



## WHAT'S IN NAME? BIODIVERSITY OR NATURAL CAPITAL AS BIOSPHERE BOUNDARY?

Sander Jacobs\*<sup>1</sup>, Alexandra Aragão<sup>2</sup>, Sara Moreno Pires<sup>2</sup>, Nuno Oliveira<sup>3</sup>, Iva Miranda Pires<sup>4</sup> & Paulo Magalhães<sup>4,5</sup>

1: Research Institute of Nature and Forest (INBO), Kliniekstraat 25 1070 Brussels, Belgium. \*sander.jacobs@inbo.be

2: University of Coimbra

3: CIGEST Environment & Sustainability / ISG Business & Economics School

4: Universidade Nova de Lisboa

5: Earth Condominium Project, Quercus

*This paper results from multi-disciplinary work within the Earth Condominium project. Earth Condominium initiated in 2009 within the Portuguese Nature Conservation NGO Quercus and has grown to an international network of engaged scientists, lawyers and policy makers. Earth Condominium aims to define a legal underpinning of a new legal entity: the Earth System, the 'software' of the planet, and to develop an accounting system for the states' contributions to this Global Common Heritage. This contribution aims to ignite debate on the problematic terminology of "biodiversity" versus "natural capital", and its implications for a legal indicator of the Biosphere boundary.*

Any internationally recognized legal entity has to be defined precisely and unambiguously. The description of the planetary boundaries' safe operating space does exactly this. However, any legal implementation<sup>1</sup> obliges states to report on the legal object and its protection, conservation and restoration. Concerning indicator choice, this boils down to a trade-off between effectiveness and scientific precision: effective indicators hold scientific relevance but also impact on decision making public policies and awareness<sup>1,2</sup>. Indicators simplify, quantify, analyze, compare and communicate complex information<sup>3</sup>, but if exclusively focused on scientific issues they can remain empty elegant messages rather than bring about change<sup>4</sup>. This is why the Planetary Boundary Initiative indicators need to be carefully constructed with their legal goals in mind.

Climatic and geological indicators are defined relatively straightforward and in broad consensus. Yet, capturing the socio-ecological complexity of the biosphere keeps puzzling and dividing scientists as well as policy makers. First, the functional conditions for a resilient biosphere supporting long-term human survival have to be defined<sup>5,6</sup>, simultaneously considering its social and ethical aspects. Secondly, strategic and communicative considerations should increase chances of actual political implementation<sup>7</sup>.

While the intuitive terminological choice for a Biosphere indicator would be "biodiversity" (BD), we argue that "natural capital" (NC) is a more appropriate wording for global biosphere governance. Both concepts raise interpretation questions and have specific advantages and risks. Here we present some of the scientific, strategic, legal and conceptual arguments for our opinion, hoping to ignite constructive discussion within the planetary boundaries initiative.

**We conclude that a legal application of the Biosphere's safe operating space requires careful development of effective indicators. More specifically, an aggregate index for the biosphere's safe operating space has to account for ecological as well as socio-economic complexity. Within the terminological and conceptual vessel of Natural Capital, an assemblage of several indicators can be hosted. The NC-index should integrate the various values involved, including but going beyond current BD indices. Assemblage of this NC index directly involves natural and social scientists as well as policy makers. Implementing a credible, realistic, correct and effective indicator in a legal context is difficult, but imperative. Close dialogue with ongoing work in science and policy is indispensable.**



## Why not Biodiversity?

The discursive power of the BD concept and its real-life achievements cannot be underestimated. Despite its clear achievements since the 80's, the weaknesses and risks of BD raise doubts about its potential as a flagship indicator for the biosphere dimension of a *safe operating space*.

- BD is only one of the biophysical components which are required to relate ecosystem structure or function to resilience. Other components include variability of recycling rates of material and energy, the rate of ecological processes, and bioenergetics<sup>8,9,10</sup>.
- Because its conceptual scope (see box) is so broad, the term suffers from conflicting definitions<sup>11,12</sup>. The normative and scientific objectives of BD are often muddled together leading to a concept that has only limited use for either science or policy<sup>11,13</sup>.
- The bulk of BD indicators applied up till now focus almost solely on red lists, umbrella species, priority species or endangered habitats. This narrows legal protection towards a very limited part of BD, often causing nature conservation policies to be ineffective due to various rebound effects<sup>14</sup>.
- Although the linkage between species richness and ecosystem functioning is intensively studied<sup>15,16,17,18,19,20</sup>, the evidence base of using (species-based) BD for nature conservation is weak<sup>21</sup>, or even contested as counterproductive<sup>22</sup>. This heavily affects legitimacy of current BD legal implementation.
- BD as a policy-science awareness concept has, despite its clear impact<sup>23</sup>, also specific limitations in mainstreaming and implementation. Conservation and BD science has been plagued by accusations of being anti-social<sup>24,25</sup>: BD has not been able to take into account inevitable socio-economic considerations convincingly.
- Valuations of BD are heavily influenced by implicit cultural values, especially within the conservation scientific community<sup>24,26</sup>. This is not a bad thing per se, but the implicitness is problematic. BD based conservation discourses are often based on a “just so” reasoning with a certain nonnegotiable moral stand. Development of a sound legal basis requires explicitness about all the values, including existence (“intrinsic”) values<sup>24</sup> and potential incommensurable aspects<sup>27,28</sup> between them.
- BD is up till now implemented as a state-owned<sup>29</sup> or geographically delimited<sup>30</sup> resource in legislation. This is an institutional hurdle for implementation within a global legal context.
- International BD policies often have legitimacy and governance problems since they tend to ignore local (state or regional) specificities<sup>31</sup>.
- States are mostly unwilling to really act on conservation because the better they act, the worse for their economy – or put otherwise: because the long-term dependencies and impacts of the broader economy and society on BD is not made explicit<sup>14</sup>.

### *Biodiversity*

*Biodiversity is the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems.*

*The term was launched in 1986 by the Society for Biological Conservation (8) with the express aim of introducing it into the scientific and especially the societal and political community (5). From its inception, the term biodiversity has thus had a dual purpose (5, 6, 7): on the one hand, the scientific goal of analyzing and remediating the extinction-crisis, on the other placing this pressing concern on the political agenda and in the social debate. Biodiversity indicators, based on the abundance of selected species' have been included both in national and international law.*



## Why Natural Capital?

We believe that NC is a more rigorous concept and a better boundary terminology for the *safe operating space*. The concept has its challenges concerning its role in the current economic context, but it displays some convincing strengths and opportunities:

- NC defines only these parts of the biosphere which are important to our survival and wellbeing<sup>32</sup>, rather than ‘the whole’ of biodiversity. This aligns with the planetary boundaries indicators, which define the *desirable ranges* of physical processes rather than the existence of these processes *as such*.
- NC is a socio-ecological concept, which allows to render the importance (the multiple values) of BD more explicit<sup>24,33</sup>; not only use values, but also cultural and moral values. This means that protected species and habitats are inherently part of NC, as they represent an agreed upon cultural value (dignity, heritage, existence value; n.b. this also rules out a strictly monetary approach)
- NC is politically unimplemented<sup>34</sup>, which enhances chances of innovative applications<sup>35</sup>. BD is a common term in nature conservation legal texts. For a new object of law, NC can help perform the epistemological cut.
- “Capital” relates immediately to the socio-economic realm which is lacking in BD discourses<sup>36</sup>.
- Accounting for the abundance of a selective species set is insufficient. Unlike BD, NC is a broader vessel containing protected species accounting, ecological health, ecosystem services, wellbeing contributions, heritage values, or whatever combination of the former<sup>37</sup>. It allows integration of these values according to scientific, societal and political debate, and remains adaptable to new insights<sup>38</sup>.
- There is a huge momentum and thus an opportunity to refocus ongoing debates on natural capital and ecosystem services the notion of ecological boundaries:
  - Current developments in ecosystem service assessments move towards inclusion of multiple values, strict conditions for monetary application, integration with resilience thinking and social aspects<sup>39,40</sup>.
  - EU DG environment is investing in the methodological development of mapping and assessment of ecosystem services, but remains indecisive on what this assessment really means<sup>41</sup>.
  - An intergovernmental panel on *BD and ecosystem services* is being conceived<sup>42</sup>, and innovative approaches to inclusion of multiple evidence types are being developed<sup>43</sup>.
  - Many states are struggling with the CBD target of ‘assessing the state of the ecosystems and their services’ or are developing NC accounting initiatives.
  - The UN statistics division is developing an experimental ecosystem accounting framework<sup>44</sup> which broadens the scope of ecosystem accounting systems to include aspects of ecological sustainability, reaffirming the necessity for a global baseline and new indicators to be developed.
- Distinguishing between the assets (the *stock*) of natural capital and the *flow* of values to humankind is key to evaluate sustainable human survival within the Biosphere. NC –unlike BD- allows to cover both aspects.

### Natural Capital

*“the elements of nature that produce value to people”.*

*In the 1940’s, key authors from the deep ecology movement promoted the idea of ‘natural capital’. This was rephrased later on as “the most subtle and dangerous threat to man’s existence... the potential destruction, by man’s own activities, of those ecological systems upon which the very existence of the human species depends”. From the Brundtland Commission report to the millennium ecosystem assessment, the concept is being used to demonstrate our dependence on nature.*

*Natural Capital accounting is a growing field of interest in science as well as policy making. Multiple values (use values alongside existence or ‘intrinsic’ values), ecological boundaries as well as equitable benefit distribution are sought to be integrated. Contrary to biodiversity, NC indicators aim to include socio-economic and ethical considerations. Legal initiatives within the EU biodiversity convention could move in this*



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