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IPBES ≠ IPCC

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The characteristics of the physical science basis and mitigation of climate change lend themselves well to a science–policy interface focused on global assessment—the function of the Intergovernmental Panel on Climate Change (IPCC). By contrast, the Intergovernmental Science–Policy Platform on Biodiversity and Ecosystem Services (IPBES) needs three additional functions of knowledge generation, capacity-building, and policy support, in addition to traditional assessment, and the same is true for climate change adaptation. These functions are included in the work program for IPBES, but their total share of the budget, currently less than a third, is inadequate. For climate change adaptation they are delivered by mechanisms like the Nairobi Work Programme and the Adaptation Committee, which should similarly receive greater attention.

Both climate change and biodiversity loss have already transgressed safe limits [1]. 2014 is an important year for the science–policy platforms addressing both issues. The Intergovernmental Panel on Climate Change (IPCC) has published its long-awaited fifth assessment with the approval sessions for the Summaries for Policy Makers of Working Groups II and III, and acceptance of their underlying assessment reports, requiring re-drafting of the text through line by line debate to achieve full international member consensus. Meanwhile, the new Intergovernmental Science–Policy Platform on Biodiversity and Ecosystem Services (IPBES) is initiating its first 5-year work program, approved at plenary in December 2013.

Throughout the development of IPBES, there has been a desire by many to fashion it after the IPCC [2,3], arguably one of the most successful international science/policy efforts in history. To supporters, the IPCC continues to be a great success in terms of providing governments with the scientific basis for their positions, helping to guide their negotiations, bringing the scientific community together, and adding respectability and public awareness to one of the most important topics of our time. Thus, the urge to replicate the winning formula of the IPCC is understandable, especially given that the loss of biodiversity and ecosystem services is widely felt not to have garnered sufficient attention [4]. However, as the IPBES work program begins, it is essential that its members understand how their platform differs from the IPCC, and why, and also to draw from the key lessons learned by the IPCC that enhance its effectiveness. We argue that governments have given IPBES a broader mandate than the IPCC because of the multiscaled nature of biodiversity and the greater gaps in knowledge and capacity to address its loss [5] (Table 1). We note that climate change impacts and adaptation, the subjects of IPCC Working Group II, are akin to biodiversity loss in these respects. Both IPBES and climate adaptation will benefit from emphasis on increasing the knowledge base, building capacity, and policy support.

The primary mandated function of the IPCC is to produce assessments of the state of climate change science as authoritative syntheses of current knowledge. The members of IPBES have tasked their platform with a similar assessment function pertaining to biodiversity and ecosystem services (embodied in its second and third objectives). These assessments will cover various themes (pollination, invasive species, land degradation and restoration, and sustainable use), methods (scenarios and modeling, and valuation), and scales (global, regional, and subregional). However, unlike the IPCC, IPBES is also responsible for three other functions (comprising its first and fourth objectives): knowledge generation, capacity-building, and policy support. Each of these is especially important for tackling the loss of biodiversity, yet collectively they are budgeted to receive less than half the funding for 2014–2018 allocated to the assessment function (Figure 1). We suggest that they warrant increased investment for the following reasons.

First, our knowledge gaps with respect to biodiversity and ecosystem services are greater than those within atmospheric science. True, uncertainties are widespread in climate change, most notably regarding impacts and adaptation (because of climate uncertainties at regional and local scales, as well as uncertainty about how social/economic systems respond), but overall climate knowledge shortfalls are narrowing [6]. For example, in its first assessment report, in 1990, the IPCC was uncertain as to whether humans were contributing to global warming, whereas the most recent assessment report has progressed to detail the magnitude, sources, and future trends of anthropogenic climate change.

