Chapter 2

CONCEPTUALIZING THE DIVERSE VALUES OF NATURE AND THEIR CONTRIBUTIONS TO PEOPLE[1,2]

COORDINATING LEAD AUTHORS:
Christopher B. Anderson (Argentina, United States of America/Argentina), Simone Athayde (Brazil/United States of America), Christopher M. Raymond (Australia, Netherlands/Sweden, Finland), Arild Vatn (Norway)

LEAD AUTHORS:
Paola Arias-Arévalo (Colombia), Rachelle K. Gould (United States of America), Jasper Kenter (Netherlands/United Kingdom of Great Britain and Northern Ireland), Barbara Muraca (Italy/United States of America), Sonya Sachdeva (United States of America), Aibek Samakov (Kyrgyzstan), Egleé Zent (Bolivarian Republic of Venezuela)

FELLOWS:
Dominic Lenzi (Australia, Italy/Germany), Ranjini Murali (India), Ariane Amin (Côte d'Ivoire)

CONTRIBUTING AUTHORS:

Hasiyatu Abubakari (Ghana), Dana Baker (United States of America), Sebastián Ballestas (Colombia), Thomas Beery (United States of America), Jordan Blanchard-Lafayette (United Kingdom of Great Britain and Northern Ireland), Robert Blasiak (United States of America), Adams Bodomo (Ghana), Marcus Briggs-Cloud (United States of America), Harry Cross (United Kingdom of Great Britain and Northern Ireland), Bruna Franchetto (Brazil, Italy), Lina Gutierrez-Cala (Colombia), Zuzana Harmáčkova (Czech Republic), Adam P. Hejnowicz (United Kingdom of Great Britain and Northern Ireland), Austin Himes (United States of America), Dylan Inglis (United Kingdom of Great Britain and Northern Ireland), Hiroe Ishihara (Japan), Samuel Issah (Ghana), Chris Ives (Australia), Jeremiah Julius (United States of America), Roope Kaaronen (Finland), Heeseo Kwon (Republic of Korea), Alexandra Lavrillier (France), Kinga Magdolna Mandel (Hungary), Javier Mejía Cruz (Colombia), Thais Moreno (Brazil), Gabriel Nemogá (Colombia), Sebastian O'Connor (United Kingdom of Great Britain and Northern Ireland), Henrik Österblom (Sweden), Nicol Dayan Pacheco Valdes (Colombia), Valentina Perdomo Nuñez (Colombia), Lauren Prox (United States of America), Sue Ranger (United Kingdom of Great Britain and Northern Ireland), James Reeves (United Kingdom of Great Britain and Northern Ireland), Annalee Ring (United States of America), Julian Rode (Germany), Ana Carolina Rodríguez Alzza (Peru), Kurt Russo (United States of America), Margrét Rós Sigurjónsdóttir (Iceland), Jane Simpson (Australia), Sanna Stålhammar (Sweden), Andrés Suárez (Colombia), Bron Taylor (United States of America), Leah Temper (Canada), Maria Tengö (Sweden), Henrik Thoren (Sweden), Araceli Torres Morales (Mexico), Catalina Trujillo (Colombia), Hein Van der Voort (Netherlands), Julian Zúñiga-Barragán (Colombia)

REVIEW EDITOR:
Kai Chan (Canada)

TECHNICAL SUPPORT UNIT:
Mariana Cantú-Fernández

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2. Authors are listed with, in parentheses, their country or countries of citizenship, separated by a comma when they have more than one; and, following a slash, their country of affiliation, if different from that or those of their citizenship, or their organization if they belong to an international organization. The countries and organizations having nominated the experts are listed on the IPBES website (except for contributing authors who were not nominated).

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Chapter **2**

CONCEPTUALIZING THE DIVERSE VALUES OF NATURE AND THEIR CONTRIBUTIONS TO PEOPLE

EXECUTIVE SUMMARY

Humanity confronts multiple socio-environmental crises that are also a values crisis (e.g., biodiversity loss, climate change, emergent diseases) {2.1.1; 2.1.2}. There is consensus that environmental decision-making can be enhanced by being more inclusive of nature's diverse values {2.1.1}. Yet, understanding nature's values requires grasping different conceptualizations of the ways people interpret and experience human-nature relationships, such as worldviews informed by different knowledge systems, cultures, languages and disciplines. Better engagement of this diversity offers opportunities to make policies more rigorous, effective and inclusive {2.1.2}.

Chapter 2 aims to help decision-makers characterize and assess different conceptualizations of the diverse values of nature and how they are expressed, formed and changed **(Figure 2.1)**. It uses scoping, systematic and critical reviews, complemented with regionally- and thematically balanced case studies to assess academic literature, government policies and indigenous and local knowledge (ILK). Findings provide conceptual background for subsequent chapters and insights for decision-makers to engage, manage and incorporate the conceptual diversity of values in governance frameworks that have impact on nature and its contributions to people **(Figure 2.2)**.

Key messages highlight (i) concepts that help diagnose policy-relevant challenges and opportunities and (ii) guidance to use these concepts in solutions to achieve better conceptual, practical and ethical outcomes {2.1}.

1 **Predominant environmental governance frameworks have privileged instrumental values (e.g., economic growth through markets) and contributed to the present biodiversity, climate and health crises. Frameworks that enable the expression of other value types can support sustainability outcomes (e.g., inclusive wealth accounting, participatory management), but careful attention should be paid to the complexity of factors that relate values with individual and collective behaviour *(well established)*.** Diverse values of nature exist; their incorporation into decision-making can contribute to well-being, sustainability, and justice outcomes. Ample evidence demonstrates that economic growth, as currently conceived and measured, contributes to the deterioration of nature and nature´s contributions to people {Box 2.7}. However, few international biodiversity and sustainability policies explicitly recognize that economic growth can be problematic for biodiversity {2.1}. Almost conversely, many conservation strategies have prioritized non-human nature, regardless of societal impacts. More nuanced and inclusive framings of human-nature relationships can overcome these divergent understandings {2.2.1}. For example, sustainability-aligned values (i.e., broad values like care, equity, reciprocity and justice) coincide with multiple visions of supporting the planet's long-term ecological integrity together with more sustainable social outcomes {2.2.1; 2.2.3.1; 2.3.2; 2.4.2}. While certain values support these goals more than others, multiple factors intervene when translating values into behaviours, including demographic characteristics, feelings of self-efficacy and the physical capacity to engage. Values embedded within social and institutional structures and biophysical contexts can promote or constrain different behaviours {2.4; 2.5.1; 2.5.2}. To ensure governing frameworks are able to achieve desired outcomes for people and nature, policymakers could consider the various types of values at stake (and for whom), which valuation methods are most appropriate for the context, the power dynamics involved, and the institutional adjustments needed for effective policy implementation {2.4.1.4; 2.4.2; **Box 2.9**}.

2 **Value expression and prioritization are influenced by the governance frameworks in place, including who has the power to make decisions. Strengthening participatory processes and designing appropriate frameworks can facilitate better consideration of multiple perspectives on instrumental, intrinsic and relational values *(well established)*.** Power influences value expression through: (i) societal structures and institutions, including the authority to determine laws and other rules and having rights to use natural assets and nature´s contributions to people; and (ii) discourses that emphasize some worldviews and values over others, including the framing of decision-making

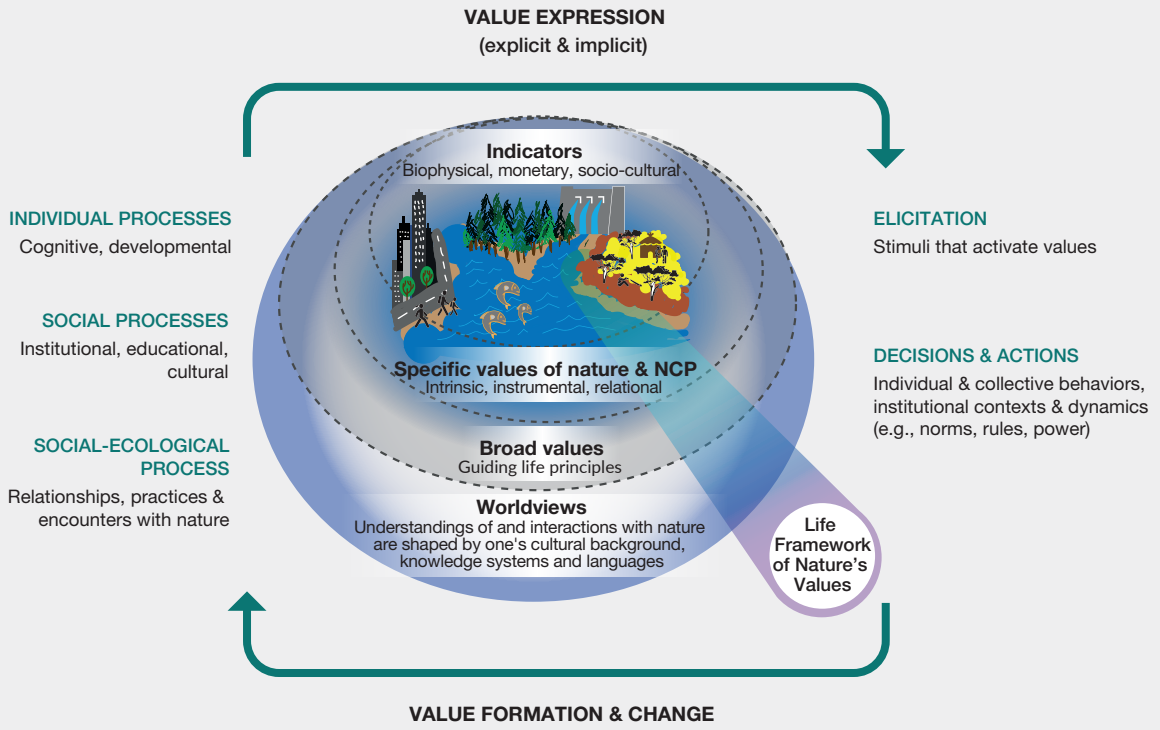

Figure 2 1 **Value concepts addressed in Chapter 2.**

'Value' has different meanings across academic, policy and cultural contexts. Clarifying these perspectives allows better recognition, communication and incorporation of diverse values and stakeholder interests into decision-making {2.1}. Core concepts in the chapter's values typology include worldviews {2.2.1}, language-value connections {2.2.2}, broad values {2.2.3}, specific values (i.e., instrumental, intrinsic, and relational values) {2.2.3} and various biophysical, monetary and socio-cultural value indicators {2.2.4}. To help organize this diversity, four life frames illustrate how particular human-nature relationships prioritize certain sets of values {2.3}. Furthermore, values are embedded in norms and rules that influence individual and collective expressions, decisions and actions {2.4}. They form and change through individual and social processes as well as socio-ecological interactions and experiences {2.5}. Finally, these concepts inform broader IPBES efforts, including this assessment, and future capacity-building that addresses knowledge and operational gaps to promote just and sustainable futures {2.6}.

processes {2.4.1.4; Annex 2.1}. Hence, governance frameworks (i.e., the institutions framing economic, political decision-making and socio-cultural processes) emphasize different values and have varying capacities to express and protect nature's diverse values **(Figure 2.2)** {2.4.2.3}. Economic decision-making is largely oriented towards producing goods and services to trade in markets, emphasizing certain instrumental values. Political decision-making, including economic and development policies, has focused largely on facilitating market expansion, combined with some conservation policies protecting intrinsic values. Socio-cultural decision-making (e.g., forming individual or collective identities) places more emphasis on relational and intrinsic values, when prioritizing values like sense of place and relationships with more than-human species {2.4.2.3}. Political decision-making, with its power to define societal rights and responsibilities, is positioned to establish frameworks that can more fully incorporate the diversity of nature's values across decision-making contexts. Such political decisions may concern the specification of property rights (common, private or state), the role of markets and the types of markets that are supported (e.g., global vs. local). They also concern what types of environmental regulations and incentives are favoured. These frameworks can help activate, support or hinder the expression of values and norms that are important to different social groups {2.4.1; 2.4.2}.

3 **Predominant economic policies align with a "grow first, correct afterwards" approach to nature's values. In a world characterized by tipping points, this strategy often erodes the values of nature and can be costly and difficult to reverse. When developing economic policies, a more holistic, long-term focus on environmental and social impacts could help to achieve transformations towards environmental sustainability and social justice *(well established)*.** General economic policies have been focused on growth (e.g., deregulating trade). Conceptually, this has been justified by equating well-being with monetary wealth. The negative socio-environmental impacts have often been

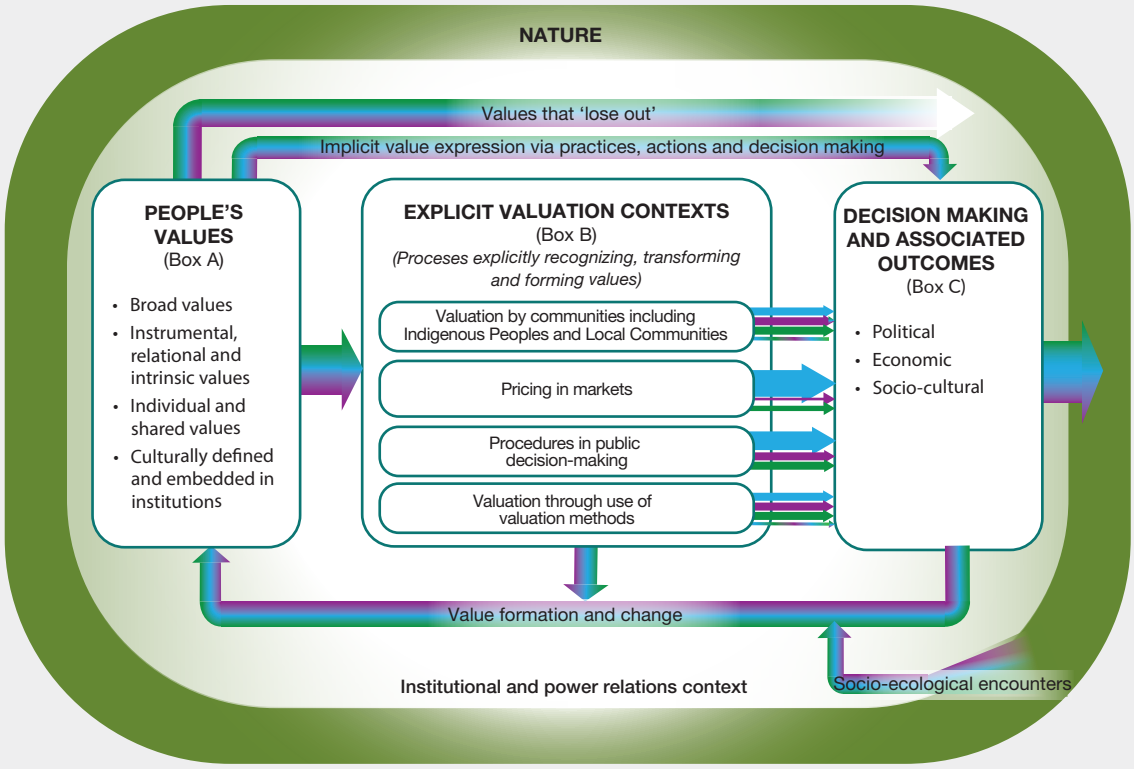

Figure 2 2 **Explicit and implicit value expression and decision-making. Blue = instrumental values; Purple = relational values; Green = intrinsic values; Blended colours = integration between values.**

addressed only after they have appeared. At that stage, it is very costly to change policy direction, given existing investments and institutional structures with their embedded interests and power relations {2.4.2.3}. Tipping points add to the challenges of maintaining the values of nature; when mitigation is attempted, it may be too late or insufficient, as evidenced by the ongoing climate and biodiversity crises {2.4.2.3}. Economic policies that prioritize living from nature do attain some instrumental values (e.g., consumption of nature's material contributions to people by more economically and politically powerful social groups), but concomitantly have at least three negative implications: (i) relational and intrinsic values are put at risk, (ii) the distribution of these same instrumental values to vulnerable social groups may be compromised, and (iii) the long-term flow of instrumental values is jeopardized {2.3.2; 2.4.2}. Sustainability is questionable in an economic system based mainly on a short-term, narrow instrumental value-logic. Supporting the expression of sustainability-aligned values makes it possible to consider the local and global linkages of both social and ecological outcomes more adequately, emphasizing reduced environmental impacts, ensuring equitable wealth distribution, providing prosperity and supporting ethical management practices {**Box 2.4**; 2.2.3.1; 2.4.2.3}.

4 **Diverse values of nature arise from diverse worldviews, cultures, knowledge systems and languages that have developed from people's long-term, place-based relationships with nature. Philosophies of good living found throughout the world offer pathways to achieving collective human-nature well-being, linking diverse values with practices, policies and institutions *(well established)*.** Worldviews are metaphorical lenses through which individuals and social groups perceive, think about, interpret, inhabit and modify the world. They are informed by one's cultural context and background, knowledge system and language {2.2.1; 2.2.2}. Many ILK-based worldviews recognize the world as a relational sphere, where other-than-human entities like rivers or biotic communities are subjects with rights and duties. This relational and reciprocal perspective forms the basis for collective human-nature well-being, including concepts like *Buen vivir* in South America and *Ubuntu* in sub-Saharan Africa, among other philosophical traditions, which have inspired scholarly work, policies and social movements from local to global scales. Although the academic literature reflects a polarization between those values held by indigenous peoples and local communities, Eastern and Western knowledges and/or

society, there may be considerable overlap between some of these groups' broad and specific values tied to Philosophies of good living and collective human-nature well-being, which could be recognized and explored in more depth in research and policy {2.2.1}. Emerging social norms, collectives and movements around current issues such as mindfulness, urban nature conservation, and climate change mitigation and adaptation, may nurture and share relational values of reciprocity, care, responsibility and interconnectedness with nature (among others) within and across various societal groups {2.2.1; 2.5.2}. Convergences or synergies of worldviews and values across different groups can be catalysed through decision and policy-making, and operationalized through existing or new institutions to promote biodiversity conservation, sustainability-aligned values and/or pro-environmental behaviour {2.2.1; 2.2.3; 2.3.1; 2.5.2; **Box 2.2**}.

5 While 'value' generally refers to what is good or important, the term is applied in different ways in particular academic, policy and social contexts. Therefore, it can be useful to clarify the dimension and type of value being considered to establish a common understanding across contexts *(well established)*. The values of nature and human-nature relationships pertain to both broad values and specific values. Broad values express life goals or guiding principles (e.g., sustainability, justice, prosperity), as informed by the general beliefs emanating from worldviews {2.2.3.1}. Those broad values associated with or supporting the achievement of the Sustainable Development Goals (SDGs) and sustainability processes can be called sustainability-aligned values {2.2.3.1, 2.3.2, 2.4.2}. Sustainability-aligned broad values concerning human-human relationships (e.g., equity, unity, reciprocity, justice) are key to pathways of transformation towards more sustainable futures (see also Chapter 5). They can foster, for example, a shift from solely individualism, materialism and economic profit to other principles like care, unity, equity, reciprocity and justice {2.3.2.3}. Specific values refer to how people express the importance of particular elements of or relationships with nature in given situations and contexts {2.2.3.2}. Specific values can be categorised according to instrumental, intrinsic and relational reasons why nature, nature´s contributions to people and human-nature relationships matter to people. While all value typologies have limits, making the meaning of value explicit (e.g., broad values, specific values or value indicators), recognising diverse values and using multiple indicators are all important, particularly in complex and contested decision-making contexts {2.2.3.3; 2.2.4}.

6 Instrumental, intrinsic and relational values are specific ways of expressing why nature, nature´s contributions to people and human-nature relationships are important to people. These categories provide opportunities for more conceptually rigorous, practically effective, and ethically-based valuation policies and practices that balance different sectoral needs and stakeholder interests *(well established)*. Academic and policy sources have extensively debated instrumental (i.e., things or processes important as means to some human end) and intrinsic values (i.e., values of nature expressed regardless of reference to humans). Relational values have become an increasing part of discourse and practice to express the value of desirable, meaningful and reciprocal human relationships with nature and among people through nature {2.2.3.2}. Relational values help express the role of contextual bonds to places or practices. Recognizing instrumental, intrinsic *and* relational values as distinct ways people conceive the importance of nature and nature´s contributions to people also helps identify the scope, appropriateness and use of particular value indicators (e.g., biophysical, monetary and socio-cultural) and value elicitation methods. Considering different value expressions can help understand why perspectives on nature and nature´s contributions to people are divergent (i.e., sources of conflict, disagreement) or convergent (i.e., sources of collaboration, legitimation, alliances). In decision-making, specific values can be used to (i) make visible otherwise neglected, intangible costs and benefits, thereby facilitating more inclusive and just expression of values; (ii) clarify, reduce or avoid conflicts by fostering participation among stakeholders; (iii) enable a more comprehensive and representative evaluation of why people value nature differently, nature´s contributions to people and human-nature relationships; and (iv) build common ground across different stake- and right-holders in support of biodiversity conservation and sustainable development {2.2.3.3}.

7 The diverse values of nature and the different ways of relating to nature can be effectively organized and communicated through 'life frames' of nature's values, such as living from nature, living with nature, living in nature and living as nature (Table 2.1). The living from nature frame has been privileged in environmental research and policy, driving unsustainable outcomes *(well established)*. A more balanced representation provides multiple levers for sustainability transformations, including different sets of sustainability-aligned values *(established but incomplete)*. A systematic review illustrated that these four ways of framing values effectively encompasses diverse human-nature relationships. Living from nature emphasizes that nature matters for its uses, goods and services to support human life, needs and prosperity. Living with nature considers nature for its cycles, life supporting processes, and many other species, with a right to flourish regardless of their contribution to human well-being. Living in nature illustrates that nature matters as place and land, contributing to history, culture and meaning.

Living as nature emphasizes that nature matters because it constitutes people physically, mentally and spiritually, experienced through relations of oneness, kinship and interdependence {2.3.2}. These frames are not mutually exclusive; people and institutions can express and embed multiple frames. Over- or under-emphasizing a life frame can lead to unsustainable outcomes; for example, over-emphasizing living from nature can become living against nature, as evidenced by the over-consumption of nature's material contributions to people and the destruction of biodiversity {2.3.2.2}. Each life frame emphasizes different aspects of sustainability and justice, and as such can also leverage different sustainability-aligned values {2.3.2}. Shifting policy emphasis from living from nature to the broader set of frames provide multiple levers for sustainability by more comprehensively establishing relations between nature and good quality of life through a more inclusive set of policy tools and value indicators **(Table 2.1)** {2.3.2}.

8 Shared and social values, beyond the individual, are expressed in different ways, which has implications for how to engage diverse groups in decision-making about nature and its contributions to people *(well established)*. Values are represented and enacted in society at different scales beyond the individual, including groups, communities, societies and cultures. Social values can in part be

Table 2 1 **Life frames of nature's values.**

Chapter 2 applied four life frames to understand how certain broad and specific values are highlighted in particular decisions related to policy outcomes.

Life frames of nature's values	Living AS nature	Living IN nature	Living WITH nature	Living FROM nature
Examples of broad values relevant to policy framings	Oneness and harmony with nature, reciprocity, self-realisation, epistemic justice	Belonging, beauty, freedom, enjoyment, health, procedural justice for place-based management	Stewardship, responsibility, respect, recognition justice with regard to other species	Prosperity, livelihood security, efficiency, distributive justice for sustainable use
Emphasised specific values for nature & nature's contributions to people	*Relational & intrinsic* values for communities of humans & non-humans	*Relational* values of non-material & context-specific nature's contributions to people	*Intrinsic* values, *relational* values associated with stewardship, *instrumental* values of regulating nature's contributions to people	*Instrumental* use & option values of material & regulating nature's contributions to people, *relational* values of non-material nature's contributions to people in agriculture & fisheries
Example indicators to assess progress	• Participation in practices of care *(sociocultural)* • Conservation status of natural entities considered to harbour agency *(biophysical)* • Connectedness to nature scales *(sociocultural)* • Ethnographic references *(sociocultural)* • Recognition of legal personhood for nature *(sociocultural)*	• Landscape character assessments *(sociocultural)* • References in historical document analysis *(sociocultural)* • Tourism revenue *(economic)*	• Alpha, beta & gamma biodiversity *(biophysical)* • Legal rights of natural entities *(sociocultural)* • Planetary pressures adjusted human development index *(integrated)* • Extent of community conservation plans *(integrated)*	• Stock indicators *(biophysical)* • Environmental economic accounts *(economic)* • Inclusive wealth *(economic)* • Circular economy indicators *(economic)* • Gini correlations with natural resources *(economic)* • Recognition & distribution of indigenous and local land rights *(sociocultural)*
Example of policy measures	• Establish active targets & measures to address 'nature deficit' for urban populations and children (e.g., forest schools). • Design policies to protect languages & biodiversity in an integrated manner. • Support customary governance practices that ensure integrity of IPLCs & ILK.	• Link natural & cultural heritage through place-based management. • Design blue & green infrastructure to recognise needs of diverse groups through effective participatory processes. • Integrate green prescribing in health systems.	• Establish new protected areas in accordance with IUCN categories in partnership with diverse knowledge holders. • Build legal frameworks to establish & respect rights of nature. • Consistently assess impact on biodiversity & nature's contributions to people in tandem with economic impacts.	• Implement standards for national & corporate environmental accounting. • Implement alternatives to GDP more inclusive of natural capital. • Review resource access & rights distributions to take account of distributive justice concerns.

established by aggregating (i.e., summing up) individual values, but this is a conceptually and ethically challenging task that can lead to social inequities, especially when values of minority groups are masked or future generations are heavily discounted {2.4.1; **Box 2.9**}. Shared values are the broad and specific values that people express collectively, in groups, communities, and across society as a whole. They can be formed through long-term processes of value formation and socialisation and shorter-term processes, such as group deliberations {2.5.1}. They do not relate to a process of aggregation, but rather to a process of co-learning and bridging values. In deliberation, participants can act as citizens rather than consumers, frequently drawing on values towards the common good. This is important because there is often a mismatch between consumer preferences and sustainability-aligned values. Shared and individually aggregated social values do not necessarily diverge and can be used in tandem. However, shared values approaches can be more robust and considered more legitimate when policymakers are faced with substantial uncertainty, many constituencies and potential for conflict {2.2.4; **Box 2.9**}.

9 **When developing policies, decision-makers encounter stakeholders who conceive the diverse values of nature differently. Clarifying the similarities and differences between these conceptualizations can allow better engagement of different policy domains across sectors, academic traditions and social groups or cultures *(well established)*.** In the academic literature, most publications about the values of nature are on biophysical topics published in life and physical science journals. Socio-cultural topics are the second most numerous, while economics and themes related to indigenous and local knowledge are the fastest growing {2.1.2}. The most frequently referenced academic concept for understanding human-nature relationships was ecosystem services (40.5% of reviewed articles) {2.3.1}. Navigating between different worldviews is critical for engaging diverse knowledge systems, disciplines and social groups in environmental decision-making and for better understanding how conceptualisations of value differ across knowledges and languages {2.2.1; 2.2.2}. People express values through oral and written articulation, and also via praxis, including embodied corporeal and spiritual experiences {2.3.2}. Understandings and expressions of value vary within and across disciplines and between individuals and socio-cultural groups. Anthropocentric worldviews shape individual and collective behaviours to attend to human needs {2.2.1}. This contrasts with relational worldviews that emphasize how groups form shared values connected to nature and integrate them into institutions, such as norms and legal rules {2.2.1}. Bio- and ecocentric worldviews are also reflected in national biodiversity strategies & action plans (NBSAPs) {2.1.1}, highlighting nature's intrinsic values {2.2.1}. Interdisciplinary and intercultural dialogues involving multiple stakeholders and perspectives can enhance opportunities for nature's diverse values to be recognized and addressed in more legitimate and inclusive policymaking processes {2.2.2}.

10 **Conceiving the values of nature and its contributions to people in economic terms (e.g., via economic valuation, market value indicators, economic incentives) plays a predominant role in many individual, corporate and governmental decisions. These approaches effectively highlight the dependence of economies on nature, but are inadequately representing multiple value perspectives, especially intrinsic and relational values. Including a diversity of economic approaches and employing multiple indicators can help strengthen nature's diverse values in policymaking *(well established)*.** Conventional economics largely understands 'value' in terms of individual preferences expressed through actual or hypothetical market transactions {2.2.4}. This approach has made significant contributions to account for many values of nature that are not considered in actual market transactions, thereby facilitating their incorporation into policymaking. For example, focusing on the economic value of ecosystem services (e.g., total economic value framework) highlights the dependence of economic development and human well-being on ecosystems and helps decision-makers recognize a wide range of instrumental values {2.2.4}. At the macro-economic level, indicators like inclusive wealth can reflect the importance of ecosystem services for prosperity. While guiding policy and decisions in many situations, these approaches also have important limitations. They do not effectively represent intrinsic and relational values, which are more difficult to express in terms of monetary indicators. Moreover, instrumental values for vulnerable groups tend to be underrepresented in policymaking. Addressing such limitations can support more inclusive decisions based on different value indicators and more plural forms of valuation and decision-making. For example, policies can broaden the set of approaches employed to understand well-being, including ecological economics, feminist economics and ILK philosophies of good living {2.2.4; 2.4.2}, and use indicators reflecting more plural perspectives on well-being and its dimensions, such as the UNDP human development dashboard, the genuine progress indicator, or the sustainability dashboard {2.2.4; **Box 2.7**}.

11 **Many environmental policies seek to create or modify values of nature to affect behavioural change. Effective policies aiming to influence values can benefit from understanding value formation and change as interrelated individual, social and socio-ecological processes *(well established)*.** Frequently, policies like national biodiversity strategies and action plans attempt to directly link values

and behaviour by raising awareness of biodiversity or promoting pro-environmental attitudes {2.1.2; Annex 2.2}, but these are multi-faceted processes {2.4.1; 2.5.1}. For example, once formed, broad values are considered relatively stable, but are more malleable at certain development stages in an individual's life cycle (e.g., early childhood, early adulthood) or potentially due to major socio-ecological shifts (e.g., significant life events, political changes, natural disasters, pandemics). Consequently, significant changes to broad values in a society often occur at inter-generational time scales. By definition, though, specific values respond to particular contexts. Therefore, social structures and dynamics like markets, monetary incentives, social norms, cultural rituals and gender roles are important in forming and changing specific values. In turn, social and socio-ecological factors can be institutionalized and create feedback between value expression and formation {2.4.2.1; 2.4.2.2; 2.5.2}. For example, religions are practiced by most of the world's population, and as institutions their informal norms and formal structures shape, form and change worldviews and associated values {2.5.1; Annex 2.3}. Further, contextual factors like age-based roles and cultural practices not only express specific values, but they also modify them as a result of social dynamics and socio-ecological relationships between humans and nature (e.g., environmental education, arts, direct encounters) {2.4.1; 2.5.1}. In policymaking, it is relevant to distinguish change in values of individuals or social groups from change in their value expression via alterations in prioritizations. These changes also need to be considered in the context of shared and social values **(Box 2.9)**. In some cases, it may be more effective and ethical for policies that aim for pro-environmental outcomes to activate or enable existing sustainability-aligned values {2.4.1; 2.5.2}.

12 Biodiversity, languages, human-nature relationships and values are interconnected and have been simultaneously eroded. Policies can seek to form or maintain values at risk. Combatting biodiversity loss and nature degradation is connected to preserving knowledge about nature (i.e., ecoliteracy) and the languages that transmit such knowledge both among IPLCs and in broader society *(established but incomplete)*. Languages express biocultural diversity (i.e., the interconnections between biological, cultural and linguistic diversity), human identities and values. Languages capture, maintain, transmit and convey knowledge, values and practices that support biodiversity and nature´s contributions to people connected to specific places, ecosystems and territories. Biodiversity and human languages face critical and interlinked crises: around 40% of the world's estimated 7151 languages are already extinct or endangered, and about half of the languages currently spoken will likely disappear by the end of this century {2.2.2}. Language loss has led to an erosion of indigenous and local knowledge, ecoliteracy, and associated values of nature across diverse socio-cultural groups in both rural and urban settings. Policies seeking to value nature or conserve biodiversity could be reinforced by better integration with knowledge, culture and language-oriented research and policies, including intercultural and multilingual language education and revitalization. Doing so would enhance strategies for sustainable living by being more inclusive of diverse conceptualizations of nature's values {2.2.2; 2.2.3}. This would also enhance policy efficacy to conserve biocultural diversity, which includes both biodiversity and the different place-based languages, practices and values connected to it {2.2.2; 2.2.3; **Box 2.3**}.

13 Values can be expressed explicitly and implicitly. In addition to the influence of worldviews, languages, knowledge systems and power relations, value expressions are affected by the decision-making context. Critical factors to consider include institutions, individual capacities and biophysical conditions *(well established)*. Explicit value expressions are those where it is possible to identify what is considered to be important. They may include oral (e.g., deliberation) as well as written expressions (e.g., stated preference surveys), values as expressed in market purchases, and community decisions. On the other hand, implicit value expressions are tacit and embodied in everyday practices (e.g., habits) and rituals {2.4.2}. Both forms of value expression are mediated by institutions (i.e., norms, customs, legal rules) that promote certain values and obscure others, which in turn influences actions and outcomes **(Figure 2.2)**. Understanding the relationship between institutions and values can help identify leverage points for changing values expressed in decision outcomes. For example, environmental policies and incentives can be designed to fit local institutions, promoting greater social acceptance and compliance {2.4.1.3}. Beyond institutions and biophysical conditions, actions and behaviour are influenced by individual factors, such as demographics, income and physical and cognitive capacities {2.4.1.2}. The coexistence of these individual, social and biophysical aspects influencing action can create a gap between expressed values and observed actions {2.4.1.2}. Therefore, strategies oriented to protect nature's diverse values can be improved if the relationships and conflicts between these elements are identified and addressed {2.4.1}.

14 Valuation methods are based on different rules regarding who should participate in the valuation process, and in what form values can be expressed and conclusions drawn by valuators. Hence, the type of method used influences which values are emphasized in valuation processes, how they are interpreted, communicated and ultimately influence policy outcomes. Decision-makers may enhance the quality and relevance of valuation studies by systematically identifying the method(s)

that are the best fit to the issue at hand *(well established)*. Valuation methods and approaches (e.g., deliberative methods, economic valuation, environmental impact assessments and multi-criteria analyses) facilitate value visibility and expression. By defining whose values are considered, how values can be expressed and what knowledge and value aspects become emphasized, methods strongly influence the values elicited and the ensuing policy recommendations {2.4.2.2}. Being more aware of these implications will increase the quality and relevance of valuation outcomes. In such assessments, it is important to consider the type of values at stake and their framing, how the involved stakeholders can best express these values, how value conflicts should be treated, and how to recognize the power dynamics involved {2.4.2; **Box 2.9**}.

15 Addressing the knowledge gaps (e.g., research, data) and operational gaps (e.g., information, resources, capacities) identified by this chapter can help make decision-making more rigorous, effective and ethical *(established but incomplete)*. Further study of the diverse ways nature's values are understood can help bring to light new perspectives (e.g., **Box 2.5**), and highlight how values are affected by social and power structures (e.g., gender roles, IPLC) {2.2.1; 2.4.2.2; 2.5.1}. First, new research is particularly important to take into account ways of knowing and valuing that are not necessarily expressed in international academic databases {2.1.2; 2.2.1} to reflect the interests of the world's historically disadvantaged peoples {2.4.2}. This also includes coordinating efforts to link linguistic studies and language revitalization efforts into biodiversity studies and management plans, as well as into valuation initiatives and decisions across scales {2.2.2}. Second, policies need more information to predict how values will respond to socio-ecological shifts (e.g., natural disasters, climate change, biodiversity loss) {2.5.2}. Third, bridging or balancing multiple life frames and forming shared values require new resources and capacities to be able to identify and manage diverse conceptualizations of nature, such as the ability to navigate between disciplines, worldviews, cultures, knowledge systems and languages {2.2.1; 2.2.2; 2.3.2}. In particular, there are opportunities to broaden and diversify the policy application of different values of nature. Specifically, the relational value concept has been little operationalized in policy {2.1.2; 2.3.1}. Finally, there is an operational need to identify institutional constraints and catalysts for integrating diverse understandings of nature (and their associated social groups) into decision-making processes via transformative policies (e.g., pandemic preparedness, decarbonizing and "greening" economies, corporate governance, socio-environmental justice, and the use of plural indicators of sustainable economic and societal goals, among others) {2.4.2; 2.5}.

