

# Chapter 1.<sup>1</sup> The role of the values of nature and valuation for addressing the biodiversity crisis and navigating towards more just and sustainable futures

## Supplementary material

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<sup>1</sup> This is the final text version of the supplementary material of Chapter 1 of the IPBES methodological assessment on the diverse values and valuation of nature (<https://doi.org/10.5281/zenodo.6418971>).

# **Annex 1.1 Concept note: Biodiversity, nature and their contributions to people's quality of life**

## **Introduction**

IPBES has a remit to better understand the wide-ranging interlinkages between biodiversity and people's quality of life. The IPBES conceptual framework builds upon a general idea that nature provides a wide range of benefits to people (CBD, 2012). As the first work program was undertaken, a wider appreciation of the variety of living beings on the Earth and their contributions to human well-being emerged (Díaz et al., 2015). The conceptual framework set the stage for IPBES assessments to explore broader perspectives of the complex issues that underpin the biodiversity crisis. It also guides the design and operationalization of policies, at different scales and for different actors, to better navigate future pathways that are more consistent with the globally agreed visions embedded into the Sustainable Development Goals and the Post-2020 Biodiversity Framework. The efforts of the Platform to expand the perspectives about biodiversity, nature, ecosystem services, and people's quality of life has consequences in the framing and results of all products of the platform. In this appendix, we clarify and reflect on such widening in the context of the IPBES values assessment.

## **Biodiversity**

The way biodiversity is conceptualized has very important implications for how the term is used, as well as for the way the biodiversity crisis is addressed (Pascual et al., 2021). How biodiversity is framed depends on what values and ways of understanding nature are considered. This framing has important consequences on what type of changes in biodiversity matter, why these matter more than others, what causes these trends, and what are the options available to address the drivers of the loss of biodiversity. The way biodiversity is framed has implications on the ways the facts and the data about biodiversity are assessed.

The concept of 'biodiversity' was coined and started to gain traction in the 1980s and was incorporated into the UN Convention on Biological Diversity (CBD) in 1992. 'Biodiversity' is one scientific description of the variety found in living nature and is to be considered along the various interpretations of 'nature' in the IPBES conceptual framework (Diaz et al., 2015). In the values assessment, biodiversity is used in concordance with CBD and previous contributions to the IPBES glossary, to encompass a broad range of complementary notions (Diaz et al., 2015; Faith, 2021).

The understanding of the variety of life is familiar to the public – for example, Encyclopedia Britannica<sup>2</sup> says: "Biodiversity, also called biological diversity, [is] the variety of life found in a place on Earth or, often, the total variety of life on Earth." Biodiversity also refers to the collection of units or elements (e.g., species) constituting that variety, a collection of elements that "add up" to that variety (Faith, 2021). Variety within the living world (at multiple levels) can be linked to the notion of insurance in the face of uncertainty or a changing world, and to investment/option values to provide possible uses and benefits (Pascual et al., 2010; Sidibé et al., 2018; Faith et al., 2021).

The definition of biodiversity as used in the CBD is widely accepted in science-policy initiatives and organizations, as well as in the scientific literature itself (IUCN, 1980). But in conservation practice, the notion of biodiversity is often used more narrowly, focusing specifically on rare or iconic species, areas with high diversity or a large fraction of rare species, as well as wild ecosystems, and on the

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<sup>2</sup> <https://www.britannica.com/science/biodiversity>

future (economic) value of wild genetic material. This approach tends to favour an interpretation of biodiversity as 'pristine nature' (Adams et al., 2004).

The values assessment interprets the notion of biodiversity in a more plural way, allowing for alternative contextual meanings and understandings by different cultures and knowledge systems. Biodiversity is interpreted through a diversity of human-nature relations to assess the broad set of associated values. This connects to an emergent trend towards greater plurality in biodiversity science (Pascual et al., 2021). By doing so, the values assessment avoids the risk of excluding legitimate ways of defining, knowing and valuing biodiversity. In addition, by favouring a plural approach assessment opens opportunities to facilitate communication across academic disciplines and traditions (e.g., ecology, economics, social sciences and humanities) by applying a common vocabulary, even if the precise interpretations may vary. This approach paves the way for the development of a broader set of indicators to explain the status and trends of biodiversity (e.g., Soto-Navarro et al., 2021). The plural approach used in the values assessment also can help engage with diverse knowledge and value systems about nature (Tengo et al., 2017). This allows recognizing a variety of perspectives held by different stakeholders on what facets of living nature ought to be conserved and why, which are inextricably linked to the values we hold for living nature (Adams et al., 2004). Finally, these also foreground the equity and justice dimensions of biodiversity conservation practice and thus allow for reflexivity about the social justice concerns that arise from operationalizing narrow conceptions of biodiversity in conservation practice (Pascual et al., 2021).

## **Nature**

The values assessment expands on the definition of nature in the IPBES conceptual framework (Diaz et al., 2015)<sup>3</sup> to widen the perspectives regarding the different ways in which people experience and value nature itself. This broad understanding of nature allows for a wider exploration of when, where and how the interactions between people and nature occur. In doing so, nature is understood to encompass all biotic elements (e.g., the different species, ecosystems and habitats) as well as its abiotic ones (e.g., rivers and mountains). It also encompasses the co-constructed concept of territory, which is particularly relevant for Indigenous Peoples and Local Communities.

The way one defines nature determines how one thinks of the impacts of nature on the quality of life of people. The values assessment recognises different cultures (Coscieme et al., 2020) and schools of thought (Ducarme & Couvet, 2020) which conceptualize "nature" in different ways (Fisher & Hajer, 1999; Latour, 2004; Baidur, 2015). Some conceptualizations conceive nature as an entity separate from humans. These understandings of nature interpret nature as the non-human living world, encompassing biodiversity, ecosystems (both structure and functioning), evolution, and the biosphere. Some conceptualizations support the existence of pristine nature while others explore how nature and humankind have a shared evolutionary heritage resulting in biocultural diversity, and the modification of nature by human enterprise. Some conceptualizations consider nature and people as inherently inseparable. These understandings are shared by many Indigenous Peoples and Local Communities, and are embodied, for instance, in the concepts of "Mother Earth" and "systems of life".

The values assessment expands from an objective conceptualization of nature to the understanding that it is socially constructed, resulting from the individual experience of people and the shared perspectives of different social groups. The values of nature are analysed in the context of the different

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<sup>3</sup> "In the context of IPBES, [nature] refers to the natural world with an emphasis on its living components. Within the context of western science, it includes categories such as biodiversity, ecosystems (both structure and functioning), evolution, the biosphere, humankind's shared evolutionary heritage, and biocultural diversity. Within the context of other knowledge systems, it includes categories such as Mother Earth and systems of life, and it is often viewed as inextricably linked to humans, not as a separate entity (see "Mother Earth")."

social and ecological systems in which people interact with nature, different cultural traditions in which it is embedded, its different expressions (e.g., narratives, religion, art), as well as different academic schools of thought. This means that a wide diversity of understandings and meanings of nature are considered and imbued into the diverse values of nature and its contributions to people (see *Chapter 2*). In the values assessment, a transparent and flexible definition of Nature that recognizes its origins is useful for communicative purposes as it is easily understood by a broad range of stakeholders.

## **Ecosystem services and nature's contributions to people**

The values assessment builds upon the evolution within IPBES of the conceptualization of the benefits that people obtain from nature. When IPBES was formed in 2012, the concept of “ecosystem goods and services” was considered a key building block of its endeavour (IPBES, 2012). The conceptual framework emphasized the different conceptualizations of these benefits by including the terms “ecosystem services” and “Nature’s Benefits to People (Diaz et al., 2015; Pascual et al., 2017; Diaz et al., 2018). IPBES coined the term Nature’s Contributions to People (NCP) in 2018 to provide an even more inclusive framework for the exploration of human-nature relationships, and the benefits that nature provides to people, as well as the reciprocal relationships between humans and other-than-humans (Diaz et al., 2018).

Nature’s contributions to people’ are all the contributions, both positive and negative, to people’s quality of life (Diaz et al., 2015; Pascual et al., 2017; Diaz et al., 2018). *Material* contributions are substances, objects, or other material elements from nature that directly sustain people’s physical existence and material assets. *Non-material* contributions are nature’s effects on subjective or psychological aspects underpinning people’s quality of life, both individually and collectively. *Regulating* contributions are functional and structural aspects of organisms and ecosystems that modify environmental conditions experienced by people and/or regulate the generation of material and nonmaterial contributions. Regulating contributions frequently affect the quality of life in indirect ways.

Nature’s contributions to people framing recognize both positive and negative contributions from nature to people, for instance, food provision or artistic inspiration on one hand and disease transmission on the other (Diaz et al., 2018). It emphasizes the importance of context-specific approaches to complement generalizing ones. The generalizing perspectives, for instance, are closely associated with the widely used notion of ecosystem services. On the other hand, the context-specific perspectives reflect the many and complex ways in which people relate to nature. Such context-specific perspectives are particularly important for taking into account the worldviews, knowledge systems and values of Indigenous and Local communities. The nature’s contributions to people’s perspective goes beyond instrumental values of nature to encompass relational values (Diaz et al., 2015, 2018; Chan et al., 2018).

The nature’s contributions to people concept expand the ecosystem services framework to allow for a more fluid and comprehensive understanding of the categories of contributions (i.e., material, non-material and regulating), and for the use of more inclusive language and framing of the interactions between people and nature (Kadykalo et al., 2019). Culture is understood to permeate all nature’s contributions to people (Diaz et al., 2018). The nature’s contributions to people framing fosters the recognition of the contextually dependent perspectives that people hold about their relations towards nature, including bi-directional interactions across social-ecological systems (Hill et al., 2021). This plural understanding of nature’s benefits enables an inclusive and plural representation of nature-people interactions for different scales, audiences, and decision-makers.

## Good quality of life

The achievement of a fulfilled human life is a notion which varies across different societies and groups within societies. It is a context-dependent state of individuals and human groups, depending not only on access to food, water, energy and livelihood security, but also on health, good social relationships and equity, security, cultural identity, and freedom of choice and action. The IPBES conceptual framework highlights this heterogeneity by using a wide range of terms such as “Living in harmony with nature”, “living-well in balance and harmony with Mother Earth” and “human well-being” to relate to different perspectives on a “good quality of life” (Diaz et al., 2015). The SDG framework also lists what is considered as the fundamental ingredients of human well-being, including the trade-offs and synergies among them (UNDP, 2022).

There is *no universal consensus* on what constitutes a good quality of life; rather, each individual may conceive it in a different and personal way. Therefore, while it may be easy to identify the basic needs that humans need to survive, such as food, water, and shelter, it is impossible to outline the requirements needed for all humans to thrive, and much less, to find enjoyment of a sense of purpose. From that perspective, the relationship between quality of life and nature is not obvious, as different people may depend on and relate to nature in different ways (Raudsepp-Hearne et al., 2010; Masterson et al., 2019).

The values assessment considers a plural understanding of a good quality of life that permits exploring both the aspects that are shared across contexts as well as those that are contextual (Sterling et al., 2017). It includes both objective and subjective measures of such quality of life (Coulthard et al., 2018; Diener, 2009). It entails both material conditions and the capabilities, agency, or necessary precursors (e.g., education, freedom, health), that enables the achievement of a good quality of life (Appadurai 2004; Breslow et al., 2017; Sen, 1985).

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## **Annex 1.2 Values of nature in previous IPBES and non-IPBES assessments and international policy documents**

### **Values of nature in non-IPBES assessments and international policy documents**

Since the publication of the Millennium Ecosystem Assessment (MA, 2005) there have been different initiatives that have assessed the status of nature using different types of value indicators. The indicators used in these assessments have thus far largely been biological and/or economic.

The **Millennium Ecosystem Assessment (MA, 2005)** synthesized knowledge on the condition and trends of the World's ecosystems in biophysical terms. The assessment took an instrumental view of nature by drawing links between human well-being and ecosystem services. It found that over the last 50 years, ecosystem degradation had been more rapid and extensive than at any other point in human history. The millennium ecosystem assessment also concluded that urgent action had to be taken to reverse environmental degradation, as current trends suggested that the planet would not be able to sustain future generations. The millennium ecosystem assessment found that there were frequent trade-offs between ecosystem services: services with the highest market values were often prioritized over those services that may have lower / no market values but were more valuable in terms of their total economic value. However, the millennium ecosystem assessment did not attempt to provide information on the economic value of ecosystem services. The millennium ecosystem assessment was followed by many sub-global assessments based on the ecosystem services framework, with varying degrees of focus on diverse value indicators about nature and its benefits to people.

**The Economics of Ecosystems and Biodiversity (TEEB, 2010)** provided the first systematic and comprehensive synthesis of the economic values of biodiversity and ecosystem services (de Groot et al., 2012). The report drew attention both to the economic cost of biodiversity loss and ecosystem damage and to the economic benefits of healthy ecosystems. The economics of ecosystems and biodiversity follows a three-steps-approach: a) recognising values (where socio-cultural values attributed to nature are strong and deeply rooted in communities or a long tradition in conservation is present); b) demonstrating values (via diversified economic valuation methods, where trade-offs or the implications of different management options can adequately be expressed in monetary terms); and c) capturing values (through policy instruments that incorporate the value of ecosystem services into decision-making via incentives or regulations).

The economics of ecosystems and biodiversity produced concrete and applicable advice not only for value assessments, but also to guide policy measures, such as incentives, regulations, and efficient resources management. To this aim, the economics of ecosystems and biodiversity focuses on two ways to assess values: a) insurance value that refers to the ecosystem's capacity to maintain a sustained flow of benefits and b) the Total Economic Value (TEV) that encompasses 'the aggregated value of the ecosystem service benefits provided in a given state' or output value (Kumar, 2012, p. 192)."