The knowledge gaps surrounding biodiversity, ecosystem services, and the relationships between them are more fundamental. Species are the main unit of analysis for biodiversity, yet perhaps as few as one-seventh of them are known to science, and data about even this fraction are

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Table 1. Characteristics of the physical science basis, mitigation, and adaptation of climate change compared with those of biodiversity and ecosystem services, and their respective implications for science–policy interfaces

Characteristics and/or implications for science–policy interface	Climate change (physical science basis and mitigation)	Climate change (adaptation)	Biodiversity and ecosystem services
Science–policy interface	IPCC (http://www.ipcc.ch)		IPBES (http://www.ipbes.net)
Global policy framework	UNFCCC (http://www.unfccc.int)		CBD (http://www.cbd.int)
Scale of the issue	Global	Multi-scalar	Multi-scalar
	Global assessment is essential	Assessment should be subglobal as well as global	Assessment should be subglobal as well as global
Extent of knowledge gaps	Moderate	Large	Fundamental
	Knowledge generation is less of a focus	Support to knowledge generation is a priority	Support to knowledge generation is a priority
Alignment of existing response capacity	Good	Poor	Poor
	Capacity-building is less of a focus	Capacity-building is a priority for developing countries	Capacity-building is a priority for developing countries
Intergovernmental policy environment	No agreed targets	No agreed targets	Agreed targets
	Less scope for delivering policy support	Less scope for delivering policy support	Support to delivery of existing policy targets is a priority

insufficient [7]. Many basic questions remain unresolved: for instance, regarding the role of climate in controlling species ranges. Targeted support to knowledge generation by voluntary networks, for example through raising the profile of taxonomy, accelerating measurement of species extinction risk, building the evidence base for the effectiveness of interventions, and measuring human use of, and dependency on, ecosystem services, would pay huge dividends. The input of indigenous and local knowledge, which IPBES has committed to encourage, can contribute towards narrowing these knowledge gaps, especially as relates to human use and dependency [8,9]. Ensuring access and interoperability across these diverse information sources will be a further challenge, to be addressed by the IPBES taskforce on knowledge and data.

Second, the importance of the capacity-building function of IPBES is a logical consequence of the previous issue [10]. The distribution of biodiversity is highly heterogeneous and marked by high concentrations in tropical countries, and ecosystem services on which humans are most dependent are similarly concentrated in the tropics [11]. Unfortunately, it is mostly in these regions where both our knowledge of biodiversity and capacity for improving this knowledge are least. Climate change adaptation faces similar issues, but fortunately for both this and biodiversity, pioneering capacity-building efforts have emerged over recent years (Box 1). For IPBES, building capacity for policy response and more specifically capacity to support international environmental obligations is a priority. With the right funding and partnerships with such existing initiatives, IPBES could also deliver major benefits by developing science capacity for conserving biodiversity and sustainably using ecosystem services in the tropics, such as by accelerating open access to conservation literature and data [12].

Third, the intergovernmental policy environment is very different for biodiversity and ecosystem services compared with climate change. Much progress in climate

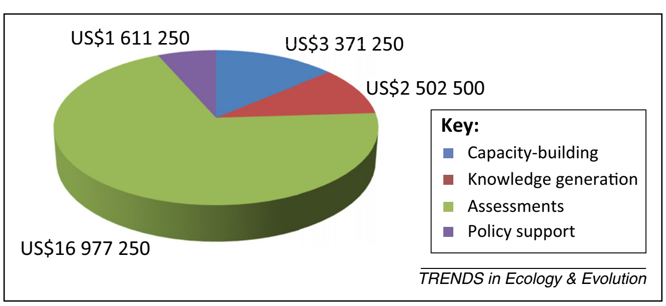

Figure 1. Slices of the 2014–2018 Intergovernmental Science–Policy Platform on Biodiversity and Ecosystem Services (IPBES) pie. Assessments, including those at global and subglobal scales (objective 2), as well as thematic and methodological assessments (objective 3), receive more than two-thirds of the overall budget. The remainder is proposed to be divided among objectives 1 and 4 in the form of support to capacity-building [deliverables 1(a) and 1(b)], knowledge generation [deliverables 1(c), 1(d), 4(a), and 4(b)], and policy [deliverables 4(c), 4(d), and 4(e)]. Data from http://www.ipbes.net/images/IPBES-2-17%20-%20En.pdf (p. 64).