2.1 INTRODUCTION

2.1.1 Scope of the chapter

There is consensus among IPBES member-states that environmental and development decisions are not achieving their intended values-related outcomes (IPBES/6/INF/9). This 'values crisis' relates directly to humanity's multiple socio-environmental crises, including the loss of biological and cultural diversity, the risks associated with climate change, the emergence of pandemic diseases and obstacles for achieving equitable, just and sustainable lifestyles (IPBES, 2019c; MEA, 2005; Pörtner *et al.*, 2021; United Nations, 2015; Zafra-Calvo *et al.*, 2020). In this context, 'values' include life goals, beliefs and general guiding principles. Values also can reflect judgements or measurements of the importance of specific things in particular situations and contexts. When considering the values of nature, one can refer to nature itself, nature's contributions to people or the ways people express the value of life-supporting processes, functions and systems –interrelating biophysical, spiritual or symbolic aspects. Chapter 2 focuses on these diverse conceptualizations of nature's values, given that they emerge from the different ways people understand, interpret and experience human-nature relationships.

Despite nature's diverse values, predominant environmental and development paradigms have prioritized a subset of ecological measures (e.g., genetic diversity, endemic species richness) and economic growth indicators (e.g., Gross Domestic Product) (Dasgupta, 2021; Menton *et al.*, 2020; Otero *et al.*, 2020). Global reviews demonstrate that international biodiversity policies and databases lack a 'diversity of values' approach (Zisenis, 2009); most databases developed specifically to implement ecosystem services policies focus on economic indicators (Schmidt & Seppelt, 2018). Similarly, a review conducted for this chapter of national biodiversity strategies & action plans (NBSAPs)[3] found that in both the Global North and South, national biodiversity strategies & action plans apply the Convention for Biological Diversity's (CBD) expansive understanding of nature's values in overall objectives, but continue to emphasize anthropocentric framings and biophysical and economic indicators in their implementation activities (see Annex 2.2). Indeed, national biodiversity strategies & action plans are mostly about vision and planning, and none of those reviewed explicitly detailed how to treat diverse values in policy tools. Nonetheless, there are examples of socio-cultural indicators (e.g., environmental awareness) and indigenous and local knowledge integration (e.g., inclusion of historically disadvantaged stakeholders) in these documents, as well as recognition of intrinsic values and ecocentric worldviews.

3. Analysis of national and international policy documents related to biodiversity and sustainability (https://doi.org/10.5281/zenodo.4399907).

This chapter aims to support improvements in decisions and policymaking by **characterizing and assessing different conceptualisations of the diverse values of nature, including human-nature relationships, from different academic and socio-cultural traditions and perspectives** (IPBES/6/INF/9). The chapter is guided by five questions that structure its sections:

- **2.2:** How may nature's diverse values be conceived and categorized?
- **2.3:** What frameworks help organize and communicate value systems?
- **2.4:** What factors affect value expressions in individual actions and collective decisions?
- **2.5:** How can value formation and change be understood as dynamic processes?
- **2.6:** What do this chapter's findings offer to the IPBES, policy and this assessment on values?

2.1.2 Characterizing different conceptualizations of nature's diverse values

The recognition of nature's diverse values is not new (Adams, 1940; Craig *et al.*, 2019) (see 1.1.2). Environmental research and policy communities have worked for several decades to operationalise the ecosystem services concept and methodology to help quantify how nature positively and negatively affects humans (e.g., ecosystem services and disservices) (Campagne *et al.*, 2018; Gómez-Baggethun *et al.*, 2010; TEEB, 2010a; Vaz *et al.*, 2017). During the 2000s, the millennium ecosystem assessment (MEA, 2005) consolidated and globalized this approach. The United Nations-led report conceived ecosystems as natural capital with benefits (and costs) for human societies insufficiently reflected in market transactions and public payments. As such, nature's instrumental and intrinsic values (see 2.2.3) were highlighted, which allowed ecological and economic research to better inform the biodiversity and sustainability science-policy interface (e.g., FAO, 2020; Foundation for Sustainable Development, 2021; Harte Research Institute for Gulf of Mexico Studies, 2020).

However, the ecosystem services framework is also critiqued from multiple perspectives; IPBES assessments, therefore, use the broader notion of nature's contributions for people (which considers ecosystem services but also other ways to frame human-nature relations) to bridge these multiple considerations (e.g., IPBES, 2018a, 2018b, 2018c, 2018d, 2019). For example, when represented as benefits using stock and flow models, ecosystem services may not capture the complexity and uncertainty of ecological systems (Norgaard, 2010). They also may overlook indigenous and local knowledge perspectives that present more embodied and relational understandings of human-nature connections (Díaz *et al.*, 2018a; Raymond *et al.*, 2013). Furthermore, the ecosystem services approach risks giving insufficient attention to ethics of care, reciprocity and responsibility, grounded in the relationships between people and nature (Chan *et al.*, 2016). At the same time, the ecosystem services framework has multiple strengths; it can enhance communication, promote understanding of human-nature relationships and support coordinated actions (Jax *et al.*, 2018). However, seeking to mainstream concepts like ecosystem services requires a commitment to considering diverse socio-ecological contexts and place-based biocultural interactions, more diverse values like justice, as well multiple paths and methodologies for tackling the complexities of environmental problems across varying contexts (Jax *et al.*, 2018).

Given the diverse ways of understanding nature's values, Chapter 2 conducted a scoping review of 40,133 academic documents[4] published since the millennium ecosystem assessment (MEA, 2005). While ecosystem services predominate in academic articles (see 2.3.1), research on nature's diverse values has increased across a range of topics (see **Figure 2.3A**). Most studies address biophysical themes, but the greatest increases were registered for economic and indigenous and local knowledge topics. These studies are mostly published in life and physical sciences journals, but a substantial proportion is found in interdisciplinary fora (see **Figure 2.3B**). Studies about socio-cultural topics were the second-most numerous, published largely in social science journals and less so in interdisciplinary outlets. While ecosystem service reviews tend to criticize a bias towards economic values of nature (Schröter *et al.*, 2014) a more expansive set of search terms demonstrate the diverse conceptualisations of nature and its values across different academic traditions. However, such more expansive notions have had less prominence in environmental policy discourse[5].

The academic traditions are different ways of characterizing nature and its values and put emphasis on particular dimensions of nature and human-nature relationships:

- **Biophysical** studies mostly conceive nature's values as stocks and flows of materials, organisms or energy (see 2.2.4). For example, ecology investigates nature's components (e.g., species diversity, carbon standing stocks) and processes (e.g., hydrological cycles, state-and-transition models) (Barton & Harrison, 2017).

4. Literature review on multiple values concepts in academic literature (https://doi.org/10.5281/zenodo.4396319).
5. Literature review on multiple values concepts in academic literature (https://doi.org/10.5281/zenodo.4396319).

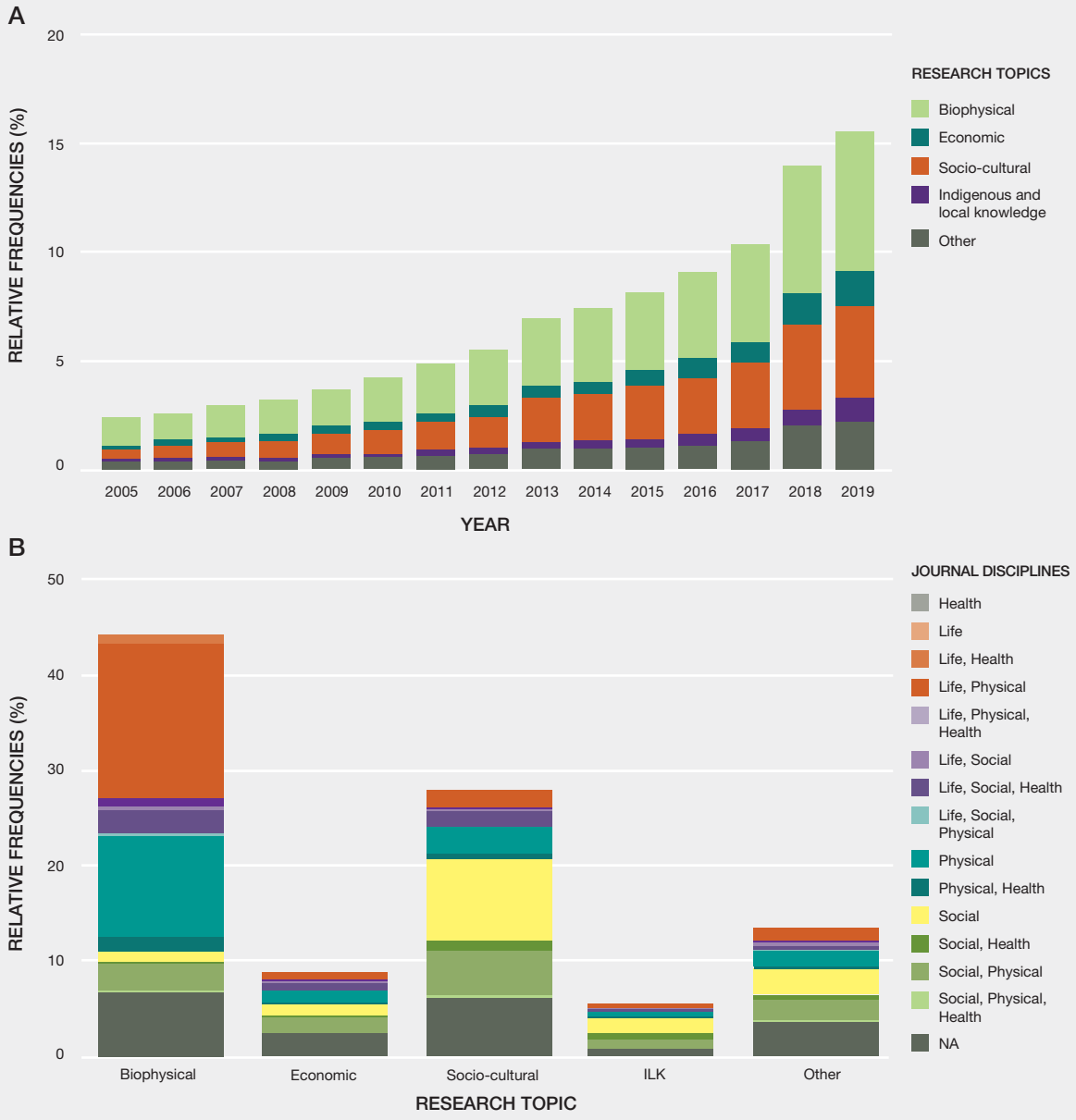

Figure 2 3 **Review of the diverse values of nature.**

Chapter 2's Stage III literature review[6] identified 40,133 abstracts in Scopus about nature's diverse values. Data are presented as each analytic category's relative frequency (%) in the entire database. **(A)** An artificial intelligence (AI) algorithm produced 60 categories that were manually classified by the predominant research topics for each, resulting in 46 assessment-relevant categories (30 biophysical, 3 economic, 6 socio-cultural, 1 ILK, and 6 'other' that did not fit one single type of topic). **(B)** Journal disciplinary domain was based on self-identified categories in Scopus: life, physical, health, social sciences or an interdisciplinary combination. NA are journals that did not self-report a discipline.

Foundational to ecosystem services, this domain quantifies nature´s contributions to people from life-support processes, including biogeochemical cycles and pollination, which underlie many material and regulating nature´s contributions to people (Ehrlich & Mooney, 1983; Seppelt *et al.*, 2011).

Economic approaches typically characterize nature's values through individual preferences under a utilitarian framing (e.g., willingness-to-pay) (see 2.2.4) and have been developed for making ecosystem services trade-offs and measuring relationships to well-being in economic terms (TEEB, 2010a). This domain provides various policy-relevant distinctions like use and non-use values (e.g., bequest values) and has been successfully applied to some policy instruments (e.g., environmental

6. Literature review on multiple values concepts in academic literature (https://doi.org/10.5281/zenodo.4396319).

taxes, payments for ecosystem services (Gómez-Baggethun *et al.*, 2010) (see 2.2.3).

- **Socio-cultural** studies, including a broad suite of social sciences (e.g., sociology, anthropology, political sciences) and the humanities (e.g., philosophy, history, literature) often consider non-material nature´s contributions to people. Research has focused on cultural ecosystem services like recreation and tourism (Plieninger *et al.*, 2013; Scholte *et al.*, 2015), and studies increasingly address broad values like care, reciprocity and responsibility (see 2.2.3.1). Understandings of value vary across research paradigms, including social constructionism and social phenomenology. Each paradigm is guided by different theories of value and behaviour, including those that seek to understand the value-basis of environmental beliefs and behaviour or those that seek to understand values as practices (see 2.2.1).

- **Health** is a multidisciplinary field of study, incorporating elements from biophysical (e.g., disease transmission), economic (e.g., disease costs due to lost productivity) and socio-cultural (e.g., relationships between gender and disease) domains. For example, the 'one health' concept spans medicine, psychology, epidemiology, economics, veterinary sciences and ecology (Hasler *et al.*, 2014). The linkages between environmental and human health include physical, mental, spiritual and social benefits that can be accounted for in the design and implementation of policies, particularly in urban areas (Hartig *et al.*, 2014; Tillmann *et al.*, 2018).

- **Indigenous and local knowledge** (ILK) studies consider nature's values being context-specific or place-based, rather than generalized understandings of 'humans' or dominant socio-demographic groups. This domain recognizes indigenous peoples and local communities (IPLCs) not only as 'subjects' of research, but also agents who produce and validate their own knowledge(s) (Smith, 2012)[7].

The IPBES conceptual framework recognizes that the values of nature are conceived and justified based on multiple cultural and academic traditions (Díaz *et al.*, 2015; IPBES-2/4). Each knowledge tradition highlighted above gives particular concepts and analytic depth appropriate for different situations (Díaz *et al.*, 2018a; Pascual *et al.*, 2017). This chapter provides guidance on how to use different approaches to characterize nature's diverse values, which arise from the different lenses through which people interpret and experience human-nature relationships (i.e., worldviews). As a result, diverse values have different meanings across knowledge systems, cultures, languages and socio-ecological contexts (see 2.2.1, 2.2.3). Often, this diversity cannot be reduced to unidimensional conceptualisations, but rather needs to be considered through multiple layers, such as nature's ethical and cultural importance. In this chapter, the reader will find typologies and frameworks to identify and organize the diversity of values, showing areas of convergence and overlap, fuzzy conceptual boundaries and points of difference. These characterizations are grounded in the 'relational turn' in environmental policy and decision-making, which recognises not only the instrumental and intrinsic values of nature, but also principles embodied in relationships between humans and the other-than-human world (Chan *et al.*, 2012; Hart, 2010; Raymond *et al.*, 2013; 2017b; Zafra-Calvo *et al.*, 2020).

2.1.3 Assessing different conceptualizations of the values of nature

Scoping, critical and systematic review methods were used to identify, screen, select and evaluate literature (Grant & Booth, 2009; Moher *et al.*, 2009; Pham *et al.*, 2014). To confront the regional-biases in evidence, publications in languages other than English were sought. A three-staged approach was used to obtain information (see *data management reports* for methodologies).

- **Stage I** consisted of a systematic literature evaluation of review articles about nature's values indexed in Scopus from 2005 to present[8]. Initial relevance screening determined 713 publications to evaluate. Delimiting this time period allowed quantification of publication trends since the millennium ecosystem assessment (MEA, 2005), given its pivotal academic and political role in consolidating the ecosystem services paradigm (Larigauderie & Mooney, 2010).

- **Stage II** protocols incorporated earlier publications and seminal sources cited in Stage I[9] (snow-ball technique). New searches included: (i) disciplines and approaches that are underrepresented in global databases (e.g., humanities) (Mongeon & Paul-Hus, 2016); (ii) individual keyword searches for specific topics (e.g., intrinsic, instrumental, relational values; worldviews; behaviour theories; human-nature relationship frameworks; different types of decision-making; fisheries at the global

7. Systematic review of indigenous and local knowledge and philosophies (https://doi.org/10.5281/zenodo.4396278).

8. Systematic review on the conceptualizations of values (https://doi.org/10.5281/zenodo.4071755).

9. Systematic review on the conceptualizations of values (https://doi.org/10.5281/zenodo.4071755).

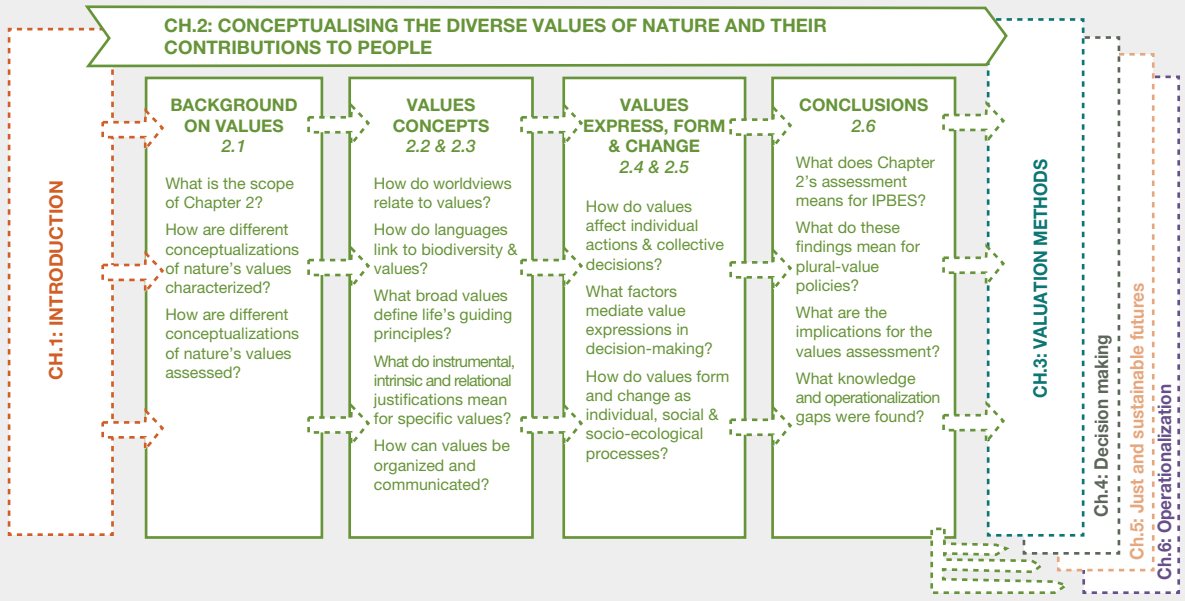

Figure 2 4 **Road map to Chapter 2.**

The sections of the ensuing chapter answer specific questions and develop key concepts that enable decision-makers to more rigorously, effectively and ethically engage nature's diverse values in policy.

scale)[10, 11, 12, 13, 14]; (iii) policy documents from national biodiversity strategies & action plans and other major biodiversity reports[15] (see Annex 2.2); (iv) indigenous and local knowledge sources, obtained from academic literature reviews and a call-for-contributions directed mainly to IPLCs and indigenous scholars from around the world (which was used both for the values and the sustainable use of wild species IPBES assessments)[16, 17, 18] and (v) contributions from *values assessment* experts and contributing authors[19].

- **Stage III** identified 148,082 publications by applying Stage I's search string and date range, but without filtering results for review articles and including agricultural studies. Given the database's size, abstracts were analysed with an artificial intelligence algorithm that created 60 research topic categories. Manually coding these produced a final total of 43 categories with 40,133 abstracts [20].

- **Case studies** and examples were chosen for illustrative purposes. While there are infinite possible cases, those selected represent core concepts, span geographic regions and address common themes. These include an assessment-wide case study on ILK-based socio-political processes related to Philosophies of good living found worldwide (see **Box 2.4**; see 1.4.2) and three chapter-wide case studies on (a) local knowledge and coastal fisheries management in the UK (see **Box 2.8**; Annex 2.4), (b) worldviews that affect land-use decisions about mining in India (see **Box 2.12**; Annex 2.5) and (c) values-articulating institutions and watershed management in the United States of America (see **Box 2.10**; Annex 2.6).

Combining these strategies, this chapter builds upon previous scholarship and governance practices, particularly the ecosystem services research-policy tradition (TEEB, 2010a), other global assessments (IPBES, 2019c; MEA, 2005) and relevant policy documents (e.g., national biodiversity strategies & action plans, the 2030 Agenda for Sustainable Development, the draft of the targets of the post-2020 global biodiversity framework, (Convention

10. Systematic review of value types (https://doi.org/10.5281/zenodo.4396289).
11. Literature review on the diverse perspectives on fisheries at the global scale (https://doi.org/10.5281/zenodo.4399386).
12. Literature review on value articulating institutions (https://doi.org/10.5281/zenodo.4399373).
13. Behaviour theories literature review (https://doi.org/10.5281/zenodo.4399396).
14. Literature review regarding values, valuation and decision-making (https://doi.org/10.5281/zenodo.4396349).
15. Analysis of national and international policy documents related to biodiversity and sustainability (https://doi.org/10.5281/zenodo.4399907).
16. Systematic review of indigenous and local knowledge and philosophies (https://doi.org/10.5281/zenodo.4396278).
17. Call for contributions on indigenous and local knowledge (https://doi.org/10.5281/zenodo.4390417).
18. Systematic review of indigenous and local knowledge and philosophies (https://doi.org/10.5281/zenodo.4396278).
19. Analysis on contributions on interconnections between languages, biodiversity and values (https://doi.org/10.5281/zenodo.4399917).
20. Literature review on multiple values concepts in academic literature (https://doi.org/10.5281/zenodo.4396319).

on Biological Diversity, 2021; United Nations, 2015)). Using these data, the chapter's sections (see **Figure 2.4**) assess different conceptualizations of the values of nature across academic, policy and sociocultural contexts to better recognize, communicate and incorporate diverse values in decision-making (see 2.1). A typology was developed to introduce core concepts, including worldviews, broad values, specific values and value indicators (see 2.2). To organize this complexity, four life frames are presented to illustrate how particular human-nature relationships prioritize certain sets of values (see 2.3). Since multiple factors condition value expression in individual and collective decisions and actions, detailed attention was given to how values are embedded in the norms and legal rules that constitute social, political and economic processes and contexts (see 2.4). Moreover, values formation and change can be understood as a dynamic process, for which information was combined to understand these individual, social and socio-ecological processes (see 2.5). Finally, the chapter's findings are used to inform broader IPBES efforts and their relevance for plural-value policies (see 2.6). The chapter's annexes present additional information, evidence, examples and contextualization for the diverse concepts and policy-implications addressed in the main text.

2.2 TOWARDS A MORE INCLUSIVE UNDERSTANDING OF THE DIVERSE VALUES OF NATURE

This section explores how interacting value concepts and dimensions, categorized as worldviews, broad values, specific values, preferences and indicators, help interpret different ways of understanding what humans consider 'good' and 'important' in their experiences and interconnections with nature **(Box 2.1)**. The values typology covers the following core concepts:

- **Worldviews** embody different knowledge systems, languages and perspectives about human-nature relationships (see 2.2.1). They have a critical role in shaping how values are constructed, expressed and assessed in science and society (see 2.2.2) **(Boxes 2.2, 2.3)**. Worldviews also respond to changing lifestyles and the displacement or loss of local languages as evidenced by a significant reduction in ecoliteracy globally (see 2.2.2) **(Box 2.3)**.

- Different **broad** and **specific values** can co-exist (see 2.2.3, 2.2.4). Considering this diversity of values can help build mutual understanding of environmental challenges; make otherwise neglected, intangible costs and benefits more visible; facilitate a more robust, inclusive and just articulation of values; and increase the socio-environmental acceptability and adoption of policy interventions.

- Values can be assessed using various **indicators** or preferences (see 2.2.4). How biophysical, monetary and socio-cultural indicators are assessed, combined or compared influences whose voices are heard in development and environmental decision-making.

- **Life frames** of nature's values (e.g., living from, living with, living in and living as nature) provide a way of organizing and communicating the complexity of values and values concepts (see 2.3). Each life frame is associated with different understandings of human-nature relationships that often overlap and can express different sustainability-aligned values.

2.2.1 Worldviews, knowledge systems and values of nature

Worldviews are forged through the dynamic interplay between individuals, social groups, and place in both biophysical and built environments, beginning in early childhood and being configured by situations encountered and roles enacted throughout one's life. Multiple factors shape worldviews, including knowledge systems, languages (see 2.2.2), and religion (see **Box 2.2**) (Koltko-Rivera, 2004). Worldviews can also be influenced by cultural encounters, such as through human displacement and migrations. They are expressed through social organization and governance structures, including norms, laws, and management systems (Gratani *et al.*, 2016; Nemogá, 2019; Vatn, 2015) (see 2.4). For example, the international conservation framework is dominated by worldviews that originated in Western societies, which often have a dualistic perspective of humans and nature, resulting in protected areas as a form of biodiversity management (Bartel *et al.*, 2020; Köhler *et al.*, 2019).

The diversity of worldviews challenges decision-making processes, which often encounter opposing or conflicting perspectives across different social actors connected to socio-environmental problems like urban transportation, watershed protection or mining (Chuang *et al.*, 2020). Power structures mediate the social dynamics of groups within worldviews, determining which worldviews are most represented in decision-making (see 2.4.2.3). For example, indigenous worldviews are often excluded from conceptualizations of development, including the Sustainable Development Goals (SDGs), which can lead to feelings of injustice or irrelevance among indigenous peoples (van Norren, 2020).

Box 2 1 Concepts used in Chapter 2 to understand nature's diverse values.

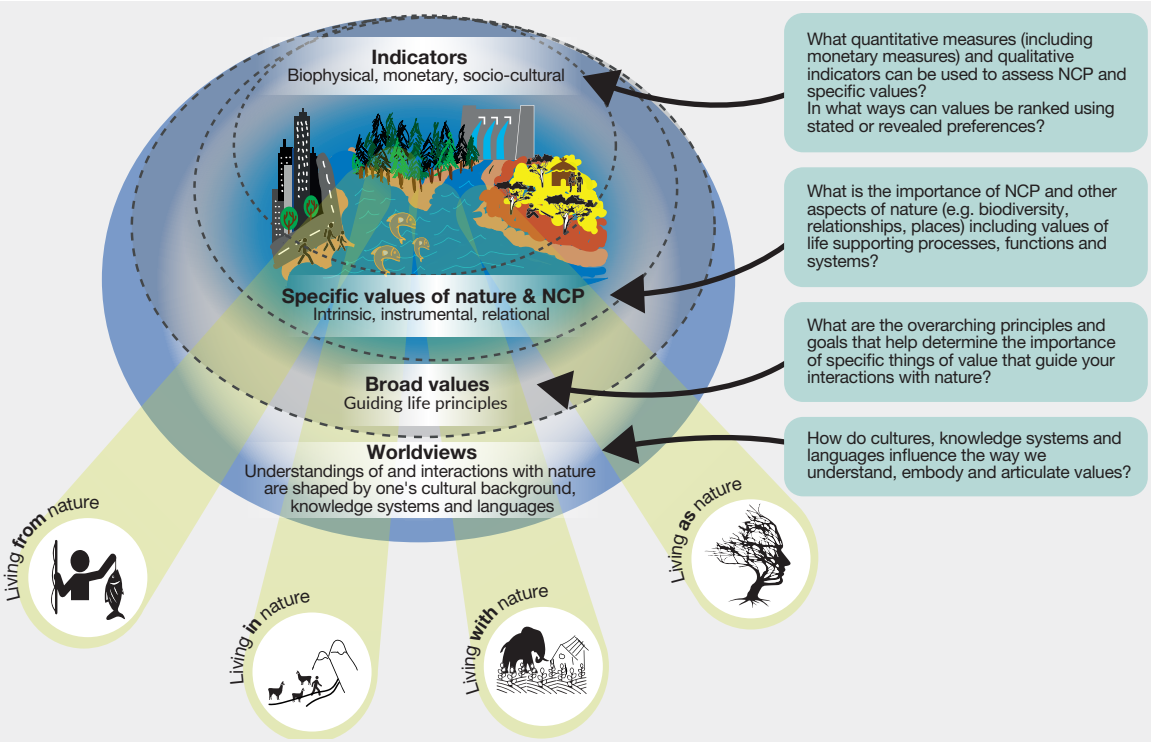

Figure 2 5 Value concepts developed in Chapter 2.

Worldviews, broad values, specific values, preferences and indicators relating to nature, nature's contributions to people and good quality of life can be depicted like the overlapping layers of an onion. Perspectives on how to organize these values, illustrated here by spotlights, are partially determined by one's life frames of nature, or the ways of being/living in the world that prioritize particular sets of values in specific valuation contexts.

Worldviews are like lenses through which individuals and social groups perceive, think about, interpret, inhabit and modify the world. Rooted in *cultural traditions* and *languages*, they help to shape people's broad and specific values (see 2.2.1, 2.2.3). They also guide perspectives on our conceptualization of and relationship with nature, based on underlying value systems – a set of ethical principles and beliefs that drive or guide individual and/or social behaviour (see 2.2.1).

Knowledge systems are cumulative bodies of knowledge, practices and beliefs, evolving and governed by adaptive processes and handed down and across generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment.

Broad values are 'life goals' and 'guiding principles' informed by one's worldview and general beliefs, including what constitutes desirable human-nature relationships for a good quality of life (e.g., the desire for sustainability and justice). Broad values span particular contexts, but originate in and arise from specific cultural settings, languages and places that affect individuals and collectives (see 2.2.3). Often embedded in a society's institutions (i.e., norms, rules), these values tend to be relatively stable (see 2.5).

Specific values are 'opinions' or 'judgements' regarding the importance of things or situations expressed in particular contexts (e.g., components of nature, human-nature relationships, aspects of well-being). Specific values are justified as instrumental, intrinsic and relational (see 2.2.3, 2.2.4). They can be activated, formed and changed via individual, social and socio-ecological processes.

Indicators are the 'quantitative measures' (e.g., money, hectares) and 'qualitative descriptors' (e.g., expressions, arguments, stories) of specific values. Value indicators are associated with valuation methods and can include preference-based indicators (e.g., willingness-to-pay). Three categories are used in this chapter: biophysical, monetary and socio-cultural. Health indicators were treated as part of biophysical, economic or socio-cultural categories, while ILK-holistic indicators are part of the socio-cultural category (see 2.2.4).

Preferences denote 'stated' or 'revealed choices' of one or more alternatives over others and can be expressed in economic or sociocultural terms. Despite being considered synonyms for value in some disciplines (e.g., economics), preferences can be understood as rankings of possible outcomes in terms of their specific value to people (e.g.,

Box 2 1

preferences related to health and good quality of life) (see 2.2.4).

Life frames of nature's values illustrate the ways that people conceptualise, or frame, how nature matters. The four archetypes of living from, living in, living with and living as nature are not mutually exclusive. They offer a range of sources-of-concern for nature that can overlap or be emphasized in diverse contexts (see 2.3.2). Life frames are similar to value systems in that they inform the order and priority that an individual or group assigns to specific values in context.

Worldviews are foremost a cultural product, while there are also individual variations. For instance, a farmer may see land mainly as a productive input to crop production, while a neighbour may have a stronger symbolic connection to the land based on a long-term relationship with that specific place. These two individuals may belong to the same culture but hold distinct worldviews and values with regard to farming, which has implications for their decisions and actions.

Worldviews encompass and inform broad values (see 2.2.3). Broad values influence how different specific values of nature (see 2.2.4) are expressed and prioritized, thereby structuring human-nature interactions and influencing biodiversity outcomes. For example, certain indigenous and local food systems are strongly rooted in gender roles and built on the broad value of reciprocity, which could encourage sustainable production systems elsewhere (Huambachano, 2018; Mizuta & Vlachopoulou, 2017). Indeed, this link between worldviews and actions was supported by a global study from 24 different countries that found people who had worldviews with pro-environmental values were more likely to endorse actions for mitigating global warming (Broomell *et al.*, 2015).

The literature on nature's values categorises worldviews in multiple ways. However, anthropocentric and bio- and eco-centric are most prevalent in both academic literature and policy documents (see Annex 2.2). While these worldviews have distinctive value orientations, there is a considerable amount of variation and overlap within and among them (see **Figure 2.6**).

- **Anthropocentric** worldviews prioritize humans, ranging from a narrow/strong human emphasis to weak/relational perspectives that do not deny non-human others (Hargrove, 1992; Norton, 1984). **Strong/narrow anthropocentrism** refers to human prioritization or superiority over other species. Under this worldview, humans are valued above nature (e.g., justifying the use of pesticides to increase crop yield despite costs to other species) (Deb *et al.*, 2010). Strong/narrow anthropocentrism is primarily associated with instrumental values. **Weak/relational anthropocentrism** refers to human values, but also recognises human dependence upon essential relationships to nature and other-than-human beings (Bannon, 2014; Plumwood, 1993). Weak/relational anthropocentrism is associated with both instrumental and relational values.

- **Bio- and eco-centric** worldviews emphasize nature's inherent or intrinsic value, in terms of individuals (e.g., each organism or species) and collectives (e.g., ecosystems). These worldviews consider living beings and the interdependent web-of-life as worthy of respect and important in decision-making (Callicott, 1989; Taylor *et al.*, 2020).

- **Pluricentric** worldviews, reflecting an emerging conception that aligns with relational values, focus on relationships between humans and other-than-human beings, as well as nature's elements and systemic processes, conceived as reciprocal, interdependent, intertwined and embedded (Gould *et al.*, 2019; Matthews, 1994; Saxena *et al.*, 2018). Further, what are sometimes termed cosmocentric worldviews share the relational qualities of both biocentric and pluricentric worldviews, but emphasise the separate roles that objects, humans, animals, land, water, and everything else plays in maintaining its place and the world itself (Lucero, 2018).

In three literature reviews of worldviews, anthropocentric worldviews were most represented in the values types review[21] and ILK review[22], whereas pluricentric worldviews were most represented in the Philosophies of good living review[23] (see **Figure 2.7**). Instrumental values were most closely associated with strong anthropocentrism, while instrumental and relational values were most associated with weak anthropocentrism. Intrinsic values were associated with bio- and ecocentric worldviews, and relational values were most associated with pluricentric worldviews. These results are based on reviewed literature and do not necessarily reflect the global real-world prevalence of worldviews, as the academic literature can have several biases towards certain types of knowledges and languages that underlie worldviews (Mongeon & Paul-Hus, 2016).

21. Systematic review of value types (https://doi.org/10.5281/zenodo.4396289).
22. Systematic review of indigenous and local knowledge and philosophies (https://doi.org/10.5281/zenodo.4396278).
23. Literature review for the philosophies of good living (https://doi.org/10.5281/zenodo.4399544).

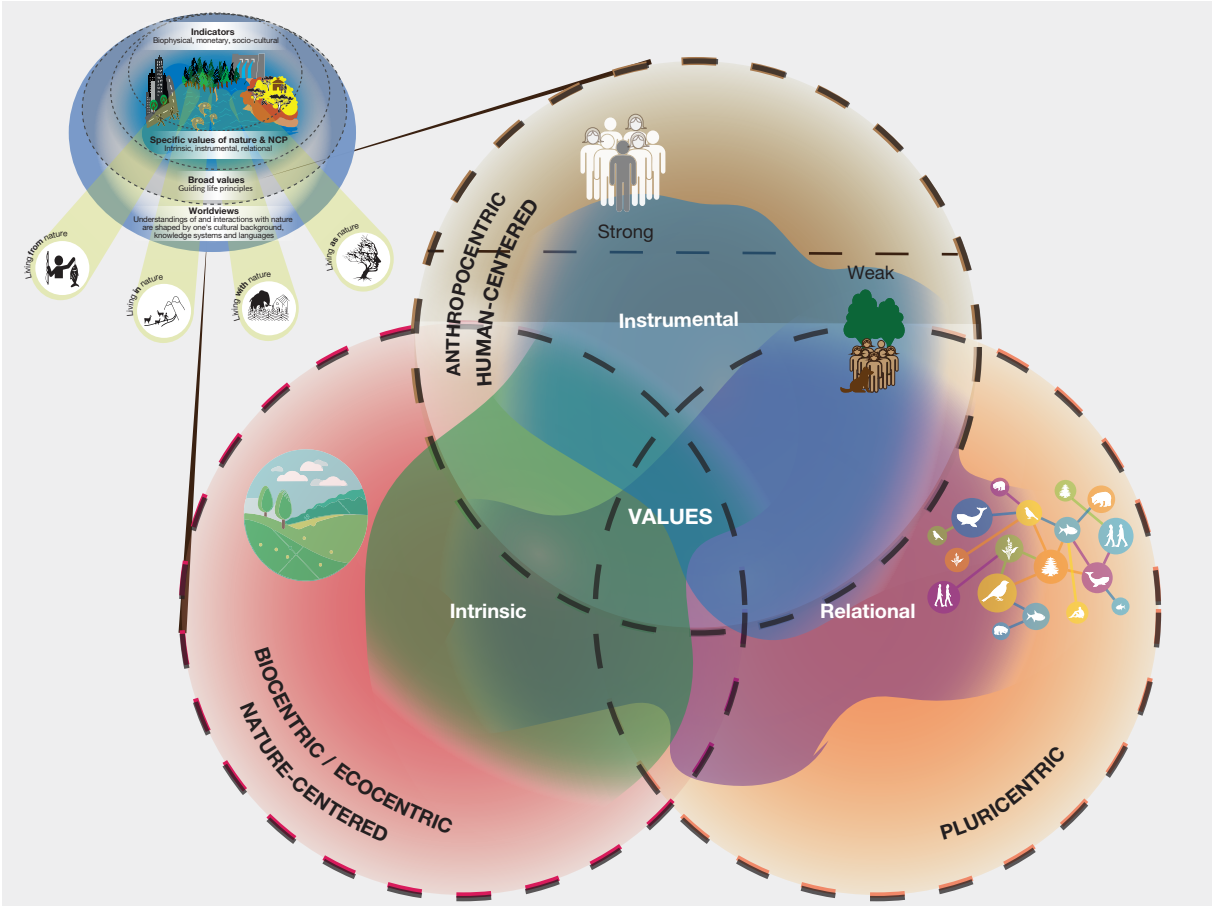

Figure 2 6 **Worldviews and values.**

Worldviews act as lenses through which humans perceive, conceive, inhabit and shape the natural world. Based on the literature, human-nature worldviews can be organized in three main types: anthropocentric worldviews (humans at the center); bio- or ecocentric worldviews (animals, plants and other beings, ecosystems and ecological processes at the center); and pluricentric worldviews (no center, the main focus is on relationships among human and non-human beings, elements and processes). These worldviews can overlap and may also be connected to broad and specific values of nature, driving human behaviour and policy-making (see 2.2.3).

