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PRELIMINARY GAP ANALYSIS FOR THE PURPOSE OF FACILITATING THE DISCUSSIONS ON HOW TO STRENGTHEN THE SCIENCE-POLICY INTERFACE

The annexed note has been prepared by the Executive Director to the Governing Council of the United Nations Environment Programme and is submitted by the Secretariat*.

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Preliminary gap analysis for the purpose of facilitating the discussions on how to strengthen the science-policy interface

Note by the Executive Director

The annex to the present note provides a preliminary gap analysis for the purpose of facilitating the discussions on how to strengthen the science-policy interface with regard to the potential establishment of an intergovernmental-science policy platform on biodiversity and ecosystem services, as referred to in document UNEP/GC.25/15. The annex has been reproduced as received and has been issued without formal editing.

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Annex

Preliminary gap analysis for the purpose of facilitating the discussions on how to strengthen the science-policy interface

Preliminary Report[1]

Contents

1 This report was prepared with the support by the UNEP World Conservation Monitoring Centre (UNEP-WCMC).

A. Executive Summary

1. The *Ad hoc international and multi-stakeholder meeting on an intergovernmental science-policy platform on biodiversity and ecosystem services* (Putrajaya, Malaysia, 10-12 November 2008) called for a gap analysis to support discussion on improving the science-policy interface for biodiversity and ecosystem services for human well-being and sustainable development. A preliminary report was to be made available at the twenty-fifth session of the Governing Council/Global Ministerial Environmental Forum[2].

2. Given the time constraints, this preliminary report is limited to identifying the context and mandate for the gap analysis, identifying what the full gap analysis will cover in terms of format and content (including identifying key information sources), providing examples of certain sections of the gap analysis where practicable in the time available, recommending a review process, and identifying next steps. The preliminary report identifies a number of initial findings, but these are not intended to be conclusions, but to focus further discussion on the issues as the full gap analysis proceeds.

3. Context and mandate: Over the last two years there has been extensive discussion on how to improve the use of science and scientists in decision making processes. It is essential that the gap analysis build on the existing reviews and ongoing discussions including, *inter alia*, the international consultation on and International Mechanism of Scientific Expertise on Biodiversity (IMoSEB), the Millennium Ecosystem Assessment Follow-up Global Strategy, the Ad hoc international and multi-stakeholder meeting on an intergovernmental science-policy platform on biodiversity and ecosystem services.

4. Conducting the gap analysis: In order to ensure that the full analysis provides an effective basis for future discussions on improving the science-policy interface, it will: provide a succinct summary of the current situation and existing plans and suggestions for improving on it, supported by appropriate technical annexes and references; draw not only on written reports and analysis, but also on the experiences of stakeholders familiar with the different processes and mechanisms under review; and allow for stakeholder review of the different components of the analysis, and for full peer review of the draft final report.

5. Use of science and scientists by policy advisory processes: There are numerous national and international science-policy interfaces for biodiversity and ecosystem services, each with their own strengths and weaknesses with respect to science. This includes the scientific advisory bodies and processes of international agreements and other intergovernmental processes, as well as mechanisms for increasing coordination between them. Preliminary review with respect to the international biodiversity-related agreements in particular provided initial findings on the following:

- Mandates for the bodies and processes
- Implementation and how science and scientists are involved
- Forward agendas and strategies
- Cooperation and coordination between bodies and processes
- Linkages to other scientific processes
- Scientific credibility, independence and peer review

6. Assessments of knowledge intended to inform policy: There is already significant experience in assessments, but it is the intention of UNEP that the gap analysis also address two other related activities, the increasing use of indicators in assessing progress in achieving international targets, and the use of models and scenarios in combining scientific information from multiple sources. Between them these activities are major means by which science is brought into policy fora at all levels. Preliminary review based on assessments and indicators in particular provided initial findings on the following:

- Importance and value of mandates
- Current and future assessment landscape
- Timing of assessments in response to policy needs
- Policy effectiveness of assessment findings
- Current and future indicator development
- Scientific robustness of indicators

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- Multi-scale assessments and indicators
- Data availability
- National capacity and technical support

7. Emerging issues of scientific concern: It is inherently difficult for policy and decision-making processes to adequately take account of emerging issues. To a significant extent this is because of the need for lead time to allow for all stakeholders to fully understand the issue and decide on their response to it. Meanwhile there is a growing number of horizon scanning and futures processes. Preliminary review of this issue provided initial findings on the following:

- Potential value of horizon scanning and futures techniques
- Communication to science-policy interfaces
- Mandates and ability to respond to emerging issues
- Coordination and sharing of knowledge and experience
- Responding to need
- Use of results in terms of understanding and response

8. "Policy information" and targeting policy makers: While this issue has not been addressed yet, it concerns the benefits that accrue from ensuring that policy makers have access to information from science and scientists in a form that best helps them to use it. It is anticipated that this issue will be addressed by reviewing existing experience in communicating scientific issues to policy makers, and reviewing the lessons learnt, both positive and negative. Consideration is being given to reviewing the impact of the Millennium Ecosystem Assessment, and species threat analyses (such as the IUCN Red List and national equivalents).

9. Capacity building needs: In addressing capacity building needs in the context of the gap analysis, there seem to be two inter-related issues, identifying what the key needs are, and reviewing the extent to which these needs are already recognised in national capacity needs assessments and similar reviews so as to better understand what level of priority is being attached to such needs. However capacity building needs cannot really be addressed until the reviews referred to in the previous sections have been completed, as the key issue is in building capacity to address the needs identified. This report therefore only includes preliminary considerations that need to be substantiated and then reviewed with a wide range of stakeholders. These concern, *inter alia*:

- Expertise in Science-policy dialogue
- Focus and priority, and clearer understanding of needs
- Coordination of capacity building initiatives
- Support services and sharing of lessons and experience

10. Summary of preliminary findings: These initial findings are intended not as conclusions on which future action will be based, but as stimuli for further discussion as the gap analysis progresses. These are the need to find ways to:

- Strengthen the science base of existing science-policy interfaces
- Improve coordination among them by providing a common science platform
- Provide a better coordinating mechanisms linking local, national, regional and global processes.
- Strengthen the independence and scientific credibility of scientific outputs
- Improve the policy effectiveness of assessment findings and results
- Strengthen the capacity of countries in all aspects of the science-policy interface.

11. Other issues: There are several other issues which have not been addressed in previous discussions on this issue, but which seem relevant. Advice from those reading the preliminary report is sought on the extent to which these issues should be addressed in the gap analysis. These are the role of the following:

- Specialist organizations working at the science-policy interface
- Information services, networks and tools
- Individual scientists, international research programmes, scientific networks
- Research funders with respect to their focus on science-policy needs

- Network of networks

12. Next steps: This preliminary report is the first step in completing the gap analysis that will inform future discussion on improving the science-policy interface, whether this concerns improving the existing processes and mechanism, improving coordination amongst them, improving the coordination of scientists contributing to these processes, and/or establishing an additional new mechanism. The next steps are as follows:

- Soliciting feedback on this preliminary report
- Inviting stakeholder support for the full gap analysis
- Implementing the gap analysis
- Ensuring wide peer review
- Completing and disseminating the report

13. Use of the gap analysis: The resulting report will be used to guide preparation for and discussion at the proposed second meeting concerning an intergovernmental science-policy platform on biodiversity and ecosystem services.

B. Preamble

14. The *Ad hoc international and multi-stakeholder meeting on an intergovernmental science-policy platform on biodiversity and ecosystem services* (IPBES Meeting) was convened in Putrajaya, Malaysia, from 10-12 November 2008, building on the global strategy for follow-up to the Millennium Ecosystem Assessment and the consultative process towards an International Mechanism of Scientific Expertise on Biodiversity (IMoSEB) [3,4].

15. The IPBES Meeting recognised that mechanisms to improve the science-policy interface for biodiversity and ecosystem services for human well-being and sustainable development should continue to be explored. The meeting called for a gap analysis to be undertaken with the aim of supporting future discussion by reviewing the existing mechanisms and processes, and requested that a preliminary report be made available at the twenty-fifth session of the Governing Council/Global Ministerial Environmental Forum[5].

16. This is the preliminary report requested by the IPBES Meeting. Given the time constraints, this report is limited to identifying the context and mandate for the gap analysis, identifying what the full gap analysis will cover in terms of format and content (including identifying key information sources), providing examples of certain sections of the gap analysis where practicable in the time available, recommending a review process, and identifying next steps. The feedback of governments and other key stakeholders on this preliminary report is actively sought.

