial common goals are highlighted, there is no agenda to resolve all conflicts between pathways and eliminate differences. Constructive dialogue between these and other pathways, based on transparency and recognition of the diverse values underlying different positions, and of the relationship between knowledge and values in pathway formation, will itself be crucial to transformative change.

15. Role of values in transformational change (https://doi.org/10.5281/zenodo.4363069).

5.6 CONCLUSION

This chapter assesses the role of nature's diverse values in supporting socio-ecological transformations toward more just and sustainable futures. A two-fold approach was followed, assessing the diverse values that have been considered in developing and creating visions for, and scenarios of the future, particularly those relating to more just and sustainable futures; and assessing how interventions to mobilize more diverse values and valuation of nature can serve as leverage points for enabling and governing transformation towards just and sustainable futures. This chapter highlighted the substantial and well-established body of specialised literature on visions and scenarios of socio-ecological futures, within the scientific literature, grey literature and those captured within the arts. It also presents the relatively recent literature on transformations and transitions to sustainability. These reviews and analyses are complemented by expert-led case studies that explore the role of values and valuation in four alternative pathways of transformation: green economy, degrowth, earth stewardship, and nature protection.

Futures thinking and its different types of approaches and methods such as scenario planning are powerful tools that can be used to learn about personal and shared values and to motivate value-inclusive decision-making. The review highlights that certain value mixes will likely result in more just and sustainable futures compared with others. The value mix within the dominant global discourse or business as usual (as it relates to trade, business and environment) will not lead to just and sustainable outcomes in the future. If a just and sustainable future is to be achieved, then this value mix (which is connected to decision-making and actions) needs to change. By grouping studies according to seven different future archetypes, the chapter demonstrates that just and sustainable futures are characterised by a strong societal focus and a balanced pursuit of material and non-material benefits.

The majority of futures studies address nature, nature´s contributions to people, and good quality of life as separate issues, and the majority of this work has been carried out within research and academic contexts. Quantitative assessments of values were mostly carried out in identifying economic values. In contrast, qualitative studies defined futures underpinned by multiple types of values. Studies that explicitly address multiple types of values primarily investigated local scales, and there were few such studies with a global context. Stakeholders were included in the development of approximately half of the futures, however, little information is available on whose values were explicitly incorporated in these studies.

While the envisioned futures encompassed various geographic and temporal scales from local to continental,

and years to millennia, the coverage of futures from selected regions, particularly Africa, and futures covering marine environments, is poorly developed, so too is the understanding of cross-scale interactions and trade-offs.

The reviews of futures research revealed that sustainable future scenarios are associated with more diverse and balanced values. The set of values that predominate in society contributes to shaping the kind of futures that are possible. If society is to transform towards sustainability it will need to embrace values that are aligned with this future. Research on transformative change has recently begun to explore the role of values in societal change and focuses on two main processes and possibilities for interventions. Firstly, interventions seek to change individual and shared values, promoting sustainability-aligned values whilst reducing the influence of values aligned with non-sustainability. Secondly, when people already hold sustainability-aligned values but are constrained to act on them due to institutional barriers, interventions seek to create more favourable conditions for mobilizing values, including changes to power relations.

Mobilizing values for sustainability requires interventions that target different strata of society. At the surface level of society, changes to everyday valuation and decision-making can be achieved through more diverse and inclusive valuation methodologies that ensure that can help to change the incentives for everyday choices by individuals and businesses. At the underlying structural level, reforms to institutions can help to scale up and deepen the impact of more diverse and inclusive valuation, operating in ways that change system-wide incentive structures. At the deepest level of all, transformative change requires changes to the broad values and beliefs that underpin decision-making, shifting societal goals and paradigms in ways that predispose decision-making towards justice and sustainability. For example, futures studies commonly find the need to redefine goals of societal progress, away from materialism and individualism and towards the non-material and communal basis for living well. Working with values at each of these levels requires attention to power relations, although changes at the deeper levels, including the goals of society, are likely to require more profound reconfigurations of power due to the incumbent powers that benefit from current regimes.

Mobilizing more diverse and sustainability-aligned values can be encouraged through deliberative processes of knowledge production and decision-making and more research is needed to better understand how these ways of working can contribute to both learning and empowerment for transformative change. It is well known that holding particular values does not necessarily lead to aligned behaviours. Policies for biodiversity conservation can be designed to better “bridge” the gap between values and behaviour by ensuring that various conditions are met. These conditions can be categorised as providing (i) capability, (ii) opportunity and (iii) motivation to act. Currently, many action plans do not explicitly consider or respond to these needs and there is an important opportunity for improvement here.

Evidence assessed in the chapter underlines that value choices, on the nature of society desired to live in and to leave for posterity, are linchpins of governance for just and sustainable futures. The significance of meta-governance elements in setting the values, images and principles as the backdrop to transition towards just and sustainable futures needs recognition as governance choices can become “easy”, “moderate” or “hard” due to (in)compatibility, (in)comparability, and (in)commensurability of values underpinning governance modes. Central to the consideration of diverse values in transformative governance is a multi-actor approach that widens the scope of participation to a broad set of values and beliefs within society and that guarantees effective participation of the involved ones. Creating space and autonomy for local experiences, encouraging innovative interventions, and the emergence of arrangements inclusive of diverse values within systems; creating an environment for questioning existing values, knowledge and structures; and providing opportunities for experimentation with new ways of governance based on knowledge co-creation and social learning processes are key enablers to manifest a transformation. At the same time, barriers to transformation such as the cognitive limits of humans, the inertia of embedded political power relations, and the absence of catalytic upscaling mechanisms for nested personal and social transformations need to be addressed.

The evidence also underlines the significance of social learning processes in enabling governance transformation towards just and sustainable futures. Participatory reflection, decision and action implementation as well as collaborative production of knowledge across different social actors, groups and networks are highlighted as mechanisms that can contribute to the recognition, mobilization, weaving, integration and co-creation of diverse values. Learning with, from and for diverse values of nature that are held by indigenous peoples and local communities can support governance for just and sustainable futures since IPLCs have key long-term place-based knowledge and values of biodiversity.

There is intense debate about the course of action that societies should take in order to advance towards sustainability. There are diverse conceptions of what constitutes a just and sustainable future and equally diverse views about what steps need to be taken to get there. Amidst this diversity, it is helpful to identify substantial alliances of actors around alternative pathways to

sustainability. The examples reviewed here are the "green economy", "degrowth", "Earth stewardship" and "nature protection" pathways. Analysis of these pathways confirms how important values are to the kind of future that people envision and work towards. Green economy is underpinned by the prioritisation of nature's instrumental values, emphasizing the role of nature as an asset that supports human well-being. Degrowth is underpinned by values of sufficiency and egalitarianism for shaping human balance with nature. Earth stewardship is underpinned by relational values linked to biocultural diversity, alongside broad values like solidarity and reciprocity among humans and between humans and nature. Nature protection is underpinned by intrinsic values of nature, particularly concerned with the inadequacies of an instrumental basis for protection.

Each of these reviewed pathways advocates some form of more plural valuation of nature as a basis for sustainability. This finding confirms that recognition and incorporation of a more balanced set of values of nature should be a key part of efforts to move towards living in harmony with nature. Matching pathways to selected or specific opportunities will become a critical task if society starts making shifts towards just and sustainable futures. No single path is presented here as superior over the others. And whilst some crucial common goals are highlighted, there is no agenda to resolve all conflicts between pathways and eliminate differences. What is crucial is the openness and attentiveness to the diversity of values and associated pathways, harnessed within more deliberative and inclusive forms of governance that support social learning and knowledge co-production.

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