Knowledge systems, including academic ones, are context-specific, culturally embedded, differ intergenerationally, and are based on lived experiences. Attempts to make them universally applicable beyond these contexts can lead to power hierarchies that privilege dominant groups or delegitimize those less powerful (Saxena *et al.*, 2018). Knowledge systems can also vary based on different lived experiences and societal roles. For example, gender can affect knowledge and values through specific interactions with the environment, which has been well established by our literature review[24, 25, 26], where 32/35 papers establish gender differences in values, attitudes, or ecological knowledge such as that about wild plants, fish, amphibians, and agro-ecological food systems and markets.

Regarding values, an important difference among knowledge systems is whether values are seen as: (i) distinguishable, persistent, self-existent mental constructs (as is common in economics and social psychology) or (ii) dynamically constructed in-context (as is common in humanities, qualitative social sciences, and indigenous peoples and local communities) (Kenter *et al.*, 2019). Results of survey research conducted among experts of this assessment revealed clusters with divergent views, regarding knowledge validation and confirmation (Hakkarainen *et al.*, 2020), which has different implications for implementing diverse value assessments (see Annex 2.7).

The spectrum of worldviews, knowledges and values of nature represented in humanity is multifaceted, overlapping

24. Systematic review of value types (https://doi.org/10.5281/zenodo.4396289).
25. Systematic review of indigenous and local knowledge and philosophies (https://doi.org/10.5281/zenodo.4396278).
26. Literature review for the philosophies of good living (https://doi.org/10.5281/zenodo.4399544)

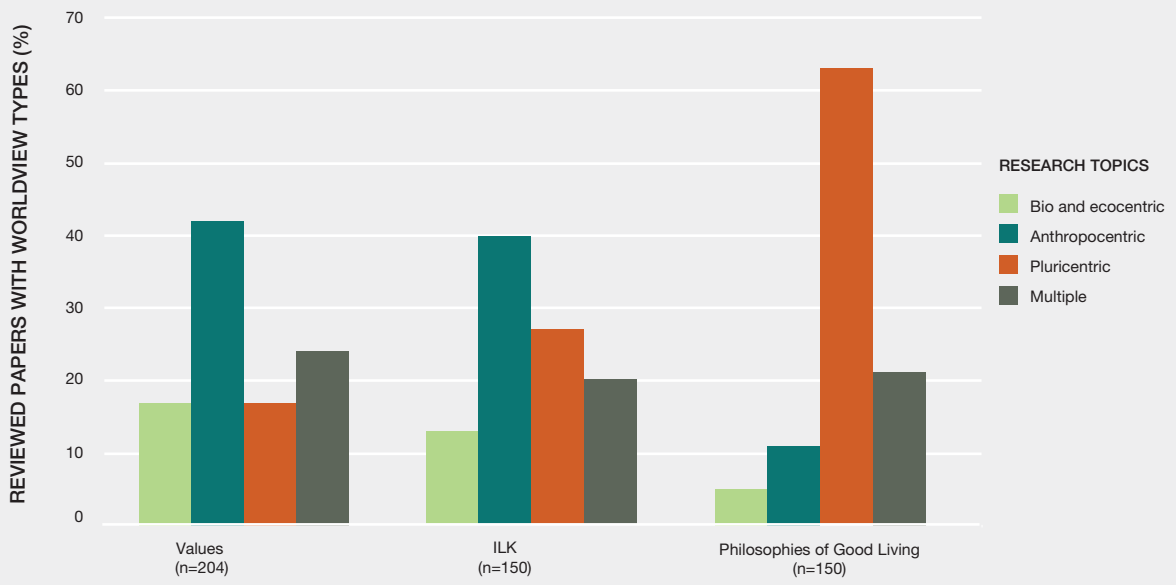

Figure 2 7 **Worldviews detected in three literature reviews, referred to as value types, ILK and Philosophies of good living.**

The columns are reported as relative frequency (%) of each worldview type as a function of the total number of papers (n) for each literature review.

and dynamic. Although, as noted, the academic literature reflects a particular polarization between those values held by certain groups, such as indigenous peoples and local communities, Eastern and Western knowledge, science and society; however, there may be considerable overlap between these groups' broad and specific values, which could be explored in more depth in research and policy. Also, due to language and power barriers, philosophy and philosophers from IPLC and the East are less widely read and cited (Ali, 2020). Taking knowledge as one of humanity's shared resources that does not know national, cultural and social boundaries, there is an obvious intersection and communication of philosophical thoughts of diverse ethnicities across the East and West (Ali, 2020). For example, emerging social norms, collectives and movements around mindfulness (see example below), urban nature (e.g., cultivating gardens to attract pollinators, recycling organic waste and planting food in cities) and climate change (e.g., the youth-led movement Fridays for the Future). Each of these initiatives may nurture and share relational values of reciprocity, care, responsibility and interconnectedness with nature (among others) within and across various societal groups, independently of how/if they can be categorized as Eastern, Western or IPLC. Convergences of worldviews and values across different groups, including religions, can be catalysed through decision and policymaking to promote biodiversity conservation, sustainability-aligned values or pro-environmental behaviour (Taylor *et al.*, 2020) (see 2.2.3; 2.3.1; 2.5.2).

Dialogue and convergences across ILK worldviews and other knowledge systems can emphasize overlapping themes, with special attention to how certain indigenous traditions may open different perspectives on how diverse beings relate to one another (Whyte, 2020). Whether the beings are understood as humans, ecological flows, fish, forests, societies, rivers, plants, whales or spirits, the moral bond of responsibility with these beings can also unite justice and sustainability and guide humans toward policy-options that can lead to futures where biodiversity engenders mutual well-being across all beings (see Annex 2.17). Similarly, the Buddhist concept of mindfulness entails intentional, non-judgmental attentiveness to the present (Wamsler, 2018) and has been adopted by the wellness industry in western cultures as a way to *live in nature* (Frank *et al.*, 2020). More broadly, mindfulness practices in psychology, medicine, businesses and sports have been shown to contribute to human functioning, raising awareness, emotional intelligence, and other cognitive-emotional functions (Frank *et al.*, 2020; Hayes *et al.*, 2006; Niemiec, 2014), and also have the potential to support sustainability-aligned values (Fischer *et al.*, 2017; Raymond & Raymond, 2019; Wamsler, 2018).

Box 2.2 Worldviews, religion and values.

Religions are important institutions (conventions and norms) that shape and are shaped by worldviews (see Annex 2.3). Worldviews typically include stories from science, religion or a fusion of both about how the world came to be. Worldviews also include broad values as normative statements about what conditions and goals are good or bad, what actions are right and wrong, and what means are permissible when pursuing good ends or preventing bad outcomes.

Researchers increasingly maintain that religious beliefs evolve, along with emotional traits and aesthetic sensibilities, including perceptions that nature is beautiful. These scholars argue that such characteristics co-evolve with values and practices and are passed to future generations because they promote healthy and resilient human-nature connections (Rappaport, 1979; Wilson, 2002). Religions can also directly promote environmental sustainability and biodiversity conservation. There is evidence, for example, that indigenous traditions are more likely than the world's predominant religions to express kinship with non-human organisms and have values that promote biodiversity conservation (Berkes, 1999; Nelson & Shilling, 2018; Taylor *et al.*, 2016; Wilson, 2002). Meanwhile, many religious and non-religious people have developed deep feelings of belonging to nature and inter-species kinship. Among the non-religious, such values and perspectives may be gained through personal human-nature experiences or through the evolutionary sciences, which demonstrate that all species are genetically related (van Horn *et al.*, 2021).

However, research also shows that religious worldviews may often hinder societies' ability to live sustainably within the ecosystems they emerged from and depend upon (Taylor *et al.*, 2016). Beliefs that deities or divine forces control environmental systems, for example, can occlude interest in and understanding about how such systems work. Moreover, many religions are anthropocentric, viewing humans as morally and even spiritually superior to other species, which hinders concern for biodiversity conservation, in part because their priority is on meeting the spiritual needs of human beings (Taylor *et al.*, 2016).

In contrast, there is potentially significant convergence among people and religions toward perceptions that life on Earth is sacred and worthy of reverent care. Such views are being expressed and promoted in a host of ways, through religious education, ceremonies and projects, as well as through the arts and sciences (Sponsel, 2012; Taylor, 2010, 2021). The convergence toward pro-environmental worldviews via religious institutions has potential to contribute to mitigating anthropogenic extinctions and addressing the climate crisis.

As an institution (i.e., a set of conventions and norms), religion also illustrates feedbacks shaping contrasting worldviews that may either hinder or promote biodiversity conservation (see **Box 2.2**). Like institutions, languages are among the factors that shape worldviews. Concepts used to refer to human-nature relationships are expressed in languages and are often connected to the contexts and places where these relationships take place across different human cultures. In the next section, we discuss the connections between languages, values and biodiversity.

2.2.2 Languages, values and biodiversity

Worldviews and values may be expressed through actions, attitudes and practices, as well as through languages in sign, oral and written forms. Worldwide, languages capture, maintain, transmit and convey values, knowledge and practices that support biodiversity and nature's contributions to people connected to specific places and territories, species, ecosystems and landscapes (Frainer *et al.*, 2020; Inglis & Pascual, 2021; UNESCO & CBD, 2010). Linguistic diversity may be used as a proxy for both cultural and values diversity (Reiter, 2018). Previous IPBES assessments (IPBES, 2018a, 2019a) highlighted the co-occurrence of biodiversity and linguistic diversity in the world's biocultural regions (see **Figure 2.8**). Furthermore, biodiversity and human languages both face critical and interlinked crises. It is estimated that around 40% of the world's approximately 7,139 "living languages" are extinct or endangered, and about half of the languages currently spoken will likely disappear by the end of this century (Eberhard *et al.*, 2021; Harrison, 2007).

With every disappearing language, we also lose values, ideas, concepts, ways of knowing and talking about the world, leaving the world poorer and humanity more vulnerable to coping with uncertainty and adapting to socio-environmental change (Frainer *et al.*, 2020; Harmon, 2002; Harrison, 2007; Maffi, 2002; Moseley, 2010). Importantly, this dual *diversity crisis* has reciprocal effects between humans and nature, since cultural change (including language erosion or loss) can be thought of as a form of co-evolution between cultural information and the socio-ecological environment in which people live (Smith, 2001) (see **Box 2.3**). For example, in France and Spain's Basque-speaking region, local relationships with mountain forests were conveyed through the significance of relational values as expressed in Euskara (Basque language) to highlight the connection between cultural identity and place attachment (Inglis & Pascual, 2021). These findings have important implications for integrating environmental and language policy in Spain, in connection with local values maintained by and transmitted through the Basque language.

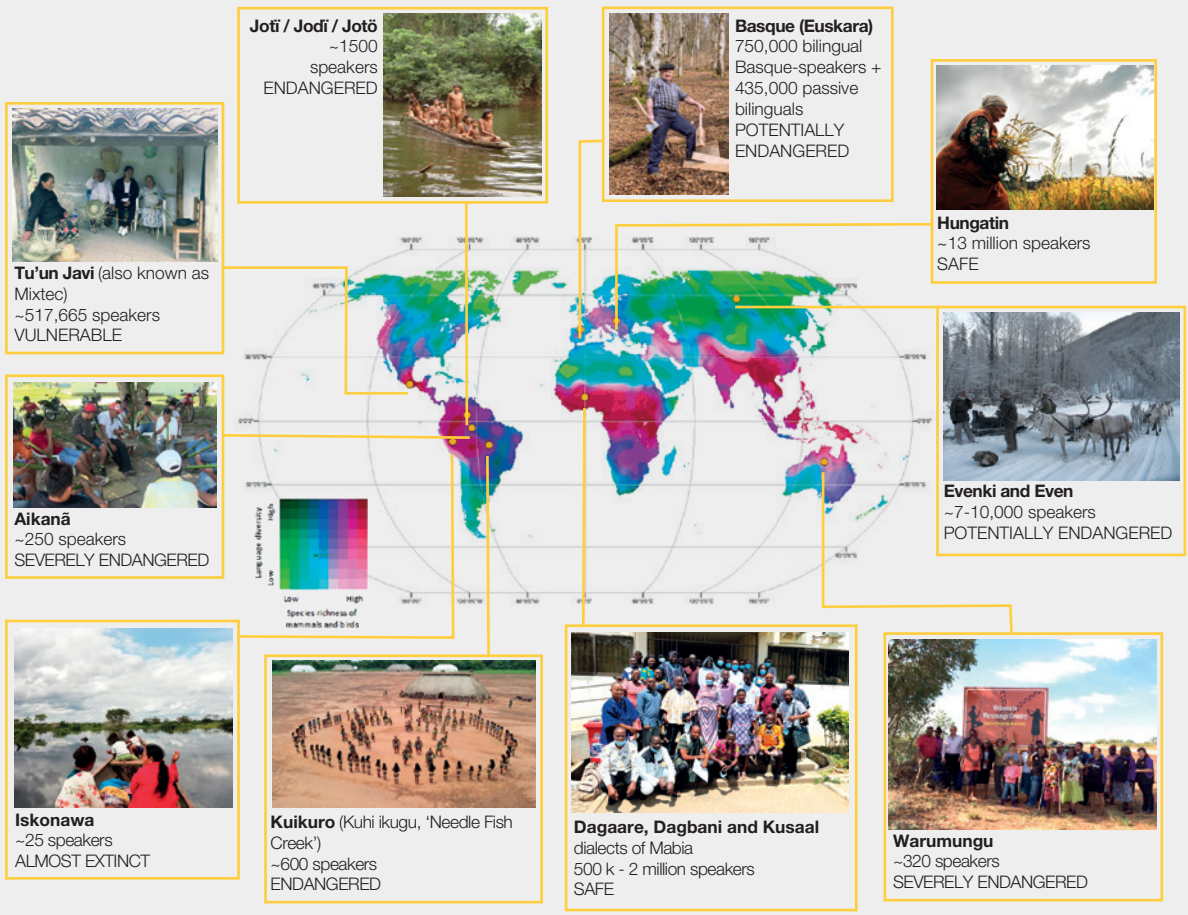

Figure 2 8 **Linguistic diversity and case studies within the chapter.**

The map from the IPBES *land degradation assessment* (IPBES, 2018a) shows the global overlap between linguistic diversity (number of spoken languages) and biodiversity (number of mammal and bird species). The sites marked with yellow dots represent the places where linguists, language specialists and ILK holders who contributed reviews, focused their case studies for this chapter (see Annex 2.8).

In the academic literature, more attention has been paid to the interconnections between biological, cultural and linguistic diversity, reflected in the concept of *biocultural diversity* (Frainer *et al.*, 2020; Gorenflo *et al.*, 2012; Maffi, 2005); than to the role of languages in shaping values of nature (Inglis and Pascual 2021). Knowledge gaps exist regarding the connections between human languages, values of nature and biodiversity conservation[27, 28, 29] (see 2.6). Only 12.6% (19 of 150) of ILK-focused reviewed articles directly address language as an important vehicle to teach, transmit and maintain values associated with nature. Aiming to shed light on the specific connections between languages and values, contributing authors from around the world were engaged to conduct complementary reviews and indigenous peoples and local communities were consulted to provide their own sources. These efforts resulted in policy-relevant insights on the intersections between languages, biodiversity, and values of nature, summarized in **Figure 2.9**; **Table 2.2**; and Annexes 2.9 and 2.10.

- Languages can store and transmit broad values, social norms and/or ethical principles. Broad values, including beliefs, taboos, and ethical principles, are found in words and concepts that are elicited and transmitted across generations through oral and written linguistic expressions, such as myths, stories, folktales, proverbs and sayings. Some examples of these guiding principles are found among many indigenous groups around the world, including the Anishinaabek,

27. Systematic review of indigenous and local knowledge and philosophies (https://doi.org/10.5281/zenodo.4396278).
28. Literature review for the philosophies of good living (https://doi.org/10.5281/zenodo.4399544).
29. Analysis on contributions on interconnections between languages, biodiversity and values (https://doi.org/10.5281/zenodo.4399917)

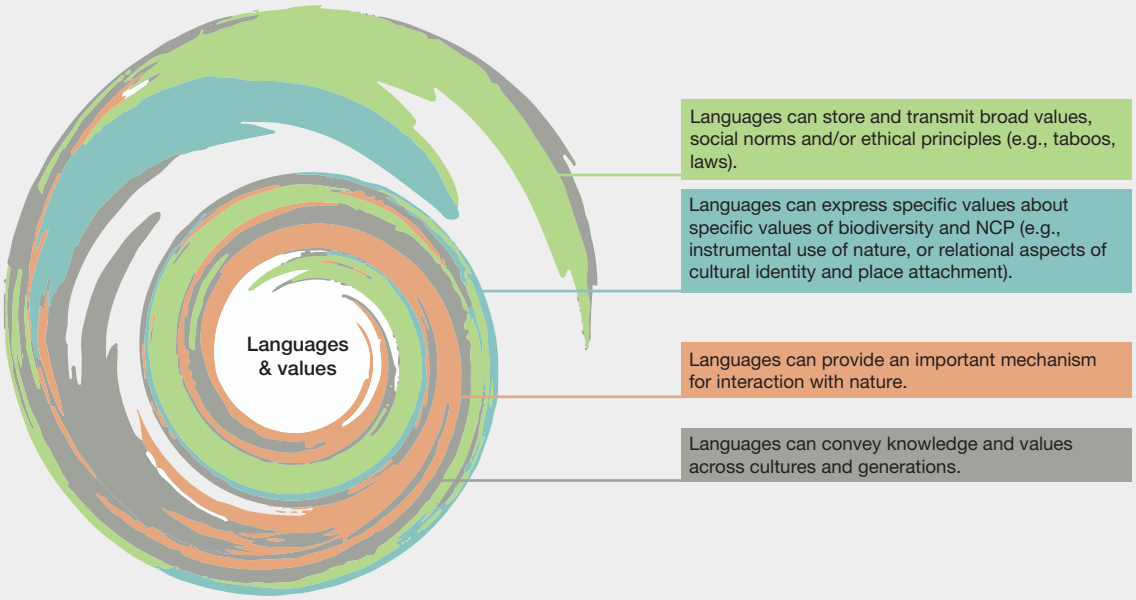

Figure 2 9 **Insights on the complex interconnections between languages, biodiversity and values of nature.**

These exploratory categories emerged from literature reviews and contributing authors. The waves represent fluid, overlapping and dynamic relationships between these different topics.

Hawai'ian groups, Maya, Quechua, Aymara, Kichwa, Maori, Yawuru, Bemba, Mbyá guarani, Inuit, and Haudenosaunee. Among the Anishinaabek in the United States of America, the value of 'respect for the spirit in all things is rooted in indigenous legal orders', and is denoted by the expression *mino-mnaamodzawin* (McGregor, 2018).

- Languages can express specific values of biodiversity and nature's contributions to people. Languages are inseparable parts of people's identities and values connected to other than human beings, places, rivers, mountains, territories, sacred sites and landscapes. The idea that all life or creation is interconnected and interdependent, existing as kin, was present in 29.4% of articles (10/34 articles) analysed for the Philosophies of good living literature review. It includes relational values like equity, reciprocity, interdependence and intergenerational connectedness (Mohatt *et al.*, 2011; Ullrich, 2019), expressed, for instance, through a Bemba saying in Zambia that *"the land is me"*, as opposed to *"the land is mine"* (Spencer, 2018). For example, the worldview of the Kichwa people from Sarayaku, Ecuador, reflects reciprocity with and respect for the land and spiritual beings: Kawsak Sacha is the living forest, a conscious living being who is the subject of rights and is inhabited by Runayuk, beings that protect ecosystems, animal and plant species (Pueblo Originario Kichwa de Sarayaku, 2018).

- Languages are also the storage of important knowledge about nature and biodiversity including instrumental values connected to nature's contributions to people. This includes medicinal plants, food, and other biocultural diversity products, as well as the benefits they provide, tied to specific biocultural contexts. Under this perspective, biocultural diversity may be considered both a form of value and an approach to valuation, where value is manifested as a combination of the tangible and intangible aspects of nature (Bridgewater & Rotherham, 2019; Merçon et al., 2019). Cámara-Leret & Bascompte (2021) found that most medicinal knowledge is linguistically unique, and that indigenous languages are singular reservoirs of threatened medicinal knowledge. Among the Aikanã people of Brazil, the position and social role of individuals in society may be connected to a highly detailed lexical and medicinal knowledge of plant species (see Annex 2.8).

- Languages can provide an important channel for interaction (mediation) with nature. This relates to ways of understanding, speaking about, interacting and communicating with other-than-human beings and nature. It also refers to ecoliteracy, or knowledge about nature that is not necessarily learned in schools and books, but in close contact and experience with nature (Harrison, 2007) (see **Box 2.3**). For example, among the speakers of the Warumungu language in Australia,

Table 2.2 **Synthesis of information provided by specialists for languages spoken in ten different places around the world (see Figure 2.9 and Annex 2.8).**

The information provided is applicable to most cases. Particularities are noted through the specific designation of the language and country in which it is spoken.

VALUES OF NATURE IN LANGUAGE **Role in formation and transmitting biodiversity, worldviews and related values.**	EFFECTS OF LANGUAGE LOSS ON NATURE'S VALUES **Links between loss and erosion of language and its impact on values and biodiversity.**	POLICY OPTIONS AND IMPLICATIONS **Policy connections and options for integrated approaches between biodiversity conservation, environmental valuation, and language's rights, protection and/or revitalization.**
• Way to name, categorize, store, and transmit nature's values, knowledge and relationships. • Worldviews, beliefs, and values are coded in language through mythology. • Means to rediscover human-nature bonds and reconnect with values of equity, respect and care with nanao *ñu'u (our mother)*, in the Tu'un Javi language (Mixtec, Mexico), which recognizes seven types/names for rain. • Humans and biodiversity are considered as kin, connected through horizontal relationships with equal rights. *Buga* is the biophysical environment inhabited by spirits and spiritual entities governing nature (Evenki/Even, Siberia). • Behavioural rules and ethical principles are coded in language. • Values coded in folktales/proverbs/songs (Dagaare, Dagbane and Kusaal dialects of Mabia, various African countries). • No word for nature. Active fabrication and maintenance of forests/biodiversity underlie *jkyo jkwainï* philosophy: to love-care all-everybody that surrounds us (Jotï / Jodï / Jotö, Venezuela).	• Erosion of values and ancestral knowledge coded in taboos, rules, beliefs, and cultural notions contained in narratives that promote environmental conservation. • Drivers of language loss: Colonization, discrimination, racism, ban/ and or replacement by dominant languages, violence, prejudice, migration, assimilation, ethnic shame, displacement, lifestyle changes (e.g. nomadic to urban/sedentary), mass media, TV, higher mobility to urban centres, missionaries, lack or inefficiency of governmental policies. • Lexicon impoverishment = loss of knowledge and values associated with them. Broken chain of transmission between generations. Medicinal plant knowledge being lost (Kuikuro and Aikanã speakers, Brazilian Amazon). • Language loss threats: security, health, territoriality, mining, colonization, and inequalities: assimilation, racism, discrimination, appropriation. No effective way to transmit values/ILK without native language (Jotï / Jodï / Jotö, Venezuela).	• Developing and implementing integrated valuation processes connecting languages and/or dialects with biodiversity/ nature's contributions to people /nature elements and processes. • Ensuring territorial protection, supporting traditional livelihoods, and self-determination of IPLCs. • Integrating language aspects into policies for territorial management, protection, production landscapes and/or conservation. • Promoting endangered languages education in formal and informal education. • Promoting specific programs to enhance ecoliteracy and intercultural education and understanding in urban and rural spaces. • Institutionalizing language rights and developing/and/or strengthening policies toward language documentation, learning and transmission. • Articulating language rights in national and international policies for biodiversity conservation (e.g. CBD, RAMSAR and others), sustainable development (e.g. SDGs) and climate change (e.g. UNFCCC).

habitat-based classification is expressed through the suffix *-warinyi*. This designation has implications for interactions and relationships between humans and other-than-human beings, since, according to this worldview, all "dwellers" of a particular habitat (e.g., plants, animals, humans, etc.) have equal rights (see Annex 2.8).

For example, in Australia, language teachers are encouraged to design teaching programs that assess student learning and knowledge development in using language, making linguistic connections and moving between cultures. These objectives for language programs are to be assessed at various stages of formal education (Moloney & Harbon, 2010).

Languages can convey knowledge and values across cultures and generations. Language is an important tool for improving intercultural communication, education and understanding within and across generations. Formal and informal intercultural educational programs are those that develop people's abilities to think, act, discriminate and experience cultural differences in appropriate ways (DeJaeghere & Zhang, 2008).

The rapid loss of languages has impacts on peoples' ecoliteracy, livelihoods, cultural and territorial rights, and collective identities (see **Box 2.3**). National and international policies and legal instruments have historically approached cultural, linguistic, and biological diversity separately (Frainer *et al.*, 2020). Enhanced synergies and coordination would help implement national biodiversity plans as well as international agreements, such as the targets of

Box 2 3 Ecoliteracy: losing biodiversity means losing ways to value nature.

Much of what humanity knows about the natural world lies outside of books, academic knowledge, libraries, and databases, since it exists in unwritten language in people's concepts and memories of long-term co-existence with mountains, rivers, forests, deserts, and other ecosystems (Harrison, 2007). This combined experiential and academic knowledge is referred to as ecoliteracy. Evidence from the literature[30] shows ILK and ecoliteracy erosion among both IPLC and the broader society (Blanco & Carrière, 2016; Genovart *et al.*, 2013; Schwann, 2018; Shah & Bhat, 2019; Uchida & Kamura, 2020).

Indeed, ecoliteracy is eroding broadly, including among children in urban places, as people are increasingly distanced from nature, and biodiversity is being lost at rapid rates (Genovart *et al.*, 2013; IPBES, 2019d; Marouf *et al.*, 2015; Pilgrim *et al.*, 2009). Drastic changes in lifestyles, often triggered by processes that result in sedentarisation and urbanisation, involve loss of livelihoods and the displacement of local languages through substitution by national ones, eroding the conditions for a meaningful usage of indigenous and non-indigenous languages (Harrison, 2007) (see **Table 2.2**, Annex 2.8). These erosion processes take a toll on the transmission and formation of values (see 2.5), including those related to nature.

According to Beery *et al.* (2015), in less than two generations, people in most industrialised countries have become increasingly disconnected from a constant experience of non-human nature as a result of urbanisation, habitat loss, societal change, and lack of economic incentives, due to a drastically reduced workforce in agriculture, forestry, fisheries and other natural resource–based economic activities. One cannot name and fully know or value what one does not experience: language loss ultimately means the loss of knowledge and values about nature, which reciprocally sustain biodiversity and nature's contributions to people around the globe (Frainer *et al.*, 2020; Harrison, 2007; Pérez Báez *et al.*, 2019). Ultimately, this apparent disconnect and loss of access to nature is having an inter-generational effect on human understanding, values, attitudes, and actions, facilitating further destruction of humans and nature altogether (Beery *et al.*, 2015) (see 2.5).

30. Systematic review of indigenous and local knowledge and philosophies (https://doi.org/10.5281/zenodo.4396278).

the post-2020 global biodiversity framework, the World Heritage Convention (WHC), the Universal Declaration on Cultural Diversity, the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES), the Ramsar Convention on Wetlands, and others (UNESCO & CBD, 2010). To address the fast-paced disappearance of human languages and, with them, ways of knowing and valuing the world, IPLC, governments, and other actors have undertaken actions to revitalise, safeguard, and support minority languages, from local community-led initiatives to global policies (Pérez Báez *et al.*, 2019; UNESCO, 2021). On February 28, 2020, participants from 50 countries, including government ministers, indigenous leaders, and other stakeholders and experts, adopted the *Los Pinos Declaration*, which establishes a Global Task Force for making 2022-2032 a Decade of Action for Indigenous Languages, placing indigenous peoples at the centre of its recommendations (UNESCO, 2021). Despite these efforts, there are many challenges, ranging from lack of funding and institutional support to political discourse and structural discrimination, that thwart local efforts to support living languages (see Bloch & Hirsch, 2017; Dockery & Duncan, 2020; Rousseau & Dargent, 2019). A knowledge and policy gap persists in coordinating efforts to articulate linguistic studies and language revitalization efforts into biodiversity studies, inventories, and management plans (Frainer *et al.*, 2020), as well as into valuation initiatives and decisions across scales (see **Box 2.15**).

2.2.3 Broad and specific values of nature and nature's contributions to people

Values are expressed by people, both individually and collectively (see **Box 2.9**). People conceive and express the ways they value nature and human-nature relationships differently. Sometimes, instead of being explicitly articulated, values are embodied in daily life actions, practices, rituals and choices, or in material culture. They are expressed implicitly (see Annex 2.10). In the following subsections, different types of environmental values and their relevance for policy are presented (see **Box 2.1**).

2.2.3.1 Broad values

Broad values – also called 'human values' (Rokeach, 1973), 'held values' (Brown, 1984), 'universal values' (Schwartz, 1994), 'principles' (IPBES, 2015) or 'transcendental values' (Kenter *et al.*, 2015; UK NEA, 2014) – refer to life goals and general guiding principles and orientations towards the world that are informed by people's worldviews (Dietz *et al.*, 2005). Although they originate in and arise from particular cultural settings, languages, and geographies, broad values go beyond singular contexts. Broad values include prosperity, freedom, recognition, health, belonging, livelihood, security, self-realisation, and justice, among others (see **Figure 2.10**). They influence specific values and provide them with a general background and meaning. For example, the Oromo of Ethiopia adhere

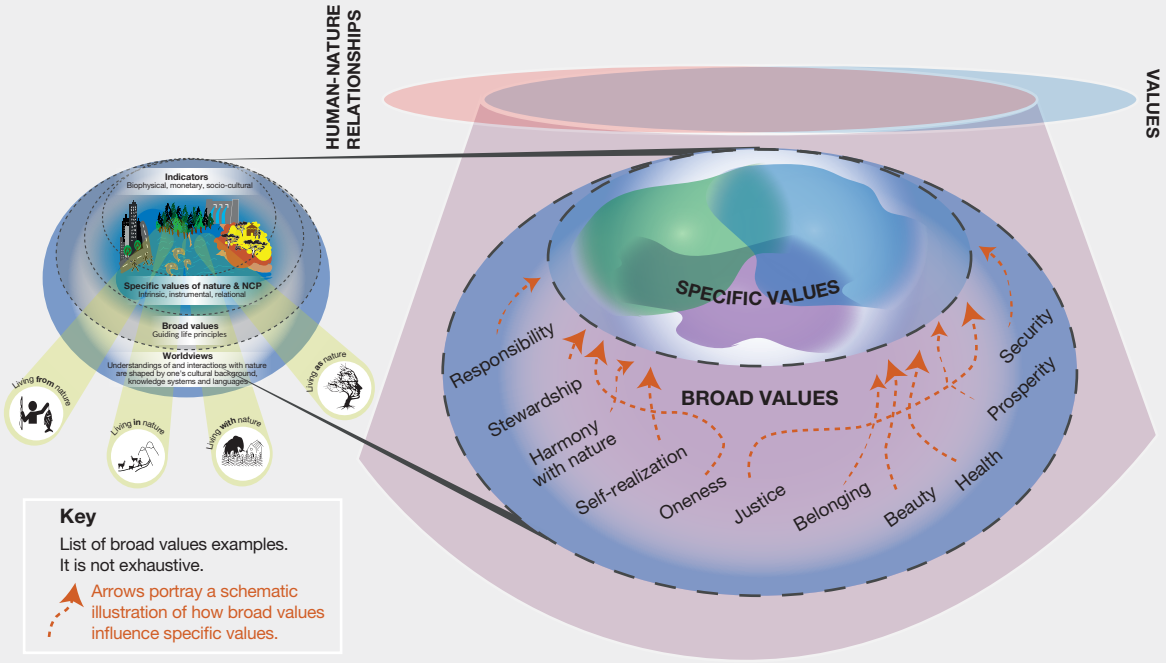

Figure 2 10 **Values of and about human-nature-relationships – broad values.**

Examples of broad values are presented that infuse and influence specific values and practices about human-nature-relationships. While broad values, such as justice, can apply to all aspects of life, the figure highlights those that are relevant for human-nature-relationships.

to the principle of *saffuu*, which guides people's lives and impels them to respect and do justice to one's own *ayyaana* (spirit) and that of other beings (Kelbessa, 2005). Because broad values are less context-specific and can be core components of human identity (Schwartz, 1992), they tend to be more stable over time (Anderson *et al.*, 2018; Bardi *et al.*, 2009; Piaget, 1952) and to only change when triggered by challenging events that affect multiple aspects of people's life, such as natural disasters, pandemics, or wars (Bardi *et al.*, 2014; Daniel *et al.*, 2012) (see 2.5, see **Box 2.14**).

Broad values can concern both human-human relationships and human-nature relationships. They play an essential role to justify extending ethical and moral concern to nature and to foster sustainability-aligned practices and policies. Different disciplines focus on different broad values. For example, environmental ethics highlights avoidance of suffering (Singer, 1975), freedom to pursue a life (Regan, 1983), harmony (Leopold, 2013), self-realisation (Naess, 1973), beauty (Hettinger, 2010), care (Warren, 2000), flourishing (Cuomo, 1998), and respect (Taylor, 1986). Economics emphasizes enhancing human welfare through efficient resource use (Mankiw & Taylor, 2014), whereas political ecology focuses on socio-environmental justice (Martínez-Alier, 2002). Research in relational worldviews highlights relational broad values like care, stewardship, identity, (Jax *et al.*, 2018; Ross *et al.*, 2018; Schröter *et al.*, 2020; West *et al.*, 2018), kinship responsibilities, and gratitude to other-than-humans (de la Cadena, 2015; Knudtson & Suzuki, 2006).

Broad values are seen as an important foundation to orient environmental action, guide policy, and motivate stakeholders and citizens towards environmental protection and sustainability (see 2.2.3.3). For example, the *Buen vivir* concept and analogous Philosophies of good living and collective well-being articulate relational worldviews and broad values that are linked with rights-of-nature discourses and policies (see **Box 2.4**; **Figure 2.10**).

Sustainability-aligned broad values concerning human-human relationships are key to pathways of transformation towards more sustainable futures (see Chapter 5), by fostering, for example, a shift from individualism, materialism, and economic profit to other principles like care, unity, equity, reciprocity, and justice, which underpin visions of more just and sustainable outcomes (e.g., Ateljevic, 2013; Horlings, 2015; McPhearson *et al.*, 2021; Ripple *et al.*, 2019) (see **Box 2.4**, see 2.3.2.3, Chapter 5). Justice provides an important example of how a broad value concerning chiefly human-human relationships illuminates specific values of/about nature and can guide sustainability-aligned policy and practices. Justice rooted in the idea of *"universal respect for human rights and human dignity"* (United Nations, 2015) is widely recognised and operationalised (e.g., in the United Nations Declaration of Human Rights) and mentioned as a central goal in major international environmental fora (e.g., the Declaration of the Rio Summit on Sustainable Development in 1992, the Sustainable Development Goals in 2015, see 5.1.2.2)

and in ILK literature[31] (see 2.2.1). In environmental policy documents and scholarly literature, justice as a broad value entails different dimensions, such as the fair distribution of benefits (including nature's contributions to people) and burdens across current living generations (distributional justice) and to future generations (intergenerational justice and sustainability); the fair inclusion in decision-making processes (procedural justice); the fair recognition of diverse values, identities, and knowledge in their own terms (recognition justice) (see Annex 5.4). Justice as a broad value refers also to human-nature relationships or nature as subject of rights (ecological justice) (Lamberti, 2019; Yaka, 2019).

31. Systematic review of indigenous and local knowledge and philosophies (https://doi.org/10.5281/zenodo.4396278).

Box 2 4 Philosophies of good living in policy and practice from around the world.

