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Biodiversity and the challenge of pluralism

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Preface: *Lack of progress to reverse the declining global trend of biodiversity is partly due to a mismatch between how 'living nature' is conceived and valued by the conservation movement on the one hand, and by many different people, including marginalized communities, on the other. Addressing this problem requires a pluralistic perspective on biodiversity. This requires reflecting on the use of the concept of biodiversity, willingness to expand its ambit, and engagement with the multiple and multi-level drivers of change. We propose ways for conservation science, policy, and practice to deliver more effective and socially just conservation outcomes*

Despite about a century and a half of action by policy makers and conservation organisations, global biodiversity is in peril. While the main driver of biodiversity loss is the unsustainable human appropriation of ecosystem products and ecosystem transformations to other uses [1,2], the application of the concept of biodiversity, particularly as it has been conventionally understood and generally used by conservationists, also constrains efforts to address its declining trend.

While societies across the world have had longstanding traditions of using and caring for nature, the formal, mainstream and largely western 'conservation movement', is only about 120 years old[3]. Discourses about why biodiversity matters and how it should be governed are dominated by ideas nurtured by this movement, in turn aligned with, and legitimized by normative positions in science, particularly by conservation biology[4,5]. Much of the historical focus of the mainstream conservation movement has been on charismatic species and/or

wilderness, driven by specific notions of aesthetic and/or spiritual values of nature[3,6]. Such focus has remained mostly unchanged since the concept of biodiversity was coined and started to gain traction in the 1980s[7], and spread to all parts of the policy arena, especially through its incorporation into the 1992 UN Convention on Biological Diversity (CBD).

As defined in the CBD, biodiversity encompasses not only the diversity of species, but also the diversity within species and of ecosystems. The popularity of the biodiversity concept rests on the fact that its three-tiered definition (diversity within species, between species and of ecosystems) provides a 'big tent' that encompasses a variety of interests within the modern conservation movement. In practice, however, conservation organisations have often continued championing their particular brands or objects of conservation while adopting the banner term 'biodiversity conservation'. This approach works for them because their immediate objectives, the conservation of rare species or wild ecosystems, are justified by the apparent universality of the concept of biodiversity, as are the resulting policy recommendations for the setting up of exclusive islands of 'pristine' areas within a rapidly expanding agrarian, industrial and urban world[3,8,9].

The assumptions underlying these recommendations are, however, problematic. The idea that one can identify and set aside such 'pristine' landscapes is based on erroneous assumptions about past human modification[10,11]. It is widely accepted that the imposition of Euro-American ideas of 'wild' nature through colonial and neo-colonial regimes has had dire consequences for those who have a different but no less legitimate relationship with nature, such as local (often Indigenous) communities practicing combinations of agri-pastoralism, shifting cultivation, or hunting-gathering that combine multiple values of nature in their practices[12].

In the 2000s, an attempt to resolve the tension between the use/tangible/material/instrumental values and the non-use/intangible/spiritual/intrinsic values of nature was made in a turn towards a more pragmatic and utilitarian argument for biodiversity conservation, through the ecosystem services lens[13]. This approach foregrounds the direct and indirect material benefits that people derive from 'natural' (read 'wild') ecosystems[14]. Although disputed, it has found favour with an important section of the conservation movement, because it is assumed that both the biocentric (wilderness) and the anthropocentric (products and services) worldviews about nature can coexist and even reinforce each other. But in fact, these perspectives may be poorly aligned. Conservation actions that focus on the protection of charismatic wildlife species do not necessarily coincide with actions to maintain the integrity of the ecosystems for producing other ecosystem benefits, whether direct ones such as forest products, or indirect ones such as regulation of local water flows, or global climate[15,16].

Whether under the banner of the intrinsic values of nature (e.g. wilderness) or instrumental values (e.g. ecosystem services), conventional calls by the mainstream conservation movement for the protection of biodiversity obscure and even crowd out other meanings and understandings of what 'living nature'[2,17] (or simply 'nature') is. Too often, conservationists turn a blind eye to the diverse ways in which humans experience and live with/in/from/as nature[18,19], and to the diversity of arguments about why humans should care about other forms of life, even while simultaneously using them to lead a human life[4]. Paradoxically, the call by a dominant section of the conservation movement to protect biodiversity, interpreted as 'pristine nature', is most often made by those embedded within the modern industrial and urbanized world[20], who often ignore the views and values held about nature by local communities living in a much more symbiotic relationship, and certainly much less destructive lifestyles vis-a-vis nature[21]. Thus, a single-minded pursuit of a narrow notion of conservation, when coupled with inattention to the social justice implications and the social position of the conservationists themselves, results not only in conflict and human suffering, but also in a loss of legitimacy for the wider idea of biodiversity conservation.

