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Relational values in evaluations of upstream social outcomes of watershed Payment for Ecosystem Services: a review

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Relational values associated with meaningful and just human–environment relationships (e.g. care and responsibility) have been proposed as motivating 'upstream' participation in Payments for Watershed Services (PWS). However, the way relational values are affected by and interact with PWS remains poorly understood. We reviewed 50 studies of social outcomes of PWS and found that approximately half assessed or discussed relational values. This included changes in relational values presented positively, such as amplifying values and norms around care for land; negatively, such as undermining traditional practices and intergenerational learning; and influencing other outcomes, such as links between land ties and human health. To improve understanding of the full suite of outcomes linked to the effectiveness, durability, and equity of PWS, we propose a research agenda based on locally-based relational value systems that include, for example, place-based conceptualizations of responsibility, care, and relation to the natural world.

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Introduction

Payment for Watershed Services (PWS), a broad subset of Payment for Ecosystem Services (PES), in which downstream water users, NGOs, and/or governments finance upstream watershed conservation, are becoming more common globally [1••,2]. As these projects proliferate, it is imperative to better understand both their environmental and social outcomes [3,4••,5]. Research around scaling these programs has focused disproportionately on the motivations of and benefits for downstream water 'users.'[8] The social outcomes for upstream participants — or the 'providers' of ecosystem services — have been understudied, particularly non-monetary outcomes such as cultural impacts [6••,7,8•]. Yet, social benefits to upstream participants are often explicit program goals, and they are also critical to the durability and scaling of PWS, as sustained participation hinges on communities feeling that their ways of life and values are respected [4••,9•]

In 'mainstream' or 'conservation efficiency' conceptualizations of PES [10,11], upstream participants are often presumed to be motivated by instrumental values, and thus compensation for conservation activities is structured as payments or in-kind contributions to material welfare. Similarly, mainstream conceptualizations of PWS have focused on increasing economic efficiency to maximize ecosystem service gain [12]. However, the literature on participation in PWS programs suggests that participants are also motivated by values such as social responsibility, sense of identity tied to land stewardship, and natural heritage [13,14]. Therefore, social assessments that focus on instrumental values alone may not reflect participants' experiences, motivations, and perceived benefits [15••].

The assertion that values beyond instrumental benefits are relevant to PWS is supported by evidence that participation is not fully explained by economic cost-benefit analysis [16,17]. The concept of relational values has recently been articulated in the ecosystem services literature as a way to broaden understanding of people's motivations to care for the natural world [18•,19], offering

[8] While PWS often emphasize benefits to downstream water users who financially support the programs, the upstream program participants can also benefit directly from changes in watershed services.

insight into the motivations of and outcomes for upstream participants in PWS. In emerging work on 'nature's contribution to people'—relational values are defined as 'preferences, principles, and virtues' associated with meaningful, reciprocal, and just human–nature relationships [18•: 1462]. Relational values 'do not directly emanate from nature but are derivative of our relationships with it and our responsibilities towards it' [20••: 12]. More specifically, Himes and Muraca [21] distinguish the *content* of relational values from the notion that all practices of valuation take place relationally: relational values are non-instrumental and epistemologically (as opposed to morally) anthropocentric, meaning that the relationships they uphold involve humans. In contrast to the dichotomy of intrinsic values (inherent to nature, independent of human relations) versus instrumental values (nature as a means to achieving human preferences) that has characterized recent debates in conservation [22], relational values are rooted in notions of mutual obligation to fellow humans and non-humans and in place-based practices of stewardship that sustain socio-cultural relations and ideas of a 'good life' [15••,23].

We posit that relational values — such as care for place and social connections inherent in traditional land management — influence perceived outcomes of PWS [9•,24]. For example, a farmer may value grazing in land targeted for reforestation in multiple ways, including for its instrumental value of income generation, but equally as a long-standing cultural practice rooted in a sense of responsibility to care for land [25]. A PWS program that fails to acknowledge such relational values will likely be ineffective at recruiting participants and could also inadvertently threaten those values by, for example, reducing access to traditional lands. This could have cascading implications for other well-being outcomes such as social cohesion and mental health. These hypotheses align with work proposing that PWS are better understood as a means to complement and strengthen relational values by 're-valu[ing] the role of land stewards' [26] or 'rewarding' continued conservation [15••,27].