17. The IPBES Meeting also recommended that the Executive Director of UNEP should report at the twenty-fifth session of the Governing Council/Global Ministerial Environment Forum on the outcome of the meeting and recommended that the UNEP Governing Council should request the Executive Director to convene a second intergovernmental multi-stakeholder meeting on an intergovernmental science-policy platform on biodiversity and ecosystem services with a view to strengthening and improving the science-policy interface for biodiversity and ecosystem services for human wellbeing, including consideration of a new science-policy platform[3].

3 Copies of reports and documents for the IPBES Meeting can be found at www.ipbes.net

4 Information on the IMoSEB consultative process, and copies of all reports and submissions can be found at www.imoseb.net

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C. Context and mandate for the gap analysis

18. In order to ensure effective and equitable decision-making with respect to biodiversity and ecosystem services at all levels, it is essential that decision-making processes are informed by authoritative, independent, credible, inclusive and internationally peer-reviewed, policy-relevant scientific advice on changes in biodiversity and ecosystem services and implications of the changes for human well-being. The current science-policy interface for biodiversity and ecosystem services comprises a number of national and international mechanisms and processes. These mechanisms and processes have a range of different mandates and purposes, and the ways in which they interrelate, and the ways in which they capture and use science, vary widely.

19. There is an extensive and potentially confusing array of networks, institutions, assessments, information services, data holdings and individual scientists that could be providing scientific advice and input, and in many cases are already doing so. However this input is essentially uncoordinated, and different science-policy interfaces may use difference sources. At the same time there is also concern amongst scientists that science is not being used effectively enough, and that as a result key policy-relevant issues are not being adequately addressed.

20. Over the last two years these issues have been extensively discussed, through a range of processes including *inter alia*: meetings of MEA advisory bodies (including coordination meetings); discussion on follow up to the Millennium Ecosystem Assessment; the IMoSEB consultative process; and the IPBES Meeting.

21. However in the absence of a full understanding of the existing "landscape" of science and assessment, and the lack of a review on how existing science-policy interfaces work and what their shortcomings are, it has been almost impossible to date to find agreement on the best way to improve overall scientific input to decision-making processes. It is in this context that participants at the IPBES Meeting called for a gap analysis to be undertaken to inform future discussion on this issue.

22. It is essential that this gap analysis build on reviews and discussions that have already taken place, and that it builds in the experience and views of the many stakeholders. Much of this is addressed in the subsequent sections, but the summary findings of three of these initiatives/processes are described further here as they help orient the subsequent discussion in this preliminary report. These are the IMoSEB consultative process, the IPBES Meeting, and the Millennium Ecosystem Assessment Follow-up Global Strategy.

C.1 International Mechanism of Scientific Expertise on Biodiversity

23. Following the International Conference *Biodiversity: Science and Governance* held in Paris in January 2005, an international consultation was launched to assess the need, scope and possible forms of an International Mechanism of Scientific Expertise on Biodiversity (IMoSEB). An Executive Secretariat was appointed, and the process was supported by an Executive Committee and an International Steering Committee that included representatives of a range of key stakeholders.

24. The consultative process included six regional meetings, briefings, presentations and discussions at numerous other scientific and policy meetings, and written inputs from a wide range of other sources, as well as ongoing dialogue with a number of stakeholders[6]. The final recommendations, which were delivered by the International Steering Committee in November 2007[7], identify the following needs:

(a) The need for independent scientific expertise: independent, synthetic, comprehensive information to support the needs of MEAs, proactive scientific input on emerging threats and issues, increased ability at all levels to predict the consequences of current actions, and insights from the relevant sciences and other forms of knowledge to inform local/national decisions on topical issues

(b) The need for more capacity: mobilizing scientific expertise for local national and regional level capacity building, and improving understanding of the factors affecting biodiversity and ecosystem services; and

(c) The need for improved communication: enhancing understanding of how to use science, improving access to science so that it can be more effectively used in decision-making, promoting

6 Information on the IMoSEB consultative process, and copies of all reports and submissions can be found at www.imoseb.net

7 The report of the final meeting of the IMoSEB International Steering Committee can be found at www.imoseb.net/international_steering_committee_2

increased dialogue among diverse knowledge systems, and identifying research priorities and gaps identified by decision-makers' concerns.

25. While recognising that a number of intergovernmental and non-governmental institutions are already addressing some of these needs, the consultation recommended further and urgent consideration of the establishment of a means of enhancing the use of science in decision making at all levels, and suggested a number of principles and characteristics that needed to be considered in carrying this out.