The **UN System of Environmental Economic Accounting (SEEA)** was adopted by the UN Statistical Commission in 2012, providing a framework to measure and link ecosystem service flows with the economy and other human livelihood activities. In 2021, the system of environmental economic accounting published a manual to be used as an international statistical standard called System of Environmental Economic Accounting - Ecosystem Accounting (SEEA-EA). Through the integration of economic and environmental information into economic accounting systems, System of Environmental Economic Accounting - Ecosystem Accounting provides a more comprehensive and multipurpose view of the interrelationships between the economy and the environment. It is a flexible system that can be adapted to a country's priorities and policy needs, while at the same time

providing a common framework based on standard concepts, definitions, classifications, accounting rules and tables for producing internationally comparable statistics and accounts. System of Environmental Economic Accounting - Ecosystem Accounting thus aims to integrate a more diverse range of values of nature into economic accounting systems beyond simply market values.

The **Global Biodiversity Outlook** (Secretariat of the CBD, 2020) is a periodic report on biodiversity by the Convention on Biological Diversity. The fifth edition (Secretariat of the Convention on Biological Diversity, 2020) reported poor progress towards achieving the Aichi Biodiversity Targets (none of the targets were fully met). The report also explores potential paths for transitions to a more sustainable future. The report uses a “Nature Futures Framework” which has also been used in previous IPBES assessments (IPBES, 2016b).

The **Dasgupta Review on the Economics of Biodiversity (Dasgupta, 2021)** was a global review tasked with assessing the economic consequences of changes in biodiversity. As such, it looked at both the economic benefits of biodiversity globally, as well as the costs and risks associated with biodiversity loss. Specifically, it aimed to explore evidence on how biodiversity supports the economy. Based on this evidence, it analysed the economic sectors that are generating losses in biodiversity, as well as those that are most affected by these losses. The Review provided best practice guidelines and recommendations for a range of stakeholders and decision-makers in order to encourage a transition towards more sustainable economies. The Review concluded that the use of the gross domestic product (GDP) as a measure of economic performance was premised on a faulty application of economics, instead advocating for the use of ‘inclusive wealth’, a measure that incorporates the state of natural assets.

**The Economics of Land Degradation** (<https://www.eld-initiative.org/>) (ELD) is a UN initiative that provides a global and holistic approach for the analysis of the economics of land degradation. It covers economic, social and environmental factors associated with the economic value of ecosystem services, as well as the costs and benefits of sustainable land management. A related report on The Economics of Ecosystem Restoration (TEER) aims to estimate the net benefits associated with ecosystem restoration. The economics of land degradation aims to support the achievement of SDG 15 (life on land) at the country level.

## **Values in previous and ongoing IPBES assessments**

Since the establishment of IPBES in 2012, there has been an evolution of how values have been conceptualised within the Platform. To date, IPBES has completed nine assessments, with a further six assessments on-going (including the values assessment) (**Figure 1.2**).

### ***Completed IPBES assessments and reports***

The first IPBES assessment on **Pollinators, pollination and food production** (IPBES, 2016a) evaluated a range of pollination services from biophysical, economic, and socio-cultural perspectives. The report found that 75% of the world's food crops depend on pollination, and that pollinators contribute between US\$235 billion and US\$577 billion worth of annual global food production. The report also highlighted some of the socio-cultural values of pollinators (particularly bees), which include inspirations for art, music, religion, and technology.

The **Scenarios and models methodological assessment** (IPBES, 2016b) identified that scenarios and models can provide means of addressing relationships between nature, nature’s contributions to people and good quality of life by playing a role in i) agenda setting, ii) policy design, iii) policy implementation and iv) policy review. The work of the assessment has been then followed by a

taskforce that has developed a set of multiscale scenarios for the future of nature and nature's contributions to people (Pereira, 2020). The scenarios place the relationships between people and nature at its core. Specifically, the framework centres around three perspectives: nature for society, nature for culture and nature for nature, which largely map onto instrumental, relational and intrinsic values. This work also highlights the importance of considering the diversity of values in the development of scenarios and recognises that the types of values and valuation methods considered would impact the choice of models and scenarios.

The **Land Degradation and Restoration assessment** (IPBES, 2018e) directly relates the integration of multiple values (and multiple conceptualisations of the word “values”) with good quality of life and thus acknowledges the need to consider multiple values in decision-making. These included material and health benefits, regulating services (like disaster mitigation), recreation, social, cultural and spiritual values.

In 2018, IPBES published four **regional assessments** (IPBES, 2018a, 2018b, 2018c, 2018d). The value evidence used in these assessments drew on a wide range of value approaches including market and non-market monetary valuation methods, and to a lesser extent socio-cultural and biophysical methods (Christie et al., 2019). The value evidence highlighted the multiple values of nature and nature's contributions to people in the respective regions and demonstrated how these have contributed to people's well-being and quality of life. The assessments show that value evidence varies across regions and by nature's contributions to people. Further, the assessments highlight the evidence and knowledge gaps.

The **Regional Assessment of Biodiversity and Ecosystem Services for Africa** (IPBES, 2018i) argued that the “true” value of biodiversity and nature's contributions to people tend to be under-appreciated in the region by decision makers. The extraction of commodities from nature for the global markets has not taken into consideration the multiple values of nature for many of the stakeholders. While regulating nature's contributions to people has been highly valued in economic terms, more encompassing valuation studies are lacking in the region.

The **Regional Assessment of Biodiversity and Ecosystem Services for Europe and Central Asia** (IPBES, 2018g) drew on a range of economic and socio-cultural valuation methods to evaluate the intrinsic, instrumental and relational values associated with nature, nature's contributions to people and good quality of life. The assessment found that regulatory services are highly valued economically and present these contributions in monetary terms (dollars per hectare). The Europe and Central Asia assessment also provide good examples of how socio-cultural methods may be used to assess indicators of relational values (Schröter et al., 2020). The Europe and Central Asia assessment did not attempt to integrate the various value indicators but proposed participatory decision-making processes as a possible tool for value integration (Christie et al., 2019).

The **Regional Assessment of Biodiversity and Ecosystem Services for Asia and the Pacific** (IPBES, 2018f) stresses that diverse values and value-systems shape people's relationship to nature in the region. While there is evidence that people in the region value nature for its contribution to their spiritual, cultural and physical well-being, the report highlighted the significant gaps in valuation data.

Lastly, the **Regional Assessment of Biodiversity and Ecosystem Services for the Americas** (IPBES, 2018h) estimated that terrestrial nature's contributions to people in the region were worth at least \$24.3 trillion per year (equivalent to the region's gross domestic product), with coastal areas and rainforests having the highest economic values. The report also highlighted the importance of indigenous and local knowledge systems for managing biodiversity in a manner consistent with cultural values. The assessment highlighted that a better understanding of how to integrate diverse

values in the decision-making process is necessary to avoid social conflicts in relation to the use and management of nature.

The **IPBES Global assessment** (IPBES, 2019) recognized the diversity of values of nature and nature's contributions to people and placed the role of values at the forefront of the discussion of the drivers of change and of the solutions. The Global assessment provided a range of evidence on the value of nature, material, regulating and non-material nature's contributions to people, and good quality of life. The assessment showed that unleashing values of responsibility and care for nature constitute key leverage points to support transformative change.

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## Annex 1.3 A decision-making typology for the values assessment

### Introduction

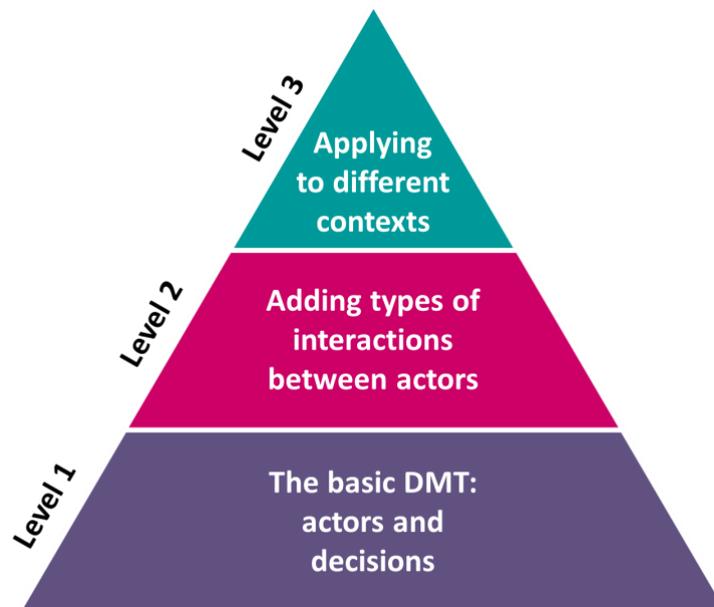
A core aspect of the values assessment is to describe how and to what extent nature's values are taken into account in decision-making, what effect this has on social-ecological outcomes, as well as how nature's diverse values could best be considered in decision-making. When referring to 'decisions', the values assessment means *choices between different options* to deal with issues that are found worthy of consideration. Values play multiple roles in decision-making and which values become emphasized depends both on the *type* of decision and *who* are involved in making the decision. Choosing which values to prioritise largely influences which issues come on the agenda and which do not, and thus which actors (decision-makers) are found to be legitimated in decision-making processes.

The values assessment develops a 'decision-making typology' (DMT) to facilitate a structured understanding about what values get prominence when different types of decisions are made by different decision-makers, with consequences for nature, nature's contributions to people's and people's good quality of life. Using such a typology can help identify leverage points for enhancing decision makers' capacity to take into account nature's diversity of values. Based on this, two main criteria are defined for developing a decision-making typology which can help analyse what causes change in the state of nature and nature's contributions to people as well as people's relationships to nature's different facets:

- The decision-making typology helps identify how *different types of decision-making influence what values get prioritised, and which get marginalised*. The decision-making typology therefore can facilitate an enhanced understanding of how different types of decisions as well as types of decision-makers (actors) involved, influence value prioritization, noting that actors' objectives and interests, as well as their power, largely influence value prioritization in any decision-making process.
- The decision-making typology *balances the need for conceptual simplification with that of flexibility* for operationalization by the different chapters. Simplification is necessary to facilitate coherence regarding insights developed across chapters. Flexibility is important to ensure that variations across scales and across socio-cultural, political and economic contexts can be properly covered.

While decision-making is not directly mentioned in the IPBES conceptual framework (Diaz et al., 2015), it is nested in the box "institutions, governance and other indirect drivers" as decision-making is a fundamental aspect of what the IPBES conceptual framework identifies as governance more broadly. The decision-making typology proposed in this document unpacks the black box of decision-making in the IPBES conceptual framework with the specific view to provide coherence to the values assessment. Based on these criteria, the decision-making typology is structured in three levels (see **Figure SM1.1**) with increasing complexity:

- **Level 1** contains the basic typology defined by *a) types of decision-makers (actors) and b) types of decisions*.
- **Level 2** includes *types of interaction between decision-makers* since also these influences which values are expressed and how.
- **Level 3** expands the typology to different contexts – emphasizing further *variations in actor constellations, types of interaction among actors, and decision-making across scales*.



**Figure SM1.1** The decision-making typology as a hierarchical structure

A *typology* is an *analytical structure*. Decision-making is, however, a process involving dynamic elements both internally to an actor and in interaction with other actors, as well with other context specific factors and processes in society (e.g., changes in power relations, modes of communication, learning processes etc. which are all highly important dynamic elements). The goal of the decision-making typology is to *create a common structure* for the analysis of the various context specific processes across the values assessment. The goal is not to develop a full conceptual framework of how and why certain decisions happen. **Box SM1.1** introduces some key terms used supporting the decision-making typology document and its abridged version in *Chapter 1* and *Chapter 2*.

**Box SM1.1. Explanation of the meaning of key terms for the decision-making typology (DMT)**

The decision-making typology is a flexible structure about the relationships between decisions, actors and values that influence the status of nature and nature’s contributions to people. It is an analytical tool to analyse expression of values, i.e., the emphasis on certain values throughout the processes of decision-making. It is influenced by various aspects of the process itself and has consequences for the outcomes of the decision.

**Types of decisions**

- **Decisions** are the choices between different options to deal with issues that are found worthy of consideration. Three general types of decisions include:
- **Economic decision-making.** Type of decisions about production and consumption of goods and services as well as (dis)investment in e.g., natural assets. Such decisions are based on rights and regulations as defined by political actors.
- **Political decision-making.** Type of decision-making about defining and protecting rights of access and control over natural assets. It also involves the responsibility towards defining conditions for utilizing those rights and for example the allocation of public budgets impacting nature.
- **Socio-cultural decision-making.** A type of decision-making process that considers the cultural dimension (e.g., the socio-cultural identity of people) as well as the maintenance (or challenge) of certain rooted human-nature relationships. A strong community element is included here as people live in and form common environments and shared identities.

### Types of actors

- **Economic actors.** Producers and consumers such as firms, households and individuals. These actors hold rights to resources – including natural assets – to be used in production and transformation to generate economic benefit. May be both private and public.
- **Political actors.** Actors who have authority to define rules for economic activity – e.g., property and use rights, regulations – as well as forming the rules for policymaking itself. Political actors are associated with the public domain.
- **Civil society actors.** Those actors who represent civil society often take the form of membership-based, non-profit organizations. They are structured around a set of goals that serve the interests of a collective (e.g., trade unions, political parties, community-based organizations, and non-governmental organisations). There are also less formally structured civil society actors, such as social movements that are not necessarily membership-based.
- **Private actors.** Actors that serve their own/private interests. They have the power to command their own assets, for example as producers or consumers.
- **Public actors.** Actors that are established to serve the ‘public interest’. They may be both political and economic actors (e.g., publicly owned firms).