Although voices have already called for self-reflection about the norms and values that guide the field[22], and for a new inclusive conservation ethic[23], conservation biologists remain reluctant to recognize its normativity. As the recent book *Effective Conservation Science: Data over Dogma* illustrates, many conservation biologists continue to hold on to flawed beliefs about value-free objectivity[24]. Most of the literature adopts a singular conceptualization of biodiversity, justifying this as scientific, and without reflecting on the implications of the dominant metrics available for equity and social justice in conservation practice[25]. Here, we reflect on the role of conservation science, the definitions and concepts it employs, and its effect on conservation policy and practice. We discuss about some of the challenges and opportunities that would unfold by opening up towards a pluralistic perspective on biodiversity.

Biodiversity is one scientific description of living nature, and biodiversity conservation can be seen as a fuzzy constellation of social processes and organizations that attach normative content to it. Hence, understanding how biodiversity is conceptualized and employed matters greatly. As a concept, biodiversity does not just have a representational function in science; it also creates powerful frames and narratives which are linked to normative positions, for instance about what biodiversity change matters most and why, what causes it, and the responses available to deal with the problem. Such narratives eventually shape conservation agendas, that determine what knowledge is produced and which interventions are considered possible and desirable, and

which options get excluded[26,27]. Unpacking the values behind the biodiversity concept may therefore be a useful starting point.

'Biodiversity' as a meeting point

Conservationists often assert that biodiversity must be preserved without making explicit the specific interpretation or definition of biodiversity they draw on and why. They tend to take biodiversity indicators and metrics for granted, without sufficient reflexivity about the broader values that may be connected with such metrics. In so doing, conservationists jump from describing biodiversity to problematizing its loss under particular value systems, in order to argue for particular conservation goals and actions. The values behind defining biodiversity inevitably intermingle with facts about what is happening to it, and recommendations about what should be done. This is inevitable, since all action requires normative interpretations of reality. But it is important to consider the implications of the specific way the conservation movement frames the problem, and promotes its own conceptualization of biodiversity and its values, especially because this has direct implications on people.

Of course, any singular way of conceptualizing biodiversity excludes other ways of defining, knowing and valuing it. But the dominance of the common scientific interpretation matters. When conservationists ignore or set aside other understandings of non-human life and other human needs and worldviews, often under the guise of scientific objectivity or universalism, the resulting conservation actions may lack broad social legitimacy and effectiveness, often ending up being opposed by people with different value systems and interests. Thus, an agenda for conservation science, practice and policy derived from a singular conceptualization of biodiversity and its value will necessarily be narrow, creating a weak foundation for more effective collaborations between conservation professionals and people (for example Indigenous peoples) who hold different normative positions about how the living world should be conceptualized and managed. In reality, people have always related to the variety of living things in a range of different ways, determined by their own value systems, experiences and abilities to work with nature[28,29].

In view of its many different interpretations underpinned by a different values, biodiversity should be conceptualized in a pluralistic way. This should be seen as an opportunity to acknowledge people's different perspectives on what should be conserved and why. Moreover, if the concept of biodiversity is to be useful as a tool for conservation, it must become part of a wider engagement with diverse knowledge and value systems about nature. This would facilitate new alliances among diverse interest groups in pursuit of fairness in conservation[30,31]. A

pluralistic perspective on biodiversity could also facilitate communication across academic disciplines by applying a shared vocabulary, even though its precise interpretation may vary[23].

