Chapter 2
Environmental Values and Nature's Contributions to People: Towards Methodological Pluralism in Evaluation of Sustainable Ecosystem Services

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Significance Statement Given the diverse ways that people value nature and the lack of an all-encompassing methodology able to capture such diversity, we call for the acceptance of plural methodologies for the comprehensive and inclusive evaluation of nature. The chapter provides a primer of five different evaluation approaches of nature: (i) economic/instrumental, (ii) ecological/biophysical, (iii) ethical/intrinsic, (iv) social/shared, and (v) relational. While leveraging the strengths and weaknesses of different evaluation methods is challenging, we suggest that defining the different normative assumptions of each approach (for example, the purposes of evaluation, how values and preferences can be expressed, and the positionality for those who recognise and give voice to different values) will provide a robust foundation for communication and learning across disciplinary and practitioner boundaries.

Keywords Multiple values · Value monism · Ways of knowing · Epistemology

1 Introduction

> Promoting different conceptualizations of value and valuation approaches is more appropriate than a deeper focus on a subset of unidimensional values (e.g. economic, biophysical, social-cultural) (Pascual et al., 2017, p. 14).

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There are as many different values for nature as there are different people who value it. Given these diverse values, we suggest that reliance on a single, all-encompassing methodology is limiting and call for the acceptance of plural methodologies for the comprehensive and inclusive evaluation of nature. Methodological pluralism facilitates a more transparent and participatory approach to natural resource decision-making where definitions are explicit, stakeholders (both human and non-human) are acknowledged, and a shared understanding of nature's value is gained.

There has been an evolution in recent international efforts towards a more expansive assessment of values. The Millennium Ecosystem Assessment (MA), beginning in 2001, adopted an ecosystem services framework and, so, largely embraced a focus on economic or instrumental values (Alcamo & Bennett, 2003). However, criticism for failing to account for the complexities of ecological systems led towards TEEB (The Economics of Ecosystems and Biodiversity) and a goal of better integrating a broader range of environmental values (Carpenter et al., 2009). Most recently, the conceptual framework of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) now acknowledges the central and pervasive role that culture plays in defining environmental values (Díaz et al., 2018). As Rawluk et al. (2018) explain, "rather than attempting to expand ecosystem services to include culture, IPBES have adopted the much broader concept of NCP [Nature's Contributions to People] which incorporates instrumental, intrinsic and relational values and most importantly includes pluralistic valuation methods, including economic, ecological, social and cultural approaches" (p. 1197). That is, the IPBES recognizes that, "in many situations, when dealing with more complex services such as cultural services, … [economic assessment] may neither be appropriate nor necessary nor sufficient nor practical" (Díaz et al., 2015, p. 11).

We agree that a comprehensive understanding of how people value nature will require different methods, scientific traditions, and ways of knowing, but we also assert that communication and understanding across such disciplinary silos requires a shared understanding of the different valuation approaches. Even though different approaches to evaluating nature use different definitions, assumptions, and methodologies, we believe the different valuation approaches can work in complementary and mutually enriching ways that lead to more adaptable, responsive, and resilient outcomes.

In this brief chapter, we provide a primer on five approaches to evaluating nature (Table 2.1) that attempt the same fundamental task of identifying, ordering, and prioritizing what is most important in nature:

(i) economic/instrumental, (ii) ecological/biophysical, (iii) ethical/intrinsic, (iv) social/shared, and (v) relational. We then discuss the challenges of utilising all approaches within the context of broadly-defined environmental decision-making.

Table 2.1 Five approaches to evaluating nature

Value type	Definition	Example(s)
Economic/ instrumental	Utility that humans receive from nature, quantifed in discrete units.	Willingness to pay for a marginal improvement in an ecosystem service.
Ecological/ biophysical	Characteristics deemed priorities for the sustainability of natural systems.	Biodiversity, ecological integrity and resilience.
Ethical/ intrinsic	Value independent of perceived human benefits or services (nature for its own sake).	Allowing nature to flourish and exist according to its own interests and ends.
Social/ shared	Collectively shared goals, norms, expectations and traditions, including of means to achieve.	Social Well-being, fairness, equity, frugality, heritage and connection to place.
Relational	Preferences, principles and virtues about relationships between humans and nature.	Domination, care, kinship, sanctity, responsibility or restraint.

