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The Debate on an Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES): Exploring gaps and needs

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This discussion paper aims at contributing to the current debate on how to strengthen the international science-policy interface for biodiversity and ecosystem services and the potential relevance of an IPBES.

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Executive Summary

This paper provides an analysis of gaps in science-policy interfaces for international biodiversity and ecosystem services governance. It explores how the attributes of the biodiversity issue and their consequences in terms of governance create specific requirements for science-policy interfaces. It discusses why the existing system is not sufficient to fill the identified gaps, and assesses the potential contribution and added value of an intergovernmental platform.

Over the last two decades, our understanding and framing of the biodiversity issue has shifted from an approach focussing primarily on species, habitats and conservation, to a holistic approach focusing on conservation and sustainable uses of biodiversity and ecosystem services.

This shift has created new challenges both for understanding and for policy-making. In particular, it generates the need to reinforce the knowledge and support available to decision-makers in a manner adapted to the characteristics of the issue –i.e. complexity, multiple causalities, multiple scales and cross-sectorality– and to our governance and policy ambitions.

Concepts such as the ecosystem approach, the valuation of ecosystem services, the precautionary principle and adaptive management are key building blocks to underpin more holistic governance of biodiversity and ecosystem services. They need to be made operational and made available to decision makers through effective science-policy interfaces.

In this context, a series of important gaps can be identified in the existing interfaces between biodiversity science and policy. These include: (i) gaps in knowledge and knowledge systems; (ii) gaps in assessments of status and trends of biodiversity and ecosystem services; (iii) gaps in effective communication between knowledge holders; (iv) gaps in ownership of knowledge by decision-makers; and (v) gaps in capacity.

The analysis shows that the current inherently fragmented system of science-policy interfaces cannot provide the required integrated policy support and regular assessment processes, nor can it foster the appropriate networking, cooperation and capacity building across sectors and scales.

A well-designed intergovernmental science-policy platform on biodiversity and ecosystem services can capitalise on existing science-policy interfaces, allow them to function more effectively, and contribute to filling the identified gaps.

Such platform would provide a common basis to support and serve the various international governance structures dealing with biodiversity and ecosystem services. By ensuring that high quality, up-to-date, timely, legitimate, authoritative and consistent knowledge is made available for, and used in, decision-making, such platform can provide the missing consistency, interconnectedness, and continuity in the knowledge support to decision-making, while improving cross-learning and capacity building.

In this way, the creation of an intergovernmental science-policy platform on biodiversity and ecosystem services appears as a necessary ingredient of more effective international biodiversity governance, although not the only one. In addition such platform could significantly contribute to the reinforcement of political will and public support, two other key ingredients to achieve our ambitious international and sub-global policy goals for the conservation and sustainable uses of biodiversity, ecosystems and the services they provide.

List of Acronyms

CBD	Convention on Biological Diversity
CITES	Convention on International Trade in Endangered Species
CMS	Convention on Migratory Species
CoP	Conference of the Parties (to a Convention)
DEFRA	UK Department for Environment, Food and Rural Affairs
FAO	Food and Agriculture Organization of the United Nations
GEF	Global Environment Facility
GFCM	General Fisheries Commission for the Mediterranean
ICES	International Council for the Exploration of the Seas
IMO	International Maritime Organisation
IMoSEB	International Mechanism of Scientific Expertise on Biodiversity
IOC/UNESCO	Intergovernmental Oceanographic Commission
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
ITPGRFA	International Treaty on Plant and Genetic resources for Food and Agriculture
IUCN	International Union for Conservation of Nature
MA	Millennium Ecosystem Assessment
MEA	Multilateral environmental agreement
NAFTA	North American Free Trade Agreement
NGOs	Non-governmental organisations
RFMOs	Regional Fisheries Management Organisations
SBSTTA	Subsidiary Body on Scientific, Technical and Technological Advice of CBD
STAP	Scientific and Technical Advisory Panel of the GEF
TEEB	The Economics of Ecosystems and Biodiversity
UNCCD	United Nations Convention to Combat Desertification
UNCLOS	United Nations Convention on the Law of the Sea
UNCSD	United Nations Commission on Sustainable Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNISDR	United Nations International Strategy for Disaster Reduction
WCMC	World Conservation and Monitoring Centre
WHC	World Heritage Convention
WHO	World Health Organisation
WTO	World Trade Organisation

Introduction

This paper provides an analysis of gaps and needs for improvements in science-policy interfaces for international biodiversity and ecosystems services governance. It aims at contributing to the debate on an Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), at international and European levels

It builds extensively on the analysis and discussions that have taken place over the last three years, in particular in the context of: (i) the consultation towards an international mechanism of scientific expertise on biodiversity (IMoSEB)[1]; (ii) the global strategy on Millennium Ecosystem Assessment (MA) follow-up; and (iii) the preparation and follow-up to the Ad hoc intergovernmental and multi-stakeholder meeting on an Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (Putrajaya, 10-12 November 2008)[2], including the preliminary report on the Gap Analysis prepared by UNEP-WCMC (UNEP 2009). It also builds on the literature on, and cases studies of, international science-policy interfaces for environmental governance[3] and on the authors' practical and theoretical experience in the field. We also greatly benefited from the input of a series of experts and practitioners, through informal discussions or through comments on earlier versions of the text.

In the next section, we briefly review the specific attributes of the biodiversity and ecosystem services issue and explore their consequences for governance. We then discuss how science-policy interfaces form a necessary component of biodiversity governance and discuss existing interface processes. This leads us to the core section of the paper, where we identify the major gaps in science-policy interfaces for the governance biodiversity and ecosystem services. On this basis and on the basis of the analysis presented in previous sections, we discuss why reinforcing existing interfaces is not sufficient to fill the gaps. We then look at how the gaps identified above translate in a series of specific needs. We also explore the respective contribution of existing advisory bodies and of an intergovernmental platform in filling these needs, as well as the added value of a platform. We finish with some concluding remarks on the relevance of an intergovernmental platform.

Context

The nature of biodiversity and ecosystem services, and the issues surrounding them, has a highly significant effect on the nature of knowledge needed for their management and governance, and hence on the nature and types of interfaces between science and policy. To understand what gaps may exist, therefore, it is first essential to understand some of the salient characteristics of the biodiversity and ecosystem services issue.