### Types of interactions among actors

**Interactions among actors** are the forms of relations they have, under a given power relation, that influence the way values are recognized, prioritized, or expressed when actors interact in a decision-making process. The four general types of interactions within the decision-making typology are: command, trade, cooperation, and conflict. Each of these types may cover a range of variations and different subcategories. They can be described as:

- **Command.** Type of interaction that implies one actor having power to decide over other actors.
- **Cooperation.** Type of interaction in decision-making where actors work together towards a common goal; there is a certain level of equality/common interest among actors.
- **Conflicts.** The type of interaction in decision-making is a social process in which the parties involved take contradictory/antagonistic positions and the interests of each party cannot be satisfied simultaneously.
- **Trade.** Type of interaction where the exchange of goods and services is a voluntary action. Differences in resources and access to information often imply power asymmetries between actors.

## **The *values assessment*'s core decision-making typology (DMT)**

The basic decision-making typology is defined by main categories of decision-makers (actors) and types of decisions. There are different ways of categorizing actors, with each approach serving specific purposes. Rather than presenting a full taxonomy of actors or stakeholders, we distinguish for analytical purposes between three main types of actors: i) political actors, ii) economic actors, and iii) civil society actors. As clarified below, the role or function of these actors varies in a society. As regards types of decision-making, we discern between: i) political decisions, ii) economic decisions, and iii) socio-cultural decisions (March, 1994; Dryzek et al., 2008; Pröpper and Haupts, 2014). Of course, there is an irreducible level of fuzziness (including overlaps) between these categories, but for an operationalisable general, still flexible, structure, such categories are a good basis for analysing decision-making processes in relation to how values are expressed.

### ***Types of actors***

The purpose (motivation and interest) of each type of actor – the values they emphasize and the power they hold in society – vary (Berger and Luckman, 1967; Biddle, 1986). This is a key aspect when analysing what causes changes in the state of nature and nature's contributions to people (through the

institutions and governance filter). Actors may be understood as operating certain roles or functions in society. Hence, the same individual may for instance: i) in one instance serve as a political actor (e.g., member of a municipality board or village representative), ii) in another operate as an economic actor (e.g., as a farmer producing food and/or as a consumer; owner of a private firm or cooperative, etc.), and iii) in yet other contexts act as a community member/citizen (either in an unorganized way as part of a social movement or as member of a civil society organisation, e.g., trade union, non-governmental organisation, etc.) (e.g., Biddle, 1986).

The same individual may therefore emphasize different goals and values when dealing with public matters as opposed to private ones. This implies that the same issue may be handled differently even by the same individual if the issue is associated with a purpose that is defined as public or private or concerns civil society more broadly. The coalitions that actors create would also depend on the type of issue at hand. The decision-making typology is thus structured in a way to help shed light on these sometimes-fuzzy relationships.

**Political actors** in the decision-making typology include those that have the authority to define rules for economic activity – e.g., property and use rights, regulations – as well as forming the rules for policymaking itself (Ostrom, 2005; Bromley, 2006). These are typically formulated as legal requirements. Political actors include parliaments and governments at federal and state levels (March and Olsen, 1996). However, it also includes municipal or other types of political actors at the community level (this categorization may vary across countries) (Baland and Platteau, 1996). Political actors are based on exclusive authority over certain geographical jurisdictions. They may be elected like parliaments, municipal boards and village councils, or they may be part of public administrations like ministries, public management bodies like environmental agencies, infrastructure administrations, or village secretaries. Indigenous and traditional authorities like clan leaders are also considered political actors in the decision-making typology. Political bodies are based on so-called ‘third-person authority’. So, while political actors represent citizens (or economic actors) within their jurisdictions, they also have legitimate power to command them. This power rests with political bodies such as parliaments or clan/community leaders and courts. In some cases, we may encounter competing systems of political power, for instance when formalized (state) power operates in parallel with power structures legitimized by customary law and tradition – i.e., legal pluralism (Vatn, 2015). We also observe that in general minorities (in certain cases minorities may be linked to indigenous peoples and local communities, IPLC) have limited formal decision-making powers even if they may enjoy a certain degree of internal political sovereignty.

Political actors are responsible for defining rights and responsibilities in a society and regulate various activities according to defined goals and visions for that society (Bromley, 1989). Hence, as already indicated, they differ from other types of actors not only because of the powers they hold but also because of their role. At the same time, there are also differences between the different political bodies of a state. For example, a ministry for industrial development and a ministry for the environment have different foci and responsibilities within a government. Political actors may thus typically be based on different perspectives as rooted in both the type of issue they handle – the interest sphere they operate within – as well as the type of competence and disciplinary perspectives they are built upon (e.g., Thomas, 1997). Most importantly, since the level of power of different ministries and agencies vary, so does their capacity to prioritize their values in interactions with other actors. They are, however, responsible to the same people and can be held accountable on the same set of premises.

**Economic actors** in the decision-making typology include producers and consumers such as firms, households and individuals. These actors hold rights to resources – e.g., labour, natural assets, financial assets – to be used in production with the aim to generate economic benefits, income, jobs, etc. (Bromley, 1989). Given the rights and responsibilities defined by current institutions like the law, economic actors have the power to command over certain natural assets. An important sub-category comprises private firms where a dominating goal is the creation of economic surplus/profit with its

implications for how and what values will be taken into account (Kraakman et al., 2009; Mankiw and Taylor, 2014). Firms may also take societal responsibility, e.g., providing local jobs, supporting environmental missions. Such societal responsibility may derive from a genuine motivation and purpose, or to attract consumer support/enhance income (Stahl and de Luque, 2014; Frynas and Yamahaki, 2016). Similarly, goals of community and household-based economic activity may include values that go beyond income generation (Gasson, 1973; Herrera-Cabrera et al., 2018). Hence, also in the case of economic actors we see variations in the goals pursued and values emphasized well contrasted by for instance global corporations' and community-based economic activity.

**Civil society actors** in the decision-making typology represent the breath of civil society. They are structured around a set of goals that serve the interests of a collective (group of people with certain shared interests) – e.g., environmental protection or/and civil rights protection – and are typically taking the form of membership-based organisations (e.g., trade unions, political parties, community-based organizations, non-governmental organisations, etc.) (Dryzek, 2013). This category also comprises less formally structured actors such as social movements – e.g., not membership based. The degree of internal agreement regarding the mission within this type of actor may vary. While in principle, political bodies have the formal power to formulate policies and regulate economic actors, the legitimacy of such power is typically dependent on its grounding in the broader civil society in many political systems.

The decision-making typology notes that there is also a distinction in the literature between public and private actors (see *Box 1.1*). This distinction can overlap with that of political and economic actors. **Public actors** are representatives of the citizens in a country. One may say they are formed to serve the 'public interest' (Bozeman, 2007; Morell, 2009). **Private actors** – on the other hand – are serving their own/private interests (Bromley, 1989). Given the distinctions above between economic and civil society actors, the concept of a private actor can be seen as synonymous to that of an economic actor. Public actors may, however, operate as both political and economic actors – in the latter case as publicly owned firms. In most cases there are competing visions about what it means to serve the public interest, but it is assumed that using public power to serve one's private interests is illegitimate. While in formulating the basic decision-making typology the choice has been to distinguish between political and economic actors, the distinction between public and private actors is also used throughout the values assessment, depending on the issues being addressed.

### ***Types of decisions***

The decision-making typology defines three general types of decisions:

**Political decision-making** is understood in the decision-making typology as defining and protecting rights regarding who has access to and control over natural assets and associated nature's contributions to people (Bromley, 2006; Vatn, 2015). This includes also a responsibility to define conditions for exercising these rights. The latter may imply regulating what uses of nature is acceptable – e.g., regulating externalities through legal or economic instruments – or by directly protecting certain values with respect to nature. Included in this lies defining what rights people have to defend themselves/ask compensation from environmental damage (e.g., pollution) and defining what rights polluters have (e.g., in some cases compensating polluters for not polluting). Political decision-making is also about allocating public budgets that may impact nature and nature's contributions to people. This kind of decision-making is typically based on formal or customary rules defining who can participate, in what form, and who has the power to make what type of decisions (Ostrom, 2005). While political decision-making is a fundamental aspect of the way the governance of nature works, governance is also linked to other types of decision-making, namely economic and socio-environmental decisions. Thus, governance goes beyond political decision-making within this decision-making typology.

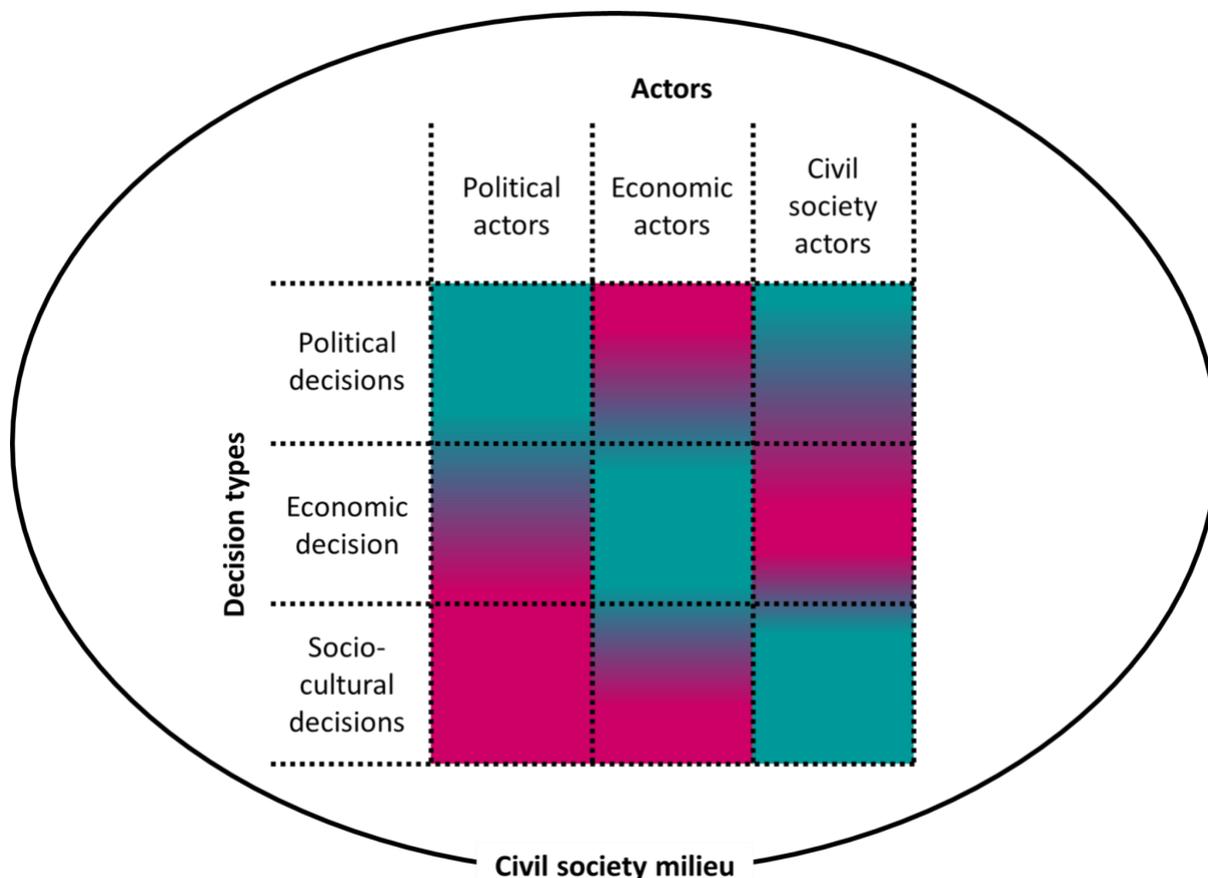
Political power and political legitimacy are key issues defining the way political decision-making operates and are generally dependent on dominant value systems in society (Dryzek et al., 2008). We may also consider political culture including both formal and informal elements. Civil society can play a key role in political decision-making as offering (or taking away) political legitimacy. Citizens participate in political decision-making both directly and indirectly for instance through endorsing decisions by different forms of organised political actors, e.g., political parties, or civil society actors, e.g., social movements (e.g., Vatn, 2015). The position of civil society varies across political systems. Similarly, economic actors may also engage in political processes using their economic power to influence political decisions for instance through lobbying. In this vein, the dependency of the political system on resources held by the economic actors (firms, households, and individuals) generally has important implications for political decision-making. Finally, the decision-making typology acknowledges that political organization may vary from democratic rule – mostly representative democracy - to more authoritarian forms of political organization and decisions.

***Economic decision-making*** of interest in the decision-making typology regards decisions mainly about production and consumption of goods and services as well as investments and disinvestment in different assets, including natural assets. Such decisions are based on pre-assigned rights and existing regulations as defined by political decision-making (see above). Rights may be individual or collective leading to individual, public and community ownership or/and control over natural assets (Bromley, 1989). Given these rights and regulations, the involved economic actors decide on the management of natural assets based on their purposes (e.g., profits, livelihoods, etc.). Communities may organize economic activities collectively. They may control and have access to natural assets together and in this way engage in economic decisions like creating and protecting livelihoods (Ostrom, 2005). Socio-cultural aspects may strongly influence such economic decisions (Schachenmann, 2006; Farfán-Heredia et al., 2018). Production of goods and services may result in negative nature's contributions to people and disinvestments in natural assets– e.g., loss of habitats. It is a key aspect of the values assessment to understand how the different values regarding the use and protection of nature are prioritized and how and what nature's contributions to people are considered in economic decision-making.