In this article, we investigate how the literature on social outcomes of PWS has considered relational values. We focus on upstream participants because they are tasked with changing behavior or implementing conservation strategies, which has implications for local livelihoods and values tied to program equity and sustainability. While relational values are also relevant to downstream users, our focus upstream is specifically intended to highlight implications of relational values for compensation and upstream socio-economic monitoring in PWS. The idea that values associated with land management influence the success of environmental programs and are outcomes themselves is not new [24], yet there is no synthesis of how these values have or have not been considered in evaluations of social outcomes of PWS. We focus on PWS as they are some of the most mature PES programs globally [1••] and because water has long posed challenges to market-oriented conservation due to its status as a 'fugitive resource,' not easily subject to property rights [28]. Its simultaneous role as a valuable economic good, a basic necessity of human and non-human life, and a sacred entity in many cultures makes water and the lands influencing water provision a key site of resource conflict linked to competing value systems.

We begin by summarizing the broad categories of outcomes assessed and then discuss whether and how changes in relational values are considered as outcomes or as mediators of other social outcomes. Based on this review, we propose a research agenda that prioritizes locally-based relational values that likely influence program effectiveness and durability.

Methods

Our review of PWS programs included water funds and other payment or investment in watershed services programs with both monetary and in-kind payments [2,29]. We located articles in Web of Science using topic search (TS) term: TS = ('payment• for ecosystem services' OR 'payment* for watershed services' OR 'investment* in watershed services' OR 'water funds' OR 'payment* for environmental services') AND TS = ('impacts' OR 'outcomes' OR 'social' OR 'livelihoods' OR 'equity' OR 'socio-economic' OR 'economic' OR 'human well-being' OR 'values' OR 'knowledge' OR 'attitudes'). This returned 796 articles. Abstracts were screened and articles included if they: firstly, focused on a PWS, including multi-objective programs; and secondly, included analysis of social outcomes for upstream participants using qualitative and/or quantitative social science methods. Studies with only perspectives of program managers or downstream users were excluded, as the focus of this review was on upstream communities. If a study included more than one watershed PWS program, we included each as a data point. These criteria reduced the number of articles to 31. In addition, we assessed articles cited within selected articles as well as those from two recent reviews [6••,30•] for a total of 50 articles (Appendix 1 in Supplementary material).

We coded outcomes based on categories commonly used in assessments of human well-being: living standards, health, social and cultural cohesion, environmental conditions (i.e. ecological values), and governance (i.e. influence of local leadership) [31,32] (Table 1). These dimensions of human well-being are underpinned by distinct and overlapping instrumental and relational values. For example, environmental conditions can be understood in terms of instrumental values (e.g. ecosystem services such as sediment retention which reduce water treatment costs) as well as relational values (e.g. responsibility to care for nature and protect it for future generations). We

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Table 1

Examples of relational values as presented in the literature on social outcomes of PWS

Category and definition of social outcomes tied to well-being metrics	Examples of how PWS influence relational values or how relational values mediate other social outcomes ((+) = framed as positive or (−) = framed as negative). n = number of studies
1. Income/material living standards *For example income, assets, living conditions (locally defined), crop production*	• (+) Payments as complemented by other, intangible benefits (e.g. implement socially desirable behaviors; protect land for future generations), to produce positive local perceptions of programs (n = 5) • (−) Income from PWS leads to decline of socio-cultural ties and traditional connections to land (n = 3)
2. Health *Mental and physical, including indirect measures like access to water, food, and medicine, life expectancy, nutrition*	• (−) Health declines related to loss of traditional agricultural production and hunting (n = 1)
3. Social and cultural cohesion *For example social cohesion, indicators of trust, social connections, and conflict; ability to fulfill cultural traditions*	• (+) PWS helps in continuity of traditional livelihoods and culture (n = 2) • (−) PWS undermines cultural connections to land and social relations around land management (n = 2) • Need to adapt PWS to local/indigenous contexts (n = 2) • (−) Insufficient attention to local knowledge and values increases social conflict and disrupts local connections to land (n = 3)
4. Governance *Influence of local leadership on the environment; perceived strength of local governance and rules; number and quality of local institutions; land tenure*	• (+) PWS strengthens local governance when acknowledging local knowledge and sovereignty (n = 2) • (+) PWS increases land tenure security which increases motivation to conserve (n = 1) • (−) PWS undermines local management/governance (n = 4) • (−) PWS can threaten land and food security and disrupt traditional tenure systems (n = 2)
5. Environmental conditions *Quality of environment related to human health, cultural and spiritual fulfillment, and material living standards; ecosystem services (provisioning, cultural, and supporting); perceptions of environment*	• (+) PWS increases community organization around conservation and strengthens social norms around conservation (n = 5) • (+) PWS as social acknowledgement of conservation activities which provide a social benefit for others and for future generations (intergenerational equity) (n = 5) • (−) Local perceptions/relationships with nature made invisible by PWS (n = 3) • (−) Reduced traditional land management activities threatens relationships to land (n = 3)