A pluralistic perspective on biodiversity would require an open-minded engagement with at least two questions: *what does humanity need/want from the rest of the living world*, and *how can one collectively get there*. In turn, this requires acknowledging that the answers to both questions will necessarily be plural and therefore any 'answers' have to be arrived at through a process that is fair and just, if it is to be socially legitimate. In addition, acceptance of a pluralistic perspective would require the modern-day conservation movement to give up its position of moral authority and power in answering these questions. In other words, it would require the movement to place its notion of 'what and why to conserve' alongside other understandings of the value of nature and human-nature relations in answering the first question, rather than insisting that their notions are 'scientifically derived' and therefore automatically superior. Of course, this shift would also require recognizing and accepting other needs and wants of legitimate stakeholders, including a life with dignity and freedom. Answering the second question would require thinking through what are legitimate bases of collaboration between groups located at very different positions on the spectrums of proximity to the living world and of dignity and freedom[32–34].

Biodiversity science (broadly conceived) is in fact well positioned to promote such a pluralistic agenda given the multiple ways in which biodiversity is represented in academic disciplines, such as in ecology and biology, economics, and social sciences and humanities. In many areas of biology, the established definition of biodiversity works well, although ecologists and geneticists (and those within conservation science drawing from these disciplines), would draw attention to different levels of ecological organization. For example, population geneticists and crop scientists focus on interspecific genetic variation, community ecologists concentrate in how many species are in a site and how they interact with each other, macroecologists and biogeographers look at how species number and biomass change with latitude, and biogeochemists quantify how much carbon and nutrients are cycled by ecosystems on the planet[35]. Other ecologists/biologists look at production, nutrient flow, and regulation in ecosystems, both 'natural' and 'managed' ones. Similarly, economics focuses on biodiversity and its values differently, such as a stock of 'natural capital' amenable to optimal portfolio asset management[36], as global public insurance for social-ecological resilience[37], or as a feature essential to human existence[38]. The environmental social sciences and humanities also apply a diversity of views on biodiversity and nature, including various philosophical approaches that distinguish between intrinsic, instrumental and relational values[39,40], and environmental anthropology that starts from

the entwinement of nature and culture and considers nature as socially, culturally and ecologically co-produced[41].

It is also important to acknowledge and include lay knowledge in the mix of conservation knowledge; particularly the situated, emotive, and intimate character of much of lay, e.g. local or Indigenous, knowledge about nature[42], and its focus on 'how to live well' with nature[18]. This means acknowledging the multiple entanglements of human and non-human life. One way to do this is by engaging with deeper interdisciplinarity as well as broader stakeholder participation in knowledge co-production[43,44].

By mobilizing an appropriate mix of scientific and lay knowledge, conservation science, policy and practice would be better equipped to identify and facilitate more legitimate and effective goals and actions, for instance through different approaches to protected areas[12,45] or through payments for ecosystem services[46,47]. Too often such interventions are contested by lay people when they draw from unfamiliar and externally-based worldviews[21].

The pluralistic understanding and use of the biodiversity concept that we advocate aims to go beyond mere 'diversity' and foregrounds the political, equity and justice dimensions of conservation. As part of this, the conservation movement will have to grapple with some fundamental problems of its own, including (i) being silent about the political claims made by particular conservation organisations on behalf of either all 'life on earth', or for all 'humankind'[48]; (ii) treating postcolonial states and their institutional structures as legitimate, and thereby transgressing Indigenous rights, failing to take proper account of the lack of democratic legitimacy of some states[20]; and (iii) accepting and thus legitimising private (for profit) corporations as legitimate actors, even where their rights to territory are acquired from corrupt institutional state structures, using methods that do not reflect local needs and rights[9,49]. Second, it is crucial to institutionalize deliberative mechanisms, appropriate to each social-ecological context[50], to find fair means to deal with the social trade-offs that may be associated with conservation action, especially since the potential losers are usually historically disempowered local communities[45,48,51,52]. And third, before such deliberative mechanisms are put in place, it is key to disentangle the multiple causes of the decline of biodiversity, including the direct drivers as well as deeper, more structural causes. We now turn to this aspect.

Plural drivers of biodiversity decline

Recognizing the different understandings of what biodiversity is and why it is important is an essential step towards pluralism, but it is not sufficient. One also has to know why biodiversity, in its different forms, is being lost, and what combinations of actions at multiple scales might slow

down or reverse the destruction of nature in particular contexts. In other words, one has to unpack what are commonly called the drivers of biodiversity loss and nature decline[1,53,54], or −drawing upon our plural characterisation above− what kinds of human actions and social processes are leading to the undermining of which facets of nature and what makes those actions and processes persist.