The Spanish-language notion of *Buen vivir* (good living in English) is rooted in indigenous Andean worldviews and languages (*Sumak Kawsay* in Kichwa, and *Suma Qamaña* in Aymara) in South America and conceptualizes a good quality of life through broad values that guide human-human and human-nature interconnections (Albó, 2018). It proposes alternatives to defining a well-being, based not on a single metric or at the individual level (Gudynas, 2011), but rather promoting collective good quality of life, where all life forms are seen as parts of a symbiotic whole (Huambachano, 2018, 2020; Shebell & Moser, 2019). Despite its origins in South America, analogous concepts and associated values are widespread among IPLC and other sociocultural groups throughout the world, as revealed from the literature (n=204 academic articles) and this cross-assessment case-study[32].

For example, *Mino-bimaatisiwin* (living a good life/balanced life) is a basic principle among Anishinaabe people in North America[33], which informs a set of principles and protocols in human actions that are manifested not only in offerings, reverence, non-greed, and non-waste, but are used to make decisions affecting community landscapes (Borrows, 2016; LaDuke, 1994). Similarly, in sub-Saharan Africa, the relational values system of the *Ubuntu* philosophy focuses on reciprocity, dialogue, and collective humanity, which are extended to nature and have been applied in development, external relations, educational and health practices (Chibvongodze, 2016; Eze, 2019; Le Grange, 2012; Lefa, 2015; Qobo & Nyathi, 2016).

Notwithstanding important local specificities (Heikkilä, 2016), throughout the world philosophies of good living generally promote and embody diverse values and principles existing between humans and between humans and nature (see **Figure 2.11**). Many of these values are broad, and include, for instance, reciprocity, harmony, respect, solidarity, responsibility, place-based identities, kinship with nature, and economic self-determination (Albó, 2018; Huambachano, 2018; Whyte, 2020). Non-IPLC languages and knowledge systems from other world regions also include comparable terms, such as the Italian concept for *la dolce vita* and the Polish/Russian concept of a good life *dobrobyt/dobrobytach/благосостояние*. In Bhutan, the gross national happiness index is based on a holistic approach to well-being that includes several criteria, such as psychological well-being, community vitality, environment diversity, and culture, which align with some of the values shared by other Philosophies of good living (van Norren, 2020).

Philosophies of good living of indigenous peoples and local communities usually contrast with conventional economic indicators of a good quality of life, since it is not conceived at the individual level (Gudynas, 2011). Rather, it is necessary to consider the community and its relationship with nature, requiring new platforms for thinking, practicing, and experiencing alternative futures based on biocultural ethics (Nemogá, 2019; see 5.5.4). For example, in New Zealand, Maori relational values of good living were found to guide instrumental values in decision-making related to business and economic activities (Härtel, 2015). Values underpinning these philosophies have been implemented in practices and policies from local to global scales (see 3.2.4), although with various levels of success and criticism (see 4.4). Locally, collective good quality of life principles have been adopted in territorial management plans, agricultural practices, and customary laws among indigenous peoples and local communities and other groups across the world (Baniwa, 2019; Quiceno Toro, 2016). Values associated with the *Buen vivir* concept have been institutionalised in the Ecuadorian and Bolivian constitutions and in other national and international policies (Quick & Spartz, 2018), albeit with significant differences from the original indigenous understanding (Cuestas-Caza, 2018; Valladares Pasquel, 2019; Waldmüller, 2014). These philosophies also have been represented and expressed in scholarly work, social movements, and intercultural educational policies (Rojas Martínez, 2005; see 5.5.4), and inspired global rights-of-nature policies protecting rivers, forests, and species (Acosta & Martinez, 2011; Gudynas & Acosta, 2011). Under the aegis of the United Nations, the Harmony with Nature initiative encapsulates ideas and values in line with those of the Philosophies of Good Living. In 2009, the UN General Assembly also proclaimed April 22 as 'International Mother Earth Day' and adopted its first resolution on Harmony with Nature. Member states recognized that it is necessary to promote the broad value of harmony with nature to achieve a just balance among the economic, social and environmental needs of present and future generations.

32. Literature review for the philosophies of good living (https://doi.org/10.5281/zenodo.4399544).
33. The concept of mino-pimatisiwin is also prevalent for the Cree/Inninuwag people.

Box 2 4

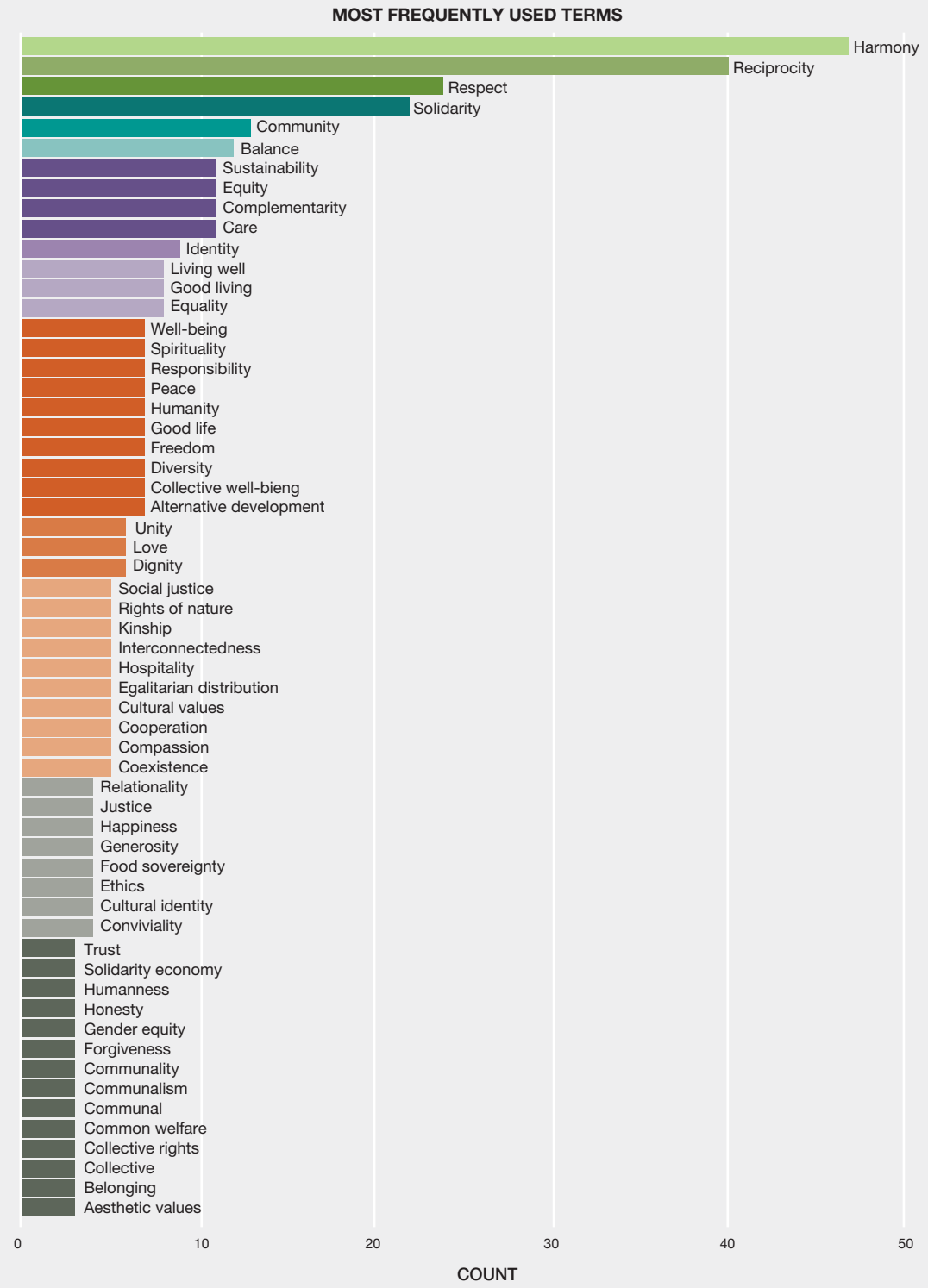

Figure 2 11 **Topics and values associated with Philosophies of good living from around the world.**

The chart shows the frequency of which these terms occurred in the Philosophies of good living literature review (n=204

academic articles)[34]. These terms express values connected to the concepts of good living, collective well-being or good quality of life rooted in the worldviews of indigenous peoples, local communities and other social groups.

34. Literature review for the philosophies of good living (https://doi.org/10.5281/zenodo.4399544).

Justice is relevant to policy and decision-making in various ways (see Annex 5.4). For example, in the global marine fisheries literature (see Annex 2.11), justice was found to be relevant for both industrial fishing and small-scale fisheries, but also within and among multiple governance scales: from households (Fröcklin *et al.*, 2013) to transboundary scales (Hanich *et al.*, 2015). (In)justice is a cross-cutting issue that affects multiple socio-ecological dimensions and determines power structures that condition trajectories of resource use and human well-being (see 2.4).

2.2.3.2 Specific values categorized as intrinsic, instrumental and relational values

Specific values are opinions or judgements of the importance of specific things in particular situations and contexts (e.g., the importance of water quality) or states of affairs (e.g., the importance of enacting water quality regulations; see **Figure 2.12**). They have also been referred to as 'assigned' (Rokeach, 1973) or 'contextual' values (Kenter *et al.*, 2015; UK NEA, 2014), or simply 'importance' (IPBES, 2015).

With respect to specific values, a literature review[35] of intrinsic, instrumental, and relational values, the value types that align with the conceptualisation in the IPBES *global assessment* (IPBES, 2019d; Pascual *et al.*, 2017) was conducted (see details in Annex 2.10). Before 2016, intrinsic and instrumental values were the predominant categories in scholarly research. While other categories exist (see **Box 2.5**), these value types correspond respectively to the importance of biodiversity for its own sake, regardless of usefulness to people (Klain *et al.*, 2017; Shanee, 2013), and the importance of nature as a resource for humans (Raymond *et al.*, 2013; Reyers *et al.*, 2012; van der Ploeg *et al.*, 2011). Relational values emerged later to address the importance of non-instrumental human-nature relationships. The definitions below refer to the core

35. Systematic review of value types (https://doi.org/10.5281/zenodo.4396289).

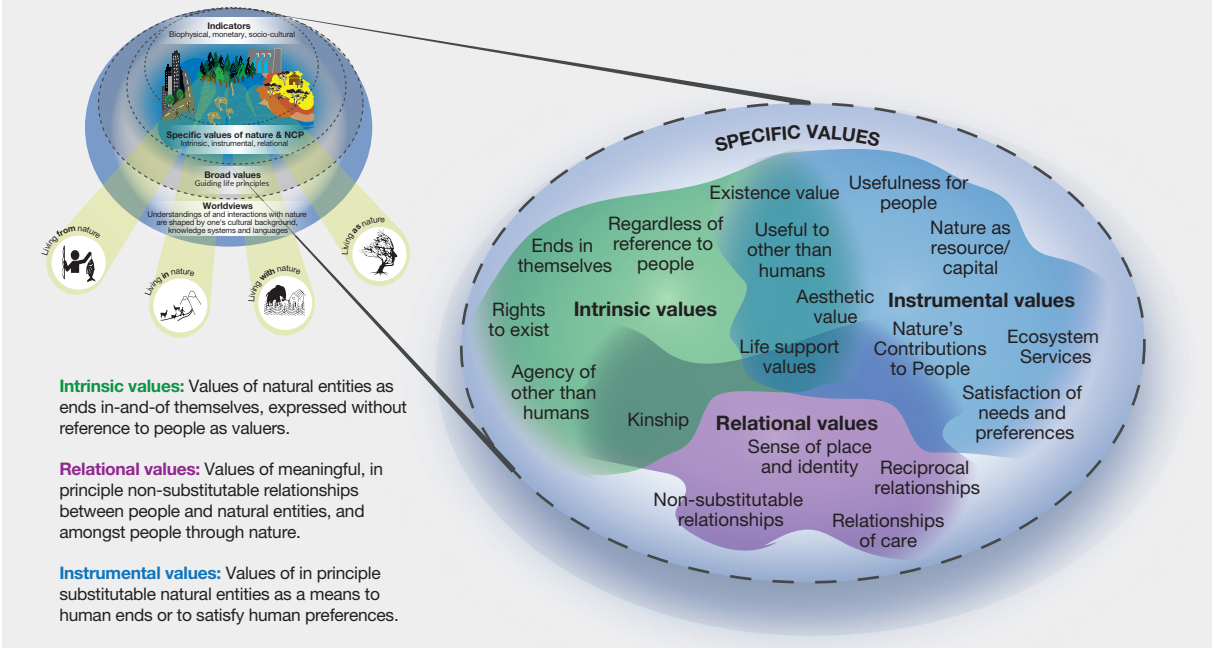

Figure 2 12 **General visualization of nature's multiple specific values.**

Core definitions, examples and fuzzy boundaries are displayed for each value type.

Box 2.5 Life-support values.

A gap emerged in the literature review regarding an overlapping dimension of value that spans across the three predominant specific values categories. This transversal dimension refers to the way people express the value of life-supporting processes, functions, and systems – interrelating biophysical, spiritual, or symbolic aspects – and relationships of dependence and interdependence with respect to them. It is largely described as non-substitutable and foundational for the articulation of other environmental values and can be linked to specific values associated with the diverse understandings of nature in IPBES-4/1. This dimension, called here life-support values, is associated with:

- Intrinsic values related to the importance of evolutionary and ecological processes that are independent of people's judgments (Hattingh, 2014; IPBES, 2019d; Kahn Jr., 1997; Rolston, 1993; Shanee, 2013), but enable other values to arise (Rolston, 1988);
- Instrumental values related to the importance of supporting ecosystem services (MEA, 2005; Rolston, 1993), functional values (Lockwood, 1999), indirect use values (Hansjürgens, 2014; Kumar, 2011), critical natural capital (DesRoches, 2019), and regulating nature's contributions to people (Díaz *et al.*, 2015) that stress the indirect function of supporting other ecosystem services or nature's contributions to people;
- Relational values referring to the importance of life-supporting processes that give sense to people's existence and identity (Arias-Arévalo *et al.*, 2018; Muraca, 2011, 2016; Schröter *et al.*, 2020).

The latter also includes the spiritual and symbolic meaning of life-giving and life-regenerating processes in specific contexts (including contextual nature's contributions to people), as expressed in the Andean indigenous concept of *Pachamama*, referring to earth's generative powers and to the very constitution of life (Macas, 2010; Pacari, 2009; Silverblatt, 1987; Tola, 2018) or contextual spiritual foundations for the regeneration of life, practices, and reciprocal relations as in the meaning for the Dongria people of the Niyamgiri Mountains of India, which *"not only provide the people with life and livelihoods, they are also worshipped as the upholders of the Earth and the laws of the Universe"* (Supreme Court of India, 1995) (see **Box 2.12**).

meaning identified in the literature review and their policy relevance (see **Table 2.3**).

Intrinsic values refer to the value of other-than-human beings expressed independently of any reference to humans as valuers (Bremer *et al.*, 2018; Christie *et al.*, 2019; Devos *et al.*, 2019; Hovardas, 2013; Pearson, 2016). This definition includes entities that are worth protecting as ends in-and-of themselves; it is consistent with biocentric worldviews and with the understanding of values as existing objectively in nature (Batavia & Nelson, 2017; Himes & Muraca, 2018; Piccolo, 2017; Regan, 1986; Rolston, 1994; Taylor, 1986; van der Ploeg *et al.*, 2011) (see 2.2.1). Intrinsic values are considered essential to sustain and trigger people's motivation for conservation (Batavia & Nelson, 2017; Polasky *et al.*, 2012), in education (Zhang *et al.*, 2013), and to articulate the agency of other-than-human beings (e.g., Quechua communities in Perú consider Ausangate Mountain as a powerful earth-being) (de la Cadena, 2010). Appealing to intrinsic values can help legitimise environmental protections and improve policy success (O'Connor & Kenter, 2019). Despite intrinsic values being essential to conservation success, they are not always incorporated in environmental management (Minteer *et al.*, 2004). For example, local fishers in England reported important intrinsic values connected to marine biodiversity, which have not fully been incorporated in governmental management plans and policies for marine governance (Anbleyth-Evans & Lacy, 2019) (see **Box 2.8**). Intrinsic values can be expressed using biophysical indicators (Pascual *et al.*, 2017), while social assessment of intrinsic value requires mostly qualitative and participatory methods (O'Connor & Kenter, 2019) (see Chapter 3).

Instrumental values refer to things and processes that are important as a means to some human end or to satisfy human preferences (Pascual *et al.*, 2017) and *"include economic values, regardless of whether the entity is directly or indirectly used, or not used"* (IPBES, 2019d, p. 30). Nature is important insofar as it provides (potential) utility to humans (Chan *et al.*, 2016; Eser *et al.*, 2014; Weston, 1985) and supports human economic well-being and subsistence (Lau *et al.*, 2019; Oba *et al.*, 2008; Pfund *et al.*, 2011). Instrumental values can help express the importance for IPLC to access and use nature (e.g., wild food plants or wild animals, Ghorbani *et al.*, 2012), but also the need for protecting it (e.g., as with the protection of crops from elephants in the Congo Basin, Ngouhouo Poufoun *et al.*, 2016). Because instrumental values refer to a means-to-an-end, the means might be substitutable at least in principle, even if not always in practice (Callicott, 2009) (see **Box 2.6**).

Among specific values, instrumental values are the ones that lend themselves best to different types of economic valuation, cost-benefit analysis of ecosystem services, and nature's material (and some regulating and non-material) contributions to people. They are conceptually and technically easier to quantify than other value types. Because they are deemed substitutable in principle, albeit not always in practice, they support high comparability and

commensurability, which facilitates trade-off assessments that can be articulated in monetary units. However, purely instrumental approaches to valuation may obscure other value expressions, lead to crowding out other reasons and motivations for environmental protection (Rico García-Amado *et al.*, 2013), alienate stakeholders (De Vreese *et al.*, 2019), and misrepresent conflicts (Hattingh, 2014).

Relational values refer to the importance of desirable, meaningful, and often reciprocal human relationships – beyond means to an end – with nature and among people through nature (Chan *et al.*, 2016, 2018; De Vos *et al.*, 2018; Himes & Muraca, 2018; Schröter *et al.*, 2020) and their significance to a good quality of life (IPBES, 2019d, p. 30). They are often framed as context-dependent, non-transferable, non-tradable, and therefore largely non-substitutable (Kenter *et al.*, 2019). Relational values highlight relationships with nature that constitute people's individual and collective identity, as expressed for example in the Japanese concept of *fūdo*, referring to interrelationships between people and local characteristics (De Vos *et al.*, 2018; James, 2020; May Jr, 2017), deeply rooted sense of place (Marshall *et al.*, 2019; Mrotek *et al.*, 2019; Norgaard *et al.*, 2017), spiritual meaning (Saner & Bordt, 2016), and community cohesion. For example, in New Zealand, an agreement between the Whanganui Iwi (Maori) people and the Crown acknowledged that the Te Awa Tupua River is connected with the Iwi and Hapu peoples' identity in an inalienable way; the document literally says *"I am the River and the River is me"* (Te Awa Tupua Whanganui River Claims Settlement Bill 2016). Relational values also include people and nature interactions that are essential components of a

Table 2 3 **Summary of literature review findings about intrinsic, instrumental, and relational values.**

Bold text is used to highlight key issues or themes (see details in Annex 2.10).

Value type	Core definition	Salient meanings summarised from the literature	Most mentioned associations with worldviews & broad values
Intrinsic	• Values associated with entities worth protecting as ends in-and-of themselves. • Values of entities expressed independently of any reference to people as valuers.	• **Non-instrumental** value • Value of something that is an **end-in-itself** • Value **independent of being valued** or recognised by (human) valuer as inherent properties of other-than-human beings • Regardless of **importance** and/or **usefulness** to people • **Inherent moral value** of natural beings **(right to exist)**	• Strongly and explicitly associated with **non-anthropocentric, biocentric or ecocentric worldviews** • Strongly associated with **moral obligations** towards other living things or life in general • Weakly associated with biospheric and altruistic values & with spirituality
Instrumental	• Values associated with living and non-living entities, as means to achieve human ends or satisfy human preferences. As means to an end, instrumental values are in principle replaceable, albeit not always in practice.	• **Means to an end,** mostly in terms of usefulness, utility or benefits for humans; sometimes also for other-than-human beings • Leading to **satisfaction** of needs, preferences, interests and desires • Strongly associated with **nature as resource, ecosystem services, capital, asset or property**	• Strongly and explicitly associated with **anthropocentrism** • Strongly and explicitly associated with **utilitarianism** & managerialism
Relational	• Value of desirable, meaningful, and often reciprocal human relationships with nature, which are often specified as a particular landscape, place, species, forest etc., and among people through nature. In principle non-substitutable.	• Values of or deriving from **desirable, meaningful, just & reciprocal relationships with "nature" and/or among people through nature** • Values relative to or deriving from **relationships that are constituent parts of** cultural, individual, collective or communal **identity** • Values relative to or deriving from relationships that are constituent elements **for living a good life (i.e. eudemonic)** • Values associated with **care for/about** specific landscapes, places, human & other-than-human others • Values associated with **sense of place**, interconnection of cultural & sacred landscapes • Value of nature as a point of **connection among people,** binding communities together & supporting social networks, such as in traditional markets	• Strongly associated with relational, **pluricentric** or non-centric worldviews that question strict separation between nature and culture/society/humanity and stress interdependence among all beings • Strongly and explicitly associated with broad values, such as **stewardship, responsibility, care, affection, reciprocity, harmony with nature, good life & justice** • Associated with **cultural ecosystem services,** as well as with **spirituality**

meaningful, dignified, and flourishing life (i.e., 'eudaimonia') (Carretero *et al.*, 2018; Klain *et al.*, 2017; Nussbaum, 2011; Saxena *et al.*, 2018; Sayer, 2011), such as mental and emotional health, virtues and attitudes of care and responsibility towards other people and other-than-human beings (Chan *et al.*, 2016; De Vreese *et al.*, 2019; IPBES, 2018a; Jax *et al.*, 2018; Krebs, 1997; Lenzi, 2017; Maass, 2005; Ott, 2016; Pradhan, 2018; van den Born *et al.*, 2018; Whyte, 2016); (see **Box 2.4**).

In policymaking, relational values can help articulate the idea that a specific place, a forest, a river, a landscape, or a population are essentially important to people (individuals or communities) because of the unique relationships, history,

Box 2 6 Values and preferences in environmental economics.

Preferences express a widespread understanding of value in economics and social science methods, such as multi-criteria analysis (Raymond & Kenter, 2016) (see Chapter 3). Preferences refer to subjective rankings between choice alternatives (Engelen, 2017; Hausman, 2005, 2012) and allow values to be prioritized and compared. The focus on preferences in environmental economics is mostly anthropocentric and instrumental, where value is assigned to biodiversity or ecosystem services *"to the extent that these fulfil needs or confer satisfaction to humans either directly or indirectly"* (Kumar, 2011, p. 187).

Preference-based approaches are useful to assess the relative importance of given scenarios through choice (e.g., the allocation of money or time for a particular purpose). Yet to be expressed in terms of preferences, values must be framed as directly comparable or commensurable, which means that they are often translated into quantitative terms to facilitate trade-offs among them (TEEB, 2010b).

The total economic value (TEV) is an established environmental economics value classification framework designed to include a wider range of values associated with benefits (or detriments) of the environment (see **Figure 2.13**). The TEV approach distinguishes among use values, based on the satisfaction generated by direct use (consumptive or non-consumptive) of natural resources or by indirect use (the conditions that enable use and satisfaction), non-use values, and option value (generated by future use). Non-use values refer to the utility or satisfaction generated for an individual by knowing that others will have access to nature's benefits, be it other people currently living (altruist value) or future generations (bequest value), or by knowing that something exists, even if there is no direct access to or direct enjoyment of it (existence value). In environmental economic language, the term altruism refers to individual preferences (i.e., individual satisfaction gained by knowing that other people might enjoy nature's benefits or that other than human beings exist).

TEV highlights the dependence of societal and economic development on ecosystems. It is helpful in providing a common metric to assess and estimate a wide range of instrumental values, which, if they are substitutable, can be ranked in terms of preferences and expressed in terms of means to an end (Kumar, 2011). By expanding the perspective to future generations, future use and others' preferences it can dialogue with weak anthropocentrism (see 2.2.1) and build bridges in practice with biocentric or ecocentric solutions, albeit using a language rooted in individual satisfaction and the assumption of trade-offs and comparability. The TEV framing is based on a broad understanding of economic values that goes beyond use of monetary indicators (Hansjürgens, 2014) and, when applied according to TEEB criteria (TEEB, 2010b) (see 1.1.2), it can provide policymakers with a helpful instrument to find agreement or convergence points among diverse stakeholders regarding instrumental values of nature.

Although the total economic value is most adequate to capture instrumental values, other value types sometimes can be indirectly identified by framing them in the language of preferences (see **Figure 2.13**). When legitimate, a proxy can help identify that a preference for a value is present but cannot estimate the strength of that preference compared to others. For example, to frame intrinsic values in terms of direct, non-consumptive use-values or as individual preferences is a great challenge for valuation because they typically represent something that cannot be ranked and is neither negotiable nor substitutable, as is the case with nature's sacred values (Dasgupta, 2021; Kumar, 2011; see 3.2.2.4, 3.3.1.2). Although existence value can be used as an indicator to represent intrinsic or spiritual values, it fails to capture their full meaning. Environmental conflicts often arise when people implicitly or explicitly reject the reduction of values to preferences and refuse to negotiate trade-offs or compensations for their loss (e.g., environmental conflict in the sacred Niyamgiri Mountains of India, see **Box 2.12**). Similarly, the value of biotic and abiotic components of functionally reliable and self-organizing ecosystems cannot be captured adequately by the total economic value; these value types *"are not ascertainable via individual preferences of human beings and therefore they cannot be assessed monetarily on the basis of certain economic methods of evaluation"* (Hansjürgens, 2014, p. 79). In these cases, non-economic indicators can replace or complement the total economic value (see 2.2.4) to better address environmental conflicts, and to support epistemic and recognition justice.

Capturing values through an utilitarian approach (Keat, 1997), can be useful in many situations, but problematic in cases (Braat, 2018; Costanza *et al.*, 2017; Kenter, 2018), in which highly complex socio-ecological systems with multiple ecosystems and services or deeply-rooted ethical or cultural values, or when multiple knowledge and value systems, including ILK, are involved (Gómez-Baggethun *et al.*, 2010) (see **Figure 2.13**, **Figure 2.14**, Annex 2.12).

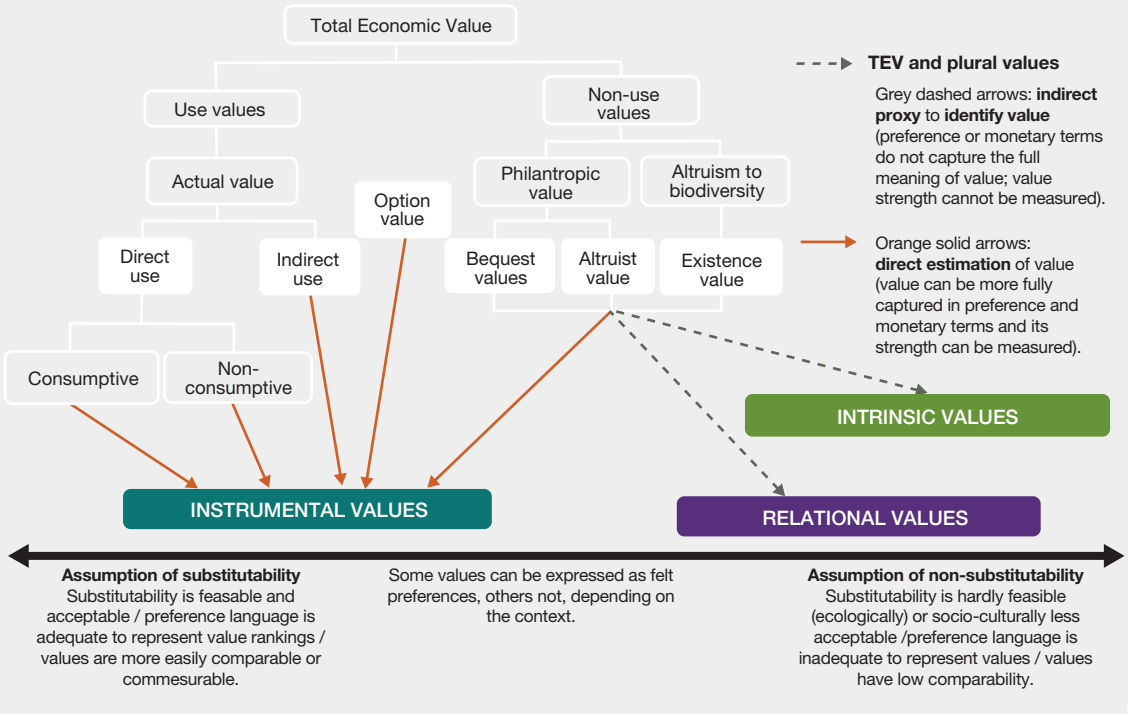

Figure 2 13 **The total economic value classification framework encompasses multiple environmental value types.**

The figure presents a spectrum between stronger and weaker assumptions of substitutability between the objects of value. The red arrows refer to values that can be estimated directly by applying the total economic value categories. The blue dashed lines refer to a possible, indirect use of the total economic value categories as proxies to identify values whose full meaning and strength cannot normally be assessed by preference-based or monetary approaches. In such cases, the total economic value can be replaced or complemented by other frameworks.

and traditions that bind them together (Kothari & Bajpai, 2017). According to academic literature, relational values can benefit policies directly by accounting for contextual nature's contributions to people (Díaz *et al.*, 2018b) and help operationalise broad policy guidance from local to national scales (Kitheka *et al.*, 2019). Relational values can catalyse motivation and appeal to a broader audience (Stenseke, 2018; Uehara *et al.*, 2020; Winkler & Hauck, 2019), particularly for IPLCs (Gould *et al.*, 2019; Himes & Muraca, 2018), and increase participation of different stakeholders (Jax *et al.*, 2018; Kitheka *et al.*, 2019). By stressing reciprocal relationships tied to responsibilities, they can facilitate justice, social equity and sustainability (Diver *et al.*, 2019; Whyte, 2020).

2.2.3.3 Policy relevance of considering diverse value types and their overlaps

Despite their distinct definitions, instrumental, intrinsic, and relational value types are not mutually exclusive and instead often overlap (see **Figure 2.12**) (Himes & Muraca, 2018; Pascual *et al.*, 2017; Schröter *et al.*, 2020). For example, food may simultaneously have instrumental and relational values, depending on the meaning and local practices that govern interactions with it (Lau *et al.*, 2019; Whyte, 2018a, 2018b, 2018c). Rather than presenting a problem, this convergence can be used by policymakers to build common understanding across stakeholders in support of conservation or equitable development (Berry *et al.*, 2018; Norton & Steinemann, 2001; Saner & Bordt, 2016). For example, agricultural policies can also consider the complex ways farmers and pastoralists identify with landscapes, including values linked to place identity or duties of care and responsibilities towards the land (Allen *et al.*, 2018), which can help design more successful productive programs that also reduce conflicts between conservationists and farmers by supporting multi-stakeholder participation in conservation incentive programs (Chapman *et al.*, 2020).

A review of national biodiversity strategies and action plans reveals that there is still less reference to relational or intrinsic values than instrumental ones and, when present, these tend to occur in aspirational or agenda-setting contexts (see Annex 2.2). Assessing diverse values can help policymakers

make otherwise neglected, intangible costs and benefits visible (Witt *et al.*, 2019), facilitate a more inclusive and just articulation of values (Himes & Muraca, 2018), clarify, reduce or avoid conflicts by fostering co-management (García-Llorente *et al.*, 2018) and participation among different stakeholders (Arias-Arévalo *et al.*, 2017; Berry *et al.*, 2018; Gale & Ednie, 2019; Reed & Ceno, 2015), increase the acceptability of environmental interventions through better communication (Hope & Jones, 2014; Witt *et al.*, 2019), and enable a more comprehensive and representative evaluation of why people value nature, nature's contributions to people and human-nature relationships. More pluralistic approaches help build common ground and reciprocal learning across different stakeholders by acknowledging different reasons and motivations (Rico García-Amado *et al.*, 2013).

Despite its relevance to policymaking, approaches that aim at considering diverse values can be more complex and require more resources (see **Figure 2.14**). It may also require institutional capacity-building, given the complexities associated with comparing values (see **Box 2.15**). Some values are directly comparable and thus rankable (Kenter, 2017; Kronenberg & Andersson, 2019) by adopting the same indicator (e.g., monetary metrics in willingness-to-pay surveys, Pouta *et al.*, 2000); or time metrics in willingness-to-give-up-time surveys (García-Llorente *et al.*, 2016). In other cases, values are only compatible because they cannot be measured by the same metrics, but it is possible to technically join the underlying data (e.g., if they denote a similar relational aspect like geographical coordinates or resolution) or to compare them indirectly through practical judgement and deliberation (e.g., multi-criteria analysis or deliberative processes that form shared values) (Martinez-Alier *et al.*, 1998; Orchard-Webb *et al.*, 2016; Ranger *et al.*, 2016; Zografos & Howarth, 2010) (see 2.4.2, **Box 2.9**). There are also cases in which different value types are neither directly comparable nor compatible and must be considered in-parallel by decision-making. For example, the relational value of Niyamgiri Mountain is sacred for the local community; cost-benefit analyses cannot adequately represent this value because it cannot be ranked, compared nor negotiated with other value types like the economic benefits deriving from bauxite mining. In such cases, assessing diverse, parallel values might be crucial to obtain a more comprehensive picture of the situation and to guide policy interventions that are better informed and aware of potential lines of conflict (Munda, 2004). Sometimes diverse, parallel value and knowledge systems can communicate through braiding (Kimmerer, 2013; Tengö *et al.*, 2014, 2017; Whyte, 2020).

Key situations where the assessment of diverse values is likely to lead to more robust decisions include highly complex, uncertain or contested decision-making contexts, including diverse stakeholders (Frame & O' Connor, 2011) (see **Figure 2.14**). Approaches that draw on a single indicator are likely to be effective in low complexity situations with limited stakeholder divergence (Kenter *et al.*, 2014; UK NEA, 2014).

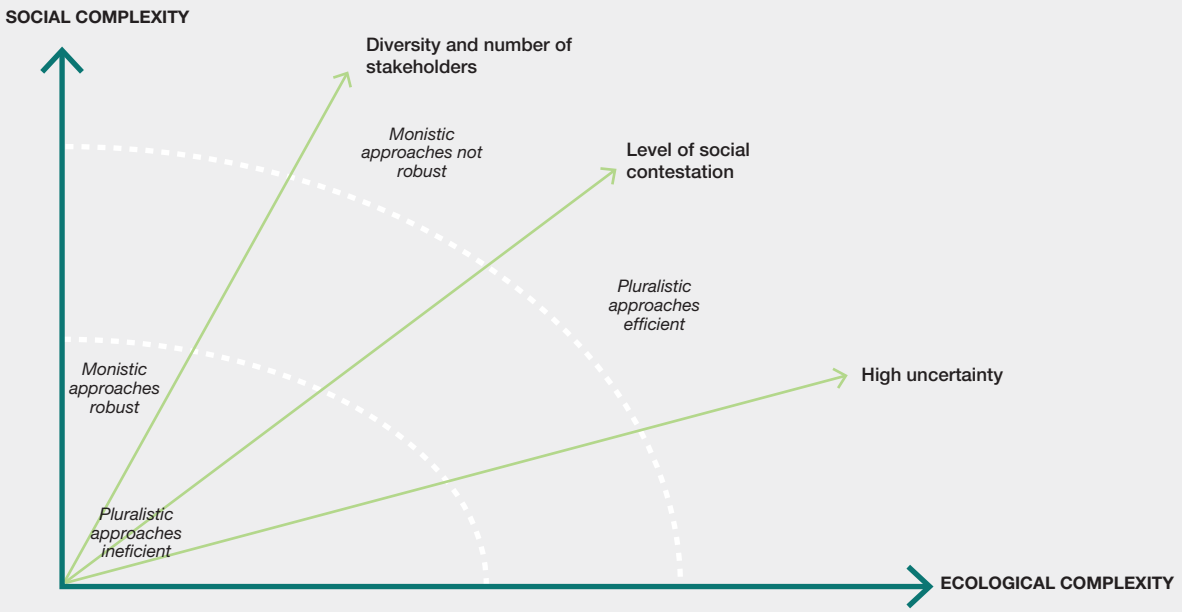

Figure 2 14 **Key factors influencing the relative robustness and efficiency of more monistic and more pluralistic approaches.**

Figure based on Frame & O' Connor, 2011; Kenter *et al.*, 2014; UK NEA, 2014.