assessed whether relational values were evaluated, which ones, whether they were incorporated into program design, how they were evaluated, and how they were linked to other social outcomes. Each manuscript was evaluated by two independent researchers who identified relational values as the 'preferences, principles, and virtues associated with relationships' between people and the natural world [18•: 1462]; a third researcher evaluated cases of disagreement.

Results and discussion

53 studies of PWS programs within 50 articles met our criteria, with China, Mexico, and Central America the primary regions represented (Appendix 1 in Supplementary material). Social outcomes were primarily assessed as changes in income or material assets (79%), though studies also considered program effects on values associated with ecological values (45%), social and cultural cohesion (26%), governance (32%), and health (9%). While studies that assess changes in income do consider other outcomes, in general we found a divide between quantitative studies assessing changes in income, which rarely included relational values, and qualitative studies focused on a broader range of outcomes.

Relational values were explicitly assessed or discussed in 26 of 53 cases and exclusively assessed qualitatively (Table 1). The term relational values was never used in the studies we evaluated, as it is a relatively recent term in this context. Just two studies [33••,34•] explicitly focused on how participation in PWS affects held values associated with land management: Arriagada *et al.* [33••] found that PWS amplified perceptions of the environmental and cultural values of forests, while Rico García-Amado *et al.* [34•] found that, in comparison to Integrated Conservation and Development Programs [35,36], participation in PWS increased perceptions of utilitarian and monetary—as opposed to 'intrinsic'—values of conservation.

Though not the explicit focus, consideration of outcomes that could be classified as relational values was common (Table 1). In particular, relational values were the primary lens through which ecological values were described (71% of studies that assess ecological values) (Table 1.5). For example, several articles described the ability to protect forests for future generations as a stated benefit to participants in PWS [37–39]. We classified this as a relational value akin to intergenerational equity; while the

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anticipated benefit of forest protection for future generations was rarely stated, an interaction of both instrumental and relational values such as obligation to future generations is likely. It was unclear from the majority of these articles whether PWS strengthened relational values of care and intergenerational equity, though two studies explicitly suggested that well-designed PWS did so [40,41] (Table 1.3; 1.5). In one, a study in Oaxaca, Mexico found that PWS strengthened relational values around stewardship (i.e. 'virtuous behavior toward the forests'), attributing this both to program design and to strong pre-existing community organization and pro-social norms [41] (Table 1.4; 1.5).

Problems and conflicts associated with environmental change, such as reduced access to land or diminished ability to carry out traditional practices, were also expressed as relational values (Table 1.5). For example, Ibarra *et al.* [42] described how PWS rules in southern Mexico altered traditional practices by prohibiting hunting in protected areas and by reducing the amount of land available for agriculture, thereby shortening fallow cycles. In addition to attributing these land-use changes to a decrease in crop production (as an instrumental value), the authors highlight a decline in social cohesion and traditional knowledge systems that underpin relational stewardship values (Table 1.1; 1.3; 1.5).