Specific attributes of the biodiversity and ecosystem services issue

By **'biodiversity and ecosystem services issue'**, we here mean the international environmental issue posed by the persistent and alarming loss and changes in biodiversity and ecosystems, both in terms of the threats to human wellbeing resulting from the loss of ecosystem goods and services and of the dramatic degradation of the global ecosystem.[4]

Because ecosystems are **complex living systems**, the biodiversity issue presents a unique combination of attributes that differentiates it to some extent (although not entirely) from other global environmental issues such as the water issue, climate change, ozone depletion and pollution.

[1] http://www.imoseb.net.
[2] http://www.ipbes.net.
[3] See Reference section and Annex 1 for a list of documents consulted.
[4] We sometimes use the expressions 'biodiversity issue' or 'biodiversity loss' in the same sense, as shortcuts.

Biodiversity loss results from the combination of **multiple drivers** operating at multiple levels, from the very local to the global – e.g. lifestyles, production and consumption patterns, population growth, economic growth, conflicts, land- and sea-use changes, climate change, ocean acidification, over-exploitation of natural resources, pollution, invasive species and soil erosion. The **multiple scale** nature of biodiversity loss differentiates it from other global change issues. Climate change in particular is an issue that can be addressed globally in a way that the biodiversity and ecosystem services issue cannot. Furthermore, the issue cuts **across sectors** of human activities. Biodiversity and ecosystem services are affected by or affect almost every aspect of human endeavour.

Biodiversity loss also relates to a **broad set of values**, from use values related to the direct or indirect benefits that humans gain from ecosystems goods and services to non-utilitarian ethical or stewardship values.[5] These complexes of drivers and values also tend to differentiate biodiversity loss from other issues of global change.

The **multiple causalities** underlying the biodiversity issue, the **multiple values** involved, and its **cross-sectoral** and **cross-scales** nature has implication in terms of the **knowledge** required to understand it and to support action. That knowledge must often (although not always) be integrated in a highly interdisciplinary way and include both natural and social sciences and it must bring together and acknowledge diverse understandings, perspectives, and values. Moreover, it must often include detailed local, regional, indigenous, socio-political, moral and institutional knowledge.

Consequences for the governance of biodiversity and ecosystem services

At the **policy** level, an important implication of these attributes is that there are strong synergies and trade-offs among the policies, technologies and practices that impact on or deal with biodiversity but also other environmental issues (Watson and Gitay 2007). This situation calls for **flexibility**, **collaboration** and **cooperation**, **cross fertilisation**, **joint-learning**, and sharing of **best practices** across issues, areas, scales and sectors, both for the production and sharing of knowledge and for policy-making.

Another important consequence of dealing with complex ecological systems is that complete knowledge and understanding of ecosystems and full prediction of their evolution will never be achieved (van den Hove 2007). The combined trajectory of human and ecological systems is even less predictable. Hence, models and paradigms underpinning biodiversity governance and management must embrace **risk**, **uncertainty**, **indeterminacy**, **ambiguity** and **ignorance**.

In terms of the **knowledge production systems**, the inescapable existence of uncertainty in all its forms render necessary explicit communication and debate about assumptions, values, choices and uncertainties, and about the limits of scientific knowledge. Different points of view may need to be presented (Watson & Gitay 2007) and assumptions and judgements made explicit and clearly flagged (Leemans 2008). Biodiversity governance needs to build on knowledge systems that are **transparent** in the treatment of assumptions, **uncertainties** and **value** statements.

Governance and management of biodiversity must therefore be deeply anchored in **precaution** (as articulated in the precautionary principle and precautionary appraisal), all the more because biodiversity loss is irreversible, and the risks associated with its continued loss are largely unknown but likely in many cases to be catastrophic. Precaution implies that measures may need to be taken even when some cause-and-effect relationships are not fully established scientifically. (O'Riordan and Cameron 1994; Harremoës et al. 2001; Stirling 2007 and UNEP 2007).

In this context governance systems, policies and management schemes must be **adaptive** to deal with the complexity, dynamics and interaction – hence the constant change – of ecosystems and of human systems, to respond to uncertainties, and to allow for continuous learning, feedback and adjustments to new situations and knowledge. The concept of **adaptive governance** is used to enlarge the focus from adaptive management of ecosystems to include the broader social contexts that enable ecosystem-based management (Dietz et al. 2003; Folke et al., 2005, MA 2003). Adaptive governance also needs to account for situations of irreversibility (Box 1).

[5] See the MA (2005a) for a classification of ecosystem services and DEFRA (2006) for a classification of environmental values.

Box 1: Adaptive governance and precaution

"Decision makers should consider whether a course of action is reversible and should incorporate, whenever possible, procedures to evaluate the outcomes of actions and learn from them. Debate about exactly how to do this continues in discussions of adaptive management, social learning, safe minimum standards, and the precautionary principle. But the core message of all approaches is the same: acknowledge the limits of human understanding, give special consideration to irreversible changes, and evaluate the impacts of decisions as they unfold."

Source: MA 2003, pp. 35-36

Science-policy interfaces for biodiversity and ecosystem services

Science-policy interfaces: A necessary component of governance

Science-policy interfaces are here understood as social processes which encompass relations between scientists and other actors in the policy process, and which allow for exchanges, co-evolution, and joint construction of knowledge with the aim of enriching decision-making (van den Hove 2007).

Scientific knowledge has always had an important role in nature conservation policies, both in terms of scientific alerts and assessments of the status and trends of biodiversity, often mediated by NGOs, and in terms of information support to management and policies, including in intergovernmental processes.

Over the last two decades, biodiversity science, policy and management have shifted from a relatively simple framing in purely conservation terms focussing mostly on species and habitats to a complex issue of **conservation**, **sustainable uses** and **benefit sharing**[6], building on an approach in terms of **ecosystem services**.

That change in perspective, and a belated acknowledgement that biological and human systems necessarily co-evolve, has allowed us to recognise that while science is obviously an essential source of knowledge, it is not the only source of relevant and valid information. In other words, the **'knowledge providers'** have become more diverse, including not only natural scientists and civil society organisations but also economic and social scientists, beneficiaries of ecosystem services, and other holders of practical knowledge and know-how. In this paper, our use of the term 'science-policy interface' therefore implies a broad view of "science" to include all relevant and reliable knowledge, however generated.[7]

As stressed above, the governance to sustain biodiversity and ecosystem services must be adaptive and precautionary. It must also be informed by the most reliable, evidence-based knowledge available. That knowledge is in constant evolution as biological and human systems change, and as understanding grows. The knowledge is likely to be complex and uncertain, but to be practicable governance and management will require simpler approximations. Biodiversity governance therefore also requires **well functioning, flexible and dynamic science-policy interfaces** capable of coping with complexity and uncertainty, and of supporting decision-making processes that will necessarily need to reduce complexity and uncertainty to manageable and practicable policy options.