Box 1. Existing capacity-building mechanisms for climate change adaptation, and for biodiversity and ecosystem services

Although capacity-building is not a formal function of the IPCC, some consider one of its accomplishments to be the Assessments of Impacts and Adaptations to Climate Change project (http://www.aiaccproject.org), which emerged from the IPCC Third Assessment Report to build developing country impact and adaptation research capacities. Likewise, the IPCC Scholarship Programme (http://www.ipcc.ch/ipcc-scholarship-programme/ipcc_scholarship-programme.shtml), started with proceeds from the 2007 Nobel Peace Prize along with the support of private foundations, has been a concrete step in the right direction. The Nairobi Work Programme on Adaptation and the Adaptation Committee of the UNFCCC's Subsidiary Body for Scientific and Technical Advice also provide important support to capacity-building, while other parallel initiatives include the Climate and Development Knowledge Network (http://cdkn.org) and the program on Mitigation Action Plans and Scenarios (http://www.mapsprogramme.org).

While IPBES does not yet have a mechanism for the establishment of strategic partnerships, various institutions provide capacity-building support for biodiversity and ecosystem services. For example, the IUCN Red List Training program includes a formal online training course 'Assessing Species' Extinction Risk Using IUCN Red List Methodology' (http://www.iucnredlist.org/technical-documents/red-list-training). Other key initiatives in capacity-building include BIOPAMA (http://www.biopama.org), the Conservation Breeding Specialist Group's training programs (http://www.cbsg.org/our-approach/training), the Conservation Leadership Programme (http://www.conservationleadershipprogramme.org), and the Durrell Conservation Academy (http://www.durrell.org/durrell-index/training). Attention from IPBES in capacity-building should build from and strengthen such efforts.

change policy has been made towards obtaining consensus on a global goal of keeping warming $<2^\circ$ and on the instruments and modalities needed for its achievement. However, the common but differentiated responsibility for implementation remains at an impasse with the United Nations Framework Convention on Climate Change (UNFCCC) struggling to reach an agreement to extend the emission mandates of the Kyoto Protocol. These policy challenges cannot be attributed to lack of knowledge, and indeed, it is explicit in the UNFCCC (Article 3.3) that 'lack of full scientific certainty should not be used as a reason for postponing such measures'. One consequence of the lack of agreed actions is that scenarios models in the IPCC must assume a wide range of possible representative concentration pathways towards policy targets for mitigating climate change, without making assumptions about responsibility through emission scenarios [13].

By contrast, the Convention on Biological Diversity (CBD) successfully forged consensus among 192 of the nations of the world at its tenth Conference of the Parties in Nagoya in 2010, resulting in the strongest commitment for sustainability the world has ever had. Thus, for biodiversity and ecosystem services, support for the policy and practice necessary to achieve the 2050 Vision and 2020 Aichi Targets of the CBD (and in accordance with the other five biodiversity-related conventions) is a high priority. IPBES also has a great opportunity to align its assessments with the Aichi Targets, for example by setting these dates and agreed targets as starting points, and then informing policy options towards them through backcast scenarios models [14] and evidence synopsis with expert evaluation [15].

Finally, we note that climate change vulnerability, impacts, and adaptation (subjects of IPCC Working Group II), emerging as they do from global to local economic impact cause and effect chains, are more similar to the loss of biodiversity and ecosystem services than either the physical basis of climate change or its mitigation. The physical basis for climate change is global in nature, making it simpler than biodiversity loss to model and, in theory, mitigate. Thus, a reduction in carbon emissions anywhere on the planet is equally effective at lowering atmospheric carbon concentrations (complexities introduced by consideration of land use change as a local to regional driver notwithstanding). Biodiversity, on the other hand, varies enormously around the planet, and so the contribution of local reductions in biodiversity loss is highly variable, hence the importance of targeted capacity-building, knowledge generation, and support to policies to deliver these contributions. Policy and capacity needs related to climate change impacts and adaptation are similarly place specific. The knowledge gaps concerning climate vulnerabilities and impacts are also greater than for the physical science of climate change. As the IPCC gears up for initiation of its sixth assessment, it would do well to consider including additional functions, such as knowledge generation and capacity-building, under Working Group II. Meanwhile, in establishing itself as an active, useful, and scientifically credible body, IPBES must not lose sight of its non-assessment functions and should allocate its resources accordingly.

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