Several studies also highlighted how 'apolitical' conceptualizations of PWS often fail to acknowledge that power relations may privilege outside values or conceptualizations of nature over local relational values (i.e. values around relationships between people and land that are specific to particular places) [43••,44,45•] (Table 1.5). For example, Aguilar-Støen *et al.* [45•] described how international development agencies and corporations defined what types of land uses and perceptions of nature would dictate program design in Nicaragua at the expense of local relational values. Similarly, Rodríguez-de-Francisco & Boelens [43••: 152] described how 'de-politicized' PWS implementation imposes a 'socially disembedded view of water resources' on local communities. These findings suggest that social and environmental monitoring and assessment of PWS need to be grounded in local 'preferences, principles, and virtues' [18•: 1462] associated with people–land relationships.

PWS influence on local governance systems was sometimes discussed in terms of notions of collective rights and responsibilities to care for land, which can be classified as a relational value (Table 1.4). In several studies, PWS was seen as strengthening local governance systems that serve, among other things, to help actualize collective values, including relational values such as rights and obligations to care for forests and other ecosystems in a culturally appropriate way (Table 1.4). For example, Denham [40] attributed largely positive outcomes (90% of participants satisfied) of PWS in Mexico in one indigenous community to a program design that upheld indigenous sovereignty and self-determination. Several studies from Ecuador concluded that PWS added legitimacy and clarity to local rules in communities with strong pre-existing governance around páramo (highland Andean grassland) management [46,47] (Table 1.4). However, these cases did not explore the connection between local governance systems and relational values.

Researchers frequently speculated that relational values, particularly notions of responsibility to care, explain participant satisfaction with PWS or continued participation despite negligible economic returns [26,48,49] (Table 1.1; 1.5). For example, Kosoy *et al.* [26] describe how participants see payments as a 'small help,' which the authors interpret to mean a token recognizing stewardship activities (Table 1.5). Other studies, however, identify reasons other than the above-described relational values to explain satisfaction and ongoing participation despite minimal economic benefit, including protection from more restrictive protected area status or labor constraints [50,51].

Relational values are also discussed as indirect or mediating factors influencing other social outcomes in PWS programs (Table 1). In particular, authors cited lack of attention to relational values as a reason PWS reduced social and cultural cohesion and exacerbated existing social conflict [42,51] (Table 1.2). For example, Ibarra *et al.* [41] concludes that, in addition to reducing socio-cultural ties directly linked to traditional hunting and agricultural lands, Mexico's PWS program could result in health declines associated with increased consumption of processed foods because program payments increase income and reduce traditional food sources (Table 1.1; 1.2; 1.3). In another example, participants in a PWS program in Ecuador perceived positive social outcomes when the program recognized and reinforced existing local relational values and social conflict when PWS failed to take these values into account [50]. In this case, many communal landowners explained their motivation to participate in terms of water and also as a sense of responsibility and pride in 'taking care' of land. In these cases, by providing resources to continue conservation activities, PWS appeared to reinforced relational values around land stewardship, which was viewed as positive by participants [9•,50]. However, in another context, where members of a rural community enrolled land that had been communal but was now private, the researchers found that the program did not address pre-existing social connections around grazing land management that are important relational values. In this case, researchers found a sentiment by some members of the community, particularly young people, that PWS was 'locking up' important areas of inter-connected grazing lands, spurring social conflict (Table 1.3).

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Conclusions and policy recommendations

Our review suggests that relational values of responsibility and care for resources in source watersheds are strongly affected by PWS in both positive and negative ways and also function as mediating factors influencing other social outcomes. Yet, while discussed in approximately half of studies reviewed, they are rarely the focus of social assessments. Relational values were addressed more often in qualitative studies of diverse social outcomes compared to studies undertaking quantitative assessments, particularly those assessing changes in income. Given that instrumental and relational value systems are deeply intertwined in determining the effectiveness, durability, and equity of PWS and other similar policy mechanisms [52,53], we advocate for greater integration of instrumental and relational values into PWS (and PES more broadly) assessment. We also expect that explicit evaluation of PWS interaction with relational values, such as care, stewardship, and identity will improve understanding of social outcomes and provide information to improve PWS design and implementation (Figure 1).

Based on our literature review, we propose a research agenda around three themes of relational values and PWS, which could be applied more broadly to PES and other conservation incentive programs.