***Socio-cultural decision-making*** regards two main aspects not covered by political and economic decisions in the decision-making typology. First, there is a cultural dimension in the sense of forming, maintaining, or changing the socio-cultural identity of people, sense of place etc., emphasizing culturally accepted perspectives about nature forming such identities (Masterson et al., 2017; Enqvist et al., 2018). Second, it includes decisions focused on maintaining (or challenging) human-nature relationships beyond material livelihood aspects, e.g., caretaking of nature for its own sake (Comberti et al., 2015; Dawson et al., 2021). It is important to note that there are some internal and external overlaps here. The aspect of caretaking is often key to people's identities in many cultures. Socio-cultural decision-making moreover overlaps to some extent with economic decision-making as the distinction between livelihoods, socio-cultural identity, and caretaking of nature for its own sake is typically fuzzy across cultures and societies. There is a strong community-level element to socio-cultural decision-making as people live in and form common environments and shared identities. Many of the processes at this level are often based on implicit decisions as embedded in the traditional and local cultures and can occasionally surface in the form of explicit decisions or agreements. Hence, it should be noted that it 'stretches' the strict definition of a 'decision'. While this is an arena where civil society organizations play a central role, public actors may, directly and indirectly, influence socio-cultural decisions for example via legislation on education. Similarly, it is possible to observe economic decisions impacting socio-cultural ones. For example, the role of advertising for certain goods and services by firms can influence identity formation in ways that can directly affect human-nature relationships (e.g., Stutzer et al., 2021).

## Linking types of actors and types of decision-making

All decision-making is embedded in the wider civil society milieu (net) as illustrated by the oval ring in **Figure SM1.2**. Hence, there is a decision-making level comprising all citizens – organized or not – generating the broader civil societal context within which the salience and legitimacy of the political, economic and socio-cultural decisions rest. Certainly, the level of civil society engagement may vary between cultures and political systems.



**Figure SM1.2** The Values capacity’s core decision-making typology (DMT) employed in the values assessment. Dotted lines indicate that the typologies of actors can also be fluid. The shadings indicate that the distinctions between types of actors and decisions also are not strict, but sometimes fuzzy. The green shading represents (that despite this fuzziness) there are some dominating relationships between different types of actors and different types of decisions. The pink shading represents weaker relationships.

The shadings in **Figure SM1.2** indicate that the distinctions between types of actors and decisions are not strict, but sometimes fuzzy or fluid. While the decision-making typology emphasizes that the core focus of each actor type differs – the green cells – it also explicitly notes that the different types of actors may engage in other types of decision-making than what is core. For example, political as well as economic actors can influence socio-cultural decisions. Economic actors and civil society actors can engage in influencing political decisions, and political and civil society actors can influence economic decisions. It is important also to note that decisions with environmental implications are related to all three types of actors and decisions.

In reality, even the distinction between types of actors is typically blurred. For example, there may be situations, especially at community level, where civil society organizations function like a political

actor while still not holding a formalized jurisdictional authority. Another example regards media, while often organized as firms, they play a key role as an arena for civil society. Yet another example regards research, knowledge production may be undertaken by organizations funded by states, private business or civil society organizations such as not-for-profit non-governmental organizations, and motivations for knowledge production may vary not least depending on who is paying for the research and what interests lie behind knowledge acquisition. Lastly, states or local governments may own firms (e.g., water companies). These may operate according to the same type of purpose as privately-owned companies, but they may also be set to combine economic goals with political or social ones – e.g., regional development, security, etc.

## **Types of interactions among actors in decision-making**

Different types of actors often interact among themselves in the process of decision-making and the types of such interactions have an important influence on which values become prioritised in decisions and there-fore also on the out-comes for nature and nature's contributions to people of those decisions. Different types of interactions are defined by different relations between actors. Power relations are key to understanding this. To explain the role that different types of interactions may have for what values get emphasized in decision-making, it is convenient to highlight four general types of interactions among actors: *a) command-based interaction; b) trade-based interaction; c) cooperation-based interaction; and d) conflict-based interaction.* Many other types of interactions can be subsumed within these general ones.

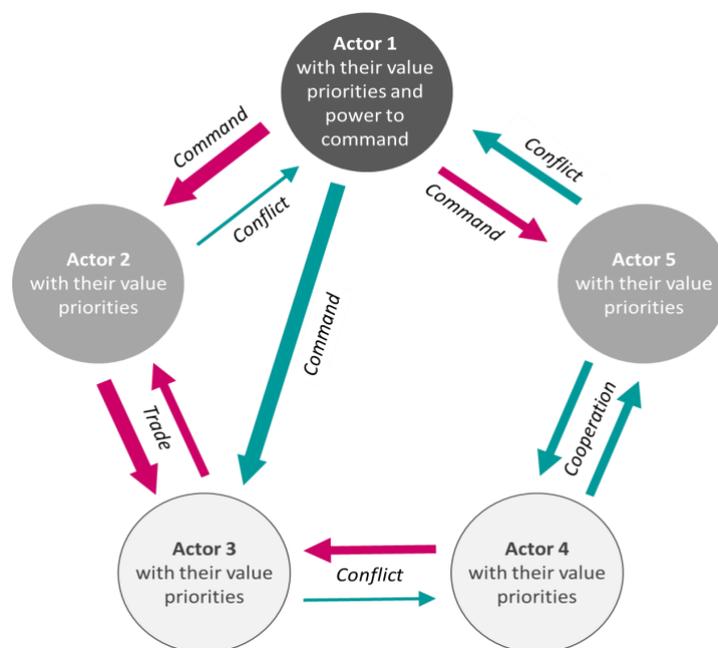
**Command** implies that one actor has the power to decide over other actors – e.g., the power of states to decide on legal measures, economic instruments, hierarchical management, but also the power of firms to command their workforce (Bromley, 2006). **Trade** is here defined as voluntary action exchanging goods and services. Trade typically happens in competitive environments while the degree of competition may vary (Mankiw and Taylor, 2014) Differences in resources and access to information often imply power asymmetries also when interaction is based on trade. **Cooperation** implies that the actors work together towards a common goal. Cooperation demands a certain level of equality/common/shared key interests between the actors (Ostrom, 2005). Reciprocity among actors is an important sub-category under cooperation. **Conflict** is defined as a social process in which the parties involved take contradictory/antagonistic positions and the interests of each cannot be satisfied simultaneously (Ostrom, 2005; Temper et al., 2018). Depending on the power relations between the involved actors, decisions may still be made under different levels of social legitimacy.

All these interactions are dynamic and can have multiple feedback effects beyond the specific type of decision and actors involved (this decision-making typology is not about identifying all such potential dynamic effects). The decision-making typology emphasizes that the types of interaction and *value expressions* associated with such interaction directly influence what kind of values are explicitly considered in decisions, which ones dominate, or are prioritised, and which ones are marginalised and invisibilised.

Some forms of interaction that are pervasive in decisions about nature include the following: State power to command is essential for who gets access to what natural assets and under what conditions the subsequent use of such assets can happen. Hence, state power is crucial both for allowing different actors to make decisions (e.g., firms) as well as defining limitations to their activities related to the use of natural assets (Bromley, 1989). But actors may also trump the interest of states. For example, powerful economic actors, such as large firms, may decide to move between countries/jurisdictions and combined with their economic power, this may imply that their values and interests may override that of states (or/and civil society at large) (Vatn, 2015). **Figure SM1.3** offers an illustration of the different types of interactions that may be at play among actors.

Interaction formats influence in what ways (e.g., indicators) values can be expressed. For example, trade generally demands a common value standard – usually money (Chaudhary and Kastner, 2016). Other types of interaction may handle multiple value expressions, as ‘balancing’ these are already an outcome pursued by the actors, e.g., cooperation. That is, cooperative interaction among different actors with different general purposes may have the capacity to handle values expressed in diverse forms (Vatn, 2009). Communication is important for this to happen (Dryzek, 2013). Command can also be based on diverse values, e.g., legal regulations protecting nature values of different kinds as well as defining rules regarding distributional effects. Moreover, certain values may be suppressed or go unaccounted due to power asymmetries between interacting actors.

It may be worth noting that in the case of political decision-making, the right of the state to command different actors is typically limited by a set of defined rights and obligations usually set by law. In situations where rights are contested or undefined, conflicts between economic and civil society actors and the state may arise. While in some situations, such conflicts may be resolved or transformed in other ways of interaction among actors. In other situations, conflicts may continue and result in ongoing disputes and become a ‘permanent’ form of interaction.



**Figure SM1.3** Value expression and forms of interaction among actors in decision-making. Green arrows indicate that diverse values can be expressed as the basis for the interaction. Pink arrows indicate expression along one dominant value dimension reflected by a given indicator (e.g., money in trade). Actors have different capacities to exert power in the interaction (shades of grey reflect power, with darker grey reflecting higher level of power in the interaction). Width of arrows indicate the actor’s relative power to influence value priorities in decisions.

It is also important to note that power relations among actors affect what values are recognized and expressed in their interactions for decision-making (*Section 2.4.1.4* in the main text). Voluntary-type interactions like trade and cooperation may, as already mentioned, still not be based on an equal say among actors. Uneven access to information or strategically strong positioning may also make it possible for some actors to manipulate or suppress other actors’ values. As an example, fair trade of food commodities (e.g., coffee) is typically seen as based on equality between the parties. However, the strong position of traders can facilitate the imposition of requirements or commercial restrictions that generate increased vulnerability among small-scale (coffee) farmers.

## **Application of the decision-making typology to different social-ecological contexts**

In specifying the decision-making typology, the most essential structures have been identified so far, i.e., types of actors, types of decisions and types of interactions among actors in decisions. Analyzing situations in specific social-ecological contexts may typically demand adaptations and further specifications of the decision-making typology, e.g., dynamics and feedbacks between value expression and actors' interactions. In this section the focus is on scale. Next, processes of decision-making are slightly expanded. Finally, important subcategories of types of interactions in decision-making are presented.

### ***Actors at different scales of decision-making***

Scale is a key contextual factor. Certain decision-making powers are only operable at particular scales. For example, it is only at the state or national level that there is an exclusive access to specific types of political decision powers on economic actors – e.g., the power to tax a given economic activity. At the same time, power to command economic actors may be delegated to lower levels – e.g., municipal rights to do land-use-planning. In addition, while states have a formalized power to command, no such formal (*de jure*) power exists at the international scale. Some states may, however, have *de facto* power to dictate/command the actions of other states due to political power (Chasek and Downie, 2020). Certainly, states may also cooperate and negotiate over issues of common interest, as in agreements on climate change (via United Nations Framework Convention on Climate Change -UNFCCC) and biodiversity (via CBD), and the SDGs (via the UN) (Chasek and Downie, 2020). The degree of common interest among states can strongly provide the content of such cooperation, including political as well as economic agreements.

There is also a scale dimension in the case of economic actors covering great variations from globalized/transnational corporations to locally based entities like small industries and family farms. While it is of importance for all such forms to make income through production, the more specific expression of such a purpose will typically vary – e.g., profit maximization, maintenance of livelihoods, risk mitigation, subsistence, economic resilience, etc. (Burton, 2004; Brown and Kothari, 2011). Scale also matters for the type of interaction among similar actors. For example, a dominant form of interaction between firms is trade while cooperation/reciprocity may also be important, especially between economic actors (as producers and consumers) at the local level (Bowles, 1998; Razeto, 2010).

At the local level, we observe a variety of property rights systems with their specific purposes. One important form regarding the use and management of natural assets is communal ownership (Ostrom, 2005). Again, we observe great variation; partly dependent on resource characteristics; partly influenced by the specificities of the institutional arrangements involved. As an example, cooperative use of a fishery is typically very different from the rules designed for managing a common pasture or a forest, while the purposes may be similar (Ostrom, 2005). Cultural and historical factors influence the institutions in place and hence, the form such interactions may take. In the case of communally organised systems, reciprocity plays an important role in many places around the globe. However, also regarding cooperative systems there may be power inequality and conflicts involved.

### ***Processes of decision-making at actor level***

Internal processes within each actor are important for defining its position on various issues related to decision-making. These depend on the purpose as well as on rules (including both formal rules, e.g., laws, and informal rules like conventions and norms) defined for such processes. Two processes at the actor level that have direct impact on decision-making can be identified: *a) rulemaking*, and *b) learning*.

In the case of the rules for political decision-making, the literature typically refers to ‘collective-choice rules’. In case of economic decision-making, it refers to ‘operational rules’. Internally both political and economic actors (e.g., firms) are principally command structures while certain economic actors – e.g., communities taking economic decisions via the management of resources held in common – may depend more on rules of cooperation (Ostrom, 2005). The same may be the case for civil society actors. The key point here is that actors define certain rules for how internal decisions should be made based on their purpose and form of interaction within the same type of actor. These rules in turn influence what values can be articulated, and which ones cannot and how values will be included in their decision-making process – e.g., what weight will be given to different values in the context of a given decision. It is also possible that actors may contest the rules thereby opening the possibility for different values to be followed and articulated (Vatn, 2015).

Decision-making also requires a process of learning and application of knowledge (as associated with worldviews held). Communication and deliberation may be an important element in learning – both regarding what characterizes an issue and what values are involved. Learning may involve the participation and interaction with external actors – e.g., (organised) citizens in political decision-making. Learning by decision-makers may also be expert based, e.g., based on knowledge provided by scientists. What type of knowledge is seen as salient and legitimate, influences types of decisions, interaction among actors and thus outcomes from decisions. In some cases, a certain type of expertise is given an exclusive position with respect to framing a problem and delivering data for decision-making (Renn, 2006; Edelenbos et al., 2011). In addition, in typically more routinized forms of decision-making, the power to decide may even be delegated to experts. Other systems of decision-making may be open to different types of knowledge and perspectives.

### ***The complexity of interaction formats***

Four general types of interactions among actors have been emphasized in previous sections: command, trade, cooperation, and conflict. Each type of interaction in decision-making may cover quite some variation and a number of sub-categories. Some forms even go beyond these categories. In each context, historical specificities and developments are important to note. Specificities of topics, values and interest constellations are also of importance.