For complex environmental issues, there is generally a **vast variety of science-policy interfaces**, spanning across levels and issues. This is inherent to the type of issues at hand, i.e. complex issues involving socio-ecological systems (Cash et al. 2003; Dietz et al 2003). These interfaces can be very different in nature and have different functions (Box 2). They can operate at different stages of the

[6] For instance, the objectives of the Convention on Biological Diversity are: *"the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources (...)"*. (CBD, Article 1)

[7] Others prefer the concept of 'Knowledge-Policy interfaces' *"to acknowledge that information and expertise relevant to policy must include all forms of knowledge"*. (Leipzig Recommendations, in Görg et al., 2006).

policy process – early warning, issue identification, policy design, implementation, assessment, ex post evaluation of measures and early lessons. Some are closer to scientific processes and aim mainly at providing knowledge, assessments and plural and conditional options for action, while others are closer to the policy process and may be used to assist decision-makers by providing prescriptive recommendations. (Stirling 2006; Koetz et al 2008).

Box 2: Key possible functions of science-policy interfaces

- Allowing for exchange and co-evolution of scientific and policy knowledge in support of sustainability (dynamic world);
- Contributing to the scientific quality process by allowing critical assessment of scientific outputs in light of users needs and of other types of knowledge (extension of the peer community);
- Facilitating timely and coherent translation of research into policy options or advice;
- Ensuring rapid uptake of research results by stakeholders to ensure conservation and sustainable uses;
- Alerting decision-makers about emerging issues;
- Ensuring strategic orientation of research in support of policies and societal issues;
- Raising public awareness of contribution of biodiversity and ecosystems to quality of life, economy, environment;
- Raising willingness to act and to support policy amongst the public and stakeholders.

It is worth noting that while the existence of well-functioning science-policy interfaces is a **necessary condition** of biodiversity and ecosystem services governance, it is in no way a sufficient condition. The existence of strong political will and mechanisms is of crucial importance and is affected by other factors than knowledge.

Existing science-policy interfaces for biodiversity governance

For biodiversity governance, there already exists an array of science-policy interfaces. These have to be understood in the context of the international and sub-global institutional biodiversity governance system that we briefly describe in Box 3.

All the treaties, conventions, agreements and institutions composing the biodiversity governance system currently rely on many different science-policy interfaces in formal and informal ways but most of them do have a dedicated science-policy interface in the form of **scientific subsidiary or advisory bodies** (e.g. the Subsidiary Body on Scientific, Technical and Technological Advice of CBD[8] and ***ad hoc* working groups**, including groups that coordinate work between advisory bodies.

Those advisory bodies are most of the time set up to **serve one main institutional client**[9] (e.g. SBSTTA supports the CBD) and have a rather specific focus. They have mandates provided by their governance bodies, and often defined modus operandi. These mandates and modus operandi most of the times only cover some of the functions identified in Box 2 above, and may even specifically preclude some of them.

By nature, they often belong to the political far end of the continuum between mainly scientific and mainly political science-policy interfaces[10]. They play a key role in building on existing knowledge to provide advice to their mandator, and this is a necessary and a positive role. As pointed out by Watson and Gitay (2007, p. 4) as concerns assessments for instance, "*the scientific*

[8] See UNEP (2009), in particular Appendix 1 for a preliminary review of the scientific advisory bodies and processes of international agreements and Appendix 2 for a preliminary review of existing coordination mechanisms and opportunities between MEAs and their advisory bodies. See also CBD (2006a) and Laikre et al. (2008).

[9] In this paper we use interchangeably the terms 'client' and 'user' and sometimes 'target group' to refer to the actors that are mostly on the 'knowledge users' side of the interface. The 'stakeholders' constitute a broader group as one can have a stake in an issue without being involved in any way in the process.

[10] See Koetz et al. 2008 for an analysis of the role of the CBD SBSTTA and its positioning at the policy end of the spectrum.

and technical subsidiary bodies of the Conventions provide an important forum for communicating the assessment findings to the Parties of the conventions, and providing an important step towards policy development based on the assessment findings". It is however beyond their remit to coordinate such assessments, or to ensure timeliness, scientific quality and relevance of their results.

Box 3: The system of international and sub-global biodiversity governance

The **international governance system** for biodiversity and ecosystem services is rich and diverse. It is the result of a historical process, as institutions have been created step by step to deal with problems as they emerged. The multi-scale nature of the biodiversity issue is another major driving force behind the plethora of governance bodies addressing biodiversity, compared to the climate change issue for instance. The system is composed of:

- **Multilateral environmental agreements** (MEAs), related to species, habitats, biodiversity and ecosystems: the Convention on Biological Diversity (CBD), the Convention on Migratory Species (CMS), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Ramsar Convention on Wetlands (Ramsar), the World Heritage Convention (WHC), and International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) –the six so-called biodiversity-related conventions;
- **Other MEAs** dealing with issues partly relating or applying to biodiversity and ecosystem services, such as the UN Framework Convention on Climate Change (UNFCCC), the UN Convention to Combat Desertification (UNCCD) and the UN Convention on the Law of the Sea (UNCLOS);
- **Topic-specific treaties** that have relevance to biodiversity and ecosystems services, such as the International Convention for the Regulation of Whaling, the Antarctic Treaty, and many others;
- **Intergovernmental organisations** dealing with issues relating to biodiversity and ecosystem services, including in particular UNEP, UNDP, the World Bank, GEF, IMO, IOC/UNESCO, WTO, FAO, WHO, and UNCSD, and more generally all organisations that need to take biodiversity and ecosystems into account in their strategies.

At the sub-global level, the system is also varied and often directly connected to the international governance level. It includes:

- **Regional environmental agreements** (e.g. Regional Seas Conventions and the Bern Convention on the Conservation of European Wildlife and Natural Habitats);
- **Intergovernmental organisations** (e.g. Regional Fisheries Management Organisations (RFMOs));
- **Regional development** banks and agencies;
- **Regional economic** integration organisations (e.g. the European Community, NAFTA)

The governance system is also populated both at the global and at sub-global levels by **other actors**, including in particular civil society organisations, private companies, and the media.