2.2.4 Values as indicators

Value can also refer to value indicators or measures to operationalize valuation methods (see Chapter 3). Indicators refer to the quantitative or qualitative dimensions that help directly or indirectly assess the values people articulate (i.e., in writing or orally) or manifest (i.e., actions or behaviour). Some indicators are more suitable to identify diverse values, while others elicit a single set of value types. Indicators encompass *biophysical, socio-cultural and economic* aspects, as well as a combination or integration of these (see 3.2.2.4, 3.3.1.2). Notably, these types of indicators do not map directly onto specific values. As such, it is possible to have socio-cultural indicators for intrinsic values, or biophysical indicators for instrumental values. Other types of indicators are applied at a larger societal scale and are termed macro-indicators (see **Box 2.7**).

Biophysical indicators encompass measurements of ecosystem stocks and flows (organisms, material, energy) and include genetic diversity; number of rare or threatened species of fauna, fungi, bacteria, and protists; structural and functional connectivity of habitat; proportion of population exposed to air pollution. Biodiversity may be treated in nature's contributions to people through the *maintenance of options* to demonstrate the importance of biodiversity as variety and as aspects of ecological integrity and resilience (Faith, 2018). **Socio-cultural indicators** can be quantitative (e.g., photo rankings, spatial densities of relational values in an area) and qualitative (e.g., ethnographic accounts, themes in a text representing nature's values). **Monetary indicators** are preference-based and may assess subjective preferences through methods like contingent valuation, choice experiments, or hedonic pricing. They can refer to flows (benefits derived from healthy ecosystems and to costs caused by their depletion) and stock values of natural capital (Jones *et al.*, 2016).

Both socio-cultural and economic value indicators can also be assessed through deliberation (e.g., participatory multi-criteria analysis, deliberative monetary valuation, or citizens juries) (see **Box 2.9**; see Chapter 3 and Chapter 4). Furthermore, indicators can be aggregated into macro-indicators or combined into indicator sets or dashboards.

Box 2 7 Gross domestic product (GDP) as a macroeconomic indicator.

Gross domestic product (GDP) is the most prominent example of an aggregated macro-indicator. It measures the market value of goods and services produced by a national economy and is used to indicate and compare the size of the economy within and between countries, and how the size evolves over time. However, GDP has many, widely recognised limitations; leading economists have called for the development of alternative indicators to better measure human well-being and social progress (e.g., Stiglitz *et al.*, 2009; Dasgupta 2021). In particular, GDP does not reflect the values of nature, many of which are unpriced and outside of market evaluation. It is well established that economic growth contributes to the deterioration of nature and this growth is often measured by GDP (IPBES, 2019d). A recent synthesis found that economic growth strategies are predominant in national biodiversity strategy documents, despite an absence of evidence that growth in gross domestic product is correlated with improved biodiversity outcomes (Otero *et al.*, 2020). Instead, gross domestic product growth is correlated with biodiversity declines, thereby invalidating the hypothesis of automatically improved environmental outcomes at higher levels of growth (known as the environmental Kuznets curve). According to the Dasgupta review (2021), standard macroeconomic approaches focused upon GDP growth have radically undervalued nature's importance for human well-being, given the absence of effective pricing or market signals for many ecosystem services. Moreover, as gross domestic product reflects an instrumental view, nature's value is largely reduced to the source of raw materials needed to produce goods and services, which are themselves of instrumental value for an improved standard of living (used as a proxy for well-being). As such, even if current environmental externalities were internalized through more effective pricing mechanisms, gross domestic product would still not measure the diversity of nature's values or non-instrumental worldviews, or human-nature relationships presented above.

Alternatives to GDP have been developed (e.g., Index of Sustainable Economic Welfare, Daly, 1992), United Nations System of Environmental Economic Accounting (UN SEEA, 2012), that enable different types of nature's contributions to people to be expressed in monetary (and sometimes non-monetary) terms so that these contributions can be compared to other goods and services. These alternatives can be adapted to countries' priorities and policy needs, while at the same time providing a set of common concepts. The Dasgupta review also proposes the alternative indicator of 'inclusive wealth', which measures the social worth of an economy's total stock of capital goods, comprising produced, natural, and human capital (Dasgupta, 2021). Unlike gross domestic product, which only attends to flows of marketed ecosystem services, inclusive wealth implies an asset management perspective on natural capital, while recognising that much of this natural capital is non-substitutable for other capital stocks, but complementary to them and indispensable for economic or human activity.

These alternatives address some of the issues of gross domestic product, including providing assessments of natures' values that take account of human and social capital. Nonetheless, important concerns remain, including how to account for values that are non-substitutable or how to represent the dynamic and often highly contextual relationships between people and nature.

Examples of aggregated macro-indicators include gross domestic product (GDP), the index of sustainable economic welfare (ISEW), the genuine progress indicator (GPI) or the Sustainable Development Goals index (Cobb *et al.*, 1995; Daly & Cobb, 1994; Sachs *et al.*, 2021). The newly developed planetary pressures adjusted human development index and dashboard, and the sustainable well-being index (SWI), aligned with the SDGs, both offer an aggregated index and a dashboard for disentangling specific dimensions of well-being (Fioramonti *et al.*, 2019). Macro-indicators can refer to specific aspects and assess them on a global scale for biophysical dimensions (e.g., ecological footprint or human appropriation of net primary production) or combine different aspects of biophysical and economic data as part of national accounting (e.g., System of Environmental-Economic Accounting) (see Chapter 4).

Based on the above information, it has been shown that (a) a spectrum of value types exists, and (b) these values can be organized to support environmental policy in different contexts. The next section covers the topic of values-organization frameworks. While no single overarching organization framework captures diverse values in their entirety, understanding their conceptual and practical abilities and limitations allows decision-makers to capture alternative and/or incompatible understandings of nature's values across cultures and contexts.

2.3 ORGANIZING THE DIVERSE VALUES OF NATURE

2.3.1 Values-organization frameworks

A review of 284 academic articles[36] identified diverse values organization frameworks (see Annex 2.10). No framework was generally accepted across disciplines. The most widely referenced was ecosystem services (41% of articles), referring to both its use and criticisms. A common critique regards its anthropocentric, instrumental discourse, which can oversimplify ecological functioning to suit a market framing (Kosoy & Corbera, 2010; Norgaard, 2010) and overlook intrinsic values key to successful conservation outcomes (Batavia & Nelson, 2017; Taylor *et al.*, 2020). However, others argue that ecosystem services can capture more diverse values and broaden scope for policy consensus than intrinsic value-based paradigms (Schröter & van Oudenhoven, 2016). Ecosystem services' limitations in fully engaging broader social sciences, the humanities, and IPLC perspectives was an important motivation for IPBES' nature's contributions to people framework (Díaz *et al.*, 2018a). While nature's contributions to people explicitly considers relational values, it still uses an anthropocentric framing, and its ability to address some of ecosystem services' limitations is debatable (Kadykalo *et al.*, 2019; Kenter, 2018; Köhler *et al.*, 2019).

A review of 150 ILK documents[37] found a substantially different emphasis on human-nature relationships. Only 8.5% referred to ecosystem services. Biocultural approaches were most common (25%). There was an overall diversity indicating the absence of any overarching framework.

In 49 policy documents[38] again no single framework dominated, with human-nature relationships and underlying worldviews typically implicit. Most documents (44.9%) reflected anthropocentric worldviews. Few expressed pluricentric and relational (14.3%) or ecocentric worldviews (10.2%). Most policy documents did not explicitly discuss value concepts (53.1%), but many emphasized mixed valuation methods, including biophysical, economic, and socio-cultural indicators (42.9%). Also, there were few explicit references to relational or intrinsic values, or nature's contributions to people, and these tended to occur in agenda-setting contexts.

Overall, there was an absence of frameworks attending to both broad and specific values around diverse human-nature relationships across knowledge traditions. Reflecting different epistemic worldviews, frameworks were not easily comparable; each provides insights on certain human-nature relationships while obscuring others.

2.3.2 Life frames of nature's values

The previous subsections demonstrated the range of ways people conceive of and relate to nature and its multiple values, but also the absence of interdisciplinary frameworks for organizing these. The life frames of nature's values (O'Connor & Kenter, 2019; O'Neill *et al.*, 2008) help address this gap, relating diverse human-nature relationships, worldviews, values, and nature's contributions to people by representing four categories: living from, living with, living in, and living as nature (see **Tables 2.1**, **2.4**). In the living from nature frame, nature is conceived as resources contributing to and providing conditions for human sustenance and prosperity. Living with nature sees nature as other(s) (e.g., other-than-humans, ecological processes, wild spaces) with their own interests and agency. Living in nature emphasizes

36. Systematic review of value types (https://doi.org/10.5281/zenodo.4396289).

37. Systematic review of indigenous and local knowledge and philosophies (https://doi.org/10.5281/zenodo.4396278).

38. Analysis of national and international policy documents related to biodiversity and sustainability (https://doi.org/10.5281/zenodo.4399907).

place(s) (e.g., land, landscapes). Living as nature refers to nature as self (physically, mentally, spiritually) without separating humans and nature.

The life frames are not mutually exclusive, but express different ways of being/living and ultimate sources of concern for nature. People often harbour multiple frames (see **Box 2.8**), though one may be emphasized in particular situations. For instance, a river may be seen as a useful resource for fisheries (living from), a harbour of biodiversity (living with), integral to a cultural landscape (living in) or an inseparable part of one's body or community (living as) The life frames can be used to bridge between ecosystem services, nature's contributions to people, and non-anthropocentric worldviews, and for organizing, communicating, assessing, deliberating, bridging, prioritising, and transforming values, and designing valuations. Semantic variations of the frames in different United Nations languages are exemplified in Annex 2.13.

2.3.2.1 Life frame representation in environmental values literature

A systematic review[39] was conducted by screening 7,204 sources to select 499 for coding, alongside a critical review of diverse academic, ILK and policy documents. The review investigated the life frames' potential to organize key sets of broad and specific values regarding nature, nature's contributions to people, good quality of life, and sustainability (see **Table 2.4**). Results showed distinct sets of values clustered with different frames. Living from nature was dominant; living as nature least represented (see **Figure 2.15**). Annex 2.13 provides a full assessment.

Each life frame emphasized different broad and specific value sets **(Figure 2.16)** and nature's contributions to people **(Table 2.4)**. Living from nature correlated strongly with instrumental values (Q = 0.86, Φ = 0.53), emphasizing nature as a means to human ends and satisfaction of human needs and preferences. Broad values emphasized included prosperity, efficiency and security. The frame presents a spectrum from exploitationism to sustainable resource use, with the latter being emphasized in the literature, with some consideration of equitable distribution. Common nature's contributions to people were food and feed (e.g., Russo *et al.*, 2017), energy (e.g., Cameron *et al.*, 2012), freshwater (e.g., Arlinghaus, 2006), medicinal/genetic resources (e.g., Abensperg-Traun, 2009), pollination (e.g., Chain-Guadarrama *et al.*, 2019), soil formation (e.g., Gomiero, 2016), and maintenance of options (e.g., Momblanch *et al.*, 2016). ILK values within this frame are often related to particular subsistence or market resources with instrumental and life-support values (e.g., Dam Lam *et al.*, 2019; Reyes-García *et al.*, 2019). However, such studies rarely indicated indigenous values of living from nature without also referencing other life frames.

Living with nature correlated substantially with intrinsic values (Q = 0.62, Φ = 0.31) and moderately with relational values (Q = 0.44, Φ = 0.22). This frame was associated with broad values like stewardship, responsibility and duty of care, and a strong emphasis on people's contributions to nature. For example, a review of motivations for participation in conservation covenant programs showed that stewardship frequently trumps profitability concerns as a primary motivation, once

39. Systematic review on the conceptualizations of values (https://doi.org/10.5281/zenodo.4071755).

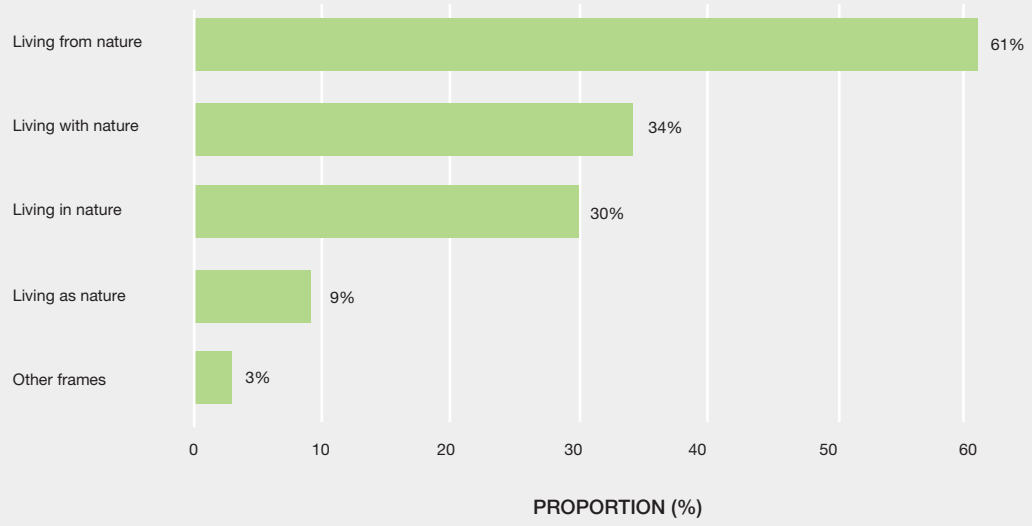

Figure 2 15 **Proportion of documents coded for the life frames in the systematic review (n=499).**

Table 2 4 **The main associations found in the literature between the life frames and their relation to nature, values, nature's contributions to people, sustainability, and risk.**

	Living FROM nature	Living WITH nature	Living IN nature	Living AS nature
Framing of how nature matters	Nature matters for the variety of ways it sustains people's lives and the goods and services supporting human needs and prosperity.	Nature matters as the other-than-human, for its cycles, processes, and the flourishing of many other species. Nature may be benign, threatening, vulnerable, or indifferent. Natural spaces may be seen as wilderness.	Nature matters as the setting for people's lives and practices, their land and home. Particular landscapes and places matter by embodying and contributing to history, culture and meaning.	Nature matters because it helps constitute us physically, mentally and spiritually; people may experience this through relations of oneness, kinship, interdependence and interpenetration with nature.
Framing of sustainability with regard to human-nature relations	Responsible use of natural resources that balances the needs of present and future generations of people.	Protecting biodiversity and ecosystems and considering needs of other-than-humans.	Sustaining landscapes, meaningful places, heritage, and cultural dimensions of nature.	Recognition of oneness and sustaining relations of connectedness, harmony and reciprocity with nature.
Examples of how to nurture sustainability-aligned values	Internalising externalities in decision-making. Resource management arrangements that support intra- and inter-generational equity.	Expansion of protected areas and rights of species; environmental education.	Protection of cultural landscapes and local heritage; improving access.	Measures to support nature (re)connection, e.g. green prescribing, nature ceremonies; emphasise oneness and reciprocity in policy framing / communication.
Examples of broad values emphasized regarding good quality of life	Prosperity, livelihood security, human welfare, distributive justice (intra- and intergenerational).	Stewardship, responsibility, respect, duty, coexistence, care, diversity of life, awe, flourishing, sharing, recognition and distributive justice towards other-than-human species.	Belonging, community, health, meaning, enjoyment, beauty, freedom, uniqueness, procedural justice, distributive justice regarding access to nature/ land.	Oneness & harmony with nature, self-realisation, awareness, reciprocity, care, sharing, respect, kinship, self-determination, epistemic justice.
Specific values emphasized	Emphasis on instrumental values; some reference to eudaimonic relational values (sustaining nature for a happy and prosperous human life) and life-support values underpinning sustenance, security, and prosperity.	Emphasis on intrinsic values (inherent worth, dignity of other- than-human beings); life-support values underpinning survival and flourishing of humans and other- than-humans; also, eudaimonic relational values (relations with nature contributing to a responsible, virtuous human life).	Emphasis on relational values (e.g., nature contributing sense of place, beauty, inspiration, identity, and enjoyment to a healthy, meaningful, and flourishing human life); instrumental values only where place-based aspects are more substitutable (e.g., recreational value).	Emphasis on relational values constituting people-nature communities, eudaimonic relational values (nature's importance for harmony, self-realisation and self-determination); and intrinsic values (e.g., dignity of other-than-humans).
Most relevant nature's contributions to people	Emphasis on material and regulating nature's contributions to people: food & feed, energy, freshwater, medicinal/ genetic resources, labour, soil formation, pollination, habitats, maintenance of options.	Emphasis on regulating nature's contributions to people: habitats, air quality regulation, climate, ocean acid regulation, hazard regulation, maintenance of options. Emphasis on people's contributions to nature.	Emphasis on non-material and context-specific nature's contributions to people: physical and psychological experiences, learning and inspiration, identities, habitats, water quality.	Limited relevance, but associations can be made with context-specific nature's contributions to people, habitats, companionship, identities. Emphasis on people's contributions to nature-as-self.
Worldviews emphasized	Anthropocentric (strong or weak).	Biocentric, ecocentric.	Anthropocentric (weak).	Pluricentric, ecocentric.
Examples of risks from overemphasis	Overexploitation of natural resources beyond their ability to regenerate; negative side-effects of technical solutions.	"Colonial" approaches to conservation; misanthropy.	Using nature for territorial identities to exclude and oppress; static values of place as an obstacle to broader sustainability.	Nature not recognised in its own right; idealisation; insufficient recognition of peoples' resource needs.
Examples of risks from underemphasis	Exporting of environmental impacts; insufficient attention to human development needs.	Mass extinction; degradation of regulating nature's contributions to people.	Loss of biocultural diversity; backlashes against decisions that exclude local values.	Nature disconnection posing risks to well-being and sustainability; epistemic injustice.

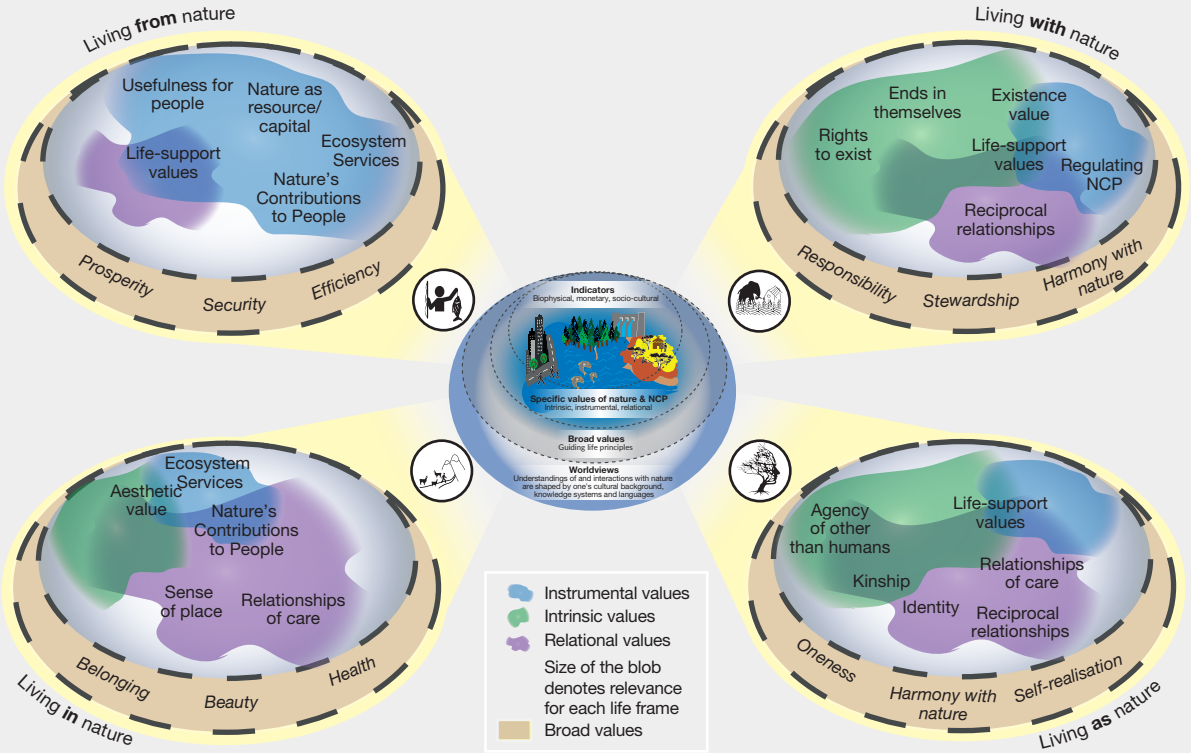

Figure 2 16 **Different value sets within the life frames.**

Living from (up left), with (up right), in (down left) and as (right down) nature frames. Selected values are key examples. Spotlights emphasize different sets of values.

basic economic needs are met (Kabii & Horwitz, 2006). In economics, existence values can partially express this frame **(Box 2.6)**. Living with nature can be associated with regulating nature's contributions to people, particularly habitat creation (e.g., Gardiner *et al.*, 2013), maintenance of options (e.g., Bretzel *et al.*, 2016), air quality (e.g., Escobedo *et al.*, 2011), climate (e.g., Czúcz *et al.*, 2018), ocean acid regulation (e.g., Graham *et al.*, 2014), and hazard regulation (e.g., Cameron *et al.*, 2012). These nature's contributions to people are typically valued as life-support values **(Box 2.5)** benefiting humans and non-humans, including over evolutionary/long-term time scales (Sarrazin & Lecomte, 2016).

Living in nature and relational values frequently co-occur (Q = 0.81, Φ = 0.48), with an emphasis on specific values of place attachment and identity (e.g., Bremer *et al.*, 2018). This frame connects nature-as-place to broad values like belonging, enjoyment, and community. Indirect use and non-use values **(Box 2.6)** can provide economic proxies for living in nature, but this is constrained by many place-based values being non-substitutable (Apostolopoulou & Adams, 2017; Elmendorf, 2008). The entwined relations between people-and-nature and people-and-people expressed through living in nature exist in myriad ways, e.g., in the Japanese concepts of *satoyama* (里山), *satoumi* (里海) and *fūdo* (風土) reflecting dynamic relationships between people, habitats, and species (Takeuchi *et al.*, 2014). Environmental features, such as local climates, species, mountains, or parks, and access to them, help determine place and community (Kim & Kaplan, 2004; Pendola & Gen, 2008; see **Box 2.8**). The frame associates with mixed material and non-material nature's contributions to people, particularly physical and psychological experiences (e.g., Nesbitt *et al.*, 2017), learning and inspiration (e.g., Lintott, 2006), and identities (e.g., Poe *et al.*, 2014), and some regulating nature's contributions to people like water quality (e.g., White *et al.*, 2010) and habitats (e.g., Arkema *et al.*, 2017).

Living as nature sees human–nature relations as non-dual, such as in the concepts of *Pachamama* or the web of life where humans and nature are seen as part of an extended community (see **Box 2.4**). This emphasis supports broad values like oneness, respect, and reciprocity. Living as nature substantially associated with relational (Q = 0.73, Φ = 0.26) and intrinsic (Q = 0.73, Φ = 0.26) values, and negatively with instrumental values (Q = -0.59, Φ = -0.19). However, this frame also challenges abstract value constructs, seeing them as embodied, reciprocal, and dynamic. It expresses life-support values from a view of embeddedness and lived experience. Living as nature supports epistemic justice by explicitly representing relational and holistic worldviews (Glaser, 2006; Strang, 2005), such as reflected in understandings of personhood of

rivers (Hutchison, 2014; Sangvai, 2002). Western examples include deep ecology (Naess, 1973) and the land ethic (Leopold, 2013) **(Box 2.13)**, or in the context of affordances in psychology (Raymond *et al.*, 2017a). The dualistic concept of nature's contributions to people (Kenter, 2018) is less easily applied here, but relevant nature's contributions to people include habitats (e.g., Lepofsky & Caldwell, 2013), companionship (e.g., Bremer *et al.*, 2018), identities (e.g., Ainsworth *et al.*, 2019), and context-specific nature's contributions to people (e.g., Dam Lam *et al.*, 2019).

Box 2.8 The life frames and local values in marine management: the UK coast.

The sea plays an important role in many people's quality of life, but coastal and marine ecosystems are under many pressures (see Annexes 2.5 and 2.12). Within United Kingdom waters, though some are recovering, many fish stocks are depleted, and their management has attracted fierce debate (Huggins *et al.*, 2020). Other debates focus on designation and implementation of protected areas, regeneration of coastal communities, and equitable access to the coast. This case considers local knowledge across United Kingdom coastal communities, based on 144 ethnographic video interviews following the Community Voice approach (Ranger *et al.*, 2016) sourced from diverse projects[40]. Each focused on different policy contexts, which strongly influenced which life frames and associated values people emphasized (see **Figure 2.17**). *Blue Heart* considered the coast's meaning to communities and *Living Coast* aimed at marginalized communities experiencing access barriers. *Common Ground* brought viewpoints from diverse stakeholders on marine protected areas implemented by a regional fisheries management authority.

40. Data courtesy of the Marine Conservation Society, Scottish Association for Marine Science and Centre for Ecology and Hydrology.

Analysis of the interviews (Annex 2.4) showed similar associations between life frames and values as the literature (see 2.3.2.1). Three or more life frames were expressed by 54% of interviewees, 24% expressed four. Sustainability and conservation discourses were primarily (66%) co-referenced with living with nature and frequently highlighted the irreplaceability or basic goodness of nature. Embodied and lived experiences of values were expressed by 32% of participants, representing 60% of living as nature references.

These cases exemplify how local people express nature's values within multiple life frames, but also that valuation design and framing will influence which life frames and associated values are emphasized. While many nature's contributions to people were expressed as important through the living from and in nature frames, local people strongly associated sustainability with values beyond nature's contributions to people. They also clearly pointed to both cognitive and embodied ways of experiencing and expressing values. Thus, if policymakers wish to identify shared values for policies **(Box 2.9)**, and more effectively leverage values towards sustainability transformation, the living with and as nature frames need to be attended to alongside benefits-based framings of nature like nature's contributions to people.

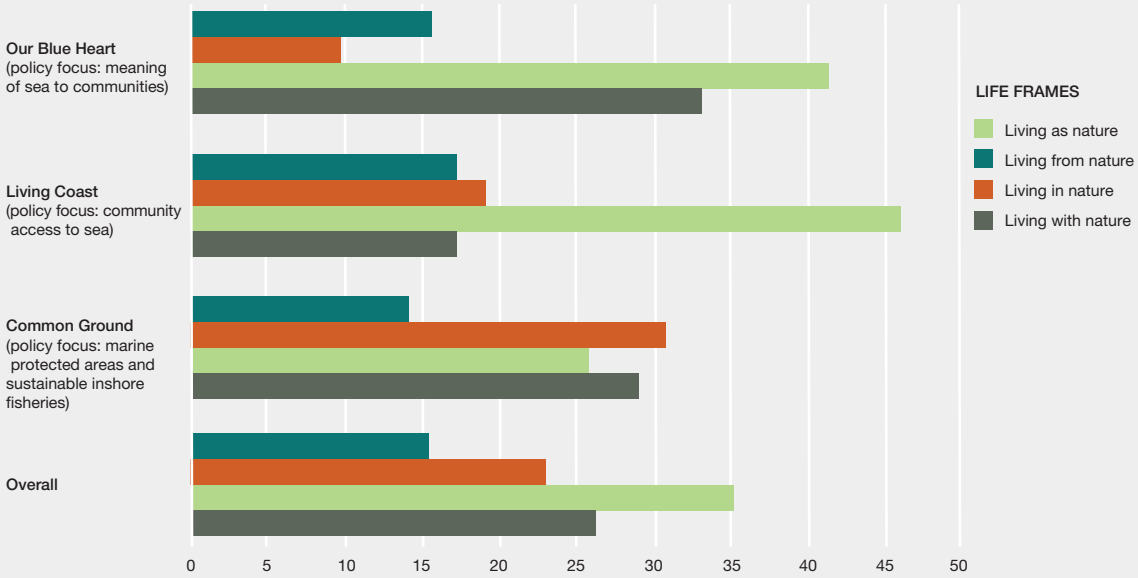

Figure 2.17 **Proportion (%) of interview references to different life frames across marine local knowledge projects.**

2.3.2.2 Representing life frames in policy

The review highlighted a range of concerns regarding over- or under-emphasis of particular life frames in policy (Annex 2.13). For example, the millennium ecosystem assessment (2005) and the IPBES *global assessment* (2019a) both expressed deep concern with the historic overemphasis of living from nature, leading to over-consumption of material nature's contributions to people and severe degradation of biodiversity and regulating and cultural nature's contributions to people, which could be seen as living *against* nature. However, underemphasizing living from nature can lead to importing nature's contributions to people and exporting ecological footprint (Fuchs *et al.*, 2020), rather than reducing domestic consumption of material nature's contributions to people (e.g., through dietary change). Furthermore, the COVID-19 crisis highlighted a major risk from underemphasizing living with nature, when ecological degradation increases infectious disease emergence (IPBES, 2020), while overemphasis can lead to mismanagement of negative nature's contributions to people (i.e., ecosystem disservices, Lyytimäki & Sipilä, 2009), human-wildlife conflicts, and backlashes from local people reliant on nature (Redpath *et al.*, 2013). For its part, overemphasizing living in nature risks overlooking life-support values and regulating nature's contributions to people, such as in unsustainable tourism (Hicks, 2011) or resistance to changing landscapes (DeSilvey & Harrison, 2020), whereas under-emphasis can lead to poor recognition of local and place-based concerns, over-generalisation of values, exclusion, and procedural injustice. For example, plans to partially privatize United Kingdom national forests sparked protests to protect place-based values, eventually forcing policy reversal (Kenter *et al.*, 2015). Finally, overemphasis of living as nature risks idealizing or obscuring natural resource needs (De Bont, 2012; Raymond, 2007), while underemphasis bears substantial issues of epistemic justice when experiential knowledge and embodied values are not represented (Jackson & Barber, 2013). More broadly, increasing disconnection from nature and loss of ecoliteracy (e.g., through urbanisation and loss of green spaces) has been identified as a major risk to both human well-being and sustainability (Cumming, 2016) (see 2.2.2, 2.5.2).

While there is no single right balance of different frames, any decision about their prioritisation leads to different value outcomes that create winners and losers and is intimately associated with questions of justice and power (Kenter *et al.*, 2019; Martínez-Alier, 2002). Explicit recognition of multiple values and knowledges in valuation and policy enhances procedural justice and improves the quality of more inclusive, democratic decisions (Devente *et al.*, 2016; Tengö *et al.*, 2014). Policymakers make choices as to which frames are emphasized in valuations and decisions **(Box 2.8)** and shifting framing away from a predominant living from nature focus towards inclusion of multiple frames can support new pathways for sustainability transformations (IPBES, 2019e). For example, when the European Union's agri-environmental payment schemes were reframed more strongly towards living with nature, self-identities of participating farmers gradually shifted from being producers to stewards of the countryside (Davies & Hodge, 2012). Consideration of multiple life frames allows a more transparent approach to include different sets of values. They provide policymakers with a straightforward and inclusive tool for cross-sectoral communication, and alternatives to combine and relate the diversity of values to sustainable futures (Harmáčková *et al.*, 2021) (see 5.2.3), including in conjunction with the Nature Futures Framework (Pereira *et al.*, 2020) (Annex 2.13).

2.3.2.3 Life frames to nurture sustainability-aligned values

Shifts in broad values are central to sustainability transformation (see 2.2.3.1; 5.2.3). While sustainability-aligned values can be expressed within each life frame **(Table 2.4)**, the review found them most explicitly associated with living with and as nature (Annex 2.13). In the United Kingdom marine case **(Box 2.8)**, sustainability was framed most frequently in terms of protecting biodiversity (living with nature) rather than other understandings, such as sustainable use (living from nature). Living as nature sources frequently consider sustainability transformation as a shift from disconnection and dualism to oneness, such as in many forms of indigenous environmental management based on values like reciprocity and care between people and nature (Annex 2.13). However, broad values that align with sustainability in one context may not do so in another. Whether a particular value manifests as being sustainability-aligned depends on many factors, such as knowledge and awareness, personal and social beliefs and norms, degree to which basic needs are satisfied, control (e.g., access to resources and sustainable alternatives), social networks, and institutional arrangements, such as incentives (Everard *et al.*, 2016).

The life frames make different aspects of justice and sustainability explicit **(Table 2.4)**, providing opportunities to integrate these into policy. For instance, living with nature emphasizes protecting biodiversity to ensure interspecies justice, while living in nature emphasizes protecting cultural landscapes, and local participation to ensure procedural justice. These interpretations can conflict but could also be used synergistically to enhance the scope of and broaden support for sustainability policies. Similarly, interventions like environmental education (see 2.5.2; Annex 2.13) may be most effective if they speak to multiple life frames (Zylstra *et al.*, 2019), such as by teaching about nature as a resource, other species, our place, and as intimately connected to ourselves, including both cognitive and experiential understanding.

2.4 VALUES, HUMAN ACTION AND DECISION-MAKING

This section assesses relationships between values, actions and decisions. Understanding these dynamics provides different entry points for decision-makers to target policies towards desired outcomes regarding the protection of the values of nature and nature´s contributions to people. The section describes key relations between values and actions (see 2.4.1) and focuses on how institutional contexts support (or hinder) certain values to influence decisions (see 2.4.2). Hence, it documents how value expressions and prioritizations depend on which actors have the power to decide and under what institutional context decisions happen. The text is based on insights from several disciplines, particularly anthropology, economics, philosophy, psychology, sociology and non-academic ways of understanding the world (e.g., ILK, other cultural traditions).

2.4.1 Relationships between values and behaviour

2.4.1.1 Why do we do what we do?

Different disciplines understand human behaviour/action differently. This section offers a brief overview of the main positions to provide a basis for more in-depth analyses in later sections, where implications for value assessments and decision-making are emphasized. Two aspects are highlighted. First, there is a divide between conceiving human behaviours as an individual phenomenon versus as also shaped by the social environments in which people grow up and live. Therefore, it is possible to distinguish between individually and socially focused traditions. Second, how human motivation is understood also varies. There is emphasis on the hedonic goal of pleasure (to feel good), gain goals (to improve one's resources, position, etc.) and normative goals (to act appropriately). These motivational aspects are understood differently when seen from an individually versus a socially focused position.

The best known individually-focused model in economics has been nicknamed *Homo economicus*. It sees humans as maximizing individual utility (pleasure), and value is defined as how much one is willing to give up to get something (see 2.2.4). This perspective demands comparable values and is basic to neoclassical economics. Moreover, preferences are considered stable characteristics of the individual. This model is the epitome of rational choice (Becker, 1976, 1993; Hausman, 1992).

Individualist value and behaviour perspectives also have a quite strong position in political science (e.g., Lohmann, 2008) and in some sociological writings (e.g., Hedström & Stern, 2008). These fields are, however, less focused on hedonic goals and more oriented towards gain goals like resources, position, etc. What is common is that behaviour is motivated by individual interests only.

In contrast, socially oriented perspectives emphasize how groups or societies form shared values and integrate them into norms and legal rules (see 2.5.2; **Box 2.9**). Values and norms influence individuals not least through forming their identities (Berger & Luckmann, 1966; Burke & Stets, 2009; Scott, 2014; Searle, 2005), and they underpin the goals motivating action (Parks & Guay, 2009). In this conception, what an individual chooses to do, not only reflects personal traits, but is influenced by the values, norms and practices emphasized by the social context.

As an example, we all need food, and some individuals prefer e.g., sweet to savoury. Nevertheless, socially oriented understandings emphasize that what we eat and how we eat it are influenced by society. For example, people eat certain types of foods during a gathering or ceremony regardless of the personal sweet/savoury preference as they share specific values and meanings of the gathering. People reproduce the practices and values emphasized (e.g., Giddens, 1984; Shove *et al.*, 2012). However, people can also transform these values by deliberately or unintentionally creating new practices based on their 'toolkits' of internalized values and meanings (Sewell Jr, 2005). For example, people may deliberately refuse to cook or eat certain types of foods due to their concern for the environment, transforming the meaning of the gathering to an environmentally friendly one.

Among the socially focused traditions there is, moreover, an emphasis on the distinction between actions based on what is individually best (i.e., gain goal) versus what is considered appropriate; best for the group or society (Hodgson, 2007; March & Olsen, 1995). People are not only egoistically motivated, but able to take the interests of others into account, following norms that define "the right thing to do". Here, a plural understanding of rationality distinguishes between what is individually versus socially rational (Sen, 1977; Vatn, 2015). This perspective emphasizes that our choices are often interdependent, such as when we use a common resource like a local fish stock. In these situations, it is rational for a community to develop rules that limit individual use to favour a better outcome for the group (Ostrom, 1990). Consequently, acts of helping others are understood as (socially) rational. Finally, this understanding does not assume that values must be one-dimensional, rather emphasizing that values are diverse and typically protected by norms.

