



Biodiversity and the challenge of pluralism

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The lack of progress in reversing the declining global trend in 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 calls for a pluralistic perspective on biodiversity. This requires consideration of 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 policymakers and conservation organizations, global biodiversity is in peril. Although 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.

Societies across the world have had long-standing traditions of using and caring for nature, but the formal, mainstream and largely western ‘conservation movement’ is only about 120 years old³. 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 the aesthetic and/or spiritual values of nature^{3,6}. This focus has remained mostly unchanged since the term was coined and started to gain traction in the 1980s⁷ and spread to all parts of the policy arena, especially through its incorporation into the 1992 UN Convention on Biological Diversity.

As defined in the Convention on Biological Diversity, 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 organizations have often continued to champion 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 to set up 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 practising combinations of agri-pastoralism, shifting cultivation or hunting-gathering that incorporate multiple values of nature¹².

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 lens¹³. This approach emphasizes the direct and indirect material benefits that people derive from ‘natural’ (read ‘wild’) ecosystems¹⁴. Although disputed, it has found favour with an important section of the conservation movement, because it is assumed that the biocentric (wilderness) and anthropocentric (products and services) worldviews about nature can coexist and even reinforce each other. In fact, these perspectives may be poorly aligned. Conservation actions that focus on the protection of charismatic wildlife species do not necessarily overlap with actions to maintain the integrity of the ecosystems to produce other ecosystem benefits, whether they are direct benefits such as forest products, or indirect benefits such as the regulation of local water flows, or of global climate^{15,16}.

Whether under the banner of the intrinsic values of nature (for example wilderness) or instrumental values (for example ecosystem services), conventional calls from 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 life⁴. Paradoxically, the call from a dominant section of the conservation movement to protect biodiversity as ‘pristine nature’ is most often made by those embedded within the modern industrial and urbanized world²⁰, who tend to ignore the views and values held about nature by local

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communities living in a much more symbiotic relationship, and much less destructive lifestyles vis-a-vis nature²¹. Thus, a single-minded pursuit of a narrow notion of biodiversity 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 field²², and for a new inclusive conservation ethic²³, conservation biologists remain reluctant to recognize the normativity of the field. As the recent book *Effective Conservation Science: Data Not Dogma* illustrates, many conservation biologists continue to hold on to flawed beliefs about value-free objectivity²⁴. Most of the literature adopts a singular conceptualization of biodiversity, justifying this as scientific without reflecting on the implications of the dominant metrics available for equity and social justice in conservation practice²⁵. Here, we consider the role of conservation science, the definitions and concepts it employs, and their effects on conservation policy and practice. We discuss some of the challenges and opportunities that would unfold in exploring 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 that are linked to normative positions, for instance about what biodiversity change matters most and why, what causes biodiversity loss, and what responses are available to deal with the problem. Such narratives eventually shape conservation agendas, which in turn determine what knowledge is produced, which interventions are considered possible and desirable, and which options get excluded^{26,27}. Unpacking the values behind the biodiversity concept is therefore a useful starting point.

'Biodiversity' as a meeting point

Conservationists often assert that biodiversity must be preserved without explicitly detailing 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 are connected with such metrics. In so doing, conservationists jump from describing biodiversity, to problematizing its loss under particular value systems, to arguing for particular conservation goals and actions. The values behind defining biodiversity intermingle with facts about what is happening to it, and recommendations about what should be done. This is inevitable, as all action and knowledge production rely on 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, especially because this has direct implications for 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 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, 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. 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 vary²³.

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 we collectively get there? In turn, it must be acknowledged 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 they are to be socially legitimate. In addition, the 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 to conserve and why 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 the identification of 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 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 on how many species are at 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 planet³⁵. Yet, other ecologists/biologists look at production, nutrient flow and regulation in both natural and managed ecosystems. Economists interpret biodiversity and its values differently, for example as a stock of 'natural capital' amenable to optimal portfolio asset management³⁶, as global public insurance for social-ecological resilience³⁷ or as a feature essential to human existence³⁸. 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 for example, environmental anthropology starts from the entwinement of nature and culture and considers nature as socially, culturally and ecologically co-produced⁴¹.