Unfortunately, existing driver-based analyses often suffer from some of the same problems discussed earlier, related to narrow and singular conceptualizations about human-nature relationships. These involve (i) an excessive focus on identifying aggregate and abstract processes that drive biodiversity change; (ii) the fetishization of singular metrics required to apply a formula-driven framework at the expense of more plural explanations of nature decline and its impacts, e.g. the 'drivers-pressures-state-impacts-responses' (DPSIR) framework; and (iii) the polarization between apolitical and political explanations of the key drivers of change. We briefly address these points in turn.

Firstly, there has been a strong tendency to cast explanation in universal or globalized terms. While it is useful to identify the biggest drivers of biodiversity or biological resource decline as resource overexploitation (the harvesting of wild organisms at rates that cannot be compensated for by reproduction or regrowth) and land cover change for agriculture (the production of food, fodder, fibre and fuel crops; livestock farming; aquaculture; and the cultivation of trees)[55] at the global scale, these analyses have often been carried out in an aggregate way without distinguishing these processes in terms of localities nor actors, e.g., agribusiness corporations, private investors, government sectors, etc., although this is changing recently[56,57]. Thus, driver-based studies should go further to tease out what sectors are responsible for harmful activities and who benefits from them, and provide context as to the localities and actors—is it large-scale ranching for beef production for global markets or cereal production by smallholder farmers for subsistence? A surfeit of analyses focusing only on proximate causes has led to the formulation of 'solutions' that are simplistic with no lasting ecological benefits at best, and often downright unjust at worst, such as arming guards with shoot-to-kill powers in protected areas[9,58]. They also deflect attention from deeper, structural processes such global capital(ism) that promotes consumerism everywhere[59]. Further, aggregate 'global analyses' encourage a focus on 'Herculean, long-standing problems'[55], which can be paralyzing, hence unquestioning overly simplistic solutions, including the removal of people from the landscapes where they live, the isolation of 'wild nature' from human influence, or a forceful return to a 'pre-human' or 'wilderness' state[10,51].

238 Secondly, scientific analysis of drivers generally risks reducing biodiversity to a set of
239 singular indices, reflecting a desire to let science drive policy, at the expense of opening space for
240 other ways of understanding the natural world and thus for deliberation. In addition, since
241 biodiversity cannot be simply reduced to a singular index, the 'problem' itself is much more
242 complicated than for example, the conventional DPSIR framework can handle[54,60,61].
243 There are multiple explanations for the many causes behind the continued decline of
244 biodiversity. Economics thinking tends to make assumptions of human beings as largely
245 independent rational actors, and therefore recommends nudging to find win-win solutions[62].
246 Political ecologists, on the other hand, may give primacy to colonial and post-colonial structures
247 of power that deprive local communities of land rights, leading to state-community conflict, and
248 may therefore recommend restoration of these rights and particularly respect to the worldviews of
249 Indigenous people and local communities[4,51], as a first step towards sustainable management of
250 nature. Yet, others may emphasize macro-level institutional failure based on ever-expanding
251 capital accumulation as the overarching single cause of the ongoing ecological crisis[59,63]. While
252 these approaches may not be entirely incompatible, the exploration of common ground is
253 prevented as much by academic silos as by differences in researchers' normative lenses, about
254 e.g., sustainability and equity[64].
255 Lastly, social analysis of outcomes for biodiversity change has been stacked into
256 'apolitical' explanations that narrowly focus on population pressure-based explanations for the
257 loss of construed 'pristine' nature, and more 'political' (structural) explanations that combine
258 concerns for social justice, acknowledgement of culturally co-constructed notions about nature,
259 with other explanations such as common property theory positioned in between[65]. This
260 polarization allows conservation groups to focus on what seems doable, given the reality of
261 dominant political economic structures, rather than on what needs to be done. They therefore
262 prioritize less politically sensitive, and more palatable, forms of action such as education,
263 communication, or behaviour nudging rather than tougher political action around rights,
264 democratic processes, and accountability of powerful government and corporate actors.
265
266 **An agenda for science, policy and practice**
267 A pluralistic approach to conceptualizing biodiversity demands deep reflexivity by each social
268 actor towards recognizing the normative positions grafted into their own interpretation of the
269 concept of biodiversity, as well as the values of other actors leading to understanding the different
270 reasons why people care about it, and what the 'it' is. Scientists, policy makers and
271 conservationists need to accept the existence of a constellation of voices, including those of

traditionally marginalized people whose livelihoods most directly depend on nature, to come up with fairer conservation interventions. While such a pluralistic perspective can indeed be constructed, the crux of the matter would still lie in understanding what people actually want to capture into decision making, the diversity of perspectives on 'what' needs to be governed, what the objectives of conservation should be, and what options exist for interventions to attain such objectives.