2 Economic/Instrumental Values

While the concept of value means different things in different disciplines, economists have spent perhaps as much time as any concerned with value. As Brown (1984) defines it, "a value is an enduring conception of the preferable which influences choice and action" (p. 232). Decisions about what deserves protection and which of nature's contributions to people are most important are reflective of underlying values. The focus of many environmental economist's work (and much of the work on *ecosystem services*) is on instrumental values: the benefits that humans receive from nature. Brown (1984) defines these as assigned values. For instance, a forest may have assigned value for, "specific purposes, such as educational value, recreational value, commercial value, and food value" (p. 234).

Economic approaches use price, or other discrete units such as the marginal rate of substitution between different ecosystem services, as a proxy for the assigned value of the benefits or ecosystem services received from nature. These units may be captured in the market place of buying and selling of goods and services, cost-benefit analyses (CBA), proxy measures such as contingent valuation/willingness to pay surveys, or economic choice modelling studies. However, Brown (1984) concludes, "There are problems with the use of market price, or other economic measures of value, as the sole measure of the value of communal resources" (p. 244). As Williams and Watson (2007) note, "not all values, benefits, goods or services should be ordered by means of market norms" (p. 127). It is said that economic analyses have failed to produced outcomes satisfactory to the public largely because they attempt to reduce all values to a single, monistic measure (Norton, 2017). Technical, all-encompassing economic evaluations are likely to be insufficient and inadequate in their consideration of non-instrumental values. Furthermore, economic evaluations can tend to subsume or colonise all other discussions, foreclosing full consideration of different, hard-to-measure values.

3 Ecological/Biophysical Values

Ecological values reflect a prioritizing of biological and geomorphological features. Ecological science indicates high priority goals such as the maintenance or restoration of:

- biodiversity (defined following the 1993 Covention on Biological Diversity (CBD) as "the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems" (Mace et al., 2012, p. 19));
- threatened and endangered species;
- population extirpation rates;
- evolutionary distinctiveness;
- ecological structure, functioning, and resilience; and
- an all-encompassing biological integrity (Karr, 1999).

Ecosystem health, as a goal, is defined as "being 'stable and sustainable'; maintaining its organization and autonomy over time and its resilience to stress" (Rapport et al., 1998, p. 397). Similarly, ecological integrity emphasizes a goal of "preservation against nonspecific ecological risks that are general disturbances of the self-organizing capacity of ecological systems" (Burkhard et al., 2012, p. 18). It also calls for the maintenance of geophysical attributes such as water quality and quantity; nutrient cycling; energy flows & capture; metabolic efficiency; climate stability; and erosion control (Burkhard et al., 2012).

However, the basis for these normative visions of ecology is not often addressed (Abson et al., 2014). That is, the why (and by whom) these goals are deemed good, as well as the implications of pursuing these goals, is not commonly considered. There are few direct markets for these ecological values distinct from the ecosystem services they provide, although there are proxies and credits for the existence of biodiversity and individual species (Kontogianni et al., 2012). Additionally, the general public has little ability to assess and rank-order ecological values. Instead, biologists, ecologists, and other scientists have distinct methods of identifying ecological priorities such as biodiversity hotspots, critical or keystone species, or preferred ranges of ecological variability. Ecological scientists rely on increasingly complicated mathematical models, multi-faceted databases, internal criteria of validity and often advanced- and jargon-filled explanations of ecological health and functioning. The public is neither invited into these decision-making processes nor likely to wish to choose between different ecological priorities. While there are threads of phenological approaches (that prioritize location- and time-specific natural history), much ecological science seeks universal and generalizable principles. The intersection with traditional ecological knowledge (TEK) or indigenous and local knowledge (ILK) can be problematic. As Jacobs et al. (2018) suggest, "biological valuation methods are [the] least suitable to capture multiple values" (p. 518).

4 Ethical/Intrinsic Values

Intrinsic and symbolic values exist independent of perceived human benefits or services. That is, nature is valuable and important in, and of, itself. Just as there is a fundamental value or goodness in a child even if they do nothing useful, intrinsic value recognises that nature can be good for its own sake. Within intrinsic value there are different conceptions of value (Batavia & Nelson, 2017) ranging from non-anthropocentric (i.e., all non-human objects have value), biocentric (i.e., all living organisms possess intrinsic value), zoocentric (i.e., animals have intrinsic value), to ecocentric (i.e., ecological collectives such as populations, communities, and ecosystems hold intrinsic value).

The recognition of intrinsic value then suggests an altruistic response of respect, of allowing nature to flourish and exist according to its own interests and ends, and of moral obligations and responsibilities to act with fidelity to protect or actively promote nature's interests (Batavia et al., 2020). With intrinsic value, nature deserves to be admired, revered, and/or celebrated for what it is and to do so independent of how that makes one feel (which can be important and valuable, too). Intrinsic value is not mutually exclusive of instrumental value, as some thing can be valued for both. However, since intrinsic value is for what a thing is, above and beyond what it does, then it cannot be substituted by another object.