Turning finally to psychology, we return to a focus on the individual, albeit not necessarily rational. For example, one perspective (associated with behavioural economics) emphasizes how heuristics and various biases characterise choice –especially choice under uncertainty (Altman, 2015; Kahneman, 2011; Kahneman *et al.*, 1982). In contrast, social psychology is predominantly focused on 'social dilemmas' (i.e., when what is individually best is collectively detrimental). It accepts that behaviour is socially influenced, notably by what is termed social norms. Authors in this tradition (e.g., Ryan & Deci, 2000; Schwartz, 1977; Steg *et al.*, 2017; Stern *et al.*, 1999) highlight the role of values and norms when understanding behaviour. A specific issue regards how individuals balance between hedonic (i.e., individual gain) goals and appropriateness. When a normative goal of appropriateness is strongest, people are motivated to do the right thing, even if more costly or less pleasurable, pointing to the intrinsic motivation of pro-environmental behaviour (Steg *et al.*, 2016).

2.4.1.2 Review of behaviour theories

This section moves from a general picture of what characterises human behaviour to a detailed examination of how behaviour theories treat values (as defined in section 2.2). Extensive research demonstrates that the links between values and behaviour are complex, with multiple factors interacting to determine how we act (Fischer, 2017). Therefore, a systematic review was conducted on how 134 theories of behaviour address value-related constructs[41] (see **Figure 2.18**). The review focuses on theories found using the term "behaviour". A wider analysis would include concepts like "practice" and "action." As the latter concepts are more used in socially focused theories, this review tends to overemphasize individually focused theories (though the review includes theories such as social practice theory) (Shove *et al.*, 2012) and actor-network theory (Latour, 2005). Later sections provide further insights into broader social dimensions (see 2.4.1.3; 2.4.2; 2.5.2). Theories in this analysis come primarily from psychology (63%) and economics (13%) with roughly a quarter (24%) from ten additional fields (e.g., sociology, political science, human ecology).

This review analyses value-related constructs in these theories defined to include (a) "values as principles and life goals" (broad values) (see 2.2.3.1), (b) "values as

41. Behaviour theories literature review (https://doi.org/10.5281/zenodo.4399396).

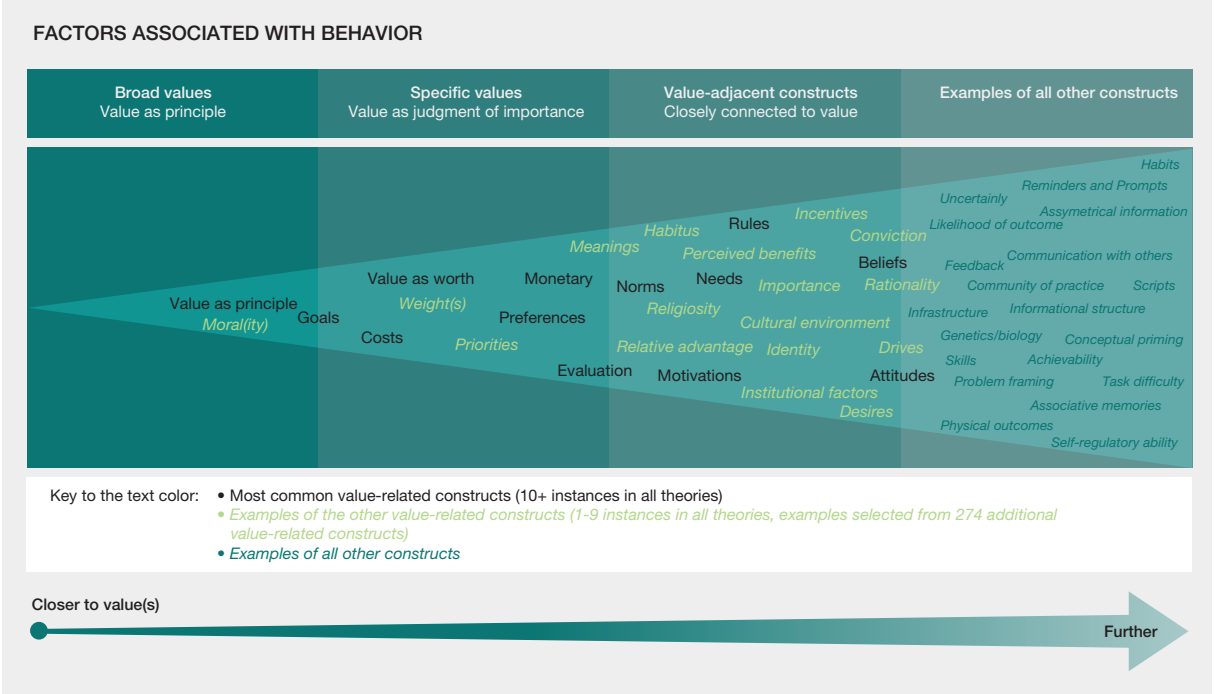

Figure 2 18 **Relative prevalence of value-related constructs and all other constructs in theories of behaviour.**

The increasing size of the cone surrounding the constructs indicates the increasing prevalence of the type of construct (broad values, specific values, value-adjacent constructs, and all other constructs) in the literature. Coding produced exact counts of each, but because theories define and cluster constructs in diverse ways, results are best understood as approximate representations of the prevalence of various concepts.

importance" (specific values) (see 2.2.3.2) and (c) constructs closely related to values (here called value-adjacent constructs; examples include norms and motivations) **(Figure 2.18)**. A systematic, replicable process for including constructs in each category was created.

The analysis demonstrates that values are associated with behaviour in diverse ways, and that many other factors impact these connections. These other factors include demographic characteristics such as income, household size (Poortinga *et al.*, 2004), feelings of self-efficacy (Tabernero & Hernández, 2011), physical capacity to engage (Mitchie *et al.*, 2011), social/institutional structures (Mitchie *et al.*, 2011) and biophysical features (Johansson *et al.*, 2016) The extent to which values are associated with behaviour also depends on the complexity and embeddedness of the behaviour. When a behaviour is relatively simple, like choosing one product over another, people can more easily act on their values to engage in the behaviour than when it is more complex and embedded in larger systems, as in the case of choosing transportation and home heating (Balundė *et al.*, 2019). This lack of a one-to-one relationship between values and behaviour is sometimes labelled the 'value-action gap' (Babutsidze & Chai, 2018; Blake, 1999; Flynn *et al.*, 2009). The review of behaviour theories found that value-related concepts comprise about 29% of theoretical constructs used to explain behaviour (see **Table 2.5**). This result both supports the value-action gap (71% of constructs are not clearly value-related), but also demonstrates that values infuse many factors (29%) related to behaviour.

Table 2 5 **Quantitative assessment of value-related concept.**

Overall statistics	**Total constructs**	2232
	Total value-related constructs	649
	Percentage of constructs that are value-related	29%

	Construct category	Total instances	Number of theories in which the construct appears
Value-related constructs	**Norm**	68	45
	Value as principle	42	28
	Evaluation	38	30
	Motivation	35	25
	Mixed	34	26
	Goal	32	16
	Attitude	31	28
	Value as worth	25	17
	Belief	23	17
	Preference	13	11
	Need	12	8
	Rules	12	11
	Cost	10	8
	Rationality	9	9
	Desire	5	5
	Drive	5	3
	Identity	5	5
	Importance	5	4
	Weight	4	4
	Priority	3	3
	Moral	1	1
	Other value-related constructs	**237**	**93**

The evidence above was supplemented with data from literature reviews that document additional lists of factors that impact pro-environmental behaviour specifically. In all cases, these address at least two categories that include constructs from the analysis above. Kollmuss & Agyeman (2002) include values, motivation and cultural norms (three of ten categories); Steg & Vlek (2009) include moral and normative concerns (two of nine categories); and Gifford & Nilsson (2014) include values, worldviews, norms and goals (three of 12 categories). It is notable that these proportions from reviews of pro-environmental behaviour roughly mirror the 29% of constructs the extensive analysis of behaviour theories identified as value-related.

In sum, analysis of theories of behaviour indicates that values are associated with behaviour in important ways, but that many other factors are also associated with behaviour. This work thus emphasizes the importance of considering both the different forms of values-behaviour links (e.g., how values embedded in institutions impact behaviour) and how additional factors (e.g., personality, knowledge, physical contexts) are associated with behaviour.

2.4.1.3 Values as embedded in institutions

Institutions such as norms and legal rules are created to protect certain values. They prescribe what may/may not or must/must not be done under certain conditions (Crawford & Ostrom, 1995; Scott, 2014; Vatn, 2005). While norms are grounded in civil society, legal rules are (also) supported by an external power that has tangible and formal sanctions, such as the state or traditional leaders (Crawford & Ostrom, 1995; McGinnis, 2011). Laws typically define and protect rights. This regards rights to natural assets – property and use rights – and laws that protect biodiversity, regulate pollution etc. The literature also shows that in societies where legal rules are consistent with the values and norms generally held, there is higher compliance (Platteau, 2000; Tyler, 1990). In the social sciences, norms are seen as structuring interaction (Berger & Luckmann, 1966; Hodgson, 1988; Searle, 2010). They influence both how we should treat each other and nature. When internalised during the process of socialisation, they become part of people's identity and form what is seen as the right thing to do. Even if not internalised, they may be followed due to fear of sanctions/shaming from fellow community members. So, one may avoid littering due to expected sanctions. One may, however, also avoid such a practice as one is a person that simply does not litter. Schwartz (2012) is among those pointing out that individuals may comply with or rebel against norms based on whether conformity or self-direction is more important.

The distinction between norms and legal rules may be fuzzy – not least in indigenous cultures (Eghenter, 2018; Nahuelhual *et al.*, 2018). Spiritual practices often linked to ancestors may be important when forming institutions (Caillon & Degeorges, 2007; Deb & Malhotra, 2001; Michon *et al.*, 2007; Singh, 2013), and kinship structures are typically integral to maintaining them (Tamez, 2012). For example, traditional management systems are maintained through knowledge transmission between generations such as the women-led management system of an orchid, locally called *calaverita*, in Mexico's Chilapa region (Herrera-Cabrera *et al.*, 2018).

In identity theory, it is standard to distinguish between person(al), social and role identity (e.g., Burke & Stets, 2009). While personal identity refers to how the individual perceives her-/himself, social identity deals with the function and status of a person as a member of a group or community. Role identity regards the self as occupant of a role in an organization, firm etc. Moving between roles and communities, we may act differently as norms form different expectations – i.e., the logic of action changes. Life becomes "compartmentalised" (MacIntyre, 1999). Furthermore, the organization and the community may emphasize different norms and hence values to the ones that are key to the person. While institutions are key to forming the individual, their role in forming organizations – political, civil as well as business-oriented ones – goes further. The character and existence of organizations are based on the rules that define their aims and govern the activities of members/employees (Scott, 2014).

The above offers an explanation for the value-action gap (see 2.4.1.2). Following norms and practices will support the values around which they were formed (Vatn, 2015). However, people may not explicitly recognise the values involved, but still support them by following the norm. Moreover, people tend to act like others (Cialdini, 2003; Demarque *et al.*, 2015; Nolan *et al.*, 2008), not necessarily reflecting on what values are being supported this way.

The stage I literature database was used to review 232 publications that addressed institutions as a key topic[42] (see 2.1.3). Studies of legal rules were more frequent, while a subset also emphasized norms. Legal rules related to studies of international environmental agreements and economic instruments. Norms focused on religion, food preparation ceremonies and farming practices. Implicit value expressions were found in both legal rules and norms. The values emphasized tended to differ, although the difference was not statistically significant. Relational values were most emphasized in studies of norms, followed by intrinsic and instrumental values (equal number). In studies on legal rules, instrumental values came first, followed by relational and intrinsic values. The analysis indicates that norms were primarily built on values related to identity, care and human-nature relationships, while legal rules were more

42. Systematic review on the conceptualizations of values (https://doi.org/10.5281/zenodo.4071755).

strongly associated with values related to resource use and distribution.

In the stage II literature review focused on ILK sources, instrumental and relational values were predominantly associated with institutions[43]. To illustrate, understanding nature as a source of use value and as sacred locations underlie the institutions for forest management in several places, as illustrated by studies of villages in West Bengal, India (Deb & Malhotra, 2001).

Understanding the relationship between institutions and values can help identify leverage points for change. Redefining roles and their responsibilities can bring about a change in which values become emphasized and consequently in the type of actions that individuals and groups engage with (Abson *et al.*, 2017; Chan *et al.*, 2020; Fischer & Riechers, 2019) (see 2.5.2). For example, if the expectations implicit in professional norms imply actions that go against care for nature and nature´s contributions to people, it is difficult for an individual to act against these expectations (MacIntyre, 1999; Vatn, 2015).

2.4.1.4 Linking institutions, power relations and socio-environmental conflicts

Power is the capacity of actors to mobilize agency, resources and discourses to achieve their goals. An important aspect of this regards the shaping of institutions. Power analysis provides insights to questions such as: Who makes decisions about nature / nature´s contributions to people? Who benefits or loses from particular decisions? What types of values tend to be prioritized or marginalized through different institutions (i.e., norms, legal rules, practices)? Power in the context of human-nature relationships can be manifested in multiple ways/dimensions through discourses and social structures (Bennett *et al.*, 2018; Epstein *et al.*, 2014; Kashwan *et al.*, 2019; Lorenz *et al.*, 2017; Raik *et al.*, 2008; Svarstad *et al.*, 2018) **(Figure 2.19)**. These power dimensions are not mutually exclusive. They can reinforce or conflict with each other in multiple ways and operate at diverse temporal and spatial scales. Power around nature/ nature´s contributions to people is constantly disputed and enforced by actors that are part of power hierarchies. A more comprehensive assessment of power analysis and dimensions is found in Annex 2.1. Main aspects and categories as used in this assessment are presented below.

Discursive power is the power of discourses, narratives, or knowledge production to shape or construct worldviews, life frames, identities, truths, and values. Dominant narratives reinforce particular options and associated values by excluding other actors' narratives, worldviews and values (Feindt & Oels, 2005). For example, in the implementation of payment for ecosystem services schemes in Lima's watersheds, discursive power (e.g., water need for the "thirsty desert city"), was used to elevate urban stakeholders' values and interests over those of upstream communities (Bleeker & Vos, 2019). However, less powerful actors may have power (agency) to produce reality through their own discourses and day-to-day practices (Bennett *et al.*, 2018), including through forms of artwork both written and otherwise (Garrard, 2016, 2017).

Framing power is an important form of discursive power. It regards how issues (e.g., in development projects, education, research, valuation processes, decision-making) are understood, communicated and discussed (see Annex 2.14, Chapter 4). This dimension highlights how these processes (and associated tools) can, through the way they present issues, favour certain human-nature relational models (Linnell *et al.*, 2015; Muradian & Pascual, 2018), knowledge systems and rationalities, and associated values (Vatn, 2009). For instance, South American delegations opposed the ecosystem services concept in the context of the IPBES conceptual framework development, because it conflicted with their worldviews, knowledge and values (Borie & Hulme, 2015). The framing was negotiated, and the final framework (Díaz *et al.*, 2015) recognized both ecosystem services (academic knowledge) and Mother Earth (ILK).

Structural power works through historic-specific socio-cultural, political, and economic systems that reproduce social positions and hierarchies among social groups and reinforce the prioritization of certain values. Individuals exercise power over others because of their position in social structures and their capacity to form such structures/ institutions (Raik *et al.*, 2008) such as class, race and caste relations, or capitalistic markets (Bennett *et al.*, 2018). For example, political ecologists have analysed how class-based relations under capitalism drive capital accumulation through environmental and social injustices (Bennett *et al.*, 2018; Svarstad *et al.*, 2018). Patron-client relationships are also important examples of structural power (Annex 2.11) Structural power is manifested, for example, through rule-making power and operational power.

Rule-making power is the power of actors to create institutions including the opportunity to bias them toward their interests and values. Rule-making is a political process aimed at the establishment of formal or informal institutions regarding access, use and responsibilities over nature/ nature´s contributions to people (e.g., property/ use rights, rules for watershed or landscape management). Exclusion may happen in many ways, as illustrated by cases of watershed management, where peasants are often excluded from decision-making and their relational values are therefore less reflected in established rules (e.g., prohibition of crops; Kothari *et al.*, 2015).

43. Systematic review of indigenous and local knowledge and philosophies (https://doi.org/10.5281/zenodo.4396278).

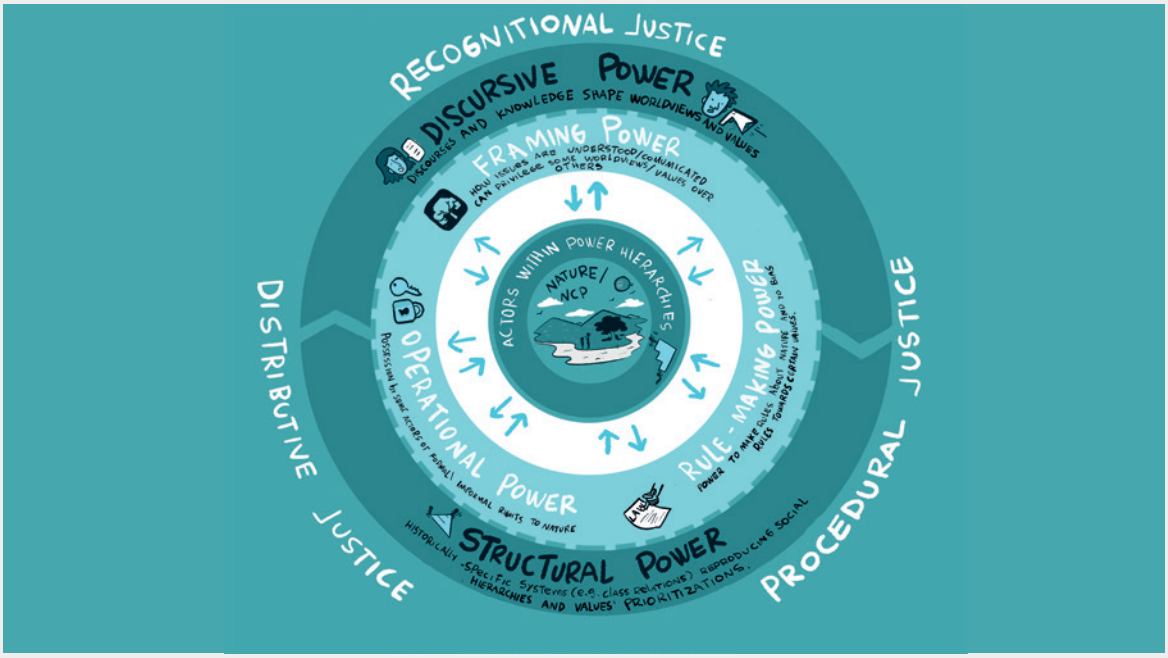

Figure 2 19 **Power and environmental justice dimensions in nature valuation and decision-making contexts.**

Operational power is the power of actors being offered the above-mentioned formal or informal rights in nature/ nature´s contributions to people to determine the use of these assets and therefore what and whose values are emphasized (Bromley, 2006). Such power also includes control and monitoring responsibilities that ensure people's compliance. The distribution of operational power through specifying property and use rights to nature and nature's contributions to people play an important role in influencing both the distribution of income and the status of nature (Vatn, 2015).

Analysing the power relations embedded in institutions (conventions, norms and rules) is an important step towards achieving environmental justice regarding access to nature's contributions to people (Zafra-Calvo *et al.*, 2020) **(Figure 2.19)**. Environmental decisions are contested as some actors (including other-than-humans) are positively and others negatively impacted (McShane *et al.*, 2011) **(Box 2.11)**. Thousands of socio-environmental conflicts have been documented globally between local communities and state-led or private development and conservation projects (Temper *et al.*, 2015), reflecting value conflicts and power disputes over nature (Rincón-Ruiz *et al.*, 2019, 2021). For example, conflicts between local communities and mining companies are observed on all continents (EJOLT, 2021) implying conflicts between – on the one hand – access to minerals (instrumental value) and – on the other – relational and intrinsic values as well as traditional instrumental values (e.g., food products). Powerful actors may even use media-power and / or violence to protect and reinforce their interests and values (e.g., assassinations of environmental defenders) (Global Witness, 2020; Scheidel *et al.*, 2020). In addition, in many cases the establishment of protected areas can produce conflicts due to incompatible life frames, one focused on preserving nature and intrinsic and life support values as endorsed by conservationists (living with nature), and local peoples' seeing their land as securing their livelihoods and place (living from and in nature), prioritising relational and instrumental values (e.g., Cumming, 2016; De Pourcq *et al.*, 2017).

2.4.2 Values in valuation processes and different decision-making contexts

This section develops the above insights further in a more in-depth analysis of how expressions and prioritizations of values are influenced by institutional contexts. The section starts by looking at the different ways values can be expressed under various contexts. Next it looks more specifically at how valuation methods frame values expression – i.e., the implicit or explicit articulation of values by actors and institutions. The last section analyses what type of values are and can be emphasized in decision-making processes of different kinds.

2.4.2.1 Value expressions under different contexts

Valuation and decision-making regarding nature/ nature´s contributions to people are framed by institutions. Procedures for valuing nature's contributions to people, rules structuring decision-making as in a community assembly or firm, procedures regarding the formulation of an environmental management plan are all examples of this. The rules define (a) what type of actors should participate (politicians, representatives of industry, experts, citizens, etc.) with their associated knowledge systems and worldviews; (b) how they can participate (e.g., verbal exchange, written forms, in a group-based or individual-based formats); (c) the form information should take (e.g., qualitative, quantitative), and (d) the appropriate process to reach a conclusion (e.g., voting, deliberation and consensus, statistical aggregation). All these rules ultimately define what values of nature can be accounted for in nature / nature's contributions to people valuation and decision-making. Valuation and decision-making processes are therefore not neutral but reflect inherent power relations (e.g., framing power, rule-making power).

The above understanding points towards several questions that need to be evaluated when organizing valuation and decision-making processes: What knowledge systems, worldviews or values are at stake in a given context? Which values can be taken into account and which ones will be excluded? What are the sustainability and justice implications of including/excluding certain knowledge systems, worldviews or values? What possible conflicts can emerge due to the inclusion and exclusion of certain knowledge systems, worldviews or values? How can valuation and decision-making be transformed so that the rules regarding the integration of values become more transparent?

Figure 2.20 indicates how valuation and decision-making processes may influence value expression in different ways. People's values (see Box A) cover instrumental, relational and intrinsic dimensions that further may relate to different worldviews and life frames. Actors may express values explicitly or implicitly. Explicit value expressions take oral or written forms (Box B). They may be value expressions by communities/IPLCs (e.g., a community assembly stating what values to prioritize in their forest management plan); pricing in markets (commodities); procedures in public decision-making (where there are rules explicitly defining what to prioritise) and valuation using valuation methods (e.g., nature, behaviour and statement-based methods) including integrated valuation methods (see 3.2.2.4).

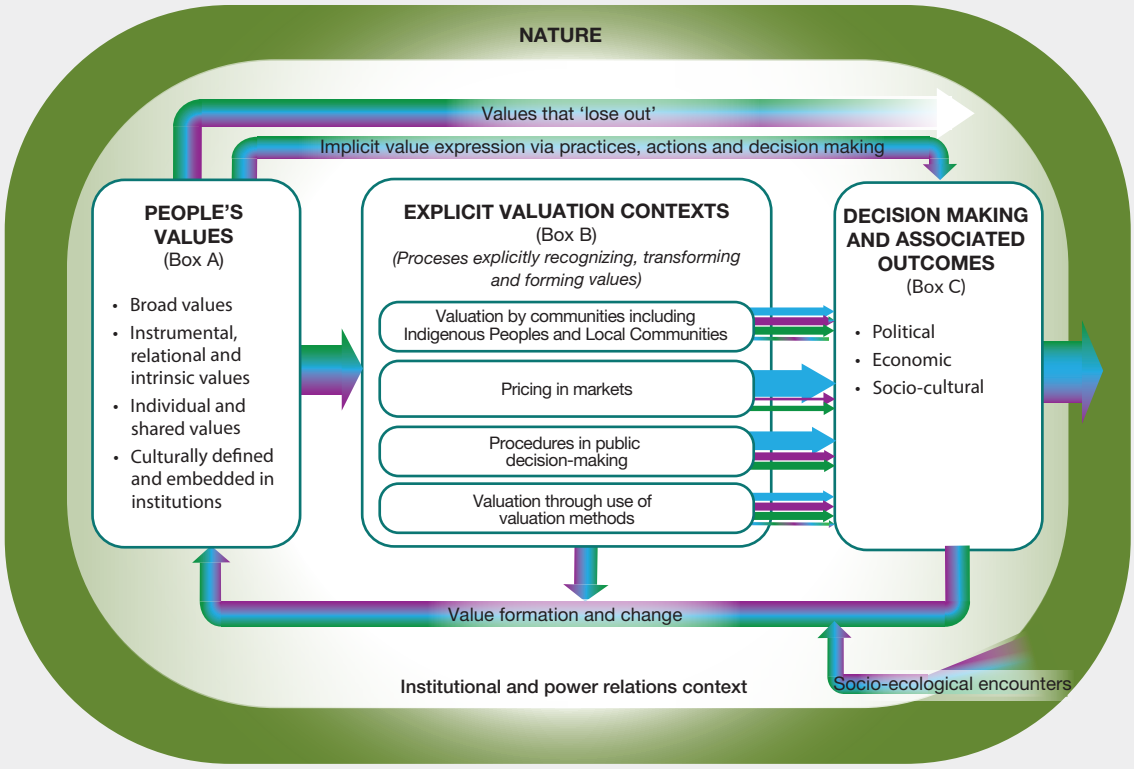

Figure 2 20 **Multiple ways in which valuation methods influence value expressions.**

Valuations inform decision-making and action contexts (see Box C) (Gómez-Baggethun & Martín-López, 2015; Kenter *et al.*, 2015). As seen from **Figure 2.20**, the form of explicit value expression influences what types of values are emphasized (e.g., market information is dominantly focused on instrumental values, while community valuation may facilitate expression also of relational and intrinsic values). Furthermore, some values may be excluded by explicit valuations (due to the rules and assumptions behind them) and may not inform decision-making (see **Figure 2.20**; arrow: values that 'lose out'). Finally, while values are important, we remember from Section 2.4.1.2 that decision-making is influenced also by many other factors – a fact that **Figure 2.20** does not cover.

So, what values are expressed, how they are expressed, and which values are excluded from the process, will depend on how the valuation is framed and undertaken. Both disciplinary and non-academic knowledge systems play important roles regarding how to frame and carry out valuations. The behavioural model of mainstream economics understands values as individually-based – represented by how much one is willing to give up to get something and therefore expressed through a common scale or metric, typically money. Moreover, markets are seen as the ideal institutional structure for valuing. If values cannot be traded – turned into commodities – this approach favours simulating hypothetical markets to elicit the willingness-to-pay. The 'values of society' – also called 'social values' – are then aggregations of individual value expressions. Socially focused academic fields emphasize the importance of institutions for value expression (see 2.4.1.1, 2.4.1.3). Worldviews, life frames and values are embedded in the institutions of a society, which in turn are internalized by actors (e.g., individuals, social groups). They see values as cultural phenomena creating intersubjective meaning acquired through social interactions. From this perspective, values are not framed as purely individual, but rather seen as shared (Kenter *et al.*, 2015). Shared values typically regard common goods, such as nature and nature´s contributions to people and are formed through social processes **(Box 2.9)**.

Box 2 9 What are shared and social values?

Shared and social values are diffuse terms that have different meanings across different disciplines. They have been defined based on the concept of value (broad or specific), who provides them (societies, cultures, communities, groups or individuals), their scale (value to society or individual), their intention (other-regarding or self-regarding), and their process of expression (through social processes or individual elicitation; Kenter *et al.*, 2015). In general, shared values refer to the values that people express collectively, in groups, communities, and across society as a whole. The term social values has been used in many ways, e.g., as broad values that influence specific values and behaviour in relation to nature conservation (Manfredo *et al.*, 2017), as sustainability aligned values embedded in religions (Ives & Kidwell, 2019) or that drive sustainability behaviour of companies (Fordham & Robinson, 2019), or as shorthand for sociocultural value indicators (Kronenberg & Andersson, 2019; see 2.2.4).

Especially in economics, social values often refer to specific values and indicators at a social scale, which can either be established by analytically aggregating individual values, or through social processes (shared social values; Kenter *et al.*, 2015). Developing effective approaches for assessing social values is one of the most significant challenges of environmental valuation (Parks & Gowdy, 2013). Aggregation from individual to social values is a conceptually and ethically challenging task. Values to be aggregated must be assumed commensurable, which can be highly problematic. Furthermore, aggregate social values may differ depending on whether everyone is considered equally or whether some are privileged. For example, the value of flood regulating nature's contributions to people may be highest near expensive houses. If this value is used to guide investment in nature-based solutions, this could lead to inequitable decisions. This can be addressed by equity weighting values (which accounts for that the wellbeing associated with a single unit of money is inversely related to income) (Ebert, 1986), but ultimately a decision needs to be made about what particular distribution is fair (Martens, 2011). Similarly, a decision needs to be made as to how to (dis)count future values against the present, and how to account for risk and uncertainty, which have been matters of fierce debate (Stern, 2021). Finally, the values of minority groups may be masked by aggregation (Howarth & Wilson, 2006). As such, how values are aggregated depends on a set of meta-values that are embedded in valuation institutions (Kenter *et al.*, 2016a). The way these normative questions are addressed in methods such as cost-benefit analysis is as much based on past practice, political forces, and bureaucratic pragmatism as theory (Hockley, 2014).

Shared values can be formed through long-term processes of value formation and socialisation, and shorter-term processes, particularly group deliberation. Long-term formation of shared sustainability-aligned values involves recursive interaction between individuals, groups and culture (Ishihara, 2018), and progressive rippling out of values from niches to broader society through social learning and cross-sectoral institutionalisation (Everard *et al.*, 2016). In terms of shorter-term processes, individualism has dominated in Western valuation contexts. However, in many non-Western contexts, group-based decision-making is common, often involving formal or informal deliberation (Christie *et al.*, 2012; Gould *et al.*, 2019; Kenter *et al.*, 2011). Deliberation is a process of learning, discussion, and consideration of options to form reasoned opinions (Kenter

Box 2 9

et al., 2016c). Deliberative valuations can form shared social values whilst navigating conflicts between different values (Hansjürgens *et al.*, 2017; Irvine *et al.*, 2016). They include increasingly diverse approaches, from established deliberative methods (e.g., Renn *et al.*, 1995) applied to economic valuation (Lienhoop *et al.*, 2015; Spash, 2008), to ethnographic and arts-based approaches that emphasize local knowledge and place (Edwards *et al.*, 2016; Kohn, 2013; Ranger *et al.*, 2016). Scholars endorsing these perspectives highlight the need for valuation to be more transformative (Kenter, 2016), normative (Ravenscroft, 2019) and democratic (Lo & Spash, 2012), moving beyond self-interested instrumental rationality (Hansjürgens *et al.*, 2017; Massenberg, 2019).

In deliberation, participants can act as citizens rather than consumers, frequently drawing on values towards the common good (Dietz *et al.*, 2009; O'Neill *et al.*, 2008; Vatn, 2009). This is important because there is often a mismatch between consumer preferences and sustainability-aligned values (Norgaard, 2010; Sagoff, 1986). Deliberative valuation methods do not assume that diverse values can be commensurated into monetary indicators. However, monetary shared social values can be deliberated directly to reflect socially desired allocations of resources (Orchard-Webb *et al.*, 2016). Justice questions in terms of who wins and who loses out from policies can be considered explicitly. Whilst such processes do not necessarily lead to consensus, they may lead to greater acceptance and legitimacy of solutions (Lo, 2014; Ranger *et al.*, 2016).

Some empirical studies suggest that shared values may be more robust than non-deliberated values; are preferred by valuation participants for policy (Clark *et al.*, 2000; Kenter *et al.*, 2014; 2016b); and facilitate uptake in decisions (see 4.6.6). These potential benefits are contingent on the inclusiveness of the process. However, shared and individually aggregated social values do not necessarily diverge and can also be used in tandem (Brouwer *et al.*, 1999; Raymond *et al.*, 2014). Shared values approaches are most salient when faced with substantial uncertainty, many constituencies and potential for conflict (Ainscough *et al.*, 2018; Clark *et al.*, 2000; UK NEA, 2014).

Box 2 10 **Value articulation in watershed management: Klamath River.**

The Klamath River is the United States of America's fourth largest. It spans two states, five Indian reservations and the Yurok and Taruk tribal nations, hosts productive spawning grounds for threatened Pacific salmon and is one of the most biodiverse regions in western North America (Mucioki *et al.*, 2021). There are indigenous communities that depend on water from Klamath: the Hoopa, Yurok, and Karuk Tribes, Quartz Valley Indian Reservation, Resighini Rancheria, Shasta Indian Nation and the Klamath Tribes (Sarna-Wojcicki *et al.*, 2019).

During the 20th century, the federal government built dams and drainage infrastructures to ensure water availability, support irrigation and produce energy. These projects provided affordable, renewable electricity and transformed large areas into arable land. However, infrastructures blocked salmon passage and reduced water quality. This impacted indigenous peoples' way of life, commercial fishing off the Pacific coast (relational and instrumental values) and threatened fish and wildlife populations (intrinsic values). In 2001, conflict ignited when a federal agency withheld irrigation water to protect endangered fish, resulting in >$200 million agricultural losses. Thousands protested publicly, and some people illegally diverted water to crops. The media branded it a "water war" of "fish vs. farmers". Subsequently, the federal government stopped withholding water from agriculture, resulting in record-high fish kills, costing fishers >$80 million and threatening indigenous cultural continuity and food security (Chaffin *et al.*, 2014; Sarna-Wojcicki *et al.*, 2019).

In 2006, Klamath dam licenses expired and protests from indigenous and environmental groups led the operating company to launch a collaborative process to negotiate conflicting values and decide the river's future (Sarna-Wojcicki *et al.*, 2019). More than 140 stakeholder groups participated to produce the Klamath Basin Restoration Agreement, which includes the removal of some dams and maintenance of higher water levels to satisfy multiple stakeholders' needs and values (Biondini, 2017). Unfortunately, the Agreement was never funded and conflict over water in the Klamath basin continues today.

The crisis in the Klamath basin revealed conflicting worldviews and values across stakeholders. Further, the divergent perspectives were inequitably expressed in the management rules (approaches and governing policies) because of power asymmetries. Treaties between indigenous peoples and the federal government ran counter to traditional ways of relating to nature as implicit value expressions. The investments in physical infrastructure along the Klamath also implied creation of organizations like the Bureau of Reclamation, managing the watershed based on a worldview aimed at regulating nature to increase economic output. As public environmental perceptions shifted in the 1970s, new laws like the Endangered Species Act provided institutional leverage points to counter the values embodied in such productivist systems, opening to more diverse life frames.

This conflict manifests fundamental paradoxes – i.e., the conflicting values and life frames underlying the irrigation projects, the Endangered Species Act and federal-indigenous treaties. The socio-environmental crisis reflected in the context provided an opportunity to create collaborative, bottom-up

Box 2 10

decision-making bodies (e.g., transient "collaborative" forums aimed at dam relicensing) that allowed diverse values and worldviews, including ILK, to be expressed. As a result, a viable solution arose that had the potential to deescalate the conflict if it had been funded (Chaffin *et al.*, 2014).

Values can also be expressed implicitly through actions like everyday practices (**Figure 2.20**, arrow: implicit value expression). Examples may include a person's decision to buy organic food – expressing an intrinsic value (see also 2.2.3; Honkanen *et al.*, 2006); classification of edible species by indigenous communities oriented by their instrumental value (Balakrishnan *et al.*, 2017); and ritual offerings to *Pachamama* performed by IPLC expressing a relational value of care (Salvucci, 2015). Actions such as habits can be a value expression even if people do not consciously think about them (e.g., filling up the washing machine before using it) (Bardi & Schwartz, 2003; Martínez-Espiñeira *et al.*, 2013). Watershed management also exemplifies that values are often implicitly expressed, as when some rules around land use favour more powerful actors and their values over less powerful ones (Arias-Arévalo *et al.*, 2017) (see 2.4.1.4, Annex 2.1). The value prioritizations implicit in water management regimes may become a source of visible conflicts over water use, as in the case of the Klamath River in the Unites States of America (see **Box 2.10**; Annex 2.6).

Values can also be transformed or constructed through socio-ecological processes (arrow: socio-ecological encounters) (see 2.5.1). Values may moreover change as an effect of the value expressions and decision-making procedures themselves (illustrated in **Figure 2.20** by the feed-back arrow: value formation and change) (see 2.5.1). Both explicit and implicit value expressions are influenced by power relations and the more general institutions within a society (see 2.4.1.4). Also, valuation and decision-making procedures may differ in how they deal with value conflicts and their assumptions regarding value comparability and compatibility (see 2.4.2.2, 2.4.2.3).

In sum, **Figure 2.20** highlights that efforts to analyse and transform values toward sustainability and justice require not only facilitating the use of valuation methods, but also analysing and transforming the institutions that influence human action more at large (e.g., markets, public decision-making procedures, practices) requiring a broad understanding of human motivation and action. The next two subsections will expand on the understanding of valuation methods and decision-making as institutionalized forms of value expressions.