Some kinds of interaction may apply to all types of decision-making. There are, however, some types of interaction that dominate certain decision-making processes. For example, in case of *political decision-making*, interaction is typically demanded by civil society and economic actors. For example, in formal democracies, the right to command depends on popular support typically through elections/voting. This way, it is the people who through elections command which political actors can exercise power and offer legitimacy to their political rule. Lobbying is also a well-known form of interaction in policymaking. Negotiation as well as deliberation are other forms of interaction – the latter being a form of cooperation (Dryzek et al., 2008).

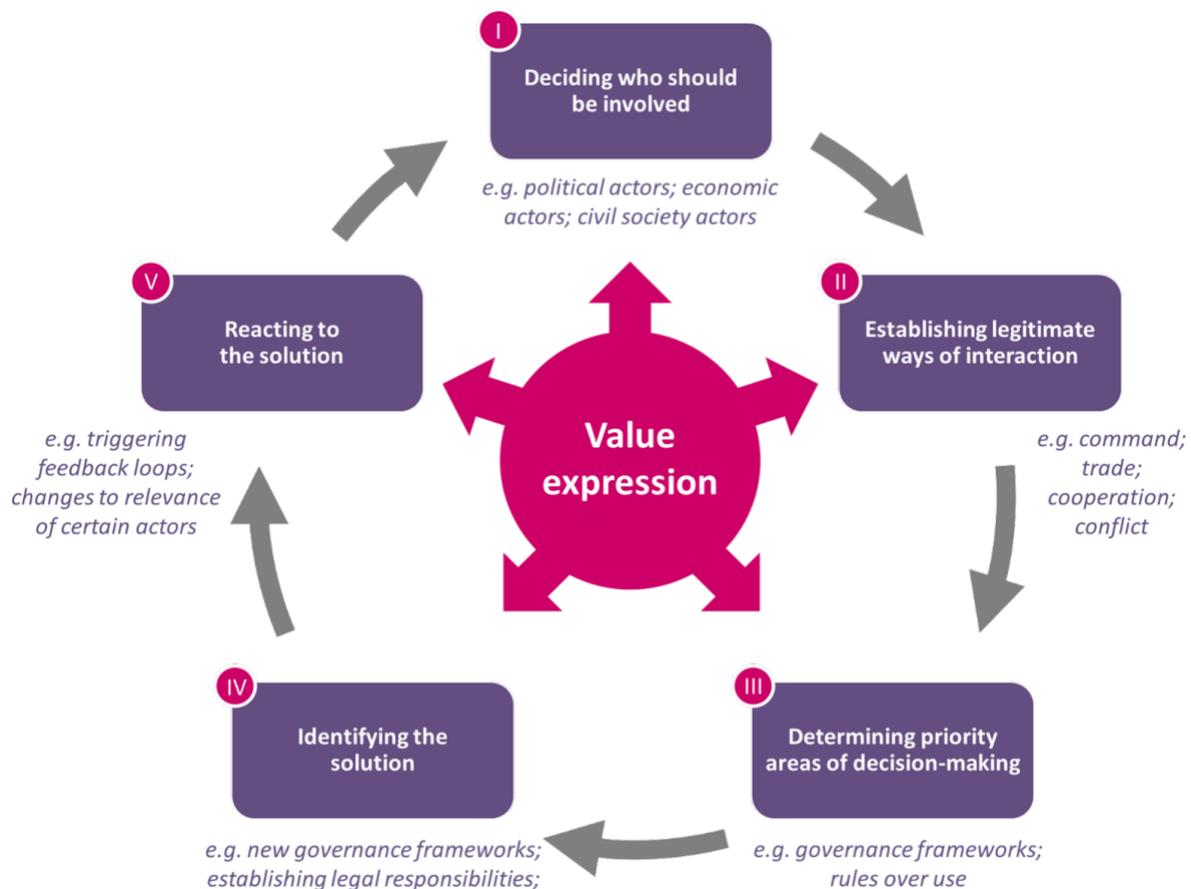
Perversions may also happen when the political power to command is used to manipulate or exploit others, ultimately generating conflict as a form of interaction among actors motivated by different purposes and values. Certain values and interests may experience systematic suppression in political decision-making as they are not recognized as legitimately represented or the way those holding these values/interests are asked to be involved restricts their ability to voice their concerns. One example would be when minorities – e.g., indigenous peoples – or other civil society collectives are forced to cultural and political subordination (De Pourcq et al., 2017). Gender inequality is another expression of political (and economic) subordination (Bee, 2019). Finally, political actors like states do not have ultimate power as they may have to obey pressures both from other States as well as economic powers.

In the case of *economic decisions*, trade (/competition), as well as cooperation (/reciprocity) as dominant forms of interaction among actors, have been emphasized. Other close forms of interaction like negotiations/bargaining are also of great importance for economic interactions (sometimes associated with trade and cooperation). Perversions may be observed also regarding decision-making through negotiation. For uneven power relations, trade (via negotiation/bargaining) may rather resemble a form of (illegitimate) command rendering the market as a form of economic subordination of politically or economically weaker actors.

In the case of *socio-cultural decision-making*, actors may interact typically through cooperation, including deliberation and conflict. However, negotiation may also be an important type of interaction. Deliberations may sometimes also turn into negotiations, even be perverted to (illegitimate) command. Any given negotiation process may involve all four basic types of interaction – command, trade, cooperation and conflict – to different degrees depending on the actors and their prospects and expectations.

### **Expression of values in decision-making**

In the following, the focus is on the way the various aspects of the basic decision-making typology help to understand how certain values are emphasized and in what way (and thus also why some values may be marginalized in decision-making). We use political decision as the main example – consider **Figure 1.15** Value expression (‘valuing’) as a process appears at all stages in the decision-making typology. First of all, *having the power to decide* about which actors can make decisions over a given issue, and with which other actors can or should an actor engage in decision-making is based on a priori value assessment about who should have a say (i.e., ‘value expression type-I’). Similarly, establishing what is the legitimate way of *interaction* between these actors has similar basis and implications (value expression type-II). Likewise, the valuation process underlies what issue is at stake in decision-making – i.e., *priority areas of decision-making*, e.g., establishing environmental governance frameworks based on value priorities, developing rules for use of natural assets, emphasizing certain values over others, and using valuation to generate new knowledge (value expression type-III). The purpose of valuation for such areas of decision-making may be informative, decisive, or technical (*Chapters 3 and 4*). Some explicit *form of expressing value* is also involved when specific solutions are identified, and types of decisions are chosen (value expression type-IV). This type of value expression is associated with the standard way of understanding “valuation” (e.g., economic valuation). Lastly, stakeholders react to the types of decisions about how to relate to nature and nature’s contributions to people and in so doing express their values (values expression type-V). Such reactions can trigger feedback loops affecting the original decision being made and changing the relevance of certain actors and their interactions (e.g., from cooperation to conflict). What social-ecological outcomes can be expected of any type of decision-making depend on choices at all levels or stages of values expression in decision-making associated with the different types of value expressions (I-V).



**Figure SM1.4** Values in an environmental governance framework: Values are expressed in different stages of the decision-making process.

Similar reasoning and structures as illustrated for political decision-making are also relevant for socio-cultural and economic types of decision-making. Regarding the former, it has already been mentioned that these decisions are often rather implicit. The levels of **Figure SM1.4** are relevant, but less easy to disentangle as stages compared to political decision-making as illustrated above. Regarding economic decisions, actors and forms of interaction are also key. This regards not least who controls natural assets as well as what kinds of rules are involved regarding interaction among actors. Areas of decision-making involve transfer of ownership, defining uses of the actual assets, etc. Outcomes will regard goods and services produced, consumed and exchanged, status of nature and nature's contributions to people as well as distributional issues etc. As an example, it may matter for the status of nature's contributions to people if production decisions are made by local or by distant actors. Similarly, it matters if production is exposed to global competition or if the market is local. From this, it also follows that leaving a decision to the market (as an economic decision-making approach to set prices) may result in different outcomes as compared, for instance, to keeping it as a topic for political decision-making where prices may be set following political priorities or objectives foreshadowed by socio-cultural values.

An example can be used based on a policy Instrument for environmental (e.g., water) management, e.g., payment for ecosystem services (PES) schemes. Payment for ecosystem services can serve as illustrative where decisions over water-related nature's contributions to people require some economic decision-making. In the case of a decision to design and implement a water-payment for ecosystem services scheme, it is first required to determine who are the legitimate actors that could join the scheme (e.g., who has access to the water services or to be rewarded for their enhanced provision) and in what way the services are defined and its boundaries determined. This will influence whose purposes, values and interests get involved in decision-making about water management (e.g.,

a private firm paying farmers to secure water flows, or a local government interested in supporting farmers' livelihoods) (value expression type-I). The format of interaction among actors under a given payment for ecosystem services scheme that will be allowed also influences what type of values associated with water will be prioritized in such interaction (value expression type-II). These values can determine priority areas of decisions (values expression type-III). For instance, a new water governance system may be established whereby water is commodified and by so doing expresses certain actors' purposes and values, e.g., protecting a flow of water services for securing profits of a private hydroelectric company. The type of price/tax that would be assigned to water usage would require a technical economic type of valuation study or can trigger a different type of valuation that allows to express the weight given to various competing societal demands (value expression type-IV). This may become an input into establishing water use rights, water tariffs, etc. with a given distribution of rights over access to water by different people, which in turn expresses values over who should have access to water-related nature's contributions to people and why. Evidently, people react to such decisions, triggering feedback, establishing or expressing competing sets of values (value expression type-V) leading to legitimizing new actors, re-establishing new forms of interaction (e.g., from cooperation to conflict), etc.

The reasoning behind the decision-making typology used in the values assessment can facilitate a discussion of transformations of our societies to make them more sustainable and just, by ensuring the protection of nature and nature's contributions to people. While the present focus on valuation for environmental policy is mainly on decisions to the right of **Figure SM1.4**, there seems to be a need to discuss also issues regarding our modes of governance at a more basic level – i.e., changes regarding the left side of **Figure SM1.4**, to ensure focus on all five types of value expression throughout decision-making processes are duly considered.

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## **Annex 1.4 How the concept of sustainability is interpreted in the values assessment**

### **The emergence of sustainability as the globally dominant environmental discourse**

Different discourses of and about nature have shaped how environmental problems have been framed throughout history. Although the awareness of ecological degradation is not recent, the concept of sustainability has not always been dominant in environmental discourses. Karl Marx, for instance, theorised the metabolic rift in the late 19<sup>th</sup> century, describing how the rupture of metabolic flow (separation between the place of production, rural areas, and the place of consumption, the cities) resulted in the increased production of organic waste in cities (problematic in terms of environmental health) and the decreased nutrient flows back to agricultural soils (which led, around that period to the first developments of chemical pesticides). Another example is Rachel Carson who, in the 1960s, raised awareness on how the increased use of pesticides was harmful to birds, and was, therefore, a threat to biodiversity.

In the 1970s, one of the major debates in the environmental arena was around the thesis that there were material and environmental limits to growth. The Meadows report “Limits to Growth” was emblematic in demonstrating that the population, consumption and economic growth were not compatible with limited material and environmental resources and sinks.<sup>4</sup> The concept of sustainability came to fore during that decade as a means to problematise the need to comply with global environmental limits, through stopping economic growth, while at the same time satisfying the physical, psychological and social needs of the global population (Kidd, 1992). The term “sustainable development” replaced it in the 1980s as a “compromise” between ambitions of economic growth and protection of the environment (Du Pisani, 2006).

The need to balance the fight against poverty, the development of poorer countries (particularly in terms of the provision of basic services for all urban dwellers) while reducing environmental degradation was at the heart of the UN Stockholm Environmental conference in 1972. The Cocoyoc Declaration of 1974 (resulting from a UNEP-organised symposium) emphasised the relationship between environmental degradation, economic growth and exploitation, and was the first one to link the protection of the environment to issues of social justice, peace, and freedom (Gomez-Baggethun and Naredo, 2015).

Building on these debates, the UN used the concept of “sustainability” as linked to “ecodevelopment”, emphasising the topics of equitable distribution of natural resources and development as going hand to hand with environmental protection (Kidd, 1992). Yet, discontent from different nations with regards to this critique of economic growth (from the USA according to Gomez-Baggethun and Naredo, and developing countries according to Kidd) pressured the UN to review this critique and promote sustainability of the use of natural resources as compatible with economic growth.

The concept of “sustainable development”, defined in the Brundtland report in 1987, emerged from a vision to sustain growth with a vision for future generations and thus ecological sustainability. Such vision has since been used as the major framing discourse to shape environmental policy at local, national and international levels. The focus has been on balancing growth and well-being: to reorient economic growth to enhance wellbeing while reducing its environmental impacts.

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<sup>4</sup> There were detractors to this thesis, characterised by a technological optimism (we have not yet invented the technology that will resolve the crisis, but we are able to create it - See for instance Julian Simon’s books (*The Ultimate Resource, Resourceful Earth*)).

Further developments of sustainable development have led to the emergence of a new scientific field and to the development of global sustainability goals. In academic circles, a new field, sustainability science, has emerged. It is characterised by a stated goal of addressing societal challenges, a commitment to ethics, and a focus on tackling the inherent complexity of socio-ecological systems through interdisciplinarity and transdisciplinarity (Clark and Dickson, 2003; Dedeurwaerdere, 2014). Numerous contributions are growingly contributing to identifying the pathways needed towards sustainability (Markard et al., 2012). The central question of this field is no longer how sustainability looks like, but rather, how we get from our current unsustainable society to a (more) sustainable society through developing technology, social innovation, and governance systems. In terms of global and local policies, the “decoupling” of the economic and environmental dimensions has gained international traction (UNEP, 2011). The sustainable development goals have identified many of these dimensions, as well as their interactions, and their indicators of progress towards them.<sup>5</sup>

To summarise, sustainability is a concept that has been used differently by different groups across history, to emphasise and promote different political visions of how to address the ecological crisis. It is important for the values assessment to reflect the evolution of (and debates around) the use of the term and clearly the justification for the choice of its own definition. Here, we present different assumptions and foci of the sustainability concept— and explore some of their political and academic implications.