As intrinsic value is defined in contrast to utilitarian or instrumental values, it should not be measured with economic methods. While there is economic value recognised in existence, option, and bequest values, there are things (eg. kin, friends) for which asking for a dollar value seems wrong or inappropriate. As Batavia & Nelson (2017) suggest, the "wholesale commodification of non-human nature ... would be incommensurable with the genuine acknowledgement of nonhuman nature's intrinsic value" (p. 372).

While the articulation of environmental values is extensive within the work of environmental philosophy, the measurement of those ethical values is less so. The use of interpretive and qualitative methods can be most suitable and Gould et al. (2015) call for "open-ended, discursive data collection techniques" (p. 577) that may involve person-to-person interviews and/or the use of scenarios, vignettes, and situation-specific questions.

5 Social/Shared Values

Members of the public value *the way* that nature is managed. In addition to wanting particular benefits and services to flow from nature, there is an important value placed on *how* they are achieved. These values (such as fairness, equitable distribution of benefits, efficiency and a lack of wastefulness) are often modes of conduct or standards to which we strive to operate. They are often shared values or our basic ideals as a society. Brown (1984) defined these sorts of environmental values as held

values. He broadly categorizes them as *means values* (such as frugality, generosity, courage, responsibility, and fairness) and *ends values* (such as freedom, equality, beauty, and friendship).

Shared values, such as these, are socially constructed, reflecting collective norms and expectations as well as cultural traditions and practices. Norton (2005) describes these as community-identity values which are "developed and passed from generation to generation, creating cohesiveness within human communities but also binding individuals and communities to their natural habitat" (p. 371). Such values are shared by people in groups or inform the shared identities of particular groups (IPBES, n.d.). Many social values can't be distributed in increments, in that you either protect and value the shared goal or you don't. Thus, there typically isn't an economic market for the buying and selling of shared, social goods. A more community-centric perspective shifts our view of nature beyond the service-provision role or benefits of nature (Turner & Clifton, 2009).

Gould et al. (2015) define some social values as cultural ecosystem services – the cultural heritage, deep connections & attachments to place, sense of belonging and security, and collective well-being - that are seen as essential for human and social well-being. Such social values can be hard to quantify and some respondents resent being asked to take such a reductionist and commoditized approach to these deeply held values. Interestingly, Brown (1984) suggests, "value *arises from* a preference relationship between a subject and an object" (p. 233). That is,

> Value is neither a concept held by the subject nor something attributed to the object . . . value is not an intrinsic quality of anything – rather, it emerges from the interaction between a subject and an object. . . . value in the relational realm is not observable; it is only at the feeling level.

6 Relational Values

Similarly, in contrast to treating nature as an external object that can be valued for the benefits it delivers (instrumental value) or for its own sake (intrinsic value), relational values focus on how nature is to be treated and are defined as, "preferences, principles and virtues about human-nature relationships" (Chan et al., 2018, p. A1). For example, these relations might be ones of harmony, sanctity, or restraint. It is stressed that

> In social contexts of all kinds – including friendships, marriage, partnerships, parenting, extended family, community, and teams – many people naturally think of what is appropriate for that relationship, not only what benefits them, others or nature. . . . it may be treacherously reductionist, if not offensive, to suggest that nature exists to provide (instrumental) utility to humans. (Chan et al., 2016, p. 1463)

Instead, these authors urge consideration of many relational values as *eudaimonic values*, "notions of a good life rooted in relationships" (p. 1463). For example, interacting with nature connects one to the land, strengthens traditions and encourages contemplation, thus sustaining the relationship between human well-being and

nature. It can be said that people belong to a place and must behave virtuously – with relational behavior such as reciprocity, care, custodianship, or stewardship of places celebrated as duties and responsibilities. These can be collective histories, perhaps perpetuating a particular culture of kinship and shared journey. Relational values are often locatable, tangible, place-based and both contextually-dependent and situationally-constructed (Rawluk et al., 2018). Their loss can be of great injustice and inequity, perhaps reflective of larger hegemonic or imperial power and status. Tadaki et al. (2017), therefore, emphasise methodologies such as deliberative workshops, public participation GIS, participatory action research (PAR), and other qualitative approaches "as 'technologies of participation' [that] can highlight normative concerns about equity and power in environmental decision-making" (p. 7).

