9

Ethical Perspectives on Biodiversity as Planetary Boundary

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Planetary boundaries are defined from a functional perspective. Only biodiversity appears as also having a value in its own. The original publication contains the laconic note: 'Massive loss of biodiversity [is] unacceptable for ethical reasons' (Rockström et al. 2009). Remarkably, this brief reference is only to be found in a table that characterizes the nine proposed planetary boundaries. Nowhere else in the document do the authors name ethical concerns. They do mention that establishing values for the respective boundaries depends on value judgements or normative judgements. However, the idea that crossing a particular boundary is morally wrong per se only occurs in relation to biodiversity.

For scholars who study 'biodiversity' from a theoretical perspective, this reference to ethics comes as no surprise. The concept of biodiversity has been morally impregnated from the beginning. It was coined at the interface of biology and politics to send a wake-up call to decision-makers and has never seen itself as a value-free scientific concept (Eser 2001). Nevertheless, like the closely related concept of ecosystem services, it appears in public discourse with the full authority of scientific knowledge. The concept of planetary boundaries presents itself as a 'science-based analysis', too. However, under the guise of 'Science' the values that underpin conservation efforts largely remain hidden. My chapter aims to address this shortcoming.

Section 9.1 will characterize the term 'biodiversity' as a concept that is situated in the borderland between biology, ethics, and politics and has factual, evaluative, and normative dimensions. Section 9.2 presents critique that has been made of biodiversity as planetary boundary, and how this has been addressed in more recent versions of the framework. The main section focuses on the different values of biodiversity, which I consider to be insufficiently reflected in the PB approach. Besides its instrumental value for humanity's safe operating space, the diversity of living beings also has intrinsic and relational value. I will present these different value concepts and discuss them with regard to the PB framework (Section 9.3).

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Finally, I will argue for a more inclusive perspective on biodiversity that recognizes and takes into account differences between the manifold ways in which humans live from, with, in, and as nature (Section 9.4).

9.1 Biodiversity: A Boundary Concept

The term 'biodiversity' comes from conservation biology (Maclaurin & Sterelny 2008). It is a shorthand of 'biological diversity' or 'biotic diversity' (Faith 2021) and was coined in the course of the *Washington Conference on BioDiversity* in 1986 in order to raise public awareness of the ongoing mass extinction (Wilson 1988). In extensive interviews with protagonists of the concept, David Takacs, a scholar of science studies, has shown that the invention of the term was associated with remarkable boundary work (Takacs 1996). Both the established separation of science and politics and the common concepts of scientific objectivity and value-neutrality were explicitly challenged in the scientific advocacy for a more resolute policy in favour of biodiversity.

The *Conference on BioDiversity* itself was a political, rather than a scientific, endeavour. Dan Janzen, one of the many renowned biologists involved, remembers in his interview: 'That was an explicit political event, explicitly designed to make Congress aware of this complexity of species that we're losing . . . . A lot of us went to that talk with a political mission' (Takacs 1996: 37). Part and parcel of the message that biodiversity is under threat is the message that biodiversity is important, that is to say: It has value. Such a statement is obviously at odds with the conventional understanding of science as being value-neutral. Accordingly, Takacs' interviewees question this scientific norm. 'One of the silly things is the idea that science is somehow separate from society. There is no value-neutral science,' says Paul Ehrlich (Takacs 1996: 181). With regard to both intricate knowledge and imminent danger, biologists feel obliged to bridge the gap between 'Is' and 'Ought' that is so well established in philosophy.

> In my view, it's preposterous for people who have spent their entire life immersed in a problem to present only a value-neutral thing. And politicians don't want you, ordinarily – they want not only to know what you think the situation is, they want at least suggestions on what society ought to do about it . . . . [I]f you're standing in a building that's burning down you don't just stand up and give measurements of the temperature and so on. You say, 'Let's get the fuck out of here' in addition. (Takacs 1996: 179)

This combination of expertise and urgency drives the protagonists of the planetary boundaries framework, too.

In his seminal book, Takacs illustrates that the commitment of biologists to biodiversity was accompanied by an attempt to shift the boundaries between

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science, politics, and ethics. Biodiversity was associated with 'a new ethic, in which biodiversity's multiplicity of values will be respected, appreciated, and perhaps even worshiped' (Takacs 1996: 9).