Moreover, depending on their specific structure and the question at hand, the advisory bodies may turn out to be **too specialised** (e.g. when the question to deal with is intrinsically interdisciplinary or cross-scale) or **not specialised enough** (e.g. when the question requires expertise that is not easily accessible in, or close to, the body). Even when mechanisms do exist to bring in additional experience (e.g. *ad hoc* technical groups), there are often strong limitations in terms of resources or mandates. Moreover, an advisory body may be reluctant about addressing issues it considers to be of more relevance to other intergovernmental and science-policy processes. In practice, it is practically impossible that all the relevant areas of expertise necessary to deal with wide-ranging and complex issues be represented in the advisory bodies of the various conventions, either on a permanent or on an *ad hoc* basis.

To carry out their mandate in this situation, they need to establish **solid bridges with the broad community of knowledge-holders**. But when issues demand holistic, interdisciplinary, cross-sectoral, or cross-scale knowledge this can be difficult to achieve given the limited resources at the disposal of scientific advisory bodies and the time pressure under which these bodies operate.

Global **and sub-global assessments** also constitute key processes at the science-policy interface. Well known examples include the Millennium Ecosystem Assessment (MA 2005), the Global Biodiversity Outlook (CBD 2006), the Intergovernmental Panel on Climate Change (IPCC) assessment reports, or the current reflection on a regular process for global reporting and assessment

on the state of the marine environment (Sanders & Rice, forthcoming).[11] Moreover, assessments produced relatively far from the biodiversity and ecosystem services governance scene may be partly related to the issue, such as for instance the Global assessment report on disaster risk reduction of the UN International Strategy for Disaster Reduction (UNISDR).[12]

Some of the **other actors** in the governance system also act as science-policy interfaces. This is the case in particular of international institutions and specialist organisations whose mission includes a contribution to science-policy interfaces for biodiversity governance, such as the International Union for Conservation of Nature (IUCN) which has a unique status due to its hybrid governmental and non-governmental nature[13]. The core mission of some other organisations can be to provide an interface, as in the case of the International Council for the Exploration of the Seas (ICES)[14]. Such institutions usually serve more than one clients.

The existence of this multitude of processes is needed because there can be no one-size fits all science-policy interface for issues as broad, complex and far reaching as biodiversity and ecosystem services. Necessary multiplicity is one thing. Ineffective fragmentation is another. But, as we shall discuss in the next section, the fragmentation of international governance of biodiversity and ecosystems is mirrored in the fragmentation of science-policy interfaces.

Hence we will need to improve the articulation between existing interfaces and fill some of the remaining gaps if we wish to evolve from an approach of conserving species and habitats towards holistic governance in terms of conservation and sustainable uses of biodiversity, ecosystems, and the services they provide.

Gaps in science-policy interfaces for international biodiversity governance

Gaps in science-policy interfaces

The starting point of this paper is an acknowledgement of the **current weakness of international biodiversity governance**. It is exemplified by the failure to reach the internationally agreed target to achieve "*a significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation and to the benefit of all life on Earth*".[15]

This is not to say that all international efforts are ineffective but rather a recognition that notwithstanding current political efforts and the wide pool of existing high quality scientific and

[11] See UNEP (2009), in particular Appendix 3 for a more exhaustive list and a preliminary review of existing assessment processes. See also the forthcoming report prepared by the Group of Experts for the "Assessment of Assessments" of the Regular process for global reporting and assessment of the state of the marine environment, including socio-economic aspects (Sanders, G, Rice J. et al, forthcoming), in particular Chapter 3 on the existing assessment landscape for oceans and coasts and Chapter 4 on best practices. There is also a series of reports assessing individual assessments such as e.g. UNEP (2006) and House of Commons (2007) for the MA. See Annex 1 for more references.

[12] See http://www.preventionweb.net/english/hyogo/gar/.

[13] "The International Union for Conservation of Nature, helps the world find pragmatic solutions to our most pressing environment and development challenges. It supports scientific research, manages field projects all over the world and brings governments, non-government organizations, United Nations agencies, companies and local communities together to develop and implement policy, laws and best practice." (Source: www.iucn.org, accessed January 2009).

[14] ICES is the organisation that "coordinates and promotes marine research in the North Atlantic and adjacent seas. It acts as a meeting point for a community of more than 1600 marine scientists from 20 countries around the North Atlantic. Scientists working through ICES gather information about the marine ecosystem. As well as filling gaps in existing knowledge, this information is also developed into unbiased, non-political advice (…) to governments and international regulatory bodies that manage the North Atlantic Ocean and adjacent seas." (Source: www.ices.dk, accessed January 2009).

[15] This commitment was made in April 2002 by the Parties to the CBD. It was subsequently endorsed by the 2002 World Summit on Sustainable Development and the United Nations General Assembly and was incorporated as a new target under the Millennium Development Goals.

practical knowledge, species are disappearing at an alarming rate (CBD, 2006) and a large proportion of ecosystems and the services they provide are being degraded or used unsustainably (MA 2005).

Several causes have been attributed to this state of affairs, which span the political, cultural, ideological, technological, macro- and micro-economic and geostrategic domains. It is not the purpose of this paper to examine them all, but rather to focus on one of the recurrently identified causes, that is: a general **weakness in the way scientific and other relevant knowledge informs and supports policy**, both directly (for instance through relevant *ad hoc* assessments and policy advice) and indirectly (for instance through better awareness of policy-makers, stakeholders and the public). This has been recurrently stressed by many actors both from the governance and from the scientific domains (e.g. Chirac 2005, Loreau and Oteng Yeboah 2006; Watson 2005; Görg et al. 2006).

Recent works have identified various **important and qualitatively distinct gaps in the interfaces between biodiversity science and policy**.[16] They are listed below.

It is important to note that some of these gaps do not exclusively concern the science-policy interface and do require actions that belong more specifically to the scientific or policy realms. This is the case for instance for gaps in scientific knowledge or for gaps in capacities. Other gaps belong chiefly to the domain of science-policy interfaces.[17] And as different science-policy interfaces have different strengths and weaknesses, they also have different gaps. But filling any of the listed gaps will require a certain degree of action at the science-policy interface level. Hence improving science-policy interfaces can significantly contribute to dealing with all these gaps either directly, or indirectly by supporting actions in the scientific or the policy domains.