## **Key debates around the concept of sustainability**

In the emergence of sustainability as the paradigm to address the contemporary socio-ecological crisis across the globe, key debates have emerged as to how the term can be understood and the dimensions it encompasses. Those debates are described below.

### ***Sustaining what?***

The first question is what is worth sustaining? Some argue for the need to sustain the Earth's life-support systems, that is to say, the bio-geo-chemical processes upon which life depends. For instance, the seminal work on planetary boundaries by Rockstrom and colleagues (2009) identifies the boundaries within which humanity can operate safely (climate change, freshwater use, chemical pollution, ocean acidification, stratospheric ozone depletion, nitrogen and phosphorus cycles, land use change, biodiversity loss and aerosol loading). Earth's life support systems are to be maintained so that human life on earth can continue safely. To account for the quality of human life within this safe operating space, in particular given the huge inequalities in the satisfactions of basic needs, the doughnut of social and planetary boundaries has been proposed (Raworth, 2017).<sup>6</sup> The doughnut has an environmental ceiling, that consists of the planetary boundaries as set out by Rockstrom et al., as well as a social foundation, the inner part of the doughnut with the internationally agreed minimum social standards, as identified by the world's governments in the Sustainable Development Goals in 2015 (2017).

Others have emphasized the need to sustain ecosystem services (the benefits to people from ecosystems). The Millenium Ecosystem Assessment (2005) identified: provisioning services (provision of goods such as food, water and other materials); regulating services (regulation of climate, soil quality, pest control, pollination); cultural services (education, spirituality, aesthetics, culture); and supporting services (eg Photosynthesis, Nutrient cycling, Water cycling). What distinguishes this approach from the planetary boundaries approach is the inclusion of cultural services, which implies that sustainability depends not only on the direct contributions to sustaining life (provisioning), or to the regulation of the conditions in which we live (regulating), but also non-

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<sup>5</sup> <https://sdgs.un.org/>

<sup>6</sup> [www.kateraworth.com/doughnut/](http://www.kateraworth.com/doughnut/)

tangible benefits that fulfil different dimensions of human life continuance (Chan et al, 2012). The conceptualization of nature's contributions to people emphasizes such non-tangible contributions of nature, as well as the role played by societies in co-producing and thus sustaining these benefits (Díaz et al., 2018).

Finally, others emphasize the need to sustain economic growth, as a means to ensure human well-being. The United Nations, for instance, has endorsed the vision of “decoupling” economic growth and enhancement of human well-being from its environmental impacts (UNEP, 2011). The decoupling approach implies that sustainability can be achieved by orienting economic activities towards resource-efficient and non-polluting activities, which can produce economic growth without degrading the environment, also called a “green economy”.<sup>7</sup> The “inclusive wealth” approach (Polaski et al., 2015) is akin to such vision. Inclusive wealth is proposed as a metric that measures the growth in all types of wealth in a society (human capital, manufactured capital, natural capital, and social capital). Such approach renders visible those economic activities which contribute to economic growth while depleting natural or social capital and allows to identify trajectories of economic growth which do not deplete but rather reinforce different types of capital, including natural capital.

### ***Sustaining for whom? (and where?)***

The second question addresses the distributional aspects of sustainability: who benefits from sustainability and who bears its burdens? what sectors of society? what regions of the world? What generation (present or future ones)? These debates are closely linked to those of environmental justice (see *Annex 5.1*).

The Brundtland definition of sustainable development shed light on the needs of future generations. As early as 1974, the Cocoyoc Declaration raised issues of unequal environmental degradation, unequal economic growth, and unequal exploitation of resources across the planet (Gomez-Baggethun and Naredo, 2015). The environmental justice movement, and in particular the climate justice movement, has been showing how the social benefits of environmental degradation (in terms of accrued well-being) have principally benefited the Global North, while the adverse impacts of environmental degradation are mostly felt in the Global South (Okereke, 2011). The doughnut inner part of the sustainable development doughnut has emphasized very unequal social standards (Rawhorth, 2017). Beyond further explorations around the concepts of justice and environmental justice, it is important to mention the distributional aspects of sustainability have led to a critique of how it is rooted in a utilitarian approach, where aggregate gains in well-being are necessarily desirable. Other approaches are called for to explore how right it is that some individuals' well-being is sacrificed to foster the common good. Therefore, rather than focusing on increasing aggregated well-being, the injustices lived by the global poor, which result from unequal power distributions at the global scale, become central to concerns of sustainability. From that perspective, sustainability is only a helpful concept if it supports transitions towards a society which is less unequal, more peaceful, and reverts historical injustices borne particularly by dwellers of the global south (Swilling and Annecke, 2012). Sustainability seldom considers the well-being of non-human life. An ecocentric approach (once centered on non-human life) helps achieve the societal transformation needed to achieve sustainability (Washington et al., 2017).

### **Weak vs strong sustainability**

The debate between weak and strong sustainability illustrates the developments of the concept of sustainability and its distributional issues. The concept of weak sustainability assumes that the

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<sup>7</sup> Defined as: an economy “that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities” (UNEP, 2012).

degradation of ecosystems is acceptable if the lost ecosystem services can be substituted (either through another ecosystem service or by technology). Approaches rooted in weak sustainability include wealth targets that assess environmental degradation and identify the ways to compensate for such degradation. On the other hand, the concept of strong sustainability is rooted in environmental justice, making visible how different countries have different conditions and needs, and that the diverse dimensions involved in such needs cannot be reduced to an economic transaction. Proponents of strong sustainability have argued that substitutability between ecosystem services is unacceptable as humans' relation to nature cannot only be limited to the services it provides. Humans also value nature because of their relations to it which are diverse (this relates to the idea of relational values). Therefore, strong sustainability emphasises that all ecosystems valued by humans must be preserved because of their relational value – even if the services it provided could be in theory or practice, substituted (Solow, 1986; Martinez-Alier, 1995, Dietz et al., 2007).

### **Sustainability – a western concept?**

The concept of sustainability, despite being used in international initiatives, is rooted in western academic tradition. Other concepts exist to describe relationships between nature and society, based on principles of how-to live-in harmony with nature, supporting both a meaningful human life as well as protecting the life support systems. Relationships of mutual respect have been identified in a wide range of contexts, leading to conceptualizations such as those linked to Mother Earth and Buen Vivir. Relational values are central to indigenous worldviews in many parts of the world; they support approaches to governance that reaffirm important points of interconnection and virtues (e.g., respect, humility, gratitude) and often lead to self-imposed restrictions on the use of nature (Spiller et al., 2011; Verbos & Humphries, 2014). However, these worldviews are seldom incorporated into global initiatives and agreements and have not been adopted internationally as sustainability has.

### **The Sustainable Development Goals: opportunities and pitfalls.**

In 2015, the UN adopted the Sustainable Development Goals as the framework guiding international and national efforts towards development. Sustainable development thus becomes an encompassing framework that allows for the consideration of synergies and tensions between objectives of poverty alleviation, environmental protection, human well-being, economic growth, and peace. The advantage of such approach is the systemic understanding of the interlinkages between the different dimensions of sustainability that cannot be simplistically decoupled. In their operationalisation however, criticisms have emerged. SDGs have been criticised for focusing on “development”, a concept which has led to injustices and unsustainability throughout its history (Kothari, 2019). Also, the operationalisation proposed for the SDGs is based on data-heavy universal metrics that may not be the most pertinent to explore the complexities of different localities and to take into account their political context (Caprotti et al., 2017, Kothari, 2019).

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## Annex 1.5 Analysis of the elaboration of the values assessment

This annex presents four sets of information that describe and analyse the process of elaboration of the values assessment, as supporting evidence for *Chapter 1*. This information was gathered by the technical support unit on values. The four sets of information focus on:

- Process of the values assessment elaboration
- Who are the authors?
- Diverse analytical approaches
- Bibliometric analysis

### Elaboration process

To guarantee legitimacy, relevance and credibility, the assessment is being produced in a stepwise process consisting of five iterations (**Figure SM1.5**). All iterations are reviewed through an internal peer-review process. The two drafts - the “First Order Draft”, “Second Order Draft” are reviewed externally by non-IPBES experts and IPBES member governments to produce the “Final assessment report”. During these reviews, every single comment that is made is addressed by experts, who are tasked with either incorporating the comment into the values assessment or offering a justification for why they did not.



**Figure SM1.5** Iterative process in which the values assessment is being produced

### *How do authors interact?*

Successive drafts of the values assessment are iteratively produced, with both internal and external reviews. The experts meet through three one-week presential meetings (2018, 2019, 2021 for the summary for policymakers) and at least one presential meeting per chapter. In parallel, virtual meetings were organised (at least one per month per chapter, and other regular meetings by section teams, and for cross-chapter issues). Three days of virtual workshops were also organised for some chapters (*Chapter 2*, *Chapter 5*, *Chapter 6*). In addition to these virtual and in-person meetings, authors regularly communicate by email and video conference (**Table SM1.1**).

**Table SM1.1** Interactions among experts

Type of interaction	Frequency
Face-to-face (one-week) meetings with all experts	Two face-to-face, one virtual.
Face-to-face (three/four days) meetings by chapter team	Three.
Three days intensive virtual workshop, by chapter team	Three.
Virtual meetings by chapter team	About one per month per chapter
Virtual meetings by section teams	As needed - not counted
Virtual meetings by cross-chapter teams	As needed - not counted
CLA meetings	Two.
Summary for policymakers workshops (three days)	Two face-to-face and two virtual ones.
Others: Fellows face-to-face workshops	Two.

### *How were stakeholders engaged?*

The values assessment reflects a strong collaboration among diverse stakeholders, who were involved through different types of events or interactions (see **Table SM1.2** below). In particular, we held our first external review process of the first order draft, from July to September 2019. It received 2,836 comments from 210 expert reviewers. Eleven governments provided comments: Antigua and Barbuda, Australia, Belgium, Canada, Finland, India, Mexico, South Africa, Sudan, Sweden and the United States.

**Table SM1.2** Inclusion of non-selected experts

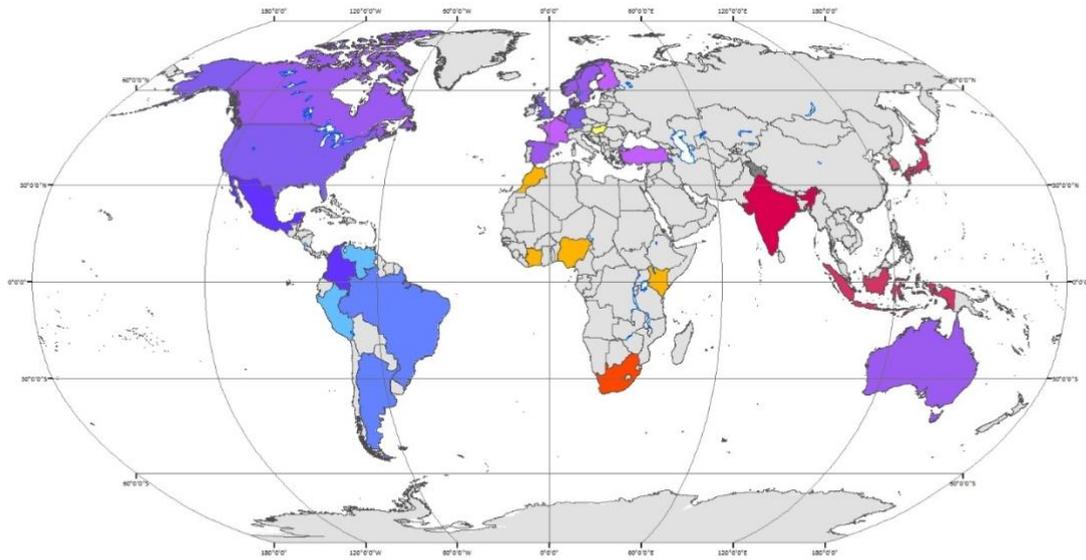
Type of event/interaction/inclusion	Frequency / Number of occurrences
Approval in plenary	Of the scoping document (2016); and of the summary for policymakers (2022)
ILK dialogues and ILK call for contributions	Three
External review processes	Three
Review by National Focal Points	Two

### **Who are the authors?**

The values assessment is undertaken at the science-policy interface by experts nominated by their country's National Focal Points (NFPs) or other organisations and selected by IPBES Multidisciplinary Expert Panel. Care was taken to select authors in such a way that they were as geographically, gender and disciplinarily balanced as possible. A total of 85 expert authors, 11 review editors and over 200 contributing authors participated actively over three years in the development of the values assessment. Experts are either academics hired at universities (69%), employed by public or private research institutes (18%), foundations, non-governmental organisations or cooperation agencies (7%), independent researchers (4%) or civil servants (2%). The assessment was gender-balanced (54% self-identified female experts, 46% self-identified male experts), with scientists from all ages (from 20s to 70s) coming from all regions of the world. The breadth of languages (>50) spoken by the experts reflects their cultural diversity.

The experts come from varied disciplinary backgrounds and the values assessment is unprecedented in IPBES history by the very large contribution of the social sciences and humanists to the team: Over 54% of experts have studied at least one degree in natural sciences, and 54% in social sciences (A third of all experts have studied economics). Ten percent have studied a degree in humanities and 7% in engineering. Many experts (66%) have changed disciplines throughout their degrees, switching between natural sciences, social sciences, humanities, engineering or a combination of natural and social sciences. Experts come from a broad set of disciplines ranging from anthropology, biology, communication science, ecology, economics, environmental science, geography, law, philosophy, political science, policy implementation, psychology, and sociology. Their expertise varies broadly, as presented in **Figure SM1.6** Eighteen experts are ILK experts, two of which are also ILK holders (in addition to 45 contributing authors self-reporting as ILK experts 12 as ILK holders).