For conservation science and practice to take on this challenge, the first step is to come to grips with the fact that current ways of working have created problems. Thus it is important to reflect on not just the lack of effectiveness of conservation approaches in halting biodiversity loss, but also their negative outcomes for social justice. Consideration must be given to whether the concepts and knowledge used in these approaches are not neutral but complicit in perpetuating, invisibilizing, and justifying these negative outcomes. Reforms within the current mainstream conservation paradigm that miss the larger picture are bound to ultimately fail. It must be accepted that many people, especially those more directly dependent on biodiversity, may not value nature in the ways articulated in the conservation movement's dominant discourses and approaches, and that the conservation of charismatic species is often an extension of the consumptive lifestyles of more affluent societies or sectors (as expressed in long-haul wildlife tourism by the wealthy, for example).

Questions that must be addressed in the search for a forward-looking focus on human-nature relationships that takes account of on people's needs and aspirations include: (i) What patterns of biodiversity are needed to attain given objectives, such as obtaining aesthetic pleasure, maintaining ecosystem processes, delivering ecosystem benefits, or meeting a moral imperative with respect to other species?; (ii) What might be the trade-offs among these nature-related objectives, and also between them and other concerns such as well-being and poverty alleviation, social justice or democracy, and are there ways to minimise these trade-offs?; and (iii) What micro- and macro-level obstacles, including political ones, will make it difficult to achieve a given outcome with its attendant social-ecological trade-offs? These questions should be addressed from a pluralistic perspective, noting that the extent of plurality and what perspectives are legitimately considered is a difficult political issue.

Based on all the arguments above, we propose ways to move conservation science, policy and practice forward, while nurturing a pluralistic conceptualization of biodiversity as a meeting point (Figure 1).

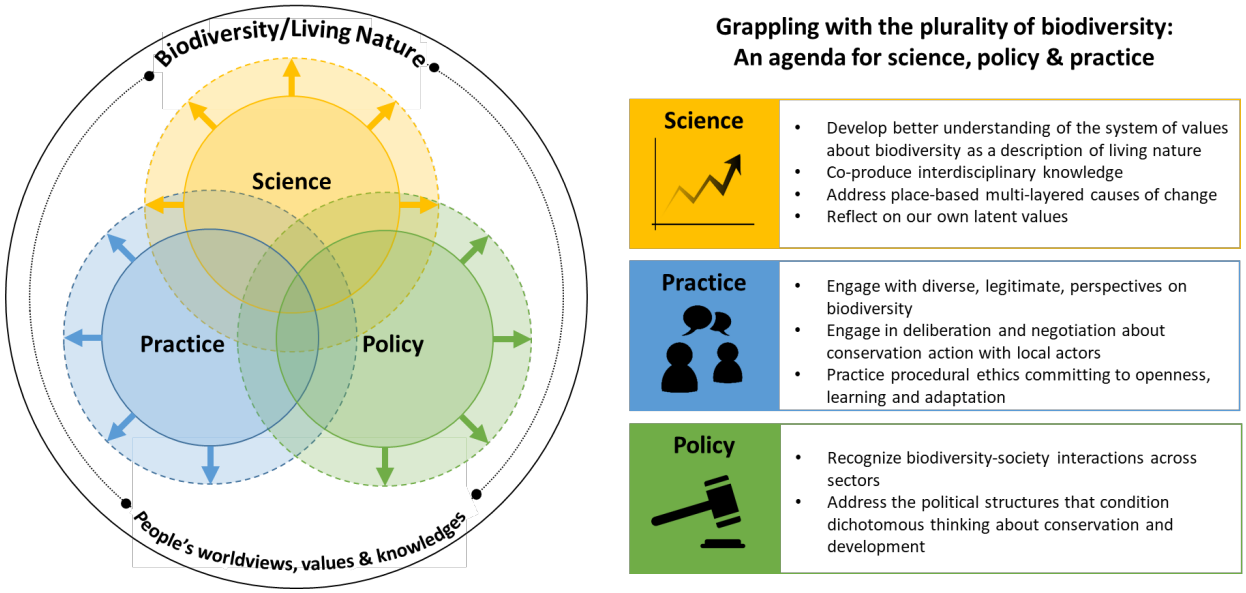

Figure 1. A pluralistic perspective on biodiversity as a meeting point for science, policy and practice