7 Plural Valuation: A Great Challenge But Pressing Need

The challenge of incorporating socio-cultural, relational, intrinsic, ecological and monetary valuation into decision-making has proven quite intractable, for several reasons. As Chan and Satterfield (2020, p. 1030) point out, even with an increase in non-economic assessments of environmental value, from both the broad social sciences and humanities, there is still a general belief that research will be most effective if it can "distil the value of nature into a number" (p. 1030). However, since no single method that can capture all values, the decision as to how to measure values is a normative one (Lliso et al., 2020). By acknowledging and amplifying particular values, different methods not only elicit already-existing values but also bring new values into discussions and deliberations. In effect, the values take on greater standing as a result of their evaluation (Arias-Arévalo et al., 2018). And while some values need to be socially constructed in this way, they resist accumulation and aggregation (Wegner & Pascual, 2011). Indeed, the process of maximizing benefits, given costs, does not necessarily yield collective preferences and well-being.

Relational values, and many cultural values, do not sit easily within broad ecosystem services assessments and may not be substitutable nor replaceable. A memorial tree, for instance, represents more than the shade, habitat, and CO_2 capture that it provides and should be evaluated accordingly. Such a tree is not so much a stock of the benefits that flow from it but a unique and complex association of meanings and heritage. Separating the tree into separate benefits and contributions would not fully capture its significance. Maximizing benefits is further complicated by the fact that individuals and communities may hold seemingly conflicting views on the same resource and when values are deeply held and embedded in culture, the repudiation of such values is a denial of those who hold them. Qualitative and humanities approaches are often absent in ecological services assessments, leaving out insights from fields such as ethnography, cultural studies, phenomenology, human ecology, and human-environment geography (Abson et al., 2014; McDonough et al., 2017).

Valuation itself does not automatically lead to greater inclusivity, consensus, nor shared understanding. Just as the choice of evaluation method dictates outcomes of

that evaluation (Jacobs et al., 2020), so, too, the expectations of the process of discussion and decision-making can determine outcomes. In particular, some values (and valuers) don't work well with others and may struggle to integrate with singular, perhaps hegemonic, approaches. Some values follow different expectations of epistemology (such as what is considered knowable, by whom, and for what purpose) and it may not be appropriate to measure and express particular values, perhaps because they are sacred or culturally significant. To point to an object may be rude or insulting, just as naming part of nature can change its status and make it more visible, accessible, and vulnerable. In sum, evaluation itself is not value-neutral and a shared, mutually acceptable approach or process that allows full and fair consideration of all values hasn't emerged.

If the purpose of valuation is to give voice to different values and to build collective awareness and acknowledgement, then the gaining of trust and legitimacy can be expected to take time and many resources. Indeed, leveraging the strengths and weaknesses of different evaluation methods is a monumental task, as it requires overcoming disciplinary boundaries (and associated practical components such as competition for funding), navigating inexperience with transdisciplinary research, as well as facilitation, process and leadership abilities well beyond specific disciplinary and bureaucratic expertise. However, some progress has been made with methods such as participatory rural appraisal, deliberative valuation, scenario and futures mapping, and narrative analyses, which all aim for iterative learning, knowledge co-construction, and enagement of the perspectives of different peoples.

In a call for greater transparency and acknowledgment of differences, a comprehensive mapping of the five different approaches to environmental values would, we suggest, define the normative assumptions of:

(a) what can be evaluated (i.e., what can be known and preferred),
(b) the particular purposes of evaluation (i.e., for what end goal or objective),
(c) how values and preferences can be expressed and documented (i.e., how, when, where, and by whom),
(d) the positionality for those who recognise and give voice to different values (i.e., in terms of access to the process, power, and status within society, as well as to available resources and funding), and.
(e) how prioritization of values is to be considered (i.e. choice of criteria such as efficiency, effectiveness, equity, precautionary principles, etc.).

Such a comprehensive mapping would expose commonalities, potential incommensurabilities (inabilities to consider data and outcomes across different methodologies), and identify strengths, weaknesses and specific insights of each approach.

8 Conclusion

Throughout our discussion, environmental values have been defined, examined and documented in different ways within different disciplines. While there may be some overlap between the five approaches discussed, there is not one, universal value

foundation. Indeed, any single approach to valuation is too narrow to fully and fairly capture the whole range of worldviews, knowledge systems, and stakeholders (Kadykalo et al., 2019). Instead, there is need of a more pluralistic foundation, one that is less focused on arguments about definitions, conceptual distinctions, and all-encompassing frameworks and methodologies. Constructive consideration and deliberation of the broad diversity of environmental values will require acceptance of each of the five approaches and their tools and methods, as well as communication and learning about the different approaches across disciplinary and practitioner boundaries.

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