- Gaps in **knowledge and knowledge systems**, including:
    - gaps in scientific knowledge and in practical knowledge that reduce the capacity to formulate or implement effective policy;
    - insufficient integration of knowledge from different disciplines (holistic interdisciplinary approaches);
    - insufficient and uncoordinated monitoring efforts;
    - gaps in data collection, sharing and accessibility (including accessibility of traditional or 'non-expert' knowledge);
    - gaps in strategic orientation and coordination of research; and
    - gaps in timely and up to date policy advice, including on new and emerging issues and on ways to act under uncertainty and ignorance.
- Gaps in **assessments** of status and trends of biodiversity and ecosystem services, including:
    - assessments of drivers and impacts, socio-economic aspects, foresight studies and horizon scanning, scenarios of possible future evolution, and policy and management response options;
    - gaps in coordination between sub-global and global assessments and between topical and global assessments; and
    - discontinuity of assessments.
- Gaps in effective **communication** between knowledge holders:
    - inside science, across regions, scales, disciplines and assessments;
    - between science and traditional and practical knowledge holders;
    - between science and policy;
    - between science and society.

  Consequences of these communication gaps include:

[16] Notably in relation to the debates around IMoSEB, IPBES, in particular in the recent preliminary gap analysis of UNEP-WCMC (UNEP 2009) and the MA follow-up (ICSU 2008), but also in the works of the Conventions (e.g. CBD 2007a & b; CBD 2006). Obviously different actors put different emphasis on different gaps.

[17] See van den Hove 2007 for a more theoretical discussion of the rationale for science-policy interfaces.

  - lack of awareness and of willingness to act;
  - insufficient use of state of the art scientific and other knowledge in decision-making;
  - incoherent scientific advice across policy-action areas.
- Gaps in **ownership of knowledge** by decision-makers: too often the knowledge available to decision-makers lacks timeliness, is not fit for purpose, is incoherent or is not in an appropriate format. This reduces the perceived and real usefulness and credibility of the information, which in turn raises scepticism of decision-makers and reduces their confidence in the reliability of both the knowledge production system (process) and the information itself (results), hence their ownership of the information.
- Gaps in **capacity** for:
  - research;
  - monitoring;
  - data management;
  - assessments;
  - interfaces between science and policy;
  - action (in particular to bring the need to maintain ecosystem services into the mainstream of policy making and management).

  These capacity gaps are particularly evident in developing countries and countries with economies in transition, but industrial and post-industrial countries have no good reason for complacency.

Strengthening existing science-policy interfaces

A necessary step to contribute to filling these gaps is to **improve the existing processes** operating at the intersection between science and policy. This is already underway in several areas. For instance, the CBD, the SBSTTA and the CBD secretariat are making efforts to improve scientific input to the CBD, and to improve the Clearing House Mechanism (e.g. CBD2006c)[18]. While the liaison group of the biodiversity-related conventions[19] is working on enhancing the cooperation amongst the scientific advisory bodies of the six conventions (CBD 2007a) and the Joint Liaison Group between the three Rio Conventions works on improved collaboration among the scientific subsidiary bodies to the conventions (CBD 2004). The Scientific and Technical Advisory Panel (STAP) of the GEF is also looking for ways to enhance its role and relevance, in particular by making STAP's advice more strategic, timely and effective and by developing and maintaining a broader global network of scientific and technical expertise (GEF 2006a & b). The above are just a few examples that hint at the current efforts to increase the effectiveness and coherence of, and between, existing bodies.

However necessary the improvement of existing advisory bodies and their better coordination may be, it will not constitute a sufficient reinforcement of the international science-policy interface. The key reason for this lies in the fact that for biodiversity and ecosystem services governance, due to the nature of the problem, there is no **one-to-one correspondence between a user of knowledge** (say the CoP of a convention) and a **knowledge provider** (say a sub-branch of the scientific community). It is not practical for each user of knowledge to communicate directly with all relevant knowledge providers and for each knowledge source to link with all its relevant clients, because:

- The issues of biodiversity and ecosystem services are, as we have seen, complex and far reaching. The knowledge needed for their resolution is held by a vast range of scientific, practical, and policy individuals and institutions, of science-policy interfaces, and of policy processes. To set up a web of interactions between every client and every holder would be hugely costly, redundant at places, and require unrealisable human resources. It would be very

[18] See also the consolidation of the modus operandi of SBSTTA, as defined by the CBD COP Decision VIII/10, Annex III, Appendix A, paragraph d).

[19] http://www.cbd.int/cooperation/related-conventions/blg.shtml

difficult for each advisory body to keep track of the actors, institutions, and processes of this system and of the knowledge available, especially because they are in continual flux.

- It is impractical as both the knowledge holders and the individual advisory bodies would quickly become overwhelmed by administrative tasks, in addition to the work associated with processing the flow of information.
- It creates a risk of inconsistencies and sub-optimal use and circulation of knowledge. In particular because as each client is individually responsible for accessing and processing information from this vast range of sources, there is no clear way to ensure that each client selects the most appropriate sources, or that the main messages distilled from the knowledge by one client are consistent with those distilled by another.
- As it depends on the client to integrate and synthesise the information, it is not well suited to deal with problems in a holistic manner, across sectors and scales, nor to see and communicate 'the broader picture'.
- It does not provide for an in-built mechanism to ensure quality and coherence of the knowledge used in support of decisions in different areas and sectors and at different scales.
- It does not promote cooperation and coordination and cross-learning between clients, between knowledge holders, and between clients and knowledge holders, but rather maintains fragmentation. And it does not increase visibility of what is going on in various areas.

Fragmentation and stratification are inherent to our international environmental governance system in general and to biodiversity governance in particular. Such fragmentation and stratification are in part historical as institutions have been created step by step to deal with problems as they emerged. The result is an array of conventions and institutions with overlapping remits and poorly-defined boundaries between them. The governance situation of our seas is a case in point in this regards. But the fragmentation is also structural, and to a certain degree unavoidable, as the issues are far reaching, cross-cutting and multi-scale, while institutions do have to focus on specific missions to ensure some degree of effectiveness and efficiency. Another way of saying this is that although we can grasp complexity in scientific and experiential terms, we need to 'reduce' complexity for action. **The fragmentation of the governance system is reflected in the science-policy interface system.** Nevertheless more collaboration between the different bodies and institutions may prove extremely useful when issues are cross-cutting.