First we focus on conservation science. By strictly equating biodiversity with living (non-human) nature, rather than treating biodiversity as one possible framing of living nature broadly conceived[2,17], conservation science risks missing the essence of a plural perspective on biodiversity, as well as disconnecting science from the values and practices of lay people. It follows that the problem formulation should not start with the ecological and then address the social aspects, nor the other way around. Conservation science needs to adopt a relational lens[66] that is sensitive to how the ecological (e.g., richness, abundance, composition, distribution and functions of non-human organisms), and the social-cultural (human practices or care or management, the different values people attribute to nature) continuously co-produce each other. This could help develop a richer set of definitions, metrics, methodologies to understand human-nature relationships and practices and design appropriate responses and policy interventions.

Secondly, conservation science needs to also accept the need to expand from a predominant focus on 'pristine' ecosystems to include what are traditionally called 'disturbed' ecosystems, acknowledging also that almost all ecosystems are human-modified at some level[11,67]. Knowledge about these ecosystems must itself emerge through a process of co-production, with special space for historically marginalised groups, as this would improve both the robustness and legitimacy of the knowledge produced.

Third, scientists need to take a multi-causal approach to understanding biodiversity change, identifying who causes and benefits from the destruction of nature, and unpacking how,

when and why certain values and interests may or may not translate into conservation policy and practice. This requires not only collaboration between different disciplines[23], but also some dovetailing of their explanatory capacities. One way to enable this might be to promote much more place-based research. Even if declining trends of biodiversity is a global problem, the form it takes, the interests that define it, and the combination of processes that shape it are context-specific, and so are the solutions.

Fourth, we, as scientists, need to be more reflexive about our own latent values and normative positions about nature[22,23,64,68]. This would involve questions about how research is defined and what values and assumptions are included or ignored in reaching research findings, whose interests the resulting knowledge serves, and whose voices might not be heard, and whose needs might not be met, by the research process[16,26]. To aid this reflection we need to recognize and learn to grapple with non-mainstream ways of knowing. In short, what is required is a commitment to diversity, openness to contestation, and more humility and accountability to all those who are directly or indirectly affected by scientific research[69].

Turning to conservation practice, we suggest that the conservation movement should acknowledge that there is no agreed generic 'we' in conservation, nor an entirely obvious 'what'; therefore, it is crucial to recognize that conservation practice and envisaged outcomes have to be deliberated upon and eventually negotiated, given wicked trade-offs stemming from conservation action. 'How to achieve conservation' should ultimately depend on what people want and consider legitimate and acceptable. This will require the conservation movement to reflect about socially just procedures for making conservation decisions[44,70]. Instead of technocratic projects that are introduced in a top-down manner, practices need be guided by procedural ethics that is committed to openness, learning, and adaptation[20,68].

Lastly, what are the consequences of pluralistic thinking for biodiversity policy? As long as policy-makers see only urban (often rather rich and rather vocal) 'conservationists' as 'the' voice of conservation, and uncritically accept their particular understanding and values about 'biodiversity' as the only ones that are valid, they will continue to rely on a narrow set of policy approaches such as those based on conserving certain pockets while turning a blind eye to the ravaging the rest of living nature in the name of economic growth. But if a new conservation science captures the multiple goals and values of biodiversity, builds bridges among a broader set of nature-concerned citizens, and challenges the structures that condition the nature vs. human well-being dichotomous thinking, this in turn would eventually result in mainstreaming nature-concerns into policies across sectors by policy-makers.

What scientists, conservationists and policy makers call biodiversity is interpreted and used in different ways, all of which are potentially relevant and legitimate. It is time to be more sensitive to this breadth of values and their implications, including the analysis of the multiple causalities behind the destruction of living nature. This would need to be aligned with conservation policy and practice that foster fairer decision-making, explicitly taking into account the triad of social equity (recognition of the diversity of voices, meaningful participation of relevant actors, and fair distribution of benefits and burdens), when carrying out conservation actions.

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