Given that history, 'biodiversity' can be regarded as a thick concept. 'Thick', in philosophy, are concepts that have a substantial degree of descriptive content but also are value-laden (Williams 1985). With regard to biological concepts like biodiversity, ecology, or evolution, such thick concepts have been named 'epistemic-moral hybrids' (Potthast 2007). In view of this hybrid character, biodiversity loss is not only a scientific matter of fact. The statement that we are losing biodiversity at unprecedented rates per se involves the value judgement that this loss is bad, and the normative statement that we ought to do something to halt it. In other words, the term has factual, evaluative, and normative dimensions.

Since its invention in the 1980s, the term 'biodiversity' has had a rapid career, in both the scientific and political arenas. Within science, the question of how to define biodiversity and how to measure it fills volumes. In the political arena, the term became the focus of global conservation efforts with the *Convention on Biological Diversity* (CBD), adopted at the first *Earth Summit* in Rio de Janeiro in 1992. The close entanglement of political and scientific dimensions of the term makes it both important and difficult to define biodiversity. According to the CBD, '"[b]iological diversity" means the variability among living organisms from all sources …; this includes diversity within species, between species and of ecosystems' (1992: Art. 2). The UNESCO funded 'Man and Biosphere' Program described it as living variability: 'Biodiversity is the property of living systems of being distinct, that is different, unlike. Biological diversity or biodiversity is defined here as the property of groups or classes of living entities to be varied' (Solbrig 1991: 9). An explanatory leaflet produced by the CBD's clearinghouse mechanism for communication purposes explained: 'The term "biological diversity" … is defined in terms of genes, species, and ecosystems, which are the outcome of over 3,000 million years of evolution. The human species depends on biological diversity for its own survival. Thus, the term can be considered a synonym for "life on earth"' (CBD 1999). When asked for a definition of biodiversity, David Ehrenfeld stated, 'I don't have a definition of biodiversity … I think it's one of those wonderful catchwords like sustainable development, that, because it's vaguely defined, has a broad appeal, like motherhood' (Takacs 1996: 46–47).

This indeterminacy of content contrasts with scientific exactness but is precisely why it enables practical cooperation. It is, therefore, helpful to understand biodiversity as a boundary object that is 'both plastic enough to adapt to local needs and constraints of the several parties employing them, yet robust enough to maintain a common identity across sites' (Star 1989: 46). While such objects can

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be very useful enablers of cooperation, it is hardly possible to pin them down to a single metric within a science-based framework. This becomes apparent when we look at the scientific debate on biodiversity as a planetary boundary.

9.2 Biodiversity as Planetary Boundary

How can an ill-defined concept as biodiversity be used within a framework that intends to be science-based? In particular: How is it possible to formulate a reliable boundary that separates the safe operating space from the danger zone? What are appropriate metrics for such a boundary? And how to deal with the huge amount of non-knowledge with regard to both the numbers of existing and endangered species and their relevance for ecosystem functioning?

The planetary boundaries framework uses extinction rate as a proxy for biodiversity loss. In calculating the boundary and the zone of uncertainty, the original paper made use of a rather rough rule of thumb: 'The lower and upper bounds of extinction rates in the fossil record . . . provide the best estimates of the background extinction rates that have historically conserved global biodiversity' (Rockström et al. 2009). With regard to this natural extinction rate, the authors set the boundary at an extinction rate of less than 10 extinctions per million species per year (E/MSY), and the zone of uncertainty at 10–100 E/MSY. However, they admit, 'it remains very difficult to define a boundary level for the rate of biodiversity loss that, if transgressed for long periods of time, could result in undesired, non-linear Earth System change at regional to global scales' (Rockström et al. 2009).