In the case of biofuels for instance, many different UN agencies, conventions and other organisations have made their own topic-specific evaluation of the issue and stakes because of the sectorality of their mandates. This has the potential to lead to incoherent and contradictory actions. Another example is the emergence and spread of H5N1 Avian Influenza. A case study conducted in the framework of the IMoSEB consultative process stresses that: *"while many agencies had research, surveillance and policy initiatives to deal with H5N1, there was little evidence of collaboration and communication among the agencies" and conclude on "the need for a forum within which biodiversity scientists, health scientists, and intergovernmental agency staff can interact, to set policy for H5N1 and other emerging zoonoses based on the latest and best information*". (Daszak & Chmura, 2007, p.2)

The **ecosystem approach** is another important example. No one existing institution can take the lead on the ecosystem approach as all are striving to make the concept operational for their specific purpose but there lacks a solid underlying framework on which they could build to adapt the approach to their needs. This is also the case at the sub-global level, for instance the Barcelona Convention deals with marine biodiversity conservation in the Mediterranean, while the aspects relating to fisheries in that Sea are tackled under the General Fisheries Commission for the Mediterranean (GFCM). Meanwhile there is growing political will to implement an ecosystem approach, thus to ensure consistency and effectiveness some form of collaboration will need to be found, especially at the level of science-policy interfaces to render the ecosystem approach operational and consistent across the conventions.

When issues are recognised as cross-sectoral and needing more coordination, the responsibility is sometimes passed on the **UN General Assembly**, but it does not have a mechanism to bring integrated and up-to-date biodiversity and ecosystem knowledge into its work in a timely manner.

In all these examples, a coordination and support mechanism at the interface between science and policy would bring significant added value in ensuring the high quality knowledge is transferred and used consistently by all the various 'clients' and to reinforce synergies and cooperation amongst them.

As stressed already above, the biodiversity issue evolved from a relatively simple framing in purely conservation terms focussing mainly on species and habitats, to a complex issue of conservation and sustainable uses, building on an approach in terms of ecosystem services. The gaps listed above do not so much stem from the weaknesses of the existing system of science-policy interfaces but from the **inappropriateness of existing science-policy interfaces to confront the challenges of conservation and sustainable uses of biodiversity, ecosystems and the services they provide**. Science-policy interfaces change because the subject changes. The current framing of the biodiversity issue and the political ambition to tackle this key global environmental issue are simply more demanding in terms of science-policy interfaces.

In summary, the option to improve existing science-policy interfaces and not to create any new mechanism turns out to be at best more costly and at worst impractical and insufficient to deal with the current gaps in international science-policy interfaces for biodiversity governance. Even if the existing advisory bodies would function optimally, there would still be some key science-policy interface needs that would not be fulfilled. This stems from the complex nature of biodiversity and ecosystem services issues which calls for holistic, interdisciplinary, cross-sectional and cross-scale knowledge and which results in an inherently multi-sources / multi-clients configuration of the knowledge and policy systems.

In this context, an intergovernmental platform that would be **supporting and serving multiple users** and significantly contribute to developing synergies between them as well as synergies between multiple knowledge providers may, if well-designed, prove to be more effective and more efficient. The objective is not to withdraw the critical capacity and the specific focus of analysis from individual advisory bodies and other institutions operating at the science-policy interface, but rather to ensure that high quality, up-to-date, timely[20] and consistent knowledge is made available for, and used in, decision-making. In other words, some of the strongest arguments for a more coordinated approach to science-policy interfaces include**: increased coherence; reduced duplication; increased efficiency; and improvements in cost-effectiveness**

No **existing institution** has such a broad mandate, and none naturally stands **as a good candidate** to be transformed into an intergovernmental platform to serve multiple clients. The reason for this is that all existing science-policy interfaces operate in specific political and historical contexts which do not necessarily fit other users. This weakens the chances for that interface to gain enough credibility, legitimacy and authority amongst these other users.

In the next section, we go one step further by looking at how the gaps identified above translate in a series of specific needs and at the respective contribution of existing advisory bodies and of an intergovernmental platform in filling these needs.

Responding to needs: the contribution of an intergovernmental platform

The wide array of conventions, institutions and other organisations populating the biodiversity and ecosystem services international governance system have specific as well as shared **unfulfilled needs regarding knowledge** on biodiversity, ecosystems and ecosystem services. These needs can exist as various levels, from the local to the global and can be divided into several categories that are neither completely independent nor exclusive and that directly relate to the gaps identified above.

Some of those needs are in some cases met totally or partially by existing institutions, but others are not. The intergovernmental and multi-stakeholder meeting on an IPBES, the IMoSEB

[20] The issue of timeliness is of the essence. Even in the case of climate change, where such a powerful science-policy interface mechanism as IPCC exists, some have pointed to the need to ensure that the most recent scientific knowledge underpins negotiations, highlighting limited availability or visibility of IPCC interim reports to politicians and negotiators and stressing the need for a mechanisms *"that brings major new scientific findings to the attention of decision makers in a timely manner"*. (Ekman et al. 2008)

consultation, the MA follow up strategy, and the discussions revolving around these three processes have identified many unmet or partially met needs. In Table 1, we list those that are specifically relevant to the international governance of biodiversity and ecosystem services and identify the contribution that an intergovernmental platform as discussed in the IPBES process would make to fulfil these needs, as well as the contribution from existing institutions and processes at the science-policy interface. We also identify the value added of a platform as well as functions that are not in the remit of a platform.

The table successively looks at needs relating to policy support, research strategies, assessments, communication, networking, cooperation and capacity building.

As shown in table 1, a **well designed intergovernmental platform** could:

- be at the service of a broad array of clients and users by complementing but not duplicating their work;
- allow the expression of clients' needs and their gathering and translation into knowledge demands to knowledge holders;
- contribute to identifying and filling unmet needs of these clients, most of the time by coordinating actions or triggering them;
- provide both demand-driven scientific advice on specific issues or as it emerges from global or targeted assessments, and proactive scientific advice on emerging threats and issues as identified by the scientific community or other stakeholders;
- act as a central and bidirectional hub in a network of knowledge, and foster and publicize inter-disciplinary state of the art research;
- facilitate the ownership of knowledge exchanged by (i) contributing to the scientific quality assurance; (ii) ensuring transparency of knowledge production and transfer; and (iii) supporting mechanisms of acceptance, approval or adoption of synthetic assessments as appropriate;
- be dynamic and adaptive to the needs of specific clients and to the evolution of the international policy goals for biodiversity and ecosystem services;
- have an in-depth knowledge of the governance, knowledge and science-policy interface landscapes.[21]

It is worth noting that a platform could also **add value to the scientific process** itself. Indeed, confronted with global environmental issues, environmental sciences needs to build-up into more collaborative and network-based interdisciplinary and international science. And the quality of environmental science must be gauged both on its scientific excellence and its policy relevance. An international platform could contribute to this evolution in particular by facilitating extended peer review (Funtowicz and Ravetz 1993) i.e. quality assurance building on the peer-review process of scientific research but extending it to an interdisciplinary peer community and broader community of users.

