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The International Year of Biodiversity: an opportunity to strengthen the science–policy interface for biodiversity and ecosystem services

Editorial overview

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Anne Larigauderie is Executive Director of DIVERSITAS, the international programme dedicated to biodiversity science of ICSU and UNESCO. She has a PhD in plant ecophysiology (Montpellier, 1985) and spent over 10 years studying the impact of increasing atmospheric CO_2 and temperature on natural vegetation in different ecosystems. In 1999, she joined the International Council for Science, ICSU, as Environment Science Officer, in charge of ICSU's portfolio of environmental programmes. At DIVERSITAS, since 2002, she is interested in strengthening the science–policy interface for biodiversity, and the role of scientists at international policy fora where more science is needed.

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Hal Mooney's research on the carbon balance of plants provided a theoretical framework for ecophysiological studies, and was instrumental in incorporating physiological understanding to studies of ecosystem processes. H. Mooney demonstrated that convergent evolution takes place in the properties of different ecosystems that are subject to comparable climates, and pioneered the study of plant resource allocation. He currently studies the impacts of global change on terrestrial ecosystems, especially on productivity and biodiversity and invasion of non-indigenous plant species.Hal Mooney is the current Chair of the Scientific Committee of DIVERSITAS, and recently co-chaired the Scientific Panel for the Millennium Ecosystem Assessment. Hal Mooney, a member of the National Academy of Sciences, has published more than 450 scientific books, and articles.

This issue of Current Opinion in Environmental Sustainability is entirely dedicated to 'Biodiversity, ecosystem services and human well-being'. It is very timely as it is published during 2010, the International Year of Biodiversity. Later this year, delegates to the Convention on Biological Diversity (CBD) will attend COP10 (Conference of the Parties) in Nagoya, and conclude that, by and large, the 2010 biodiversity targets have been missed. This failure should be seen as a collective failure of the science–policy process and we, the scientific community, should reflect on the reasons for this, and feel committed to improving the situation. As suggested in the Cape Town declaration, adopted at the second DIVERSITAS Open Science Conference (Larigauderie and Mooney, this issue) we, as scientists, must commit to be more present in policy debates, to better understand policy needs, and to become much better at addressing them.

Looking back, it is quite clear that biodiversity science has been evolving quickly over these past two decades [1]. The field has moved from a focus on systematics and taxonomy in the 1970–80s, to a more dynamic view of biodiversity's role in ecosystem functioning throughout the 1990s. The early 2000s and the Millennium Ecosystem Assessment [2] have placed biodiversity within the context of ecosystem services and human well-being, and some efforts are currently focusing on putting this concept into practice, and on valuing and mapping ecosystem services in order to shed light on economic and environmental consequences of decisions. These various chronological developments have not happened at the expense of one other and all fields have remained active and complementary. Some of the papers presented in this issue illustrate well the breadth of the issues that are currently being explored in biodiversity and ecosystem service science. Examples include an overview of the outstanding diversity of the Cape region, a study of the role of tree diversity in forest ecosystem functioning, a presentation of scientific challenges for a new agriculture reconciling biodiversity conservation and food security, or a discussion on the importance of considering biodiversity as a source of 'evolutionary services', that is, as a source of options for society's future choices.

But we, the biodiversity community, must become much better at understanding how to impact indirect drivers of biodiversity, which remain poorly studied. A new biodiversity science must quickly emerge, which helps people identify biodiversity changes that are dangerous for Earth capacity to support human well-being, manage biodiversity for multiple

benefits, and adapt to biodiversity changes. DIVERSITAS together with ESSP (Earth System Science Partnership) partner programmes and ICSU (International Council for Science) are committed to point the way towards these new priorities.

In this issue we explain how, in order to be successful, the science–policy interface for biodiversity and ecosystem services at the international level needs four components each complementing one another: (1) Research, (2) Observations, (3) Assessment, and (4) Policy.

Aside from the research contributions briefly presented above, this issue reviews the major observation, assessment and policy initiatives that will be released or discussed during this year 2010.

In terms of assessment, Larigauderie and Mooney brush a quick history of the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) process so far, the initiative to build an assessment mechanism for biodiversity, explaining what role the scientific community, and programmes like DIVERSITAS, in particular, should play in addressing future needs of IPBES.

In terms of observations, a new observation mechanism called GEO BON (Group on Earth Observations — Biodiversity Observation Network), under the auspices of GEO (Group on Earth Observations) is currently being planned, and will be instrumental, in particular in addressing the needs of parties in fulfilling their observation needs to meet the future 2020 targets. Yahara *et al.*, in this issue, present plans to develop one of the least developed components of GEO BON, on genetic diversity.

In terms of policy, 2010 will be a major year for the Convention on Biological Diversity, since, as mentioned above, countries meeting at SBSTTA 14 (Subsidiary Body on Scientific, technical and Technological Advice) and COP10 will conclude that the 2010 targets have largely been missed, and negotiate a new set of targets for 2020. Mace *et al.* provide a review of the 2010 targets, and express views on the selection of the next set of targets for 2020. They argue in favour of a stronger involvement of the scientific community in this process, a role that a future IPBES could play, if established.
Another important issue dealt with this year at COP10, under the auspices of the CBD will be the negotiation of a protocol on Access and Benefit Sharing. Martinez *et al.* present a review of the issues at stake in the ABS discussions, and a plea to scientists for their stronger involvement in the negotiation process, given the potentially major impact of ABS on the way science is conducted.

This special issue should make it clear that these are crucial times for biodiversity science and policy. Key science–policy mechanisms are being assembled, such as GEO BON and IPBES, and the scientific community is at the forefront of these discussions. We hope that 2010, the International Year of Biodiversity, will hold its promises and bring on these issues the public and political attention that they urgently deserve.

References

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2. *Millennium Ecosystem Assessment: Ecosystems and Human Well-being* Washington, DC: Island Press; 2005.