2.4.2.2 Values and valuation methods

Valuation methods are procedures aimed at recognizing or measuring values (see Chapter 3). They are 'value articulating institutions' based on rules defining which values can be expressed and in what form (Cook *et al.*, 2020; Kallis *et al.*, 2013; Šunde *et al.*, 2018; Tadaki & Sinner, 2014; Vatn, 2009). They are therefore not neutral devices (see 2.4.1.4; Annex 2.14). Important rules regard: (i) who should participate and in what role, (ii) the form of the valuation process, (iii) what is considered data, (iv) treatment of value conflicts and issues around comparability/compatibility of values and (v) how recommendations should be made (Jacobs, 1997; Vatn, 2009) **(Figure 2.21)**. Here examples regarding how valuation methods influence value expressions. Regarding the relevance and robustness of these and other examples, see Chapter 3.

Participants and roles: Valuation methods define who can participate and according to what role and competence (e.g., as consumers, citizens or experts) (Cook *et al.*, 2020; Martín-López *et al.*, 2014; Vatn, 2009) – influencing what human-nature relationships (life frames) and rationalities (e.g., self-interest, reciprocal, other-related) are emphasized (Vatn, 2009). For example, in contingent valuation studies, participants are assumed to participate as consumers and expected to express willingness-to-pay (instrumental value) for the marginal provision of the commodity at stake (Martín-López *et al.*, 2014). Other approaches, such as social multicriteria evaluation, may emphasize individuals' participation as stakeholders (Šunde *et al.*, 2018), facilitating the expression of diverse (even conflicting) views on human-nature relationships and values (Saarikoski *et al.*, 2016). Experts also express values when constructing biodiversity indicators reflecting their adherence to the intrinsic value of species or ecosystems (Duelli & Obrist, 2003). Deliberative processes typically emphasize the role of the citizen and social rationality (Dietz *et al.*, 2009; O'Neill *et al.*, 2008).

Valuation process: Valuation methods define how participants should contribute – individually and/or as part of a group, in writing or orally. Important issues regard if communication between participants is possible/facilitated; if values are seen as fixed or as changeable; how complexity and uncertainty should be addressed. For example, willingness-to-pay is expressed by individuals assuming stable preferences/values (Vatn, 2009). Individual-

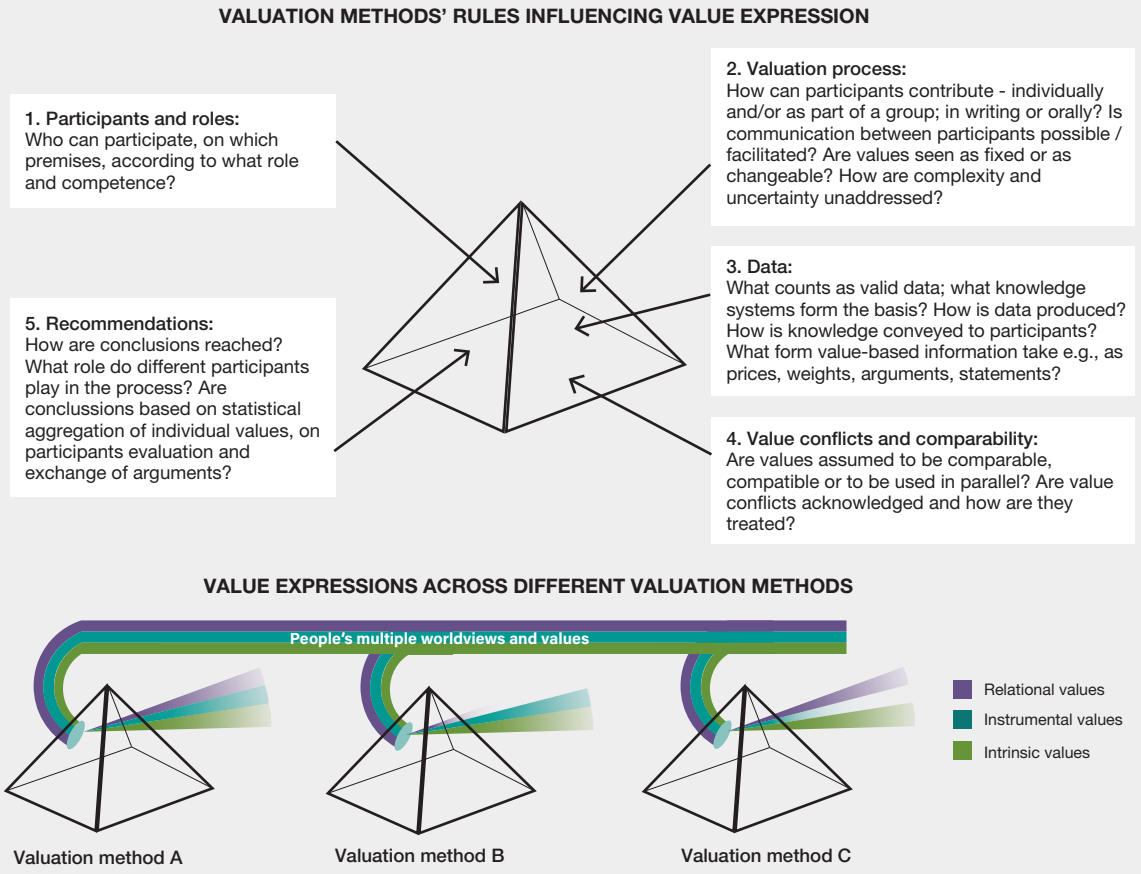

Figure 2 21 **How valuation methods influence value expressions.**

While people's values may cover a spectrum of all value types, the choice of a valuation method will influence which values are expressed.

based non-monetary methods such as interviews, may focus on capturing diverse life frames and values. In some deliberative group-based valuation methods, participant focus is on the possibility to construct shared values **(Box 2.9)** acknowledging complexity and conflicts (Jacobs *et al.*, 2018; Popa & Guillermin, 2015; Ravenscroft, 2019; Šunde *et al.*, 2018; Vatn, 2009), assuming that values are not fixed (Gasparatos & Scolobig, 2012; Tadaki & Sinner, 2014). For example, in a choice experiment, Kenter *et al.* (2011) found that in contrast to initial individual-based responses, after deliberation participants were unwilling to trade-off nature´s contributions to people against money.

Data: Valuation methods frame what counts as valid data; what worldviews and knowledge systems form the basis. This regards issues like how data are produced and communicated and what form value-based information should take (e.g., as prices, weights, arguments, statements). Valuation methods frame both value inputs and outputs by emphasizing the validity of certain knowledge systems, worldviews and life frames. IPLCs, industry, citizens, scientists and policymakers may emphasize different knowledge systems, worldviews and thus values (Cook *et al.*, 2020; Kallis *et al.*, 2013). The choice of measures and indicators also influence outcomes (Šunde *et al.*, 2018; Tadaki & Sinner, 2014). The non-monetary indicator of willingness-to-allocate-time for nature´s contributions to people conservation may exclude the values of social groups with high time restrictions, such as women reinforcing gender inequalities (Medina & Arche, 2015; Tilahun *et al.*, 2015). Because willingness to pay is affected by income distribution, low-income groups will state low economic values even if attributing high importance to nature. Weighting to correct for income distribution have been proposed (Adler, 2016; Boardman *et al.*, 2018).

Value conflicts and comparability: Valuation methods define if values are assumed to be comparable, compatible or to be used in parallel (see 2.2.3.3). Key issues regard to what extent value conflicts can be acknowledged and how they may be treated. Valuation methods handle value conflicts and the (im-)possibility to translate multiple value dimensions into a single value measurement differently (Gasparatos & Scolobig, 2012; Martín-López *et al.*, 2014; Vatn, 2009). Economic

valuation assumes that declined consumption of one good (attribute) can be compensated by increased consumption of another (Hanley & Czajkowski, 2019). However, people can reject the expression of the value of nature in monetary terms and the trade-offs that such translation entails (Temper & Martinez-Alier, 2013) **(Box 2.6)**. Assuming that diverse values can be compared and ranked by a common unit or standard may be problematic when diverse worldviews with diverse values coexist (Jacobs *et al.*, 2018; Tadaki & Sinner, 2014) (see 2.2.3.3). Valuation methods based on participation and deliberation (e.g., participatory scenario planning, social multi-criteria evaluation) may foster mediation of value conflicts (Rincón-Ruiz *et al.*, 2019).

Recommendations: Valuation methods frame how conclusions are reached and what role different participants play in that process. A key question regards whether conclusions are based on statistical aggregation of individual values or on participants' evaluation and exchange of arguments. Some deliberative approaches are aimed at consensus; in others, conclusions are reached through voting. However, this would not necessarily resolve value conflicts. In cost-benefit analysis, recommendations are based on the net present value. However, there is disagreement among economists on the choice of the proper discount rate (Beckerman & Hepburn, 2007; Davidson, 2015), which highly influences net present value measurements.

The *Exxon Valdez* oil spill in Alaska, Unites States of America in 1989 illustrates the issues raised above (Fourcade, 2011). Contingent valuation was used to litigate a claim for the loss of non-use values. A survey among the English-speaking United States population showed that the aggregate monetary loss of non-use values ranged from 2.8 to 7.2 billion (1990) dollars (Carson *et al.*, 2003). On the other hand, a 'talking circle' (a traditional institution), was established with members of the Inuit communities (Centemeri, 2015; Picou, 2000). The talking circle was aimed at addressing the social and cultural impacts (shared instrumental and relational values) caused by the oil spill (i.e., decline in social relations, livelihoods, health; post-traumatic disorders) (Palinkas *et al.* 1993). Participants showed expressions of sorrow and apology for all beings affected by the disaster, developing cultural rituals aimed at healing intrinsic values of nature (Centemeri, 2015). Contingent valuation was instrumental in establishing compensation levels and seems to have influenced the reduction of large oil spills in the United States of America (Carson *et al.*, 2003). However, this method was not able to capture the worldviews and values of the Inuit communities concerned. For them the talking circle was a better way to express the diverse values involved (Centemeri, 2015).

To conclude, the choice of a valuation method is not neutral. Scholars in sustainability science have made a call to reflect on how valuation methods emphasize / exclude knowledge systems, worldviews and values emphasizing the sustainability and justice implications of such choices (Popa & Guillermin, 2015). This seems an important point for policymakers when commissioning valuation studies. Power issues implicit in valuation methods go beyond framing and may interact with other forms of power (see 2.4.1.4) as is the case when powerful actors influence the selection of representatives in participatory valuation approaches (Šunde *et al.*, 2018) or when facilitators may affect results by how they mediate between conflicting interests (Drennon & Cervero, 2002; Heron, 1999).

2.4.2.3 Values and decision-making

The problems we face for maintaining the values of nature/ nature´s contributions to people are the result of decisions that humans make (see Chapter 1). As we have seen, decisions are sometimes based on explicit valuation, sometimes the valuation is implicit or follow rules defined for the specific decision. This section is focused on what values dominate different types of decision-making and how this influences sustainability and justice outcomes.

As outlined in Section 2.4.1.3, values are often implicit in the rules (institutions) defined for specific types of decision-making and / or the role that individual or collective decision-makers operate under. Hence, there are rules for what a politician, chief executive officers of firms or community leaders are expected to do. These rules are defined to protect certain values underlying the kind of decisions involved. What values that are protected, vary across types of decision-making. Moreover, what power different decision-makers have that allows them to influence nature as well as the decisions of others vary (see 2.4.1.4). The aim of this section is to clarify key aspects of these complex issues. A more developed and thoroughly referenced analysis of the issues covered here is found in Annex 17.

Since we share natural environments, maintaining the values of nature and sustainable deliveries of nature's contributions to people demands coordinating actions at multiple geographical scales and across social groups. In principle, each single decision regarding nature influences the conditions and the values of nature for others. This is understood differently across the literature (e.g., concepts like external effects, side-effects, cost shifting) (Field, 2016; Kapp, 1971). However, all conceptualizations emphasize that what is best for the individual decision-maker – be it individuals, households or firms – may add up to intolerable situations for the collective. Moreover, actors may have an incentive to 'free-ride' since reducing negative side-effects of one's actions is costly, and the gains thereof are spread across all implicated actors. Even when actors have internalized values of care for nature, it may be demanding to know when one does something that is harmful and how to avoid the harm. Further, human interactions with nature

are mediated by power relations (see 2.4.1.4) implying both differentiated environmental responsibilities and distribution of environmental benefits and costs. Hence, ensuring conditions for collectively realizing the broad values of justice, sustainability and care is demanding.

2.4.2.3.1 Different values are underpinning different types of decision-making

So, what types of values are promoted under different contexts of decision-making? Building on the assessment-wide decision-making typology (see 1.2.3, Annex 1.3), it is possible to make some general assessments. This typology distinguishes between political, economic and socio-cultural decision-making. In parallel to that, a distinction is made between political and economic actors and civil society. Political actors have rule-making power and define the institutions – named resource regimes in **Figure 2.22** – under which economic actors operate. Political decisions are themselves governed by constitutional and collective choice rules also defined by political processes (Ostrom, 1990). Constitutional rules typically define broad values important for the society as well as basic rights of citizens including what powers policymakers have in relation to its citizens. Collective choice rules regard how political decisions should be made. The resource regimes offer economic actors the rights to manage, use and possibly trade resources from nature producing goods / income but also waste (operational power). That happens given the characteristics of these resources and existing technologies and infrastructures. Both political and economic decisions are to a larger or lesser extent embedded within the wider social and cultural context of civil society. Taken together, the institutional framing of specific economic, political decision-making and socio-cultural processes of relevance to the governance of human-human and human-nature relationships are termed governance frameworks. The different relations described above are captured in **Figure 2.22**.

Mainstream economics divides economic actors into producers and consumers. They are assumed to be self-interested, aimed at maximizing profits and utility respectively (e.g., Mankiw & Taylor, 2014). Notably, mainstream production and consumption theory emphasize values that can be traded in markets (i.e., foremost instrumental values that can be valued in monetary terms).

Understanding firms as profit-making entities is a highly relevant perspective. The rules established favours the values of owners. Still, the focus on profits is a more relevant description for corporations than for family firms, IPLCs and community-owned firms. Regarding the latter, broader quality of life considerations may also be important, such as landscape and community relational values (Burton, 2004; Gasson, 1973). This is not least an aspect featuring strongly in the literature on indigenous peoples and local communities (Dominguez *et al.*, 2012; Herrera-Cabrera *et al.*, 2018). At the same time, it is also observed that the more integrated such producers are into markets, the stronger role do instrumental values, as embedded in commodities, tend to play (e.g., Farfán-Heredia *et al.*, 2018) and cooperative structures may erode (Annex 2.11). Similarly, integration in international markets both increases the distance between actions and their effects on nature values between different social groups across geographical scales. Moreover, it breaks the links between local ecological capacities and the flow of matter across the globe following commodity chains raising a series of issues regarding which values become

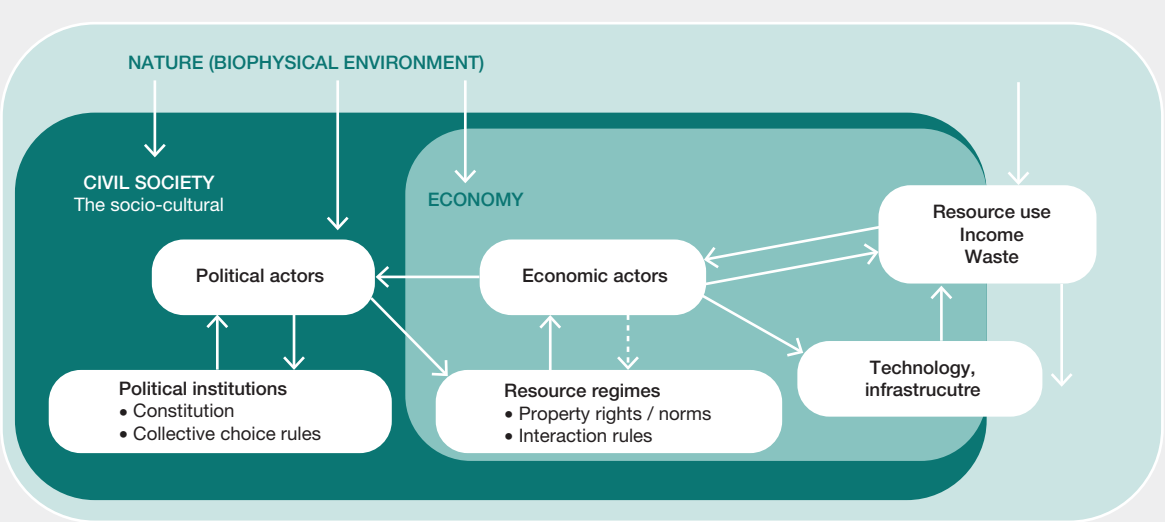

Figure 2 22 **Decision-makers and decisions in context. Source: Vatn (2021, translated).**

Box 2 11 Conflicting values expressed through the coal supply chain from Colombia to Türkiye.

Conflicting values at different geographical scales and across social groups can be identified in commodity chains. One approach to map the connections between nature´s contributions to people, stakeholders at different levels, value conflicts, justice issues and power dynamics affecting sustainability is through commodity chain analysis (Robbins, 2014). Such analyses cover the provision of natural resources, implied externalities like contamination, as well as the social dynamics crucial to understanding the socio-environmental conflicts and issues of distributive justice arising along these chains (Conde & Kallis, 2012) (see Chapter 1). For example, analysing the coal chain requires the identification both of its market and physical components (Wilde-Ramsing *et al.*, 2012) and the diverse and conflicting values involved in the socially and ecologically unequal exchanges between the countries involved (Cardoso, 2018; Ciccantell & Smith, 2009; Hornborg & Martinez-Alier, 2016; Talbot, 2002).

An analysis of the coal chain between Colombia and Türkiye shows that a growing industry implies increased socio-environmental impacts producing conflicts at various scales (Cardoso & Turhan, 2018) Conflicts between and within the countries and regions involved, arise from clashing worldviews regarding relations with nature / nature´s contributions to people as well as the unequal distribution of impacts along the chain (distributive justice). Concerns include reduced public health following air pollution and loss of identity and sense of place values associated with relocation and displacement of local communities. Additionally, there are concerns about the loss of intrinsic values due to ecosystem degradation (diversion of rivers and coastal ecosystems) and climate change. Decisions at one scale or one position in the chain percolates through the whole chain illustrating the political ecology of coal as a macro-level project of resource extraction and trade (Bebbington, 2015). The injustices produced may result in claims for compensation, remediation (retributive justice) and cessation (Zografos & Rodríguez, 2014). They may be expressed in plural valuation languages, besides economic compensation (Martínez-Alier, 2002).

The market only captures the monetary (instrumental) value of coal. Local indigenous and Afro-Colombian communities bear heavy social and environmental costs and associated value losses (Cardoso, 2015; Pérez-Rincón, 2014), and in Türkiye the combustion of coal affects the public health of communities in the areas surrounding the coal-fired power plants. In addition, the coal chain impacts climate, which itself affects intrinsic, relational and instrumental values across the planet in unequal ways (Richards & Boom, 2015). The multiple components of the coal chain and the lack of transparency throughout the system enable companies to disregard their socio-environmental harms (Harris *et al.*, 2016).

Grassroots movements across cultures and borders can be linked to better account for the plurality of values (costs and benefits) across the supply chain. However, how actors' valuation languages and their own worldview of coal and nature are defended and handled is affected by their power within the chain and their relationship with the territory where coal is extracted and burned (Cardoso, 2018). Assessing and comparing the coal chain from a value pluralist perspective enables better comprehension of the issues that underlie conflicts and may better embrace the valuation languages deployed by each actor, in each country and local territory.

prioritized. This is illustrated in **Box 2.11**. At the same time, a burgeoning literature on sustainable entrepreneurship / eco-social businesses indicates that it is possible to establish companies where values of nature are explicitly accounted for in the aims of the business (Johanisova & Fraňková, 2017; Muñoz & Cohen, 2018).

Also, consumers may act beyond self-interest and – to the extent affordable – "buy green". Still, that is a rather marginal phenomenon if we look at the entire market for goods and services (e.g., Vatn, 2015). Nevertheless, consumers may pressurize firms to act more environmentally friendly (Klooster, 2006; Skjærseth & Skodvin, 2001). Pressure from civil society through non-governmental organizations represents a similar trend (e.g., Pattberg, 2005). This has delegitimized the one-sided focus on monetary instrumental values by corporations, resulting in the concept of corporate social responsibility (CSR) to enhance business legitimacy. Taking the concept of social responsibility seriously may not imply loss of profits as civil society reactions are avoided (Gatti *et al.*, 2019; Walker & Wan, 2012). Still, the large literature on 'greenwashing' shows that genuine corporate protection of the diverse values of nature is more the exception than the rule (de Freitas Netto *et al.*, 2020; Delmas & Burbano, 2011; Pizzetti *et al.*, 2021).

Given these observations, it is not expected that economic actors can solve the challenges faced themselves. While they operate under resource regimes defined by political actors, it is, however, not a given that these actors are neither able nor willing to change the regimes in ways that favour the maintenance of the diverse values of nature. The literature is quite split on what motivates political actors. The public choice literature emphasizes that policymakers also act on self-interest (e.g., Dearlove, 1989). Other parts of the literature are more concerned with the specific characteristics of democratic governance, where a key aspect regards forming the role of the politician and the administrator as serving society (e.g., March & Olsen, 1995). While politicians are typically under strong influence

by powerful economic actors, this understanding opens space for changes in resource regimes making it possible to protect the nature's diverse values.

While policymaking has largely been seen as driven by interest and interest conflicts, it is also acknowledged that it is fundamentally about choosing the broad values on which societies should be based (Fukumoto & Bozeman, 2019; Stewart, 2009). This may happen through explicit decisions when making budgets and laws. It may, however, also be implicit in the designated mandates/responsibilities and rules defining what should be accounted for when ministries and agencies make their decisions (e.g., March & Olsen, 1995). Notably, these actors are formed around a key (and often conflicting) set of values, interests and knowledge (Movik & Stokke, 2015; Thomas, 1997). Moreover, it is important to note that general economic policies are as important for the capacity to maintain the diverse values of nature as the more specific policies for protecting them (see 2.4.2.3.2).

Figure 2.22 emphasizes that both political and economic decision-making is embedded in civil society. Certainly, by making markets the dominant institution for resource allocation, the link between civil society and economic action is weakened, and many civil society actors may align with the value prioritization of economic actors (e.g., some social media) (Stutzer *et al.*, 2021). As emphasized above, civil society forces – especially through the activity of social movements and NGOs – nevertheless impact upon economic and political decision-making by advocating the acknowledgement of nature's diverse values. First, civil society and socio-cultural processes form the value base of societies and political action would – at least in democracies – reflect that (e.g., Schill *et al.*, 2019). Second, socio-cultural actions are broad in their focus, with emphasis not only on instrumental values, but also on relational and intrinsic values (Chan *et al.*, 2016; Comberti *et al.*, 2015) (see 2.2). It reflects the experiences of people as they encounter each other and nature and is the case whether we talk of industrialized societies or indigenous peoples and local communities. Certainly, sustainable human-nature relationships may feature less prominently in the former case (Dawson *et al.*, 2021). The role that civil society can play *vis a vis* political and economic decision-making is moreover influenced by the respect given to human and civil rights (Ahmad, 2018; Deva & Birchall, 2020).

2.4.2.3.2 The conflict between values in policymaking

As noted, the role of policymakers is to prioritize between values when they decide on the more formal institutions of a society. The period after World War II has been characterized by strong economic growth, measured with gross domestic product, a monetary instrumental value indicator (Steffen *et al.*, 2015). Economic growth became a key political goal – reaching the status of a broad value – in many countries from around 1950 and onwards, and gross domestic product became the main measure of success underpinning many policies **(Box 2.7)** (Coyle, 2014; Purdey, 2009; Schmelzer, 2015). Liberalizing markets and ensuring stable currencies were important institutional aspects fostering its realization (Steil, 2013). Except for a short period in the 1970s (Gómez-Baggethun & Naredo, 2015), there has been no serious emphasis on the conflict between economic growth and maintaining the diverse values of nature. Rather a win-win discourse prevailed (Otero *et al.*, 2020).

Research shows that increased global gross domestic product drives increased use of natural resources (Krausmann, 2017). In recent periods, even a 1:1 relationship is observed (Hickel & Kallis, 2020). Such extractive policies have created immediate loss of multiple nature values at different geographical and social scales, disproportionately affecting indigenous and local communities (Temper *et al.*, 2018). The Niyamgiri case **(Box 2.12)** illustrates the power issues and value conflicts between economic development projects and indigenous peoples and local communities. Over time, effects have also become global and threaten the functioning of the whole earth system by crossing key planetary boundaries (Steffen *et al.*, 2015). Certainly, due to a loss of nature's values following this development, international treaties and national policies – e.g., regulations and price incentives – have been instituted in an attempt to overcome the various types of free-rider and power issues involved (Chasek & Downie, 2020). However, the field of environmental policy is more characterized by failure than success (e.g., biodiversity loss and climate change) (IPBES, 2019a; IPCC, 2021).

There are several reasons for this. Environmental regulations generally do not engage with the drivers. They rather focus on effects (IPBES, 2019a). The institutions established to foster market expansion, international trade and economic expansion are generally left unchanged or even strengthened. Policies for economic growth are often put in place as if they will not create serious threats to nature values. When such problems are encountered, regulations may be put in place to reduce negative impacts on these values (e.g., Vatn, 2015). There are several serious issues encountered when using such a 'grow first – regulate afterwards' strategy. It produces interests that typically act against policies that are later proposed to protect the natural values involved (Union of Concerned Scientists, 2007). Moreover, in a natural world of tipping points, the delays caused by such a strategy are highly problematic. Creating institutions that integrate economic and environmental policies to protect sustainability and justice values, that focus up-front on avoiding serious future impacts on nature and nature's contributions to people and make people less dependent on economic expansion, especially in rich countries, may be important strategies to handle the challenges humanity faces.

Box 2 12 Conflicting values, power and justice in decision-making about mining: Niyamgiri mountain.

The socio-environmental conflict that emerged due to mining near Niyamgiri mountain (Odisha, India), which is conceived as sacred by local indigenous peoples (Temper, 2019), elucidates the role of worldviews, values, power and justice in decision-making. It also illustrates how political actors who define the rules for resource use often also define relevant forms of valuation.

In 2003, the mining company Vedanta Resources received approval to build a refinery (which did not require forest clearance). In 2004, Vedanta then requested approval to clear forest for a mine, citing the existence of the refinery as rationale. Niyamgiri provides habitat for diverse species and supports livelihoods for the Dongria Kondh and Kutia Kondh indigenous peoples, who regard Niyamgiri as sacred and see their survival as dependent on its ecosystem's integrity (Temper, 2019).

In 2004 environmentalists petitioned the Indian Supreme court to not allow the mine permit (CEC, 2005; Sahu, 2008). For nuanced reasons (Annex 2.5), the court approved the mine and associated forest clearance. This verdict resulted in mass-scale demonstrations. In 2013, India's Supreme court reversed the earlier decision, ordering that the Dongria Kondh's right to worship their sacred mountain must be "protected and preserved" and that those with religious and cultural values associated with the area must be included in the decision-making process. It allowed the affected tribal villages to decide on the project via local referenda (Tatpati *et al.*, 2016; Temper & Martinez-Alier, 2013). The affected villages held referenda and unanimously rejected the mining project. In 2014, the Ministry of Environment, Forest and Climate Change upheld the decision to disallow forest clearance.

The case includes a range of valuation approaches: the firm's bottom-line considerations, cost-benefit analysis (focusing on instrumental values), portrayals of ecological (intrinsic) values, and evidence of (relational) cultural values of indigenous peoples. In this case, the power to make decisions influence which values were prioritized and which valuation methods were deemed appropriate.

The case also exemplifies how different valuation logics succeed or fail in representing different life frames and sets of values. The first court decision was largely based upon prioritising economic development (living from frame), emphasizing industrialization (Lele, 2012). Cost-benefit analysis, which focused on instrumental values (e.g., employment income; infrastructure expenses, profits) and thus supported Vedanta's interests, was central to this decision (Padel & Das, 2010). Yet conservation activists (who largely aligned with a living with frame) conducted an alternate cost-benefit analysis and submitted it to the court; this cost-benefit analysis was associated with biophysical evaluation (e.g., evidence of rare species) and represented the project's biophysical externalities (CEC, 2005). These same activists also submitted a writ petition that emphasized the intersections between cultural and biodiversity values and the rights of local communities to define their livelihoods (Supreme Court of India, 1995). They highlighted a relational worldview (living as and living in frames). The latter two ways of approaching the issue intertwined, as both incorporated an intact Niyamgiri ecosystem as a core value. Yet cost-benefit analysis, even when employed by conservationists and including extensive analysis of the biophysical impacts of the mining operation, was unable to represent the cultural, spiritual and territorial values that were most important to local indigenous people (Temper & Martinez-Alier, 2013).

2.5 VALUES FORMATION AND CHANGE AS DYNAMIC PROCESSES

Environmental policies often seek to directly or indirectly create or modify values. For example, almost all national biodiversity strategies and action plans promote greater awareness and concern for biodiversity (see 2.1.2, Annex 2.2). Decision-makers thus need to understand value formation and change processes to effectively and ethically engage them in policymaking, including anticipating their relative stability/malleability in the face of specific policies (see 1.3). Here, scoping and systematic literature reviews (Pham *et al.*, 2014) were used to explore how values form and change as individual, social and socio-ecological processes (Kendal & Raymond, 2019) that depend on value type (e.g., broad versus specific), context (e.g., institutional setting) and scale (e.g., spatial and temporal) (Horlings, 2015) (Annex 2.16, **Figure 2.23**). These processes can operate simultaneously and can feedback to value expression (see 2.4). This subsection spotlights particular concepts to facilitate reflexive decision-making that better tailors policies for desired outcomes.

2.5.1 Individual, social and socio-ecological processes of value formation and change

Diverse concepts from multiple academic and non-academic traditions relate to value formation and change **(Table 2.6)**. 'Value formation' refers to how values develop in the first place. 'Value change' describes the modification of broad values or altering the prioritization of specific values in individuals or social groups. Though these are fundamentally related processes, values formation

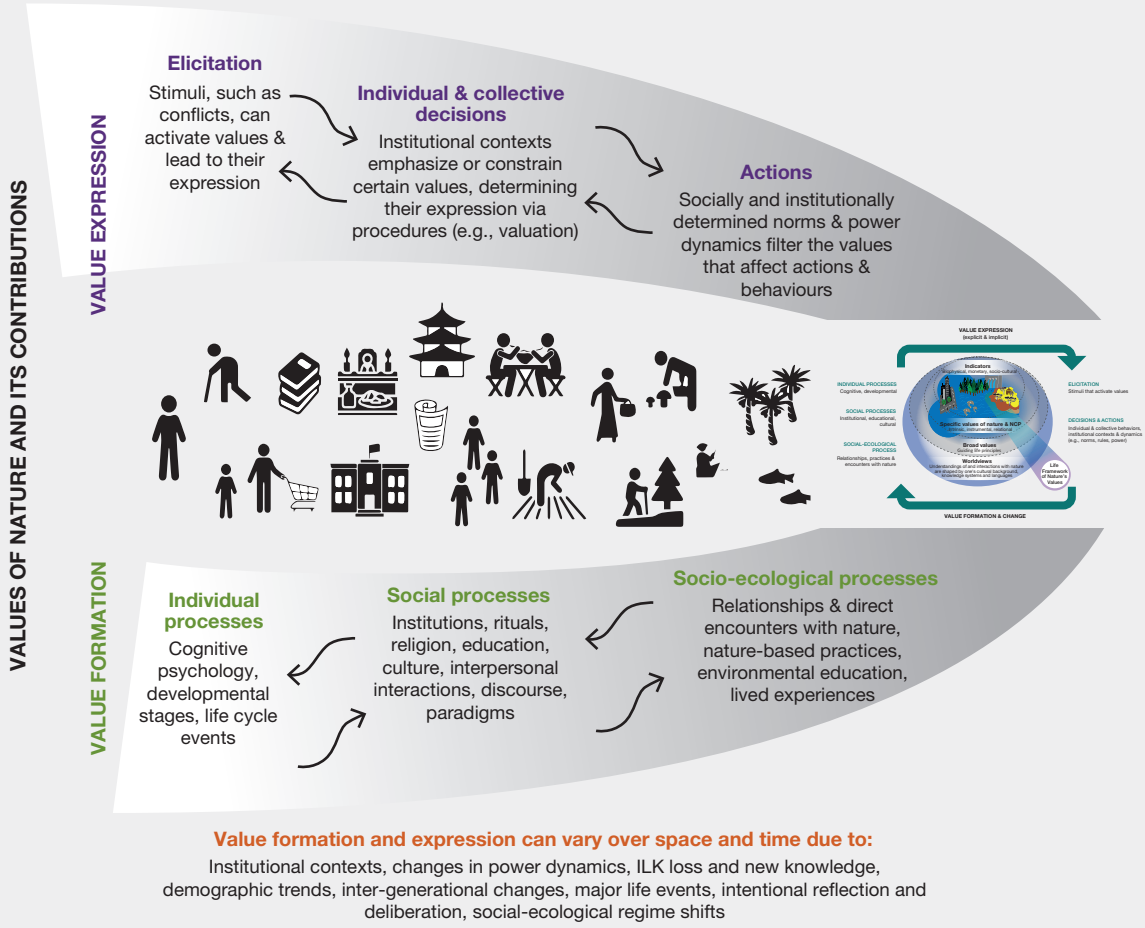

Figure 2 23 **Understanding value formation and change as part of a dynamic process provides various 'entry points' for decision-makers to tailor policies toward specific levels (e.g., individual, social and socio-ecological) in light of desired outcomes of value expression (e.g., actions, decisions, see section 2.4).**

scholarship rarely considers what was there before (e.g., Schwartz, 1992), whereas values change studies mostly focus on shifts in sets of values or the organization of values hierarchies over time (e.g., within an individual's life, between generations) (Kendal & Raymond, 2019; Manfredo *et al.*, 2017).

A critical insight for policy-making is to recognize the pivotal role of social dynamics (e.g., gender roles) and social context (e.g., institutions through which decisions are made) of values formation / change whereby collective meaning is constructed regarding what is good or bad and right or wrong within specific situations over time (Bourdieu, 1990; Cooper *et al.*, 2016; Dumont, 1980, 1986; Graeber, 2001; Hitlin & Piliavin, 2004; Levi-Strauss, 1973). This constructivist perspective applies explicitly to social and socio-ecological processes and implicitly to some aspects of individual processes. For example, while a child's individual cognitive development may underlie her value formation process (Gilligan, 1993), she is also infused by social dynamics and is always a member of many communities (Bardi *et al.*, 2009; Norton, 2005). As such, values are embedded in social dynamics and institutions like gender roles and rituals (see 2.4.1) that emphasize what is expected to be important. Therefore, these social contexts can promote, activate or hinder certain values at both individual and societal levels (Amel *et al.*, 2017).

Consequently, policy-settings constitute an important arena whereby individual, social and socio-ecological processes combine (e.g., collective discussion, deliberation) regarding what matters via decision-making. These processes also interrelate in forming shared values (Irvine *et al.*, 2016) **(Box 2.9)**. On the one hand, broad values like justice or responsibility can form due to social dynamics (e.g., family roles, intergenerational exchange) or become embedded in and perpetuated by institutional contexts (e.g., norms, rules) (Aldridge, 2007; Dewey,

Table 2 6 **Summary of key concepts detected in the literature from diverse academic and cultural traditions to explain value formation and change.**

Concepts (bolded in text below) are organized by their focus as (i) individual, (ii) social or (iii) socio-ecological. These are not mutually exclusive categories and may operate simultaneously (see Annex 2.16).

