

## **Relational Values in Environmental Assessment: The Social Context of Environmental Impact**

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### **Highlights**

- Relational values are important to understanding experience of environmental impact
- Values are relevant for environmental assessment
- Social science and humanities scholarship can inform relational value inclusion

### **Abstract**

Relational values, or values that people hold on the basis of their relationships and responsibilities to society and the broader environment, are increasingly recognized as deeply important to human understanding of what is acceptable. This review argues that given that environmental impacts are mediated by relational values, in the sense that such values have a major effect on how impacts are experienced, environmental assessment processes designed to support infrastructure decisions should consider relational values explicitly. Currently, formal environmental assessment tools generally do not explicitly include societal values other than instrumental financial valuations, though the assessment community increasingly recognizes their significance. The environmental social sciences and humanities have produced substantial scholarship on relational values in communities experiencing environmental change, which can inform integration with environmental assessment.

### **Introduction**

How do we consider environmental impacts when making decisions about products to buy, infrastructure projects to approve, and policies to implement? One of the major challenges of pursuing “environmental sustainability” is that the environment is a fundamentally multicriteria concept. Different aspects of environmental impact are often incommensurable, and decision makers considering different options for achieving a goal often find that no option is uniformly better than the rest across all criteria of interest. A power plant with low carbon emissions might consume more water than an alternative with high carbon emissions, for example. In part because of this multifaceted nature of environmental impact, many of the common methods used for environmental assessment focus on quantifying impacts within specific categories, like air pollution, water pollution, or climate change. Two of the most common frameworks for environmental assessment are Environmental Impact Assessment (EIA) and Life Cycle Assessment (LCA), which will be referred to generically as environmental assessment in this article.

Understanding design choices for environmental assessment methods is especially important because they are explicitly intended to influence decisions [1]. Design choices are implicit or explicit implementation of values, here defined as assessments of worth that can vary across people and societies. For example, a choice to consider climate pollution but no other environmental impacts is an implicit implementation of a value that assesses climate change as the primary environmental concern [2].

This review argues that values already exist in environmental assessment [3] and that more explicit, more expansive inclusion of values can improve outcomes. In particular, a class of values known as “relational values” are sufficiently well understood, and sufficiently relevant, that they ought to be more explicitly included.

### **Theories of value**

Beyond the notion of values as assessment of worth, what is a value? One framework advanced by Chan and coauthors distinguishes three classes of value: instrumental values, which define worth based on benefits to people; intrinsic values, which define worth based on existence; and relational values, which are based on principles or worth relative to collective and individual relationships between entities [4]. Within an environmental assessment context, an instrumental value might be described as the financial value of an ecosystem service, calculated based on the cost of replacing the service [5]. Instrumental values are particularly common in decision making in part because they are quantifiable in ways that allow for damage mitigation and/or reversal via substitution by something with equal or similar instrumental value. For example, an instrumental view might hold that loss of desert tortoise habitat due to construction of the Ivanpah Solar Electric Generating Station can be offset by creation of habitat somewhere else [6]. An intrinsic value [7] might appear in the form of Endangered Species Act restrictions that motivate protection of the desert tortoise’s habitat in the first place, based on the idea that species are inherently valuable even when they do not provide direct benefits to people.

Relational values are often less visible than instrumental and intrinsic values in environmental assessment, despite the deep relational context of environmental impact [8\*\*]. Such values take the form of concepts like stewardship, intergenerational obligations, linkage to place, and identity. Relational values are not substitutable in the way that instrumental values are [8\*\*,9], which means that a decision process integrating relational values requires a fundamentally different perspective on what constitutes acceptable tradeoffs. In the habitat substitution example, a relational view focused on values like continuity of traditions, responsibility to a particular species, and commitment to place helps to explain why practices like compensatory habitat mitigation are often seen as incomplete substitutes for damages. For example, some public comments on the Ivanpah Environmental Impact Statement (EIS) refer to land stewardship and personal relationships with the valley [6]. Public comments on the programmatic EIS for mountaintop removal coal mining in Appalachia include comments about stream headwaters as anchors of community life and collective identity, disconnection from “home” after mining, generational ties to the land, and a duty of stewardship [10]. Such comments are consistent with climate change-related findings by Tschakert and coauthors that socioenvironmental losses are harmful largely because of relational values like sense of place, identity, place-based knowledge, and social cohesion, noting that “[climate related] loss...is more felt than tangible” [8\*\*].