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 knowledge (local or Indigenous, for example) about nature⁴² and its focus on how to live well with nature¹⁸. This means that the multiple entanglements of

human and non-human life must be acknowledged. 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 worldviews²¹.

The pluralistic understanding and use of the biodiversity concept that we advocate aims to go beyond mere ‘inclusion’ or ‘diversity’ and emphasizes 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 (1) being silent about the political claims made by particular conservation organizations on behalf of either all life on earth or for all humankind⁴⁸; (2) treating post-colonial states and their institutional structures as legitimate, and thereby transgressing Indigenous rights and failing to take proper account of the lack of democratic legitimacy of some states²⁰; and (3) accepting and thus legitimizing 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}. In addition, it is crucial to institutionalize deliberative mechanisms, appropriate to each social-ecological context⁵⁰, to find fair means to deal with the social and political choices and trade-offs that may be associated with conservation action, especially as the potential losers are usually historically disempowered local communities^{45,48,51,52}. Before such deliberative mechanisms are put in place, it is also critical 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 on its own. 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 on our plural characterization above—what kinds of human actions and social processes are leading to the undermining of 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 (1) an excessive focus on identifying aggregate and abstract processes that drive biodiversity change; (2) 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 (for example, the drivers–pressures–state–impacts–responses framework); and (3) the polarization between apolitical and political explanations of the key drivers of change. We briefly address these points in turn.

First, there has been a strong tendency to cast explanation in universal or globalized terms. Although 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 or actors (for example, agribusiness corporations, private investors, government sectors and so on), although this has recently begun to change^{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 as global capital(ism) that promotes consumerism everywhere⁵⁹. Furthermore, aggregate global analyses encourage a focus on “Herculean, long-standing problems”⁵⁵, which can be paralysing, and fail to question overly simplistic solutions, including the removal of people from the landscapes where they live, a focus on behaviour change and education, the isolation of wild nature from human influence, or a forceful return to a pre-human or wilderness state^{10,51}.

Second, scientific analyses of drivers generally risk reducing biodiversity to a set of singular indices, reflecting a desire to let science drive policy at the expense of opening space for other ways of understanding the natural world and thus for deliberation. In addition, as biodiversity cannot be simply reduced to a singular index, the problem itself is much more complicated than, for example, the conventional drivers–pressures–state–impacts–responses framework can handle^{54,60,61}. There are multiple explanations for the many causes behind the continued decline of biodiversity. Economics thinking tends to make assumptions about human beings as largely independent rational actors, and therefore encourages the use of nudging to find win-win solutions⁶². Political ecologists, on the other hand, may give primacy to colonial and post-colonial structures of power that deprive local communities of land rights, leading to state–community conflict, and may therefore recommend restoration of these rights and particularly respect to the worldviews of Indigenous people and local communities^{4,51} as a first step towards sustainable management of nature. Others may emphasize macro-level institutional failure based on ever-expanding capital accumulation as the overarching single cause of the ongoing ecological crisis^{59,63}. Although these approaches may not be entirely incompatible, the exploration of common ground is prevented as much by academic silos as by differences in researchers’ normative lenses about sustainability and equity⁶⁴.

Finally, social analysis of outcomes for biodiversity change has been stacked into ‘apolitical’ explanations that narrowly focus on population-pressure-based explanations for the loss of construed ‘pristine’ nature, and more ‘political’ (structural) explanations that combine concerns for social justice and acknowledgement of culturally co-constructed notions about nature, with other explanations such as common property theory positioned in between⁶⁵. This polarization allows conservation groups to focus on what seems doable, given the reality of dominant political economic structures, rather than on what needs to be done. They therefore prioritize less politically sensitive, and more palatable, forms of action such as education, communication or behaviour nudging rather than tougher political action around rights, democratic processes and accountability of powerful government and corporate actors.