Focus	Key concepts related to value formation and change	Examples
Individual-focused processes	**Human biology: Biological perspectives** link values formation and change to human evolutionary history and the need for nature for survival.	The biophilia hypothesis explains human affinity for nature as part of our species' evolutionary history and as a basic biological trait.
	Cognition: While the individual is never entirely isolated from a broader context of culture and environment, **cognitive and developmental psychology** highlights commonalities of how human minds develop broad values and moral judgements, but does not emphasize values change.	Young children do not consciously apply values-thinking to problems, but through their cognitive development (connected with social processes) later begin to form values that they then apply into decisions.
	Life cycle: Psychology has also shown that formative **life cycle stages** influence the formation of broad values. After maturation, modification is still feasible, even if more difficult, via social and socio-ecological processes.	Having children can shift people's values to become more focused on the nuclear family, but concomitantly more concerned about the future.
Socially- oriented processes	**Social dynamics:** Values are seen to arise from **social processes**. Individuals **internalise** values through **socialisation** processes.	Reward / punishment dynamics from parents and elders teaches a child what is right or wrong, some of which is incorporated into how he thinks and behaves based on these values.
	Institutions: Values are embedded in institutions, and therefore changes to **institutional contexts** (e.g., increased exposure to markets or a new religion) can influence the relative importance of values and those that become dominant.	After a natural disaster, such as a tsunami, the choice of policies applied to the recovery plan can shape and modify pre-existing values, such as promoting individualism over communalism by changing financial incentives.
	Deliberation: Shared values can form through deliberative social processes, such as **collective decision-making**. Plural-value-articulating institutions can help legitimately form **shared values**, while navigating conflicts between different values and value types.	Participatory engagement like councils, public debates, story-telling, ethnographies and audiovisual materials can help stakeholders identify and create common values and interests regarding environmental agenda-setting and management implementation (e.g. fisheries) (see 4.6.6, **Box 2.8**).
	Intra- & inter-generational social change: Demographic changes (e.g., immigration, emigration) that affect social composition can change values due to the aggregation (or removal) of new individuals into group dynamics. Inter-generational change in values also can occur due to major demographic shifts over time, but these are not changes in the individuals' values, rather the aggregate of social groups.	Indigenous communities around the world report that youth migration to urban areas in search of employment leads to drastic value change, and that children who were born and raised in urban areas often cannot learn about and engage with their community's traditional livelihoods. Such lack of exposure to everyday practices, places and language contributes to intergenerational value erosion.
Socio-ecological processes	**Human-nature interactions:** Socio-cultural values are frequently shown to arise from encounters at the **confluence of social factors** (e.g., demographics, socio-political context) and **biophysical conditions** (e.g., landscape features, ecosystem health).	Many socio-ecological interactions like fishing, animal husbandry, logging or hunting are not only drivers of environmental degradation (when they are unsustainably practiced), but they are also human-nature relationships that produce diverse knowledges and values about nature and nature's contributions to people.
	Relationships: The relational values concept recognises that values form from **connections and bonds** between people with biodiversity and ecosystems or between people and place.	The Quechua concept *Sumak Kawsay* (*Buen vivir* or good living) encompasses meaningful holistic relationships among humans and more-than-human nature and a variety of relational values (e.g., balance, reciprocity).
	Interconnectedness and interdependence: The culturally-specific concept of **being/living in an interconnected world** and values related to well-being.	Values related to interdependence with nature are formed in many cultural manifestations, such as the Japanese concept and practice of *shinrin-yoku* (forest bathing) and sayings, such as *"we take care of the land, and the land takes care of us."*
	Embeddedness: Some humanities approaches (e.g., phenomenology) highlight how people are **embedded** in and emotionally tuned to meaningful relationships with and within the world.	Cultural and artistic practices often express and create embeddedness. Hawaiian hula and north-western North American totem poles, for instance, both express and produce natures infused with meaning, including values.
	Environmental education and literacy: Formal and informal **environmental education** often involves interaction with ecological systems; this interaction can facilitate experience-based knowledge acquisition and also associated values.	Environmental education (e.g., formal or informal programs that guide people to understand more about their surroundings) can increase connectedness to nature, sense of place, and relational values. In many communities, environmental education occurs iteratively through joint participation in activities such as farming, foraging or land management.
	Socio-ecological change: Generally, broad values are considered to be rather stable unless major shifts occur in the life of an individual or society. In particular, **shifting baselines and major societal or ecological transformations** have the potential to affect values. An important knowledge gap exists as to whether sudden environmental or social changes (e.g., pandemics, floods, wildfire) lead to long-term shifts in individual and societal values.	The COVID-19 pandemic has led many people to resignify the importance of nature as a place of respite and a source of mental health, at least in the short-term. Over longer periods of time, shifting baselines can also produce 'environmental generational amnesia' and 'ecological grief, associated with the loss of values as a result of loss of encounters with nature or particular features (species, ecosystems).

1922; Habermas, 1991; Saroglou *et al.*, 2004; Schwartz & Huismans, 1995) (Annex 2.3, **Box 2.2**). Subsequently, individuals may adhere to these values in different ways and to different degrees. What is considered individual value formation, therefore, may actually be the expression of shared values at the individual level. Policies can engage with values formation at the individual level via internalized (or rejected) through socialization (e.g., by exposure to new belief systems, religions or markets that impact the values that individuals either hold or express) (Hwang & Bowles, 2011) (Annex 2.3). At the same time, feedback from ecosystems often informs social value processes (i.e., information from and about nature is used as a primary input) (Berkes, 2008; Bieling *et al.*, 2014; Rappaport, 1979; Satz *et al.*, 2013).

Finally, this socio-constructivist perspective helps interpret value stability. Stability depends largely upon the type and dimension of value being considered. A broad value may remain constant in the individual after formative life stages or within social groups in a given place or time due to stable social dynamics and contexts. However, specific values have numerous mediating factors that affect the final expression of a particular principle or preference in a given situation. Nonetheless, even broad values can shift in the face of significant life events or changing socio-ecological contexts, but this topic requires further research (see **Boxes 2.13** and **2.14**).

2.5.2 Combining value formation and change processes to enhance policymaking

Value formation and change are dynamic processes with multiple components and mechanisms that allow policy engagement. An important insight for decision-makers is that targeting value-related outcomes (e.g., pro-environmental behaviour) (see 2.4.1) can be achieved by forming and changing values (e.g., via environmental education) (see Annex 2.16), but also attention to institutional structures and decision-making contexts that can activate or hinder existing values (see 2.4.2). Based on this assessment, policies oriented towards value formation and change can consider the following topics to be more rigorous, effective and inclusive:

- Relatively stable broad values can adapt at certain points in the life cycle. Shifts can occur when (i) major life events like parenthood or maturation (Kendal & Raymond, 2019; Milfont *et al.*, 2016), (ii) people's values are seriously challenged (Bardi & Goodwin, 2011), (iii) one's life is threatened (Gailliot *et al.*, 2008; Greyson, 1983, 1993; Joireman & Duell, 2005) or (iv) one encounters significant life changes (e.g., migration, Lönnqvist *et al.*, 2011);

- Engaging value formation and change is an inherently ethical issue. It is important to not only 'change' others values, but also avoid altering desirable cultural expressions (institutions, languages, knowledges) that protect nature's values (see 2.2.1, 2.2.2, Annex 2.1)[44]. Consequently, policy instruments can acknowledge and engage with other knowledge and value systems (e.g., epistemic and recognitional justice). Doing so would help prevent inappropriate value impositions or manipulations (e.g., Heberlein, 2012);

- Likewise, it can be both more ethical and effective to concentrate policy on building upon existing value structures and encouraging collective reflection to promote desirable attitudes, norms and behaviours (Manfredo *et al.*, 2017). For example, rather than calls to transform established religious traditions (White, 1967), it can be more appropriate to reinforce values shared by world religions (e.g., reverence, respect, restraint, reciprocity, redistribution, responsibility and renewal) (Grim & Tucker, 2014). Facilitating intentionality and self-reflection (e.g., via deliberation) within decision-making can aid individuals and social groups to activate or reprioritise values that are needed for sustainability solutions (Raymond & Raymond, 2019).

- Desired specific values can be formed, but also activated or prioritised (see objective 20 from the working document of the targets of the post-2020 global biodiversity framework proposes: *Foster diverse visions of a good quality of life and unleash values of responsibility, to effect by 2030 new social norms for sustainability)* by (1) supporting or creating arenas where stakeholders can communicate about value priorities in their societies; (2) strengthening educational programs and language revitalization efforts, spreading knowledge and fostering reflection over societal values; and (3) changing the institutional contexts under which decisions are made –both at individual and socio-political levels– to shift what values get emphasized (Bowles, 1998; Dewey, 1922; Habermas, 1991).

- Long-term change of broad values occurs slowly, even over generations, but can also occur when: (i) major life transitions involve multiple alterations (e.g., natural disasters, urbanization), or; (ii) there are significant alterations in the socio-ecological context (e.g., society's evolving values regarding environmental conservation) (Manfredo *et al.*, 2017, 2020). There is a need for new knowledge directed at understanding better how values change in the face of socio-ecological regime shifts, such as amidst the risks and uncertainties of natural

44. Systematic review of indigenous and local knowledge and philosophies (https://doi.org/10.5281/zenodo.4396278).

or human-made catastrophes and hazards (Kendal & Raymond, 2019) (see **Box 2.14**).

While broad values generally form in childhood or early adulthood and remain relatively stable across one's lifetime (Dietz *et al.*, 2005; Rokeach, 1973), at the societal level, broad and specific values may shift due to long-term changes in the ways people relate to the natural world (Greenfield, 2009) or based on shifting group composition (i.e., the socio-demographic structure of societal groupings). In response to these altered social contexts, an individual's values can be activated (Maio *et al.*, 2009). For example, economic incentives and other institutional structures can modify how an individual or group attributes importance to nature (Dixon & Pagiola, 2001). In sub-Saharan Africa, some studies show that nature was more valued in formal land-use decisions when it was linked with tourism and international monetary transfers for conservation that benefited local communities (Barnes

Box 2 13 Human-nature interactions and value formation and change: Leopold's wolf encounter.

Aldo Leopold (USA, 1887-1948), considered a founder of ecology and environmental ethics, exemplifies how the senses, sciences and arts can be fused in activating, forming and changing values. In *A Sand County Almanac* (Leopold, 2013), Leopold advanced what he called the 'land ethic', arguing, *"that the individual is a member of a community of interdependent parts"*, adding that humans gradually broadened their moral concern to larger communities through *"a process in ecological evolution"* (Leopold, 2013, p. 171). Leopold then reasoned that moral concern ought to be extended *"to include soils, waters, plants, and animals, or collectively: the land"* (Leopold, 2013, p. 172), which would mean an environmental decision *"is right when it tends to preserve the biotic community. It is wrong when it tends otherwise"* (Leopold, 2013, p. 188).

Leopold acknowledged that Darwin influenced his understanding that we *"are only fellow-voyagers with other creatures in the odyssey of evolution"*. This realization can lead us to *"a sense of kinship with fellow-creatures; a wish to live and let live; a sense of wonder over the magnitude and duration of the biotic enterprise"* (Leopold, 2013, p. 97). Leopold did not, however, arrive at his ethics exclusively through science. His perspective was kindled by a personal, sensory, eye-to-eye encounter with a wolf. As a 22-year-old forester, Leopold was hired to survey public lands in New Mexico. In *Thinking like a mountain*, he recalled the day he and a co-worker had the now-famous wolf encounter:

> *"We were eating lunch on a high rimrock, at the foot of which a turbulent river elbowed its way. We saw what we thought was a doe fording the torrent, her breast awash in white water. When she climbed the bank toward us and shook out her tail, we realised our error: it was a wolf. A half-dozen others, evidently grown pups, sprang from the willows and all joined in a welcoming mêlée of wagging tails and playful maulings. What was literally a pile of wolves writhed and tumbled in the center of an open flat at the foot of our rimrock.*
>
> *In those days we had never heard of passing up a chance to kill a wolf. In a second we were pumping lead into the pack, but with more excitement than accuracy; how to aim a steep downhill shot is always confusing. When our rifles were empty, the old wolf was down, and a pup was dragging a leg into impassable side-rocks.*
>
> *We reached the old wolf in time to watch the green fire dying in her eyes. I realised then, and have known ever since, that there was something new to me in those eyes—something known only to her and to the mountain. I was young then, and full of trigger-itch; I thought that because fewer wolves meant more deer, that no wolves would mean hunters' paradise. But after seeing the green fire die, I sensed that neither the wolf nor the mountain agreed with such a view"* (Leopold, 2013, pp. 114-115).

Seeing the *"green fire"* die in the wolf's eyes did not suddenly lead Leopold to value predators. Nor did it alone precipitate his land ethic. Indeed, for years, Leopold embraced government efforts to exterminate wolves and mountain lions from North American wildlands to increase the availability of deer and elk for hunters. Rather, the wolf haunted Leopold. She became his muse. Eventually, when combined with Leopold's growing ecological understanding, this emotionally-wrenching experience helped him to understand the socio-ecological importance of predators to flourishing ecosystems. Decades later, he came to see the effects of deer and elk overpopulation on vegetation and soil erosion. The experience also led to regret, contributed to his feelings of kinship with other organisms and perceptions that we have ethical obligations to the entire community of life.

Leopold was aware that people from diverse times, places and cultures have had such feelings. But as a man whose professional life spanned the first half of the 20th century, he was keenly aware that such broad values were not prevalent in his country's decision-making. Indeed, Leopold recognised that too often *"we abuse land because we regard it as a commodity belonging to us"* (Leopold, 2013, p. 4). Through the art-craft of writing –telling stories about his own, emotionally-moving experiences, and describing the wonders and beauties of nature both aesthetically and scientifically– Leopold sought to awaken humankind's ability to care, because, *"when we see land as a community to which we belong, we may begin to use it with love"* (Leopold, 2013, p. 4).

Box 2 14 Values involved in the risks and uncertainty of catastrophic events.

Research indicates an increased frequency and severity of natural and human-made hazards, particularly those driven by climate change (Coronese *et al.*, 2019; IPCC, 2012; UNDRR & ISC, 2020). Consequently, policy-makers from defence, economy, environment, health and transportation sectors are searching for ways to manage the risk and uncertainty associated with these catastrophic events (e.g., Asian Development Bank: Thomas & López, 2015; IUCN: Monty *et al.*, 2016; insurance industry: Hoeppe, 2016). Nature-based solutions (e.g., supporting ecosystem-based disaster risk reduction) harness the ability of biodiversity and ecosystems to provide multiple contributions to people across development sectors, ranging from infrastructure and territorial planning to health and business (WHO: Wisner *et al.*, 2002, IUCN: Monty *et al.*, 2017). These policies not only improve biophysical measures of nature, such as hectares of mangroves, but also indicators of human well-being related to economics like reduced cost of road construction and maintenance and health outcomes like fewer lives lost. Valuation efforts have been made to estimate market and non-market values of the social, economic and health costs of natural disasters and the benefits derived from mitigation investments; these studies indicate that even when cost-benefit analyses are not feasible, due to insufficient information or incommensurable values (e.g., mental health, cultural heritage), it is prudent to account for diverse values when prioritizing decisions or use non-economic methods, such as consultative or deliberative processes (Rogers *et al.*, 2019).

Decision-making regarding natural hazard risk management is a complex process integrating multiple 'facts' and 'values' in the assessment of both the disaster's effects and its underlying causes (Aven, 2016). Consequently, effective natural-disaster preparedness accounts for nature's instrumental (e.g., crops, timber), intrinsic (e.g., species, ecosystems) and relational (human health, sense of place, recreation) values (ECLAC, 2003; Graham *et al.*, 2013). Furthermore, certain social groups are more vulnerable to such catastrophes, as in the case of women having a lower life expectancy than men in response to natural disasters due to their socio-economic status, rather than biological or physiological reasons, (Neumayer & Plümper, 2007). Scholarship has shown that integration of ILK (Kuruppu, 2009; Rai & Khawas, 2019), attention to cultural values (Jogia *et al.*, 2013) and consideration of social institutions (e.g., religion, Hiwasaki *et al.*, 2014) are not only requisite to achieve equity and inclusion, but also ensure community preparedness and resilience, resulting in improved conditions for recovery.

As socio-ecological processes, catastrophic events make nature's diverse values more evident. For example, in the face of the COVID-19 pandemic, the concept of 'one health' has led policymakers to reconsider the value of the link between human and environmental health (Rampa, 2020; UNEP & IRLI, 2020). Such 'encounters' also demonstrate that: (i) the acknowledgement of diverse values is necessary to respond effectively to socio-ecological risks and uncertainty, and (ii) the solutions employed to mitigate or recover from such crises can themselves modify social values (Ramanujam *et al.*, 2012). These insights can be applied to other policy challenges where wholescale socio-ecological regime shifts occur at slower time scales, such as the land use transformations involved in dams, monoculture plantations and urbanization. However, more research is needed to better anticipate not just the values at stake in the face of extreme events, but also how these disturbances can change values in the long-term like placing greater importance on green infrastructure. In particular, it is clear also that the policies and structures created to manage these phenomena themselves are value articulating institutions that will express and also form values into the future (see 2.4.1; see also Ford *et al.*, 2019).

et al., 2002) or the state (Amin, 2016). However, integration into global markets and other economic institutions can also erode local values and institutions (Al-Ubaydli *et al.*, 2013; Bowles, 1998; Macy & Sato, 2002) (see 2.3.2.3).

- Inter-generational time scales are important policy considerations, not only to change values, but also maintain them (Manfredo *et al.*, 2017). For example, broader socio-cultural change (e.g., migration, educational attainment) can weaken knowledge transmission and value formation from older to younger generations (Tefft, 1968; Traub & Dodder, 1988) or decrease resilience to new value systems (e.g., assimilation) (Bruner, 1956). Plus, "shifting baseline syndrome" (i.e., becoming accustomed to a degraded world) has been shown to affect younger people's knowledge and perceptions of nature, which may ultimately determine their attitudes and values (a phenomenon known as 'generational amnesia') (Jones *et al.*, 2020). The issue of inter-generational value changes is particularly evident in the loss of ILK and associated values, as well as erosion of nature knowledge or ecoliteracy connected to biodiversity loss (see 2.2.2) (Berkes, 2008; Genovart *et al.*, 2013; Pilgrim *et al.*, 2007; Schwann, 2018).

2.6 CONCLUSIONS REGARDING THE MULTIPLE CONCEPTUALIZATIONS OF NATURE'S DIVERSE VALUES

Based on three stages of literature review and ILK dialogues and submissions, Chapter 2 authors characterized and assessed different conceptualizations of nature, nature's contributions to people and human-nature relationships and how these diverse ways of understanding affect peoples' attitudes, behaviour and decisions. This process brought to light knowledge and capacity gaps (**Box 2.15**, see Chapter 6). To conclude, the chapter's findings are brought into perspective as insights to the IPBES conceptual framework (IPBES 2/4) (see 2.6.1), to the science-policy interface (see 2.6.2) and to this assessment's subsequent chapters (see 2.6.3).

2.6.1 Relevance for the IPBES conceptual framework

Chapter 2's main concepts and their interrelations are visualized in **Figure 2.24**; red numbers refer to pathways that complement and enhance the IPBES conceptual framework (Díaz *et al.*, 2015; IPBES-2/4).

1. In the context of previous IPBES assessments, **'nature'** refers to the *"nonhuman world, including co-produced features, with particular emphasis on living organisms, their diversity, their interactions among themselves and with their environment"* (IPBES, 2019b) **However, the concept of nature itself varies among cultures, knowledge systems and traditions.** Within the context of predominant environmental science and policy perspectives, nature is often conceived in terms of biodiversity, ecosystems, evolution, the biosphere, humankind's shared evolutionary heritage, and biocultural diversity. Within the context of other knowledge systems, however, it includes more holistic, relational concepts such as Mother Earth and systems of life. Indeed, in the worldviews and / or languages of many sociocultural groups (both IPLCs and others), there is no separation between humans and nature, but rather a context-specific understanding of the symbolic, spiritual and physical connectedness between people and places (see Chapter 1, 2.2.2, 2.2.3, Annex 2.8).

2. Different **worldviews shape one's adoption of broad values with regard to nature and a good quality of life.** Worldviews are forged through the dynamic interplay between individuals, social groups, and place, in both biophysical and built environments (see 2.2.1). Multiple factors shape worldviews including knowledge systems, languages and religion. Worldviews can also be shaped or modified through cultural encounters, such as in human displacement and migrations, as well as through coping with natural and human-made disasters **(Box 2.14)**. Different types of worldviews are recognized in the literature including anthropocentric, bio- and eco-centric, and pluricentric. Philosophies of good living held by many indigenous peoples and local communities and other human groups promote and embody diverse broad values between humans and between humans and nature, including reciprocity, responsibility, place-based identities, kinship with nature and self-determination. Some of these values have been articulated in different policies and governance systems from local to global scales (see **Box 2.4**)[45].

3. IPBES' conceptual framework focuses attention on institutions and governance systems as underlying causes of environmental change that are exogenous to the ecosystem in question. This chapter reinforces this conceptualisation by recognising that **institutions** (e.g., conventions, norms and legal rules) **shape and are shaped by worldviews and broad values.** These processes are both formal and informal and influenced by existing power structures. For example, different understandings of fairness, equity and responsibility will shape different systems of property rights, economic policy, legislative arrangements, norms and conventions, which significantly influence how people make decisions and act in relation to nature. Thus, through worldviews and institutions, broad values shape direct **anthropogenic drivers** affecting nature.

4. The IPBES conceptual framework and *global assessment* discuss the importance of harnessing values for sustainability. This chapter reveals the complexity associated with changing values to achieve just and sustainable futures, providing conceptual clarity to support the other chapters, as well as policy options. **Values can change slowly or quickly, depending on the value dimension at play and the broader socio-institutional context (4).** Broad values typically form in childhood and early adulthood (see 2.5.1) but can be modified subsequently based on major life changes or through deliberative processes (see 2.5.2). Specific values (i.e., instrumental, intrinsic and relational values) are more malleable and also overlapping; they often depend upon context-specific situations, including institutions that are amenable to policy interventions (Annex 2.16; see 2.5.2). Pathways of formation and change vary according to social dynamics and socio-ecological settings. For example, specific values as expressed in political, economic and socio-

45. Literature review for the philosophies of good living (https://doi.org/10.5281/zenodo.4399544)

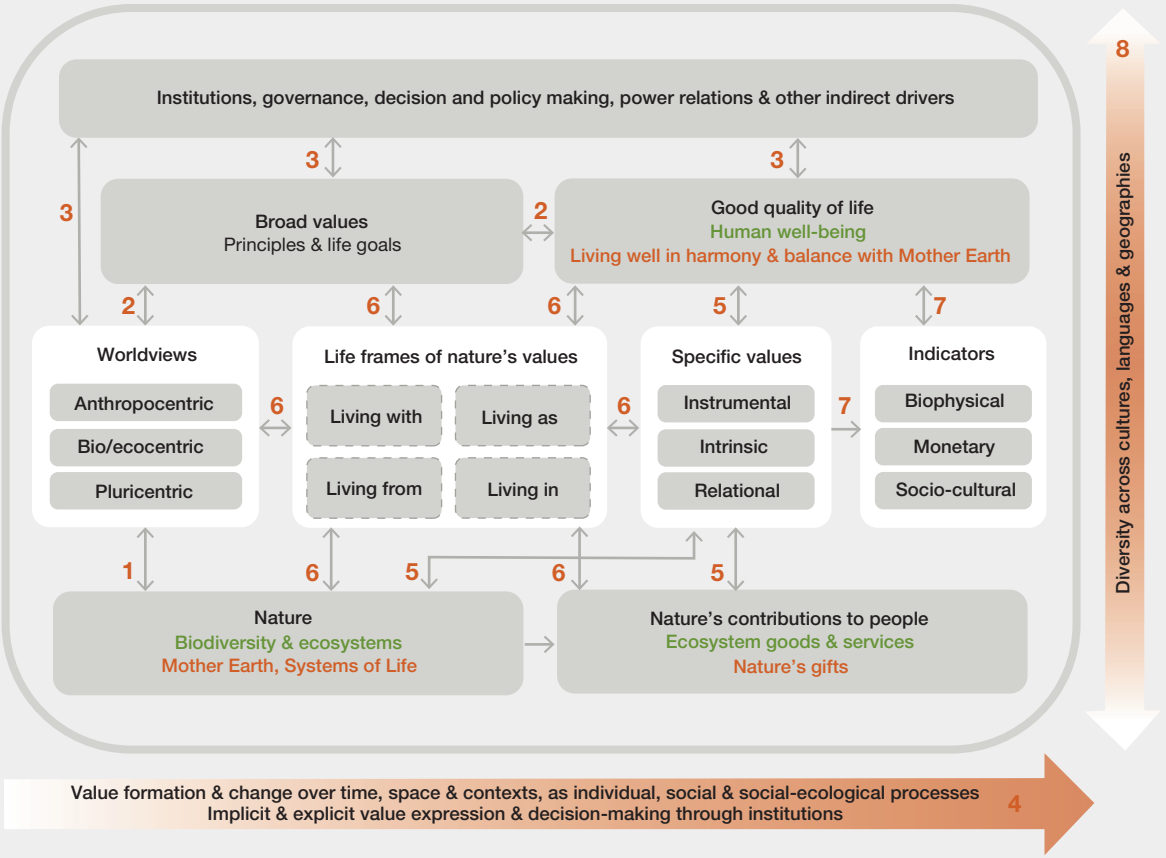

Figure 2 24 **Summary of the main conclusions derived from the assessment in Chapter 2.**
Red numbers indicate places where the chapter's work complements or enhances the IPBES conceptual framework. Descriptions of each are provided in the text.

environmental decision-making can obstruct changes in broad values. Similarly, how values are expressed can be affected by valuation approaches used and power dynamics. Changing the institutional contexts under which decisions are made (e.g., whether they emphasize individual or collective interests, economic growth or broader notions of well-being) help shift what values get emphasized (see 2.4.2, 2.5.2).

a. The **change in institutions over time** corresponds with changes in and formation of broad values (horizontal orange arrow) through a dynamic relationship. Value expressions, including behaviour and actions, are mediated by power relations and manifest in institutions affecting which values are prioritized in decision-making, as well as how values are formed and activated. Institutions influence decision-making in different ways. They define who has the power to influence or make certain decisions and on the basis of what values and knowledge (see 2.4.1.4). They influence how / which values can be expressed in decision-making (see 2.4.2.1). The methods used for valuing nature and nature's contributions to people are based on rules like who can participate (connecting with procedural, epistemic and recognition justice) (see Chapters 1, 4 and 5) and in what capacity, what are considered valid value expressions and how value expressions can be aggregated as social values or deliberated as shared values (see 2.4.2.1, 2.4.2.2). Institutions, moreover, play a role in forming individuals and collective actors. Decisions made by political, economic and civil society actors are based on different institutionalized logics (e.g., human and environmental rights and regulations, democratic rule / voting, cost-benefit analysis, bottom line considerations, deliberation) (see 2.4.2.3).

5. Specific values are diverse and mediate between nature, nature's contributions to people and good quality of life. Despite their distinct definitions, specific values are not mutually exclusive and can overlap (see

2.2.3.3). For example, food may simultaneously have instrumental and relational values, depending on the measure. Broad values inform people's understanding of what a good (quality of) life consists of. Under the umbrella of this general understanding, specific values express the particular ways in which nature's contributions to people can contribute to a good life. Some of the relationships between broad values and good quality of life can be considered objectively (e.g., disease incidence and life expectancy), while others depend on what life frames matter most or are prioritized in a given context, and the broad values associated with these framings.

6. **The life frames link different subsets of broad and specific values, including with regard to nature's contributions to people and good quality of life, but also in terms of how nature is framed as important more broadly.** Life frames can be used as a tool to mediate between ways that people relate to nature, or to why nature is important (see 2.3.2). Life frames are not mutually exclusive overarching framings of human-nature relationships. Rather, they can be seen as different sources of concern for the natural world. Both individuals and collectives can harbour multiple frames, though one or more may be emphasized in particular situations.

7. **Specific values can be assessed using biophysical, economic and socio-cultural indicators.** Indicators can be qualitative or quantitative. Some indicators are more suitable to identify diverse values, while others elicit a single set of value types. Value indicators can be comparable or compatible, but direct comparison is often not possible due to their different conceptual or ethical underpinnings or technical characteristics (see 2.2.3.3). Recognising and operationalising value plurality through multiple indicators is particularly important for complex and contested policy questions (see 2.2.3.3); in these cases, it is also key to bridge diverse values and indicators through deliberative shared values approaches, rather than aggregation into single measures of social value (see 2.4.2.1). This assessment recognizes that certain groups, under specific contexts, wish for their values not to be compared, or indeed the underlying assumptions associated with certain values are so different that they need to be used in parallel.

8. **Cultures, languages and geographies affect all aspects of human-nature relationships**, including the way that nature and its contributions to good quality of life are conceived of (see 2.2.2), the degree to which different life frames are emphasized (see 2.3.2), and the way that broad and specific values are conceptualised, expressed and operationalized through behaviours and decisions (see 2.4.1, 2.4.2).

2.6.2 Relevance for supporting value-plural policies

Many international environmental and development policies recognize nature's diverse values, enunciating a range of broad values (e.g., sustainability, justice, equity) and specific values (e.g., intrinsic, instrumental, relational). However, a review of national biodiversity strategies and action plans found a predominance of instrumental values. None of those reviewed explicitly detailed how to treat diverse values in policy tools. Incorporating a dynamic and relational understanding of values would help move these policies beyond the extant dichotomy between people and nature (or people versus nature) that is part of the predominant anthropocentric worldview behind a central prioritization of economic growth and instrumental values, often to the detriment of other values. This chapter demonstrates that people recognise not only material, non-material and regulating nature´s contributions to people, but also values that express meaningful and often reciprocal relationships with nature, and values for nature beyond its importance to people (see 2.2.3.2, **Box 2.4**). Drawing on nature's diverse values can make otherwise neglected, intangible costs and benefits visible in environmental policy, and at the same time, enable representation of diverse voices in decision-making, thus supporting a more inclusive and legitimate process, as well as a better understanding of the sources of environmental conflicts. For example, drawing upon relational values can facilitate justice, social equity and sustainability outcomes (see 2.2.3.2, 2.2.3.3), including the attainment of international policies and agreements, such as the SDGs. The chapter also recognises alternative and / or incompatible understandings of values across cultures and contexts. Yet objects or subjects of value can be important across more than one value type (and life frame). This potential convergence can be used to build common understanding across stakeholders in support of conservation, justice and/or sustainability (see 2.2.3.3).

Value-related outcomes can be achieved by forming and/or changing values through individual and social processes (see 2.5.1), but also by giving attention to institutional structures and decision-making contexts that can activate or hinder certain values (see 2.4.2). Many environmental and development policies are oriented towards changing values within the individual to support sustainability (see 2.4.1, 2.5.1). Social dynamics (e.g., gender roles, intergenerational equity) and social context (e.g., institutions structuring decisions) also influence how values are constructed over time. The same regards socio-ecological processes **(Table 2.6)**. Furthermore, value articulating institutions have a powerful role in shaping value expression. Institutions rely on different forms of power (e.g., framing power, structural power, rule-making power) and define which values of nature can be integrated into environmental policy and decision-making (see 2.4.1.4; 2.4.2). For example, the UK

fisheries and Niyamgiri case studies reveal that the policy focus and valuation design will influence which life frames and associated values are emphasized (see **Boxes 2.8** and **2.12**, Annexes 2.5 and 2.6).

Policy settings can support justice and sustainability by drawing on this more inclusive understanding of the diverse values of nature. Practices that can encompass this more inclusive understanding include: (a) engaging diverse values and knowledge systems (see 2.2); (b) seeking to activate values, attitudes, beliefs and norms that are likely to support pro-environmental behaviour (to the extent that values influence behaviour; see 2.4.2, 2.5.2); (c) encouraging collective reflection and allowing for expression of multiple value structures through institutions (see 2.4.2); and (d) changing the institutions that manage and impact specific economic, political decision-making and socio-cultural processes (see 2.4.2.3.1).

However, sustainability is not a single homogenous value, but relates to diverse broad values that are different depending on what life frames are emphasized. Examples include fair distribution of resources within and between generations (living from nature) and achieving sustainable relations of harmony and connectedness (living as nature). Decision-making contexts can activate sustainability-aligned values (see 2.4.2, Chapter 5). By choosing which life frames to emphasize in specific contexts, multiple sets of sustainability-aligned values can be balanced, embedded in institutions, and harnessed for sustainability transformation, while negative values arising from overemphasis of any single frame can be avoided or minimized (see 2.3.2).

2.6.3 Relevance for the values assessment

This chapter provides the conceptual basis for the assessment's subsequent chapters. Chapter 3 expands on the findings from section 2.2 regarding indicators and preferences, distinguishing methods families based on nature-based, statement-based, behaviour-based and integrated valuation approaches for assessing broad and specific values in plural decision-making contexts, including valuation as practiced by indigenous peoples and local communities. Chapter 4 expands on the different forms of values expression and institutions developed in section 2.4 to examine valuation uptake for public information, decisive project appraisal, policy instrument design and legal dispute resolution purposes. Chapter 5 explores how sustainability-aligned values (see 2.2.3) can be encouraged by different policy interventions or planning processes that can shift values (or their expression or prioritization) by removing barriers to or creating favourable context (see 2.5). To support Chapter 6's mission of developing capacity for assessing and integrating the nature's diverse values into decision-making, Chapter 2 offers a set of knowledge and capacity gaps to be addressed in future research and practice (see **Box 2.15**).

Box 2 15 Chapter 2's knowledge and capacity gaps.

This chapter identified knowledge and capacity gaps in the understanding and operationalization of diverse values between different cultural groups, academic disciplines, social roles and policy domains. ILK and western philosophies of good living (see 2.2.1) are often presented in a polarised way in the literature. Future research would benefit from presenting how diverse local communities in the global north and global south draw upon or are guided by different philosophies. The value types have been considered primarily from an ethical and social science perspective, but less so from a biogeographical perspective. For example, what kinds of biophysical features lead to particular human-nature relationships that in-turn support particular kinds of values expressions? There is an important need to further study life support values, including the way people express the value of life-supporting processes, functions, and systems, which cut across instrumental, relational and intrinsic values (see **Box 2.5**). Future research would also benefit by comparing and contrasting diverse understandings of human-nature relationships and life frames across disciplines and knowledge systems, and explicitly relate them to different broad and specific values or use them to bridge instrumental, relational values, and intrinsic values (see 2.3.1). Also, how values are represented at the societal scale requires further investigation, including more systematic comparison between social values from individual aggregation and shared social values in different contexts.

While there is ample study of negative drivers on biodiversity and ecosystems (e.g., research on environmental degradation or conservation conflicts), there could be a more explicit treatment of the role of negative values (e.g., living against nature, living disconnected from nature) compared with the positive orientation and / or on trade-offs between different frames, often connoted with general values theory and policy frameworks.

There is a need to continue creating new information regarding the relationship between social roles and power structures (e.g., gender, ethnicity, race, colonial legacies) and how values are expressed in decision-making. One way to address such dynamics would be via systematic comparison of different institutionalized logics (e.g., economic incentives and governance structures that emphasize instrumental values) and how they operate given different contexts (e.g., community, markets)

Box 2 15

and affect different stakeholders (e.g., business, consumers, citizens) (see 2.4.2). Finally, while it is common for environmental policies to seek to modify values (e.g., education, awareness campaigns), more study is needed on how values are affected by conservation interventions (e.g., community engagement, deliberation, environmental education, ecological restoration) and shifting linked socio-ecological baselines (e.g., languages and ecoliteracy loss and species extinction, pandemics, natural disasters, climate change; see 2.2.2, 2.5.1, 2.5.2). It is also clear that relationships between values and behaviour and human action are extremely complex (see 2.4.1). More research that focuses specifically on these complex relationships would help better understand the multi-faceted implications of values.

These diverse conceptualizations of nature and its values also require enhancing certain capacities. Many conceptual issues have direct implications for the practical management of decision-making processes drawing on the diverse values of nature. Such decision-making implies the ability to recognize and validate knowledge developed by indigenous peoples and local communities (i.e., legitimacy, procedural and recognition justice), thereby connecting worldviews, values and policymaking in IPLC contexts and applying them to environmental management not only of local areas and indigenous territories, but also more broadly (see 2.2.1, 2.2.2). This need includes specialized training for decision-makers on IPLCs worldviews and governance structures to properly engage with and articulate ILK-based values in policymaking (see 2.2.1, 2.2.2). Furthermore, the capacity to integrate strategies for cultural and biological diversity implies such abilities as the creation of *in situ* language revitalization programs that could produce fluent speakers connected to their environment or participatory environmental education that is inclusive of diverse social groups (see 2.2.2). Conversely, historically disadvantaged groups need greater abilities to have agency and overcome power dynamics to articulate their own values in their own terms (see 2.4.1).

The concept of relational values seems to be mostly used by academics, but there is also a need to operationalize this concept in environmental policy (e.g., environmental impact assessments) and corporate governance (e.g., accounting; environmental, social and governance criteria). As such, mainstreaming diverse values into new forms of corporate and civil governance (e.g., legal instruments, technical training) means developing the capacity, time and resources to shift the focus from solely material well-being to wider goals of reciprocity, care and justice that are grounded in different socio-cultural groups and languages (see 2.2.1; 2.2.2; 2.2.3). It also requires building capacity to consider decisions from the perspective of multiple life frames (see 2.3). Enhancing the conceptual proficiency of decision-makers is inextricable from the practical applications they carry out, such as conducting risk assessments that consider the risks of under- or over-emphasis of specific values (e.g., instrumental, relational, intrinsic) or ways of organizing values (e.g., specific life frames). Finally, training is necessary to also make practitioners aware of how different value articulating institutions may allow or resist value and behaviour change and affect outcomes of sustainability policies (see 2.4.2). Building these capacities would allow participatory valuation processes that ensure diverse values are supported.

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