In summary, a platform has the potential to **help existing science-policy interfaces** better perform their missions and to increase **effectiveness**, **consistency** and **quality** of the international science-policy interface system to support the ambitious international and sub-global policy goals in terms of conservation and sustainable uses of biodiversity, ecosystems and the services they provide. In addition such platform could significantly contribute to the reinforcement of **political will** and **public support**, two other key ingredients to successful governance.

[21] One major difficulty during the discussions on the reinforcement of the international biodiversity science-policy interfaces has been to precisely know what is actually existing and effective and what is not.

Table 1: Needs to be fulfilled by international science-policy interfaces for the governance biodiversity and ecosystem services

Gaps	Needs	Potential Contribution of existing science-policy interfaces	Potential Contribution of an intergovernmental Platform	Potential added Value of a platform	Not in the remit of a platform
Knowledge and Knowledge systems	**POLICY SUPPORT** Timely answers to **specific questions** emerging from the policy process, including in particular holistic questions and questions with strong, interdisciplinary and intersectoral dimensions; Rapid synthesis of the state of the art knowledge on **new and emerging issues** at the demand of policy users or as proactively suggested by scientists or stakeholders; Information about **tools and best practices** for policy implementation and management; **Ex post evaluations** of effectiveness of measures and early lessons. Non-prescriptive **policy advice** on all of the above, e.g. identification of consequences of various policy options.	Articulate demands for information. Refine their demands as information become available. Dialogue with knowledge-holders as appropriate. Bring this knowledge to bear into the policy and decision process.	Activates the appropriate (networks of) knowledge-holders to obtain the necessary information. Translates and presents the information in relevant format as appropriate. Communicates the information to the client and facilitates subsequent dialogue when necessary.	Has wide acquaintance with broader set of relevant scientific knowledge-holders and holders of practical knowledge and know how. Triggers more interdisciplinary, cross-sectoral and cross-scales approaches by facilitating collaboration between the relevant knowledge-holders. Acts as an entry point to collect early warnings emerging from the scientific and other knowledge-holders communities, triggers rapid assessment of the issue (see below) and communicates it to relevant policy-makers and stakeholders. Has skills and resources to synthesise and present the knowledge in the appropriate format if necessary. Makes the knowledge available to other users. Reinforces the scientific quality and the consistency, credibility, legitimacy and saliency of the knowledge. Creates a core entry point to express and obtain answers, in particular when they are relevant to multiple clients.	Developing the knowledge
Knowledge and Knowledge systems	**RESEARCH STRATEGIES** Continuous expansion of the **knowledge basis** on biodiversity and ecosystem services	Feed their topic-specific analysis of research gaps to the platform.	Continuously identifies gaps in knowledge (including uncertainties and data gaps) and research priorities based on input from existing institutions and mechanisms and own contribution. Ensures that these research priorities are developed with and communicated to funding agencies, international research programmes and the scientific community.	Adds a more integrated vision of the knowledge gaps. Helps turn these into research priorities. More integrated interdisciplinary, cross-sector and cross-scale picture to support research strategies of funding agencies, research programmes and scientific institutions. Facilitates the communication between existing institutions and the science funding actors.	Doing or funding research.

Assessments	**ASSESSMENTS** Regular and timely synthetic **global assessments**: - to ensure up-to-date global view about the drivers, status and trends of biodiversity and ecosystem services, including socio-economic aspects, scenarios, foresight studies, horizon scanning, response options; - to help link with other global environmental change issues; - to build a basis to frame non-prescriptive advice to policy-makers. Coordination of **sub-global assessments** **Information** on existing assessment landscape	Translate the (relevant parts of the) global assessment into formats fit for their specific purposes.	Organises and oversees the production of the synthetic assessments by selecting and supporting a dedicated task force and process. Identifies gaps that need to be filled to contribute to the assessment and contributes to defining strategy and finding resources to fill these gaps. Produces a scientifically sound and consistent conceptual framework to compare and pull together various elements from sub-global or topical assessments. Coordinates and targets future assessments. Contributes to the coordination of sub-global assessments as appropriate. Acts as a central information hub on existing assessments.	Centralised integrated and holistic approach. Avoids redundancy by building on existing sub-global assessments or global targeted assessments as appropriate and focusing on filling gaps. Contributes to ensuring that global assessments feed and are fed by sub-global ones. Allows to bridge between scales, issues and sectors. Contributes to dissemination of best practices and common conceptual frameworks in the various assessment communities. Makes the various assessment efforts more visible, hence more useful to broader range of users. Reinforces the scientific quality and the consistency, credibility, legitimacy and saliency of the assessment product and process. Reduces the risk of ignoring or forgetting relevant existing knowledge or previous assessments.	Producing the different components of the assessment
Assessments	**ASSESSMENTS** Timely **targeted assessments** on specific issues, linking to societal needs[22] **Policy advice** on specific issues allowing the translation of knowledge into action.	Express demand for targeted assessment or policy advice. Translate the assessment or advice into formats fit for their specific purposes. Bring the knowledge to bear into the policy and decision process.	Supports, organises and oversees as appropriate the production of the targeted assessments or the policy advice. Identifies thematic assessment needs.	Major entry point for demands by users. Rapid mobilisation of appropriate knowledge-holders for the preparation of targeted assessment or advice. Allows to bridge between scales, issues and sectors. Timely transfer of assessments or advice to users. Enhances visibility of targeted assessment and advice to a broader range of potential users. Reinforces the scientific quality and the consistency, credibility, legitimacy and saliency of the assessment product and process.	Producing the assessment or the policy advice

[22] A recent example of such targeted assessment is the Report on The Economics of Ecosystems and Biodiversity –TEEB (Sukhdev 2008).