**Figure SM1.8** Country of residence of experts (color by IPBES region)



**Figure SM1.9** Languages spoken by experts

In addition, six experts form part of the management committee which oversees the elaboration of the values assessment, also representing diverse academic backgrounds and six nationalities from the five IPBES political regions.

## What analytical approaches were used?

Different literature reviews were performed to collect, systematise and assess the existing evidence on the methods to assess diverse values of nature. Here, we summarise the literature reviews performed. Systematic reviews were complemented by expert reviews to reach the literature that tends to be omitted through systematic reviews (for instance, grey literature or literature from other languages). Literature reviews are presented in **Table SM1.3**.

**Table SM1.3** Summary of types of literature reviews performed in all chapters of the values assessment.

Types of literature reviews	Number of reviews performed
Number of systematic literature reviews	16
Number of non-systematic literature reviews	17
Number of mixed literature review (systematic and non-systematic)	6
<b>Total number of literature reviews performed.</b>	<b>39</b>
Number of literature reviews that included languages other than English	10
Number of literature reviews that included non-academic knowledge (grey literature, the arts, etc.)	18

## Bibliometric analysis

This bibliometric analysis was performed on all sources cited in the second order draft of the values assessment. Given that most sources are expected to be added to the assessment by the second order draft (and systematic reviews are concluded by that time), this analysis can give us a reasonable estimation of what kind of sources are cited in the final version of the values assessment.

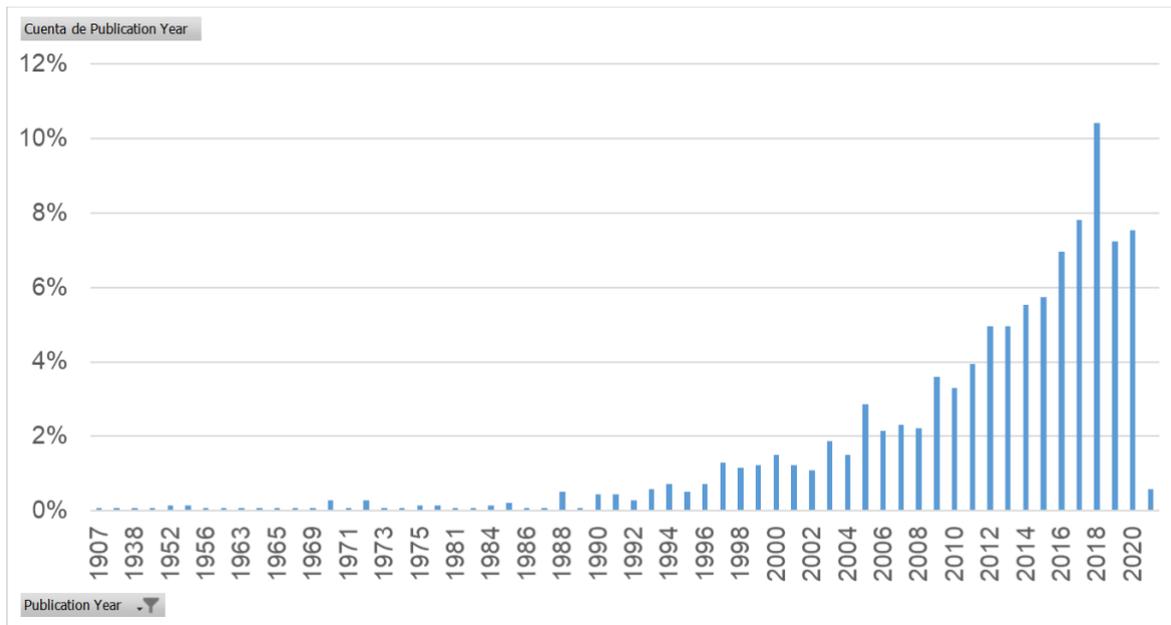
We analysed between 10% and 20% of all references cited in each chapter, either as part of the main body of text or as part of a systematic review (see **Table SM1.4**). The percentage of references analyzed for each case is presented below.

**Table SM1.4** References analysed as part of the bibliometric analysis.

		Number of references	Analysed references	Analysed references (%)
<b>Chapter 1</b>	Cited in the chapter	170	31	18%
	Cited as part of a systematic review	420	41	10%
<b>Chapter 2</b>	Cited in the chapter	1123	218	19%
	Cited as part of a systematic review	2006	194	10%
<b>Chapter 3</b>	Cited in the chapter	499	96	19%
	Cited as part of a systematic review	2979	297	10%
<b>Chapter 4</b>	Cited in the chapter	633	116	18%
	Cited as part of a systematic review	3135	314	10%
<b>Chapter 5</b>	Cited in the chapter	569	107	19%
	Cited as part of a systematic review	674	65	10%
<b>Chapter 6</b>	Cited in the chapter	750	147	20%
	Cited as part of a systematic review	109	12	11%
<b>Total</b>		<b>13067</b>	<b>1638</b>	<b>13%</b>

## Publication year

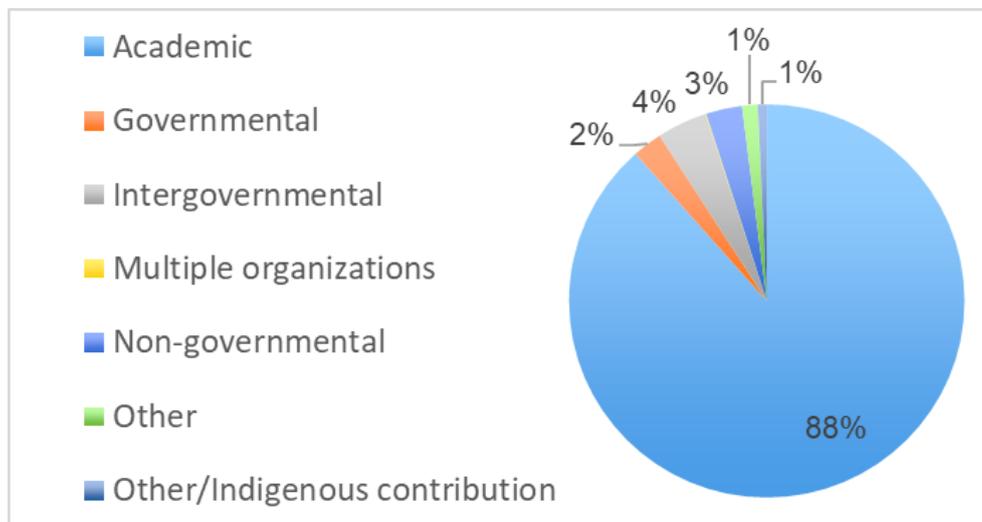
The assessment cites sources that have been produced during the 1900's and the 2000's. There are 154 sources from between 1907 to 1999, and 1485 from 2000 to 2021 (**Figure SM1.10**).



**Figure SM1.10** Publication year of the sources used in the values assessment.

### *Type of sources*

The sources reviewed are mostly academic sources (89%). The most recurrent type of document used in the assessment are journal articles, magazines, books (**Figure SM1.11**).

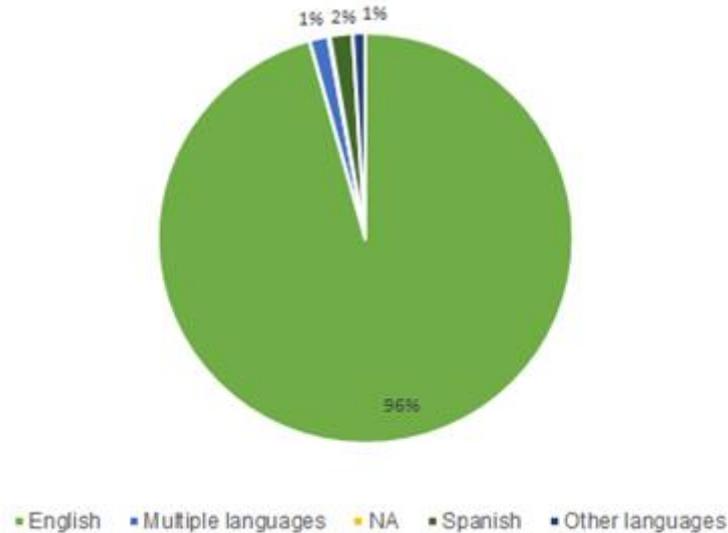


**Figure SM1.11** Type of sources reviewed.



## Language

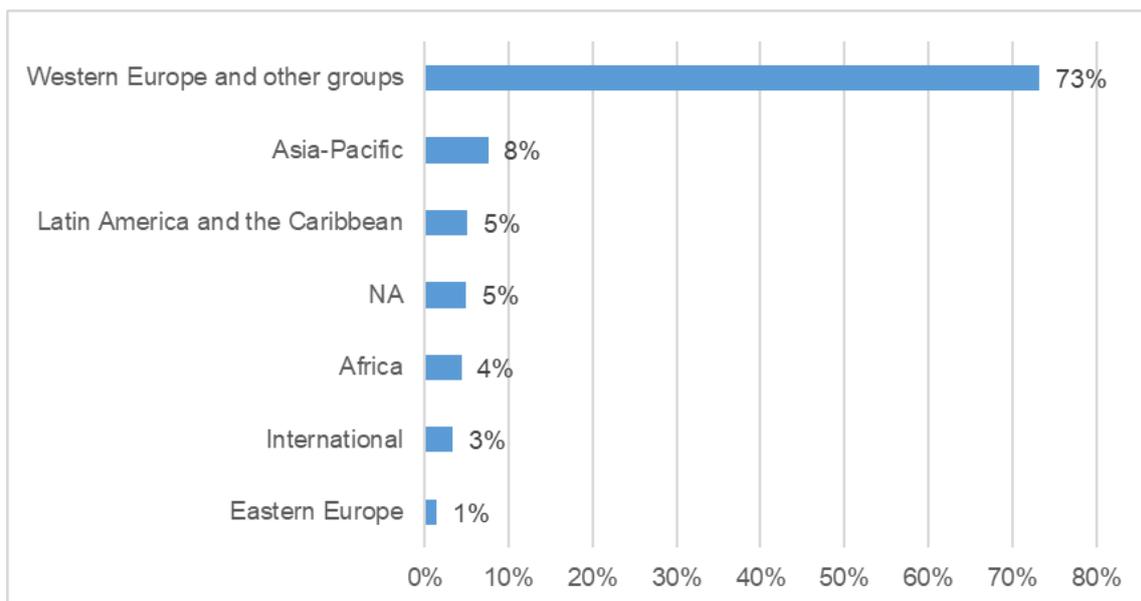
The predominant language is English with 96% of sources, followed by Spanish with 2%; the remaining sources are in Chinese, Dutch, French, German, Portuguese, Norwegian, Polish, Russian and Ukrainian (1%). The 1% of sources were published in multiple languages and only the 0.1% was not identified (**Figure SM1.14**).



**Figure SM1.14** Sources language.

## Country of origin

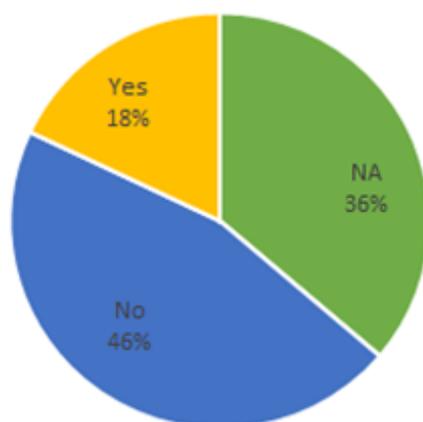
The country of affiliation of the first author shows that most cited sources were produced in Western Europe and other groups (including the USA) with 73% of sources. Only 1% of sources are from Eastern Europe. 3% of sources are international (in the sense that they are produced jointly by authors from different regions, for instance, United Nations Agreements) (**Figure SM1.15**).



**Figure SM1.15** Country of origin of the sources analysed in the assessment.

### Cross regional team

Only the 18% of the sources cited were produced by a team conformed by authors of more than one region (**Figure SM1.16**).



**Figure SM1.16** Sources produced by authors of more than one region.

### *Country of focus*

From all the sources cited, 55.5% have an explicit regional focus (for instance, a case study or a regional study). Western European and Others Group is the region on which most sources focus (21%). Focus on each region of IPBES is specified in **Table SM1.5**.

**Table SM1.5** Country of focus from all the sources cited.

IPBES Regions	Percentage of sources
Africa	8.1%
Asia Pacific	9.4%
Eastern Europe	1.1%
Latin America and the Caribbean	8.6%
Western Europe and Other Groups	21.1%
International	7.4%
No regional focus	44.3%
<b>Total</b>	<b>100%</b>

### *Disciplines*

Of all sources cited, only 54.5% are published in a journal which topic is classified in the Scopus database of journals, the remaining percentage could not be identified. The disciplines that could be identified are shown in the **Table SM1.6** below.

**Table SM1.6** Disciplines from all the cited sources.

<b>Broad discipline</b>	<b>% of sources</b>
Environmental Science	27%
Social Sciences	7%
Economics, Econometrics and Finance	5%
Agricultural and Biological Sciences	4%
Earth and Planetary Sciences	2%
Arts and Humanities	2%
Multidisciplinary	2%
Medicine	1%
Business, Management and Accounting	1%
Engineering	1%
Psychology	1%
Energy	0%
Decision Sciences	0%
Physics and Astronomy	0%
Computer Science	0%
Not Available	46%
<b>Total</b>	<b>100%</b>

## **Annex 1.6 Strategy for the inclusion and recognition of indigenous people and local communities and their knowledge systems in the values assessment**

The inclusion of a variety of knowledge systems, and specifically ILK systems, is part of the foundations and mandates of IPBES. At an early meeting to discuss the creation of IPBES (held in Putrajaya, Malaysia in 2008), it was stated that there was a need to “*improve the dialogue between scientific and other knowledge systems and understandings, perspectives and values regarding biodiversity and ecosystem services to help make policy decisions more effective, efficient and equitable for the sustainable use of biodiversity and ecosystem services*” (UNEP, 2008. IPBES/1/2. p. 3). The key role of IPLCs and ILK on biodiversity conservation and sustainable management has also been consistently highlighted in various international efforts such as the Convention on Biological Diversity (CBD), the Intergovernmental Panel on Climate Change (IPCC), the International Mechanism of Scientific Expertise on Biodiversity (IMOSEB), the United Nations Convention to Combat Desertification (UNCCD), and the Millennium Ecosystem Assessment (MA) (Thaman et al., 2013).