Within conservation biology, there have been controversial debates for years about whether biodiversity is an end or a means of conservation, and how biodiversity helps in the selection and prioritization of conservation objects (Maclaurin & Sterelny 2008; NRC 1999; Sarkar 2005). Due to massive conceptual and methodological difficulties, some even argued for abandoning the term altogether (Santana 2014). Accordingly, the biodiversity community's response to the planetary boundaries framework was mixed. The reactions range from constructive criticisms (Mace et al. 2014) to harsh verdicts (Montoya et al. 2018). Mace et al. (2014) argued that extinction rate and species richness were weak metrics and suggested alternative approaches to determine biodiversity loss boundaries. In response to their critique, the PB framework was adjusted and the initial boundary 'biodiversity loss' was replaced by 'biosphere integrity' (Steffen et al. 2015). Biosphere integrity has two components: genetic diversity, with extinction rate as control variable, and functional diversity with a Biodiversity Intactness Index (BII) as control variable. The updated table no longer contains the remark on ethics but the note: 'These are interim control variables until more

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appropriate ones are developed' (Steffen et al. 2015), thus acknowledging practical and theoretical challenges of finding appropriate control variables at regional or global scales.

Despite these adjustments, some still doubt the practical utility of the concept. '[N]otions of planetary boundaries add no insight into our understanding of the threats to biodiversity and ecosystem functioning, have no evidence to support them, are too vague for use by those who manage biodiversity, and promote pernicious policies' (Montoya et al. 2018). In addition to practical conservation concerns, the authors of this verdict also express moral and political concerns. In the face of boundaries that are difficult to operationalize, they consider the talk of a 'safe operating space' problematic because it could encourage policymakers to assume 'if the planet is not obviously collapsing around us, then surely we can continue to deplete it' (Montoya et al. 2018).

I will leave the question of a proper metric for biodiversity here and turn to the ethical implications of a concept that considers the diversity of living beings exclusively in terms of a safe operating space for humanity.[1]

9.3 The Value(s) of Biodiversity

'Our primary reason for including biological diversity as a planetary boundary is its role in providing ecological functions that support biophysical sub-systems of the Earth' (Rockström et al. 2009). Apart from the marginal note in the first table, the planetary boundaries framework considers biodiversity for functional reasons. The only value of biodiversity taken into account is its instrumental value: Biodiversity is valued as a means to humanity's continued existence. Genetic diversity is appreciated as a database that allows adaptation to an uncertain future, and functional diversity is treasured for its contribution to ecosystem services (Steffen et al. 2015). There is no doubt that this functional perspective contains essential reasons for the protection of biological diversity. However, it ignores other, equally important reasons: it does not take into account the possible intrinsic value of other than human living beings (*Instrumental vs. Intrinsic value*), nor does it adequately address the diversity of meaningful relationships between humans and nature (*Relational Value*).

[1] The original manuscript of this article was submitted before the latest update was published. Richardson et al. (2023) replace the Biodiversity Intactness Index with a computable proxy for net primary production (NPP), thus defining the boundary of functional integrity as 'a limit to the human appropriation of the biosphere's NPP (HANPP) as a fraction of its Holocene NPP'. A discussion of this new metric cannot be provided here. For critics, it probably does little to change the scepticism regarding its practical usefulness. Regarding the ethical implications, it also focuses on functionality and therefore reflects the same instrumental perspective.

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9.3.1 Instrumental vs. Intrinsic Value

The planetary boundaries framework links biodiversity to human well-being. This link has been emphasized ever since the Millennium Ecosystem Assessment (2005). This had helped the concept of ecosystem services, developed in the 1990s, to achieve a breakthrough. Biodiversity, according to this approach, contributes significantly to supporting, provisioning, regulating, and cultural ecosystem services (Díaz et al. 2006). The purpose of the concept of ecosystem services was to enable communication between economics, ecology, and politics (Eser 2016). However, it met (and still meets) with criticism among conservationists. A commentary published in the prestigious journal *Nature* that warned from 'selling out on nature' and pleaded 'for returning to the protection of nature for nature's sake' (McCauley 2006) surely spoke from the heart of many conservationists. The notion that all life has intrinsic value, independent from whatever human interests, goals, or preferences are, is inextricably linked to the concept of biodiversity, as I have shown earlier. The conviction that nature has intrinsic value has to be considered a core belief of most conservationists. It is, therefore, reasonable to assume that the harsh criticism of biodiversity as planetary boundary demonstrated earlier has one of its roots here.