### **Values in environmental assessment**

A desire for methods to appear “objective” is common in the environmental assessment community. Results are bounded and studies are made consistent through guidelines like ISO standards for LCA [11] or National Environmental Policy Act (NEPA) guidance for EIS, a US-based form of EIA [12]. In practice, however, practitioners understand that value-free environmental assessment cannot exist, in part because of the many inherent boundary choices and the ultimate need for tradeoffs when a decision is based on multicriteria information [3,13].

In this context, particularly given that many assessments are part of or adjacent to public processes, the push for “objectivity” can perhaps be interpreted more precisely as a desire to ensure that the work can be replicated and possibly withstand legal challenge (see, e.g., [14]). Existing frameworks for addressing human-nature interactions in environmental assessment, particularly those that focus on monetization (e.g., [15]), are insufficient in part because the default assumption is that normative preferences, principles, and virtues must be framed as resources with knowable, quantifiable instrumental value. Such a frame fundamentally limits the validity of concerns that are not primarily instrumental, like relational values (see, e.g., [16\*,17\*,18\*]).

Where are value judgments in environmental assessment? Given that environmental assessment is designed to support decisions, it makes sense that values emerge alongside the major elements of a decision: what options to consider and how to evaluate them, uncertainty, embedded risk attitudes, and preferences [3]. All these elements are based on values, meaning specifically that there are multiple valid perspectives on how to approach each issue, and choices will alter the outcome of the assessment. The most fundamental step of environmental assessment, measuring impact, is based on numerous choices, typically made by “expert” communities of physical and natural scientists or engineers. What should be measured? How should it be measured? What measurement threshold indicates a problem? As with Integrated Assessment Models, their basis in “expert” judgment means that environmental assessments can gain status as nonhuman knowledge producers with power in their own right [19\*]—a condition that perhaps also compels moral responsibility by the modelers to more completely consider their choices. Despite this power, underlying choices can be revealed as choices: see, for example, claims by shale development region residents that assessments exclude contamination pathways for hydrogen sulfide and hydraulic fracturing flowback fluid [20]; the story of the Sylvester Dustbusters, two women who disputed coal dust pollution measurements in their community [21]; or evaluations of coal-associated cancer incidence that imply a choice about acceptable tradeoffs between coal mining and cancer based on allowable contamination levels [22]. Similarly, treatment of uncertainty manifests as confidence intervals; risk attitudes are reflected in discount rates associated with damages; and preferences are reflected in inter- and intra-category comparisons of damages associated with pollutants.

Values are present in environmental assessment [2,3], but their deployment is not arbitrary. Norms about which kinds of value judgments are considered rigorous and which are not influence methodological development. Some value choices within environmental assessment are not typically perceived as such, while others are. Often, it is the value choices perceived as untested or untestable—sometimes because they are considered too opinion-based—that are challenged or avoided. Certain kinds of value judgments, like the relative importance of one kind of environmental impact versus another, the value of a human life, choice of discount factor, and others are often characterized as being highly subjective, in contrast to less frequently mentioned value judgments like the choice of normalization factor for a certain kind of pollutant, the choice of which impact categories to consider in an assessment, the choice of measurement technique, and other “scientific” choices characterized as assumptions in service of an “objective” assessment. The distinction is enforced by community norms like the notion that those who perform the environmental assessment should be separate from those who implement the final value judgments necessary to make the decision. Indeed, LCA disallows the use of weighting

factors that allow for direct comparison across incommensurable categories (e.g., air pollution versus water pollution) in comparative studies intended for public release [11].

The distinction between inputs characterized as assumptions versus value judgments often parallels the distinction between inputs based on natural or physical science versus those based on social science, which might be related to a legacy of epistemological differences between more and less positivist fields. Certainly, attention to the source and nature of value judgments is merited if they are to support effective decision making [2,23,24]. The idea that environmental assessment can adopt evidence-based, scientific assumptions based on value choices applies not only to work based on natural and physical sciences, however, but also to social science work that deals more explicitly with values.