26. The International Steering Committee also invited the UNEP Executive Director to convene an intergovernmental meeting with relevant governmental and non-governmental stakeholders to consider establishing an efficient international science-policy interface to address these needs, which would also have the following characteristics:

(a) Being flexible and pragmatic: intergovernmental in nature, but also include non-governmental stakeholders, and building upon existing networks of scientists and knowledge-holders;

(b) Building on what already exists: in collaboration and as a follow up to the Millennium Ecosystem Assessment, consider the need, scope and requirements for assessments of biodiversity and ecosystem changes at the global level, and ensure interaction with other relevant assessment processes;

(c) Incorporating ongoing evaluation: include monitoring procedures for measuring its effectiveness, used from the outset for programme evaluation, development and continuation.

C.2 Millennium Ecosystem Assessment Follow-up Global Strategy

27. In 2005, the Millennium Ecosystem Assessment (MA) was completed, based on the substantial contribution of a broad range of scientists[8]. Two independent evaluations of the MA were conducted. The first was by the Global Environmental Facility and was completed by 2006[9], while the second was conducted by the United Kingdom's Environmental Audit Committee of the House of Commons, which published its results in 2007[10].

28. Both evaluations reported that the MA's technical objective of assessing the capacity of ecosystems to support human well-being proved both innovative and far-reaching. The MA's emphasis on ecosystem services and their significance for human well-being is widely recognized as having made a major contribution to linking biodiversity conservation with poverty alleviation.

29. However, the evaluations also concluded that there was little evidence so far that the MA has had a significant direct impact on policy formulation and decision-making, especially in developing countries. This can be attributed to a number of reasons but with the main ones being:

(a) Gaps in ecosystem services knowledge base: More needs to be known about the interdependence of ecological and social systems for human well-being, including the way ecosystems function, their response to human pressure, and the relationship to biodiversity. Few ecosystem services, other than those traded in markets, are routinely monitored.

(b) Lack of operational tools and methodologies: There was limited availability of working models that could be used readily by policy-makers to analyze ecosystem services, and their trade-offs with development policies and resource allocations.

Insufficient attention to Sub-Global Assessments: Very few developing country sub-global assessments (SGAs) were adequately funded, resulting in the quality of the SGA products varying significantly.

Limited Economic Analysis: The MA fell short of providing convincing economic values of ecosystem services, and in particular of the regulating and cultural services which could be used to evaluate the trade-offs with conventional development strategies.

8 The reports of the Millennium Ecosystem Assessment can be found at www.maweb.org

9 Terminal evaluation of the UNEP/GEF Project "Millennium Ecosystem Assessment" – Project Number MT/FP/CP/1010-01-04, September 2006. Available at www.unep.org/eou/Pdfs/Millennium Eco Assessment Report unedited.pdf

10 House of Commons, Environmental Audit Committee. The UN Millennium Ecosystem Assessment. First Report of Session 2006-07. Published on 3 January 2007. Available at: www.publications.parliament.uk/pa/cm200607/cmselect/cmenvaud/77/77.pdf

(c) Lack of periodic assessments: No permanent body or process exists to conduct periodic assessments of the status of ecosystem services to monitor and track changes in ecosystem services and their impacts on human well-being.

(d) Limited awareness and understanding among decision-makers on the MA findings and the concept of ecosystem services: Ecosystem services are a new concept to most decision makers. As a result, there is limited capacity to apply the ecosystem services framework and work proactively on incorporating ecosystem services considerations into development strategies.

30. In addition to the independent evaluations, the Conference of the Parties of the Convention on Biodiversity has considered the implications of the MA for the work of the Convention (decisions VIII/9 and IX/15), and, *inter alia*, requested the Executive Secretary, and invited Parties and other Governments, to contribute actively to the implementation of the global strategy for follow-up to the MA aimed at addressing knowledge gaps, promoting sub-global assessments, promoting application of the MA framework, methodologies and findings, and outreach.

C.3 Ad hoc international and multi-stakeholder meeting on an intergovernmental science-policy platform on biodiversity and ecosystem services

31. This meeting was convened by UNEP in response to the invitation made by the IMoSEB consultative process, as part of the follow up to the Millennium Ecosystem Assessment, and in response to decision IX/15 of the ninth meeting of the Conference of the Parties to the Convention on Biological Diversity. It was agreed at the meeting that no recommendations would be adopted, but that the Chair's summary, annexed to the meeting report, would serve as the outcome[11].

32. In calling for the gap analysis, participants specifically identified the following as being important issues to be addressed:

(a) The strengths and weaknesses of existing science-policy interfaces and coordination among them at all spatial scales, including the advisory bodies of biodiversity-related Multilateral Environmental Agreements and United Nations bodies;

(b) The potential for strengthening existing science-policy interfaces, as well as the potential added value of a new mechanism complementing existing interfaces and helping to overcome the recognised weaknesses in the current system; and

(c) That mechanisms to improve the science-policy interface could include components of multi-scale assessments, early warning, policy information and capacity development

C.4 Conducting the gap analysis

33. In order for the gap analysis to provide an effective basis for future discussions on improving the science-policy interface, it must have the following characteristics:

(a) Provide a succinct summary of the current situation and existing plans and suggestions for improving on it, supported by appropriate technical annexes and references;

(b) Draw not only on written reports and analysis, but also on the experiences of stakeholders familiar with the different processes and mechanisms under review; and

(c) Allow for stakeholder review of the different components of the analysis, and for full peer review of the draft final report.

34. Where possible, criteria will be used as a basis for reviewing particular science-policy interfaces and the documents and processes on which they base their discussions and decisions. Criteria would include such issues as scientific credibility, independence, degree of peer review, policy relevance, and so on.

35. It is intended that the gap analysis will address multiple scales. However while it is possible within the likely time and resources to review all relevant global efforts, it is only possible to review examples of regional and national processes and mechanisms. Advice will be sought from key stakeholders on which regional and national processes to use as examples.

11 Copies of reports and documents for the IPBES Meeting can be found at www.ipbes.net

36. Given the time constraints, the content of the preliminary report is necessarily preliminary in nature, and has not yet benefited from more thorough review, and from stakeholder discussion. Specifically, the preliminary report is limited to:

(a) identifying the context and mandate for the gap analysis;

(b) identifying what the full gap analysis will cover;

(c) providing initial review of some issues in more detail;

(d) recommending a review process;

(e) identifying next steps; and

(f) soliciting feedback of governments and other key stakeholders.

However, the key elements of the detailed analyses that might be undertaken are all considered within this report.

D. Use of science and scientists by policy advisory processes

37. According to the Chair's Summary, most participants at the IPBES Meeting recognized that there were currently numerous national and international science-policy interfaces (mechanisms and processes) for biodiversity and ecosystem services, and expressed the need for a gap analysis of the strengths and weaknesses of the existing interfaces and coordination among them at all spatial scales (including the scientific subsidiary and advisory bodies of relevant biodiversity-related multilateral environment agreements and United Nations bodies).

38. At the international level, whether global or regional, consideration needs to be given to the need for and use of science by international agreements, and by other intergovernmental processes including UN agencies. This is addressed in Subsection C.1 and Subsection C.2, which aim to review the processes that are currently in place for using science in guiding policy and supporting decision making, and to identify both those science-policy processes and mechanisms that are working well and those where improvements are necessary. In many cases the needs for improvement in the science-policy interface have already been discussed by the agreements and processes concerned.

39. Given the need for consistent and coherent implementation of international agreements, and the consistent and coherent use of science in decision making both with respect to international agreements and in other intergovernmental processes, a further serious consideration is the extent to which the scientific advisory processes referred to in these sections are coordinated. This is addressed in Subsection C.3, which aims to review current efforts at coordination, and how these might be improved.

40. At the national level the processes for incorporating science into decision-making tend to be rather different, and vary significantly from one country to another. The general principles are dealt with in Subsection C.4 below, and in Section G on analysis of capacity building needs.

41. Finally, it should not be forgotten that in addition to the science-policy mechanisms and processes themselves, there are a number of organizations working actively at the science-policy interfaces helping to make available and interpret relevant science for decision-makers. Review of the role and contribution of these organizations would be a significant exercise in its own right, but gap analysis of the adequacy of how science is used in policy development and implementation would be incomplete without also addressing this issue. This is considered further in Section I.

D.1 Review of the scientific advisory bodies and processes of international agreements

42. The aim of this review is to understand the processes that already exist, the timetables involved, the means by which scientific advice is currently sought and used, existing reviews of gaps and shortcomings, and efforts that are already underway to improve the current situation. However there are many different agreements, so in order to ensure that the task remains manageable, the focus will be on the following international agreements, adding experience from other agreements and processes as time allows:

(a) The global biodiversity-related