Acknowledging the great importance of the idea of intrinsic value, however, does not necessarily mean to attribute moral intrinsic value to nature. In a seminal analysis of 'value systems and attitudes toward nature', the German philosopher Angelika Krebs discriminated between three possible understandings of 'intrinsic value': absolute intrinsic value, moral intrinsic value, and eudemonic intrinsic value (Krebs 1999). The distinction between moral intrinsic value of nature and other non-instrumental values like aesthetic, emotional, or spiritual value was formative for the German discourse on conservation ethics (Eser & Potthast 1999; Muraca 2011; Ott 2020). In the wake of the activities of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) it also became recognized in the global biodiversity discourse. Non-instrumental intrinsic values have gained greater attention in the international conservation community as so-called relational values.

9.3.2 Relational Value

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) was established in 2012 as an independent intergovernmental body. Its mission is 'to provide policy-relevant knowledge and to catalyze the implementation of knowledge-based policies at all levels in government, the private sector and civil society' (IPBES 2022a). To facilitate a comprehensive

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understanding of the complex interactions between the natural world and human societies, IPBES developed a conceptual framework (CF) that integrates not only different types of knowledge but also different values. The original CF contained six elements: nature, nature's benefits to people, good quality of life, anthropogenic assets, institutions, and direct drivers (Díaz et al. 2015). The term 'nature's benefits to people' has later been replaced by 'nature's contributions to people' (NCP), not least for the less instrumentalist and more comprehensive notion of NCP (Pascual et al. 2017). In addition to instrumental value,

> NCP can embody symbolic relationships with natural entities to the extent that such relationships are inextricably linked to people's sense of identity and spirituality, to a meaningful life and to 'doing the right thing'. In this case NCP are associated with relational values, that is values that do not directly emanate from nature but are derivative of our relationships with it and our responsibilities towards it. (Pascual et al. 2017)

The term 'relational values' was promoted to overcome the false dichotomy between instrumental value and intrinsic value (Chan et al. 2016; Luck et al. 2012). Besides nature's instrumental value in providing benefits to people and nature's intrinsic value, the concept of relational value wants to raise 'attention to other ways that value is expressed and realized by people' (Chan et al. 2016). By its integration into the IPBES process, the value of non-instrumental relationships between people and nature finally received broader attention by conservationists.

The point that nature and the diversity of living beings matter to humans in other than instrumental ways does not come into view in the functional perspective of the planetary boundaries framework. The idea of a *Safe Operating Space for Humanity* suggests that the major concern of environmental politics is the survival of humankind. However, as early as 1972 the *Club of Rome* stated in its afterword to the report *Limits to Growth:* 'The crux of the matter is not only whether the human species will survive, but even more whether it can survive without falling into a state of worthless existence' (Meadows et al. 1972: 200). What makes human lives worth living cannot be defined by the natural sciences alone. There are philosophical traditions devoted to exploring the meaning of a good life and the role nature plays in it. For but one example, philosopher Martha Nussbaum names 'Being able to live with concern for and in relation to animals, plants, and the world of nature' as 1 out of 10 central human functional capabilities (Nussbaum 2000). There are also contributions by the social and political sciences that name minimal standards of a decent human life. With regard to the planetary boundaries, Kate Raworth expanded the 'safe operating space' to a 'safe and just space for humanity' (Raworth 2012). The doughnut she suggests is meant as a new model of prosperity that not only respects planetary boundaries but has equity at its heart. In a similar vein, researchers from the social sciences and humanities recently

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pleaded for a move from planetary to societal boundaries (Brand et al. 2021). This focus on societal aspects brings me to my major concern: the unifying concept of 'humanity' is an abstraction and an over-simplification that needs to be broken down. Instead, we have to make visible and acknowledge the different ways in which different people, cultures, economies, and societies relate to nature by taking a more inclusive perspective on biodiversity.

9.4 A More Inclusive Perspective on Biodiversity

For decades, environmental discourse has been framed as a conflict between humans and nature. Such a framing ignores that in environmental protection and nature conservation we are usually not dealing with conflicts between 'man' and 'nature', but with conflicts between different people with different interests and needs – and different potentials to achieve those. One consequence of this binary framing is that the exclusion of people is often seen as the best way to protect nature. One recent example of such a preference is the Kumming-Montreal biodiversity framework adopted at the 15th Conference of the Parties to the CBD in Montreal in December 2022. It established the 30 by 30-target of global biodiversity conservation, to '[e]nsure and enable that by 2030 at least 30 per cent of terrestrial, inland water, and of coastal and marine areas, … are effectively conserved and managed through … systems of protected areas and other effective area-based conservation' (CBD 2022). Only after fierce debates and in response to serious concerns with regard to: Indigenous people and local communities, the document finally explicitly recognizes and respects the rights of these groups. As long as we conceive of biodiversity loss as a conflict between humans and nature, crucial distinctions between different lifestyles and economies and their impacts on biodiversity cannot come into view – and hence cannot be adequately addressed in the political arena.

This critique of generalization also applies to the concept of planetary boundaries. '*Human activities* increasingly influence the Earth's climate … and ecosystems', '*humans* are effectively pushing the planet outside the Holocene range of variability …', '*humanity* has already entered deep into a danger zone' (Rockström et al. 2009, emphasis added): These quotes demonstrate the shortcomings of a planetary perspective mentioned earlier. Different human activities influence climate and ecosystems in very different ways – not 'human activities' as such but particular activities of particular persons. Not 'humans' are pushing 'the planet' outside of the comfort zone, but some humans with specific lifestyles and policies are pushing other humans – and other species – 'deep into the danger zone'.

Talk of 'humanity' tends to ignore morally relevant differences between originators and victims of the depletion of nature. Those who are responsible for

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the decline of species and those who suffer from this decline more often than not are different persons. As the *Human Development Report 1998* pointed out, responsibility for environmental damage, including biodiversity loss, lies mainly with the top global consumers (UNDP 1998). Increasing consumption not only puts strains on the environment but also reflects and increases global inequality. The richest fifth of the world's population account for 86 per cent of total private consumption expenditures – and the related environmental and social burdens (UNDP 1998). On the other hand, consequences of biodiversity loss 'will be felt disproportionately by the poor' (Díaz et al. 2006). Degradation of the Earth's life support systems 'is threatening the fulfillment of basic needs and aspiration of humanity as a whole but especially, and most immediately, those of the most disadvantaged segments of society' (Díaz et al. 2006). Both with regard to the polluter pays principle and with regard to responsibility for particularly vulnerable groups, the unifying talk of humanity is inadequate from an ethical perspective.

Talk of 'humanity' also tends to ignore conflicting interests: on the one hand, conflicts between interests in different kinds of use (e.g. provision of food vs. provision of housing); on the other hand, conflicts between interests in use and interests in other kinds of relations with nature (e.g. aesthetic, cultural, or spiritual). In order to overcome the unsatisfactory frontline between humans and nature and to recognize the diversity of human-nature relationships, IPBES initiated an assessment on the multiple values of nature and its contributions to human well-being in 2018. Over a period of four years, a multidisciplinary and multinational team of nearly a hundred authors scrutinized different concepts of value and methods of evaluation, analysed the values underlying current decision-making, and inquired if the inclusion of multiple values might lead to better decision outcomes. The results, published in July 2022, provide extensive evidence that 'decisions based on [a] narrow set of market values of nature underpin the global biodiversity crisis' (IPBES 2022b). The *Summary for Policy Makers* establishes that decisions are (too) often made on the basis of monetary values, neglecting other values. 'Despite the diversity of nature's values, most policymaking approaches have prioritized a narrow set of values at the expense of both nature and society, as well as future generations, and have often ignored values associated to indigenous peoples and local communities' worldviews' (IPBES 2022c). According to the *Values Assessment*, dominance of market values and ignorance of non-instrumental values are to be seen as root causes of the biodiversity crisis. To overcome this restriction, the assessment suggests a value typology that leaves room for different ways in which humans can relate to nature. It discriminates four 'live-frames': living from, living in, living with and living as nature. *Living from nature* designates the instrumental perspective on nature as a resource. *Living with nature* emphasizes relational bonds between humans and other than human beings.

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Living in nature highlights place-based connections between people and nature while *Living as nature* underlines the inseparability of humans and nature.

The findings of the IPBES Values Assessment may shed new light on the planetary boundary approach. By taking a functional perspective on biodiversity, it is clearly situated within the living-from frame. Within that frame, it provides powerful reasons for action. However, this achievement comes at the expense of neglecting other perceptions. A more inclusive perspective on biodiversity needs to take into account diverse values and to address social aspects such as power, poverty, and inequality. As long as such an inclusion is missing, it is doubtful whether the planetary boundaries approach can provide adequate solutions to the ongoing crisis of biodiversity.

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