IPBES documents have consistently argued for the inclusion of IPLC and ILK, and to engage indigenous and local leaders and communities in mechanisms of participation, co-production of knowledge and setting of common problems and concerns (Cámara-Leret & Dennehy, 2019; Hill et al., 2020; McElwee et al., 2020). The establishment of the IPBES ILK task force since 2014 and the Technical Support Unit on ILK (ILK task force, hosted at UNESCO) have continuously promoted the participation of IPLCs and the recognition of ILK into the various IPBES mandates. This work has helped to advance social learning on how to best acknowledge the diversity of indigenous peoples, afro-descendant communities and other communities, as well as to include and articulate ILK in IPBES Assessments and other UN initiatives.

The values assessment strategy for the inclusion of ILK consisted of a series of interconnected steps, presented in *Chapter 1* and detailed here. A number of ILK experts and ILK holders<sup>8</sup> were invited to the different chapters as authors or contributing authors. An ILK liaison group was formed by a group of authors supported by Technical Support Unit (TSU) officials and the ILK task force, to coordinate efforts across chapters. Building on the IPBES experience in previous assessments, three dialogues were established between ILK holders and experts to harness a face-to-face space to exchange opinions and views while having feedback on Chapters key questions and content. These took place in Paris on March 20th to 21st of 2019, in Mexico on September 10th to 11th of 2019, and virtually on February 202, during the production of the values assessment (IPBES, 2019a; 2019b). From the first two ILK dialogues, a number of key messages were identified to further gather the needed evidence while acknowledging the data gaps on specific topics. The third dialogue was in a virtual format and allowed for greater participation of ILK experts, representatives and holders across the world.

Also, a wide array of evidence and data from multiple sources of ILK were targeted by a global *Call for contributions*, released in different languages and spread through ILK networks, as an important part of the strategy. Furthermore, parallel to the gathering of evidence two cross-cutting case studies were developed, focused on Good-living philosophies and on the Amazonia. Additionally, contributing authors were integrated into the production process of the assessment to adequately represent available evidence on ILK and related knowledge gaps across the values assessment chapters. This work involved special initiatives in *Chapters 2* and *3*. In *Chapter 2*, integrated eight linguists and language experts from different biocultural regions providing insights on critical

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<sup>8</sup> Among the different chapters there were 14 authors that self-recognize as ILK experts or holders and active members of their local and indigenous communities from different parts of the world and 46 ILK experts.

interconnections between languages, values and biodiversity (*see Chapter 2*). In *Chapter 3*, solicitations were made to 76 IPLC and ILK experts and holders to contribute essays describing how valuation is undertaken in the communities that they work. A total of 26 contributions were submitted that form the foundations for an exploratory analysis of IPLC valuation as undertaken in IPLC contexts. This is differentiated from valuation studies that are conducted in IPLC territories by non-IPLC scholars or practitioners (*see Chapter 3*).

In the following sections, we detail the procedures and some results of the Global call for contributions, the three ILK dialogues and the cross-cutting case studies.

## **Global call for-contributions on indigenous and local knowledge<sup>9</sup>**

The call for contributions was released in June of 2020 including translations in English, French, Spanish, Arab and Russian in the IPBES web page (IPBES, 2020a). The purpose of this call was to invite indigenous peoples and local communities, indigenous representatives, indigenous organizations and institutions, and ILK experts from all over the world to contribute to three assessments from IPBES launched in 2018 and 2019:

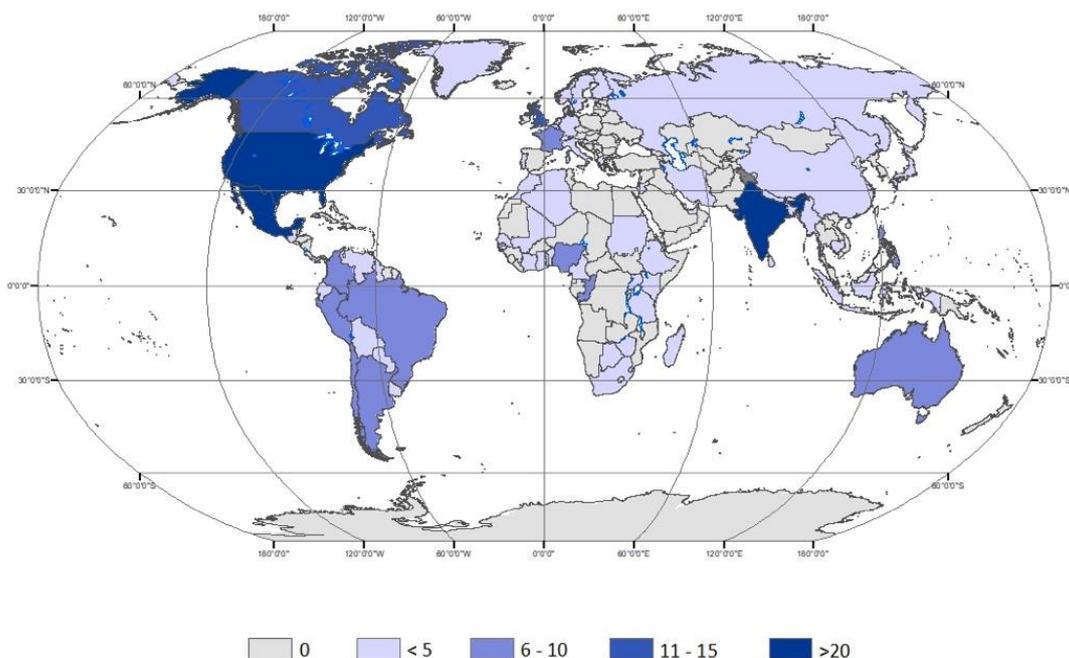
- The values assessment
- The sustainable use of wild species assessment
- The invasive and alien species assessment

A great proportion of contributors self-identified as indigenous people (33%) or part of local communities (22%). Contributions include community reports, declarations, academic papers, case studies, videos, songs and artworks, including materials in local languages. We also received recommendations of individuals, communities, organizations and networks. Languages of the contributions include: English, Dene, Chinese, Maori, Spanish, French, Indonesian, Portuguese, Shuar, Kichwa and Sápara.

The amount of materials submitted for the three ongoing assessments exceeds more than 600 materials, including suggestions of individuals and organizations. The countries of residence of the contributors (for the three assessments) represent 73 countries, (**Figure SM1.17**). For the values assessment there were around 420 materials. This information was revised and synthesized by the values assessment experts and incorporated into the chapter as a source of evidence for different issues.

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<sup>9</sup> Call for contributions on indigenous and local knowledge (<https://doi.org/10.5281/zenodo.4390417>).



**Figure SM1.17.** Country of residence from the contributors submitting materials on ILK for three IPBES Assessments.

## Summary of the three ILK dialogues

The ILK dialogues were one of the main tools to exchange opinions, experiences and ways of understanding the “values of nature” from IPLCs. They were also a mechanism to implement the free prior and informed consent (FPIC) with different indigenous organizations and representatives from around the world. Here we present the main results from these three dialogues. The participants are presented in **Table SM1.7**.

**Table SM1.7** Participants and countries of the participants of the three dialogues

	1st dialogue (France)	2nd dialogue (Mexico)	3rd dialogue (virtual)
Participants - ILK experts and holders	12	10	85
Countries - ILK experts and holders	12	8	37
Participants – IPBES authors and TSU	13	10	30
Countries - IPBES authors and TSU	9	4	17
<b>Total of Participants</b>	<b>25</b>	<b>20</b>	<b>115</b>

### ***First ILK dialogue (IPBES, 2019a).***

This dialogue workshop was organized to facilitate the participation of indigenous peoples and local communities (IPLCs) as well as the incorporation of indigenous and local knowledge (ILK) into the early development of the IPBES values assessment, to contribute to the initial framing of the methods, key questions and content so that the assessment can better reflect IPLC values. The main discussions during this workshop centered around topics such as: i) the recognition of diversity of IPLCs worldviews and cosmovisions; ii) IPLCs views about “nature” and “values”; iii) the recognition of contributions and perspectives from ILK for the conservation of “nature”; iv) acknowledging rights and power dimensions as critical for transformation; v) overall challenges for the assessment; vi) processes and methods for IPLC participating in the assessment.

### ***Second ILK dialogue (IPBES, 2019b)***

The second ILK dialogue workshop for the IPBES methodological assessment regarding “diverse conceptualisations of multiple values of nature and its benefits to people” occurred during the external review period for the first order draft of the assessment. The discussions of the workshop were organized by chapter and were guided by a series of questions delimited by the experts. These questions allowed guiding in-depth discussions to identify topics and issues that should be considered within the chapters of the assessment. As the discussions followed the logic of the assessment chapters, the topics that were discussed covered the following aspects: i) Concepts of “nature” and “values”; ii) indigenous people’s methods for valuing and valuation; iii) decision-making processes and implications on the values that are involved in decisions; iv) values relevant for better futures; v) recommendations to make better futures happen.

### ***Second ILK dialogue (IPBES, 2020)***

Due to COVID-19 pandemic, the third dialogue was held online. Although this format allowed for greater participation of IPLCs experts and holders from different countries. At the time of the dialogue workshop, the values assessment had reached an important milestone – the review period of the draft summary for policymakers (SPM) and second order draft of the assessment. This is one of the most important phases in the IPBES assessment process, as it allows scientists, decision makers, practitioners, indigenous peoples and local communities and other knowledge holders to provide feedback on these draft documents. The widest-possible participation and most diverse engagement in the external review is vital to ensure the quality and policy relevance of the assessment. The ILK dialogue workshop was organised to facilitate the participation of IPLCs in the reviews of these documents.

The objective of the dialogue workshop was to engage IPLCs in critically reviewing the draft summary for policymakers and assessment chapters, with a focus on the summary for policymakers key messages, providing feedback and comments regarding strengths, gaps and additional sources of information. Additional aims of the dialogue include sharing information about IPLC values between IPLC participants and assessment authors and exploring how the final values assessment could be utilised by IPLCs.

During the dialogue, key messages from the summary for policymakers of particular relevance to IPLCs were presented by assessment authors, and participants were invited to discuss and comment. In general, the summary for policymakers reflects what was discussed during the previous dialogue workshops. Most of the summary for policymaker’s messages coincide with the messages coming from indigenous peoples. In addition, it was recognized that the summary for policymakers has the potential to help IPLC processes. It has elements of spiritual, economic and legal issues. In addition, it presents a series of determining factors of various issues that come from the colonial period

## ILK cross-cutting case studies

The ILK liaison group led a collective effort focused on the literature review of **a case studies**. The main purposes of this effort were to i) highlight the diversity of values of nature, and the interconnections between cultural, linguistic and biological diversity; ii) provide tangible examples of ILK for policy interventions; and iii) emphasize IPLCs struggles to defend their territories, rights and values of nature. These two cases were the “Amazonia” and the “Philosophies of good living around the world”. They were selected because they offer alternative pathways to the current nature crisis that reflect other relationships of people and nature based on broad values like stewardship, respect and reciprocity. All the documents gathered on these literature reviews are stored in the data management reports<sup>10,11</sup>, and the full case study for the Amazonia can be found in the *Annex 4.5* “Amazonia cross-chapter case study” in *Chapter 4*. For the integration of the Philosophies of good living integration across the values assessment see **Box SM1.2**.

### **Box SM1.2 IPLC’s Philosophies of good living and nature’ values for decision and policymaking toward sustainable and just futures.**

As an effort to document how IPLCs philosophies articulate sustainability-aligned values of nature, we conducted a literature review on philosophies of ‘good living’ or ‘good life’ connected to a diversity of indigenous peoples and local communities around the world. Results from the analysis of 204 academic publications in different languages<sup>12</sup> (show a strong body of empirical evidence from little more than 100 different cultural, local and indigenous groups and around 119 good living philosophies or expressions. Also, in recent years (between 2016 and 2020), the number of publications has increased substantially showing the importance of this topic in academic literature. This evidence emerges from different countries in all continents, but there is a higher concentration from South American countries, especially Ecuador and Bolivia (47 % or 95 publications).

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<sup>10</sup> Literature review for the Philosophies of Good Living ILK cross-assessment case study (cross-chapter/ILK) (<https://doi.org/10.5281/zenodo.4399544>)

<sup>11</sup> Literature review for the Amazonia ILK cross-assessment case study (cross-chapter/ILK) (<https://doi.org/10.5281/zenodo.4396203>).

<sup>12</sup> Literature review for the Philosophies of Good Living ILK cross-assessment case study (cross-chapter/ILK) (<https://doi.org/10.5281/zenodo.4399544>)



**Chapter 5:** *IPLCs philosophies crosscutting with Earth Stewardships clusters.* Philosophies of good living present core cross-cutting convergences with alternative future pathway clusters based on biocultural conservation and on earth stewardships (protected areas, agro-productive stewardship and education).

**Chapter 6:** *Philosophies of good living' and capacity dimensions for incorporating other values into decision-making for transformative change.* A targeted review exemplifies how these philosophies and the nuances that emerge from them, contribute to the different capacity dimensions for making visible diverse values.

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