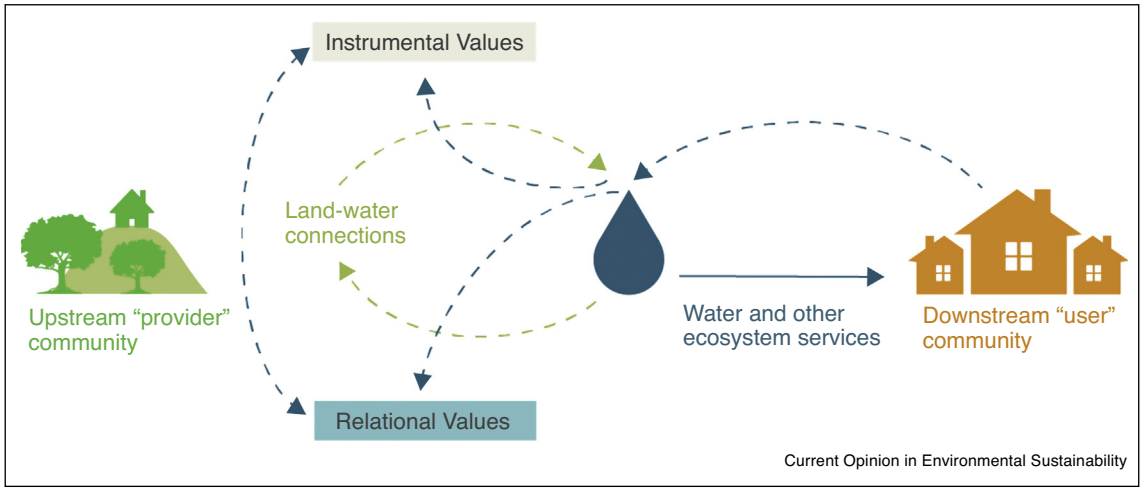
How does PWS affect relational values?

Whether PWS, or economic incentives more generally, amplify or displace (i.e. 'crowd in' or 'crowd out') other motivations to conserve has been an important topic of research [52]. Our literature review shows that the ability to responsibly manage or protect land for identity, social responsibility, and future generations was seen as a benefit of PWS in some cases. Fruitful areas for future research include greater attention to how, and in what contexts, PWS supports or restricts relational values, and how relational and instrumental values interact, as relational values have been shown to be 'dynamic and susceptible to change with experiences' [54]. For example, where relational values are not carefully considered in program design, economic incentives can lead to declines in traditional land management practices and participant dissatisfaction [e.g. in Ref. 42]. Similar findings around loss of access to land and implications for relational values emerged from a review of protected areas [55]. Including economic incentives within a broader policy framework that recognizes and includes relational values may be more equitable and sustainable [21].

How does PWS affect institutions, and how does this influence the ability to actualize relational values?

Creating and reinforcing local governance through PWS is a goal of some international actors [e.g. in Ref. 56], and PWS more broadly could function as 'incentives for collective action' [58]. Where communities hold strong relational values (such as care for land as part of collective identity), PWS could influence both those values and governance systems that actualize them. While studies have addressed links between PWS and local governance [46,47,59], future research should address how changes in local governance resulting from PWS affect relational value systems and their implementation. For example,

Figure 1



PWS are frequently conceived of as a way to link downstream to upstream communities, leveraging downstream resources to fund upstream improvements to water management. Mainstream conceptualizations of PWS contend that upstream outcomes be evaluated in terms of changes in income or livelihoods related to economic incentives or to benefits in terms of instrumental values of hydrologic services. However, PWS—both through economic incentives and through changes in land and water use and interactions—also can affect and be affected by relational value systems. Instrumental and relational values around community land-water relationships intersect in PWS and should be considered together.

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better understanding of how PWS strengthens or weakens local rules around resource use would help shed light on how economic incentives interact with local value systems.

How can PWS be designed to amplify relational values alongside instrumental values?

There is emerging evidence that PWS programs that amplify local relational values are more successful and durable [40,41]. Mixed-methods research into effective framing and design, and greater attention to power dynamics in conceptualizing nature, is likely to improve PWS effectiveness.