An agenda for science, policy and practice

A pluralistic approach to conceptualizing biodiversity demands deep reflexivity by each social actor towards recognizing the normative positions grafted into their own interpretation of the concept of biodiversity, as well as the values of other actors, leading to an understanding of the different reasons why people care about it, and what the ‘it’ is. Scientists, policymakers, and conservationists

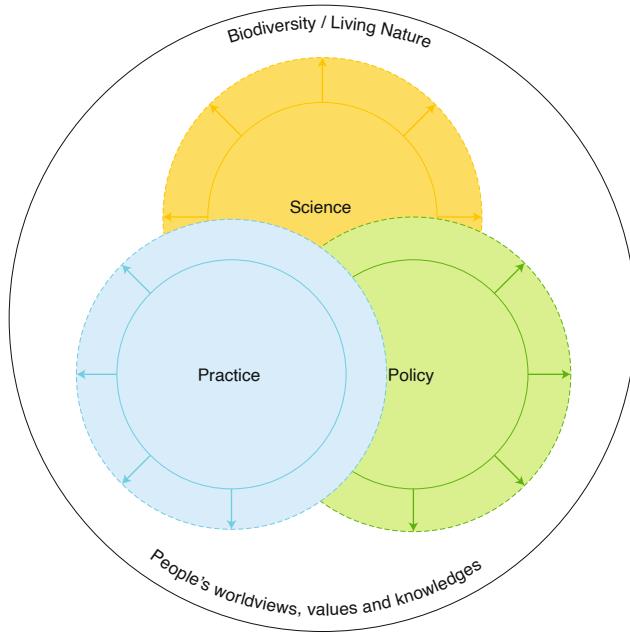
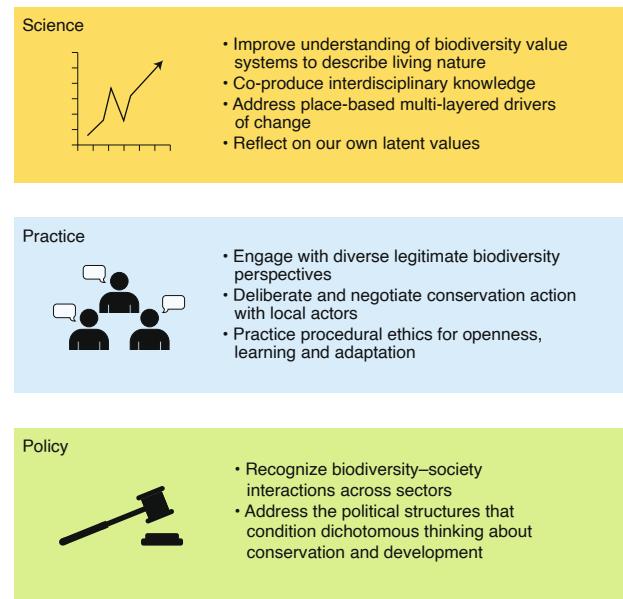


Fig. 1 | An agenda for a pluralistic perspective about biodiversity in science, policy and practice. Arrows indicate the need for expanding interactions among science, policy and practice to grapple with the plurality of biodiversity/living nature, given people's multiple worldviews, values and knowledge systems.

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. Such a pluralistic perspective could be constructed, but 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 the ways in which the concepts and knowledge used in these approaches are complicit in perpetuating, invisibilizing and justifying these negative outcomes. Reforms within the current mainstream conservation paradigm that miss the larger picture are ultimately bound to 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 accounts for people's needs and aspirations include: (1) 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? (2) What might the trade-offs among these nature-related objectives be, and between them and other concerns such as well-being and poverty alleviation, social justice or democracy, and are there ways to attribute costs and responsibilities fairly and minimize these trade-offs?; and (3) 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.

On the basis of 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 (Fig. 1).

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^{12,17}, conservation science risks missing the essence of a plural perspective on biodiversity, as well as disconnecting scientific values and practices from those 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 lens⁶⁶ that is sensitive to how the ecological (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 and methodologies to understand human–nature relationships and practices and design appropriate responses and policy interventions.

Second, conservation science needs to 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 modified by humans at some level^{11,67}. Knowledge about these ecosystems must itself emerge through a process of co-production, with special space for historically marginalized 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 disciplines²³, 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 will 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, 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 research⁶⁹.

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’; it is therefore 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}.

Finally, what are the consequences of pluralistic thinking for biodiversity policy? As long as policymakers 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 of 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 versus human well-being dichotomous thinking, this in turn would eventually result in mainstreaming nature concerns into policies across sectors by policymakers.

To conclude, what scientists, conservationists and policymakers 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 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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