### **The relational context of environmental impact**

Environmental impacts are deeply socially situated, and relational values are important for understanding environmental impacts. Response to human activities is often mediated by relational values associated with people's relationships with other people, with the environment, and with nonhuman species [4,9,25,26]. Relational values like place-based cultural identity affect individual and community decisions, and those choices might be socioenvironmentally protective or maladaptive [27]. Respecting or violating relational values invokes deep and often highly personal cultural sensibilities that can lead directly to observable social impact [28\*,29,30]. When a relational value or ethic is violated, for example when a sacred place becomes a development target or when a community consultation process is perceived as unjust, people and communities can experience irreversible losses of nonsubstitutable relationships with people, place, and nature [4,8\*\*]. These relational losses, distinct from damages in the sense that they cannot be reversed with reparation [8\*\*], interfere with collective flourishing, or eudaimonia [4]. From a utilitarian project implementation perspective, engagement with relational values also affects public support for activities and policies [31–33]: a growing body of literature, often associated with the concept of “social license to operate,” demonstrates that violating relational values in a community can lead to cancelled projects and high financial costs in addition to relational harms [29,34–36].

In environmental literatures, many of the types of relational values identified by Chan and coauthors [4] are visible as important and relevant to attitude formation, experience of socioenvironmental impacts, and response to policy and other decisions. References to cultural and personal identity values associated with sense of place and place attachment are common [27,33,37–39], which likely also contributes to the social science literature's frequent use of place and distance as a frame for attitudinal evaluation, e.g. [40]. Similarly, discussion of values related to identity [28\*,33] or a broader sense of community and social norms are frequently observed in the literature [23,30,33,41–42]. Moral and social responsibility are also discussed as relevant to environmental choices [28\*,43,44], with different expectations of one's own social responsibility [45] versus expressions of corporate social responsibility and accountability [46]. Relational values pertaining to stewardship and personal responsibility [39,46] or understanding what makes a “good life” [28\*,33,47\*,48] are also important in understanding how environmental impacts are socially situated.

### **Justice as relational anchor: research from the environmental social sciences and environmental humanities**

Just as environmental assessment derives assumptions about physical systems from physical science research, it could productively turn to the social sciences and humanities as rich sources of information and scholarship about the relational context of environmental impact. Deep literatures on societal response to and understanding of environmental change exist in both the social sciences and humanities, with increasing prevalence of multi- and interdisciplinary work being brought together in journals and collaborative projects. Integrating this work with environmental assessment presents further opportunities to expand the disciplinary boundaries of how we understand socioenvironmental impacts during decision making. One major finding from exploratory manual and computationally aided review [49] of recent environmental social science and environmental humanities literature is the notable prevalence of work on justice. Substantial work on relational values related to sense of place, identity, community norms, and moral responsibility also exists and is briefly reviewed above. Justice, however, is conspicuous in the environmental social science and environmental humanities literatures, particularly given how rarely it is substantively addressed in EIA and LCA.

Justice is inherently relational. Research on the nature of justice, both felt and imagined, carries a strongly value-based thread that positions communities in relation to each other, the environment, and the future. The emerging frame of “energy justice” engages questions of access, environmental harm, and the distinction between equity of opportunity and equality of treatment, while recognizing the deeply personal and identity-affirming or -denying elements of energy use [11\*]. The concept of energy and environmental justice is also present in the just transitions literature, which includes a focus on deindustrialization as major infrastructural systems shift in response to socioenvironmental impacts and priorities [50,51]. The social science literature in particular presents a diverse set of case studies of community responses to socioenvironmental impact, including an emphasis on lived experience, cultural context, and response [21,51–59]. Case studies, methodological contributions, and other work relevant to the study of relational values in environmental contexts can be found particularly in several recent special issues of *Energy Research and Social Science*, a relatively new journal that focuses on the relationship between society and energy [47\*,48,60–62].