Ultimately, PWS seek to incentivize specific types of land management. In doing so, these programs interact with participants' individual and shared values around land and how it ought to be cared for. Greater attention to how relational values mediate outcomes of PWS, and how they may themselves be changed by PWS, is critical. PWS programs that do not attend to local values are at risk of causing harm while failing to effectively implement conservation. Conversely, integrating relational value systems into program design and framing may lead to more effective and equitable PWS. Putting these values on par with instrumental outcomes when evaluating and designing PWS also has the potential to change the way that PWS are described and evaluated in the literature [15••]. Instead of seeking and critiquing ideal programs of economic efficiency [10], PWS might be defined and evaluated as sites of intersection among pluralistic, instrumental and relational values in source watersheds [15••,53].

As relational values become more prominent in evaluations of PES, care must be taken not to oversimplify or co-opt indigenous and other local relational ontologies when bringing them into a Western-based evaluation framework. Evaluation of relational values should recognize that relational values as term originates from a long-overdue appreciation of local value systems in communities where reciprocal relationships to place are central to survival, thriving, and worldview [60,61]. Meaningful evaluation requires actively engaging local partners to assess outcomes and values most important to those who care for the lands that PWS aim to protect.

Uncited reference

[57].

Acknowledgements

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.cosust.2018.10.024.

References and recommended reading

Papers of particular interest, published within the period of review, have been highlighted as:

- • of special interest
- •• of outstanding interest

1. •• Salzman J, Bennett G, Carroll N, Goldstein A, Jenkins M: **The global status and trends of Payments for Ecosystem Services**. *Nat Sustain* 2018, **1**:136-144.

Summarizes state of global Payment for Ecosystem Services, including Payment for Watershed Services programs, finding over 550 active programs active globally. Identifies key challenges for scaling including motivated buyers, motivated sellers, metrics, and low transaction costs institutions.

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Reframes the equity versus efficiency debate in Payment for Ecosystem Services and argues that there are important causal links between social equity and ecological outcomes of PES that need to be carefully considered in program design and implementation. Does not use the term relational value, but discusses the importance of integrating non-material values into PES implementation and design and the importance of paying attention to the social context under which PES occurs.

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6. •• Blundo-Canto G, Bax V, Quintero M, Cruz-Garcia GS, Groeneveld RA, Perez-Marulanda L: **The different dimensions of livelihood impacts of Payments for Environmental Services (PES) schemes: a systematic review**. *Ecol Econ* 2018, **149**:160-183.

Conducted a systematic review of livelihood outcomes of PWS globally and found that outcomes are mixed and sometimes conflicting. Emphasizes that socio-cultural dimensions of livelihoods are poorly studied.

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Reviewed existing literature on social outcomes of PES using a capital asset framework and concludes a lack of attention to evaluating and fostering social, human, and institutional capital.

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Reviewed outcomes of PES in terms of poverty alleviation and deforestation and concludes that PES does not reduce deforestation and that there is not sufficient evidence to assess welfare outcomes.

9. • Farley KA, Bremer LL: **"Water is life": local perceptions of páramo grasslands and land management strategies associated with Payment for Ecosystem Services**. *Ann Am Assoc Geogr* 2017, **4452**:1-11.

One of few studies that focuses on values of PWS participants towards the lands that PWS aims to influence. Finds that PWS participants value páramo grasslands for cultural, provisioning, and regulating services that underpin multiple dimensions of human well-being.

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Discusses a suite of concerns critiques of PES and proposes re-framing PES to address these concerns, including greater incorporation and amplification of relational values in program design and implementation.

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18. • Chan KMA, Balvanera P, Benessaiah K, Chapman M, Díaz S: **Why protect nature? Rethinking values and the environment**. *Proc Natl Acad Sci U S A* 2016, **113**:1462-1465.
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19. Klain SC, Olmsted P, Chan KMA, Satterfield T: **Relational values resonate broadly and differently than intrinsic or instrumental values, or the New Ecological Paradigm**. *PLoS One* 2017, **12**:1-21.

20. •• Pascual U, Balvanera P, Díaz S, Pataki G, Roth E, Stenseke M, Watson RT, Başak Dessane E, Islar M, Kelemen E *et al.*: **Valuing nature's contributions to people: the IPBES approach**. *Curr Opin Environ Sustain* 2017, **26–27**:7-16.
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