Communication	**COMMUNICATION** Enhanced and streamlined **communication** and **outreach** towards policy-makers, stakeholders and the public about: (i) drivers, status and trends of biodiversity and ecosystem services; (ii) socio-economic stakes, impacts and risks; (iii) need and options for action.	Act as multipliers of the communication outputs of the platform. Provide information on their specific issues to the platform as appropriate. Implement topic-specific communication actions.	Implements an integrated communication and outreach strategy based on the scientific, practical and policy knowledge produced or exchanged by the platform. Adapts the communication to the different types of recipients and to different scales. Contributes to the development and implementation of dissemination tools for assessments.	Raises understanding, awareness and willingness to act amongst decision-makers, stakeholders and the public. Has broad visibility and authority and delivers consistent messages. Offers one-stop access to relevant high quality scientific results. Improves the ways in which scientific input is made, in terms of timing, format and content.	Lobbying for particular interests.
Communication	**NETWORKING & COOPERATION** Improved links between **science-policy interfaces across issues.** Improved links between **science-policy interfaces across levels**.	Link with the platform. Provide experience and best practice.	Links with international science-policy interfaces focussing on issues that are related to biodiversity. Facilitates bilateral links between those interfaces as appropriate. Contributes to diffusion of best practices in science-policy interfaces Links with regional and national science-policy interfaces for biodiversity and ecosystems services.	Brings together the multiple science-policy interfaces on an *ad hoc* basis. Favours circulation of information. Helps to avoid redundancy and to identify gaps in interfaces. Constantly maps the landscape of science-policy interfaces and makes this information available to those who need it. Helps specific institutions to enter into dialogue. Increases coherence and coordination and reduces duplication.	
Knowledge and Knowledge systems	**COOPERATION** More systematic and operational **monitoring** of drivers, status and trends of biodiversity and ecosystem services on a wide scale.	Feed their topic-specific monitoring needs to the platform to include in the monitoring strategy.	Supports the collaboration and coordination efforts for monitoring worldwide. Contributes to defining monitoring strategy and to finding additional resources. Contributes to efforts to identify, harmonise, use and revise appropriate indicator suites and baselines.	Contributes to defining a monitoring strategy that accounts for the needs and the experience of a wide range of users.	Doing or funding of monitoring. Developing indicators.
Knowledge and Knowledge systems	**COOPERATION** Broad, rapid, fair and cost efficient availability and accessibility of scientific and monitoring **data**.	Feed their specific data needs to the platform. Inform the platform about existence of specific data collections that are relevant but not easily accessible.	Supports the collaboration and coordination efforts for data accessibility worldwide. Ensures that data management institutions are aware of specific data needs of various users. Ensure that data users are better informed of where and how data is available. Encourages data producers to make their data available; including practical knowledge holders.	Contributes to raising awareness of the importance of data sharing and accessibility. Communicates about existing options to access or store data and encourages their use.	Collecting or managing data.

Capacity	**CAPACITY BUILDING** **Capacity building** in: - research - production of assessments - monitoring - data management - science-policy interfaces - action (policy, policy implementation, and management)	Support specific capacity building efforts in relation to their topic. Inform the platform of capacity needs related to their specific area of action. Inform the platform about relevant on-going initiatives in capacity building.	Maps capacity needs. Contributes to enhanced coordination of capacity building efforts and to the sharing of experience and best practice amongst institutions and actors focussing on capacity building. Identifies the need for, and as appropriate coordinates the development of, conceptual frameworks, guidelines, or tools and methods (e.g. assessment methods, guidelines frameworks, scenarios). Facilitates capacity-building for relevant scientific institutions in order to enhance their involvement in the activities of the platform.	Acts as an information hub on capacity needs and on on-going capacity building efforts (benchmarking and best practice). Helps focus capacity building efforts where most needed.	Funding capacity building

Clients, users and target groups of an IPBES

The intergovernmental platform would serve a series of clients and target groups operating in the international and regional biodiversity governance system, including in particular the scientific advisory bodies of Conventions and international organisations (see Box 3 above). In particular, the institutions and processes which have biodiversity and ecosystems at the core of their missions and which would be among the first to express demands. These would constitute its **regular clients**.

It would also benefit other clients and target groups, sometimes on a more ***ad hoc* basis**, in particular, development agencies and banks, national governments, NGOs, the private sector, the media, and the scientific community itself.

There are also actors or organisations which are **not yet aware** of their needs for biodiversity and ecosystem services knowledge but who will increasingly need to integrate biodiversity and ecosystem service considerations in their work towards sustainability. They will need to have reliable sources of knowledge to frame their work. This is the case for instance of the WTO or of some business sectors which do not deal directly with ecosystems while being dependent on them or impacting them.

Conclusions

Fifteen years after the entry into force of the Convention on Biological Diversity[23], and only one year away from 2010, the date at which the Parties to the Convention committed to achieve "a significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation and to the benefit of all life on Earth", we know that the objective will not be reached. Biodiversity and ecosystem services continue to be degraded and lost at alarming rates. And biodiversity turns out to be the Achilles' heel of international environmental governance.

Criticising the lack of political will is neither sufficient nor helpful. There is actually a lot of good will at all levels, from the local to the global, and initiatives to deal with the multiple facets of the problem are flourishing. We are clearly not operating in a governance void. But there remain many political weaknesses and social and economic challenges, while we do have rising governance ambitions, as articulated for instance in the Millennium Development Goals, the MA, and the TEEB report. Acting and producing effective changes in processes and outcomes remains challenging.

As already stressed above, science, experience and practice have highlighted the complex and far reaching dimension of the biodiversity crisis. Over the last two decades, we have operated a shift in the way we understand and frame the biodiversity issue, from an approach dominantly in terms of species, habitats and conservation, to a holistic approach in terms of conservation and sustainable uses of biodiversity and ecosystem services..

This shift has created the need to reinforce the support available to decision-makers in a manner adapted to the complexity of the issue and to our governance and policy ambitions. In practice, this translates into the need for substantial operational material to support the development and implementation of action at the political and management levels. For instance, the ecosystem approach, the ecosystem services approach, the precautionary principle and adaptive management are key concepts to underpin more holistic governance of biodiversity and ecosystem services. They need to be made operational and this revolutionises our way of working.

[23] The text of the CBD was adopted in Nairobi in May 1992 and opened for signature in Rio in June 1992. It entered into force in 1993. The US amongst a few others has not yet ratified it.

In particular, it introduces new requirements in terms of science-policy interfaces. These requirements cannot be fulfilled by merely improving existing science-policy interfaces and justify the creation of a well-functioning intergovernmental science-policy platform on biodiversity and ecosystem services. We have tried to show that such a platform is a necessary, but not sufficient, ingredient of a more effective international governance of biodiversity and ecosystem services.

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Annex 1: List of other documents consulted

In additional to those listed in the reference section, the following documents have been consulted to prepare this paper.

[The list is being prepared. It will be available in the final version of this document, in February 2009.]