Work from the environmental humanities also emphasizes justice and the relationships among people and the environment. As Bergthaller and coauthors write, “Clearly, the ecological crisis is not only a crisis of the physical environment but also a crisis of the cultural and social environment” [63]. Studies of cultural values and the nature of environmentally relevant knowledge have an increasing presence in humanist inquiry [64,65\*]. One note is that, while environmental humanities scholarship can be found in journals like *Environmental Humanities* and *Resilience*, this scholarship is also often found in media that might not be easily identified by journal-focused search strategies, like books (both fiction and nonfiction), poetry, visual art, and others. Narrative and art often reveals and explores relational values implicitly or explicitly [66–72]. The frame of life in the Anthropocene, and what it means to experience and create environmental change as a human member of the global community, is another research thread particularly relevant to relational values [73–75]. The environmental humanities include substantial work on human meaning, the articulation of values, and the idea of people “learning to live well with each other and with the environment” [76].

## **Conclusion: Why do relational values matter in environmental assessment, and how could they be integrated?**

Scholarship shows that given multiple valid views of the world, and given that socioenvironmental decision making routinely involves complex tradeoffs, the value context within which models are developed influences decision outcomes [77,78]. Explicitly considering that value context should be part of an environmental assessment process. Increasingly, the environmental assessment literature reflects efforts to understand, acknowledge, and use social input and value systems in analyses [79-89], suggesting potential receptiveness.

The nonsubstitutability of relational values suggests that one application for relational values in environmental assessment is in establishing boundary conditions, or criteria that an acceptable solution must meet. Environmental assessment methods often include steps to establish such conditions. For example, the first step of LCA is “Goal and Scope Definition,” which includes required functions of the object of analysis, limitations, types of impacts to be considered, and other relevant issues [8\*\*,90]. By considering relational values at the beginning of a process, when these values can still be incorporated to decision criteria, environmental assessment processes can more completely account for potential impacts.

Some environmental assessment directionally addresses relational values in different terms. For example, the cultural theory of risk framework suggests that people respond to risk differently depending on their sociocultural context and how they view themselves in relation to society [32,79]. Ongoing LCA work addresses how impact categories might better account for what society values, framing three value categories as instrumental, intrinsic, and cultural [91\*]. Proposed “cultural” values include “cultural heritage” (e.g., damages to manmade objects and landscapes) and “natural heritage” (e.g., damages to plants, animals, and geology). This framework could be expanded to address less material relational values like community cohesion, identity, and ethical action. Further, a theory of relational value could aid in integrating the nascent framework of social LCA, which proposes to address impacts with more explicit relational character, such as community well-being.

Another path suggested by initial research on relational values supports the idea that environmental assessment processes would be well served by increasing participation. The personal and often community-specific nature of relational values means that choice of participants in a process matters, as perceptions are often quite different across people, cultures, and groups [92–94]. The typology of values proposed by Tadaki and coauthors [95\*] articulates how different concepts of values affect governance and participatory strategies and suggests that in general, environmental values are useful as “technologies of participation” in decision making. That is, engaging people on questions of what values should be considered during a decision tends to enable more direct involvement in the decision process itself. More participatory and more representative decision making tends to be correlated with more successful outcomes [77]. Currently, the literature reflects academic attention to Indigenous participation in particular [83,85,96,97]. Evidence suggests that often, misunderstanding what is truly at stake or why people care about something can lead to major conflict, especially when the issues stakeholders raise are excluded from discussion as not decision-relevant because they do not fit the framework [29,54,98–101]. Recognizing the role of relational values in decision making, and how that role is qualitatively different from the role of instrumental valuation, can improve environmental assessment.

Notably, much of the contemporary scholarship on environmentally relevant values resides in the environmental social sciences and humanities. Another path toward integration of relational values in environmental assessment likely includes more explicit outreach and acknowledgement of these communities. As the social science and humanities literatures have explored in depth, environmental impact is often experienced relationally among people, places, generations, communities, industries, and otherwise [31,45,51,71,102–103]. An explicit discussion of justice, widely emphasized in these works, is relatively rare in environmental assessment. Further exploration is warranted. Relational values matter for environmental assessment-based decisions, and bringing together multi-epistemological perspectives on these values could catalyze more complete, more just, and more sustainable environmental assessment.

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