



The diversity of life on Earth is in rapid decline, yet society's response to this biodiversity crisis has lacked the urgency and attention it warrants. Why is this?

Diversity without representation

For policymakers, biodiversity can present more complex challenges than climate change, argue **Michel Loreau, Alfred Oteng-Yeboah** and their co-authors. So why isn't there an international panel of experts for biodiversity?

Since the 1992 United Nations Earth Summit conference in Rio de Janeiro, Brazil, biodiversity has received increasing attention from scientists, governments and the public worldwide. There is growing recognition that the diversity of life on Earth, including the variety of genes, species and ecosystems, is an irreplaceable natural heritage crucial to human well-being and sustainable development. There is also clear scientific evidence that we are on the verge of a major biodiversity crisis. Virtually all aspects of biodiversity are in steep decline and a large number of populations and species are likely to become extinct this century. Despite this evidence, biodiversity is still consistently undervalued and given inadequate weight in both private and public decisions. There is an urgent need to bridge the gap between science and policy by creating an international body of biodiversity experts.

Although protected areas have increased slightly during the past few decades, collectively they contain only a small fraction of the world's terrestrial species and ecosystems, and the situation in the oceans is even worse¹. The forces that push towards biodiversity loss globally are much stronger than the conservation gains. Habitat destruction (notably in tropical forests, inland waters and coastlines),

introduction of invasive species, overexploitation of biological resources (such as overfishing in the seas), pollution, and now clear signs of global climate change are major threats to biodiversity and continue unabated, driven by unsustainable growth of the world's population, production, consumption and trade.

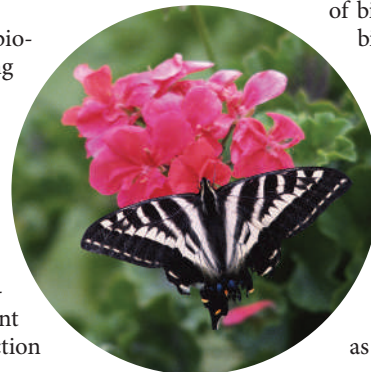
Slow response

As a result of these forces, biodiversity loss is accelerating globally. Some 12% of all bird species, 23% of mammals, 25% of conifers, 32% of amphibians and 52% of cycads are threatened with extinction², and climate change alone might commit an additional 15 to 37% of extant species to premature extinction within the next 50 years³. Because biodiversity loss is essentially irreversible, it poses serious threats to sustainable development and the quality of life of future generations. According to the 2005 Millennium Ecosystem Assessment (MEA), two-thirds of the evaluated benefits to society from ecosystems, known as 'ecosystem

services', are currently being degraded or used unsustainably⁴.

Given the magnitude and urgency of the biodiversity crisis, why has the societal response been so slow and inadequate? A lack of awareness of the role of biodiversity in enabling the delivery of ecosystem goods and services, the failure of markets to recognize the value

of biodiversity, and the fact that biodiversity is a public good are key factors. They underlie the perceived conflict between biodiversity conservation and economic development, which exists only insofar as development is not sustainable. Biodiversity is also intrinsically more complex than other environmental concerns, such as the stratospheric ozone hole or even global climate change. By definition, biodiversity is diverse: it spans several levels of biological



Important ecosystem services, such as pollination, depend on biodiversity.

organization (genes, species, ecosystems); it cannot be measured by simple universal indicators such as temperature and atmospheric CO₂ concentration; and its distribution and management are more local in nature.

But another factor, which is within our power to rapidly change, is also limiting our ability to tackle the biodiversity crisis. An interesting comparison can be made between two important multilateral agreements that resulted from the Earth Summit in Rio: the Convention on Biological Diversity (CBD) and the Framework Convention on Climate Change (FCCC). The FCCC built on a strongly organized scientific community and the existing Intergovernmental Panel on Climate Change (IPCC) to inform subsequent political negotiations over climate change. In contrast, the CBD and the other international agreements concerned with biodiversity do not have the structural means to mobilize the expertise of a large scientific community to inform governments. Consequently, the scientific community often doesn't feel involved in the global political process, which tends to exacerbate the disconnect between science and policy and a general attitude of powerlessness and fatalism.

Bridge the gap

Biodiversity science needs to evolve, and is evolving, towards greater unity and integration⁵. What is lacking, however, in our view, is a mechanism akin to the IPCC that is able to bring together the expertise of the scientific community to provide, on a regular basis, validated and independent scientific information relating to biodiversity and ecosystem services, to governments, policymakers, international conventions, non-governmental organizations and the wider public.

The four-year process that led to the MEA was a first attempt at filling the gap between science and policy. Its successes, in providing a much-needed conceptual framework and a synthesis of existing data, give us hope that the task is achievable, but it also has shortcomings for addressing biodiversity loss in the long term. First, it was a one-off effort⁶. Various projects are following up on aspects of the MEA, often at the level of a single country or region, but there is currently no mechanism for making this type of assessment global, systematic and sustained. Such a mechanism should ideally be intergovernmental, rather than non-governmental, if it is to have credibility and clout. Second, the MEA explored the consequences of ecosystem change for human well-being, but was not specifically focused on biodiversity.

The idea of establishing an international panel on biodiversity with a role similar to the IPCC has floated around for some years. But the situation is now favourable to developing and achieving it. In January 2005, the idea received political support from the French president Jacques Chirac during the

international conference 'Biodiversity: Science and Governance' held in Paris, France. It also received broad support from the 2,000 scientists, non-governmental and policy representatives from 100 countries that attended this conference, and was later enthusiastically endorsed by the 600 scientists assembled in the first DIVERSITAS Open Science Conference held in Oaxaca, Mexico, in November 2005. The French government is currently funding a consultation process to assess the need, scope and possible models for an international mechanism of scientific expertise on biodiversity (IMoSEB).

What shape would such a panel take? Although clearly its contours must emerge



Jacques Chirac speaks in support of an international panel on biodiversity.

from the ongoing consultation process, a number of features seem critical for its success. First, like the IPCC, it should have a formal link to, and be funded by, governments. This feature, which distinguishes it from previous biodiversity initiatives, would ensure that negotiations within international biodiversity conventions are based on validated scientific information and lead to action at national and global levels. However, the proposed panel should also involve other stakeholders, such as non-governmental organizations, intergovernmental agencies, conventions and DIVERSITAS — the international programme of biodiversity science.

Way forward

Second, it must be objective and independent; it should include the world's leading scientists, and its goal should be to provide rigorous, updated scientific information in support of policy decisions and actions at all levels of civil society. Just as in the IPCC, the involvement of governments and non-governmental organizations should in no way constrain the content and quality of the scientific information delivered. Third, it should be transparent and representative, in terms of opinions, disciplines and geographical regions. A strict peer-review process is required to meet these conditions.

Fourth, it should strive to generate clear,

readily accessible information about the status and trends of biodiversity, projections of future changes in biodiversity and the ecosystem services that depend on it, and options to conserve biodiversity and ecosystem services and mitigate adverse impacts of biodiversity changes. This information should allow governments, international conventions and society at large to define clear targets for action. Finally, it should build synergy with existing mechanisms and organizations. It has a unique scientific role to play, and should not attempt to duplicate existing efforts.

Building an initiative such as this requires careful examination of needs and existing mechanisms. The consultation process, supervised by an international steering committee, will last 18 months and proceed in two phases. During the first phase, a number of studies will define the need for, and goals of, an international panel on biodiversity. These studies will examine the global decision-making landscape concerned with biodiversity, analyse successes and failures of biodiversity conservation efforts at different scales, and assess existing international mechanisms that deliver scientific expertise. In a second phase, this information will be used to articulate a set of recommendations for an international panel, which will be presented at a set of regional

meetings to seek input from all sectors of society and all regions of the world.

These consultations should be seized as a unique opportunity to move biodiversity science and governance forwards and find new ways of resolving the crisis. We call upon all scientists interested in biodiversity science to get involved, and seek the participation of their government, in these consultations. ■

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1. Hendricks, I. E., Duarte, C. M. & Heip, C. H. R. *Science* **312**, 1715 (2006).
2. Baillie, J. E. M., Hilton-Taylor, C. & Stuart, S. N. (eds) *2004 IUCN Red List of Threatened Species: A Global Species Assessment*. (IUCN, Gland, Switzerland, 2004).
3. Thomas, C. D. *et al. Nature* **427**, 145-148 (2004).
4. *Millennium Ecosystem Assessment, Ecosystems and Human Well-Being: Synthesis* (Island press, Washington DC, 2005).
5. Dirzo, R. & Loreau, M. *Science* **310**, 943 (2005).
6. Mooney, H., Cropper, A. & Reid, W. *Nature* **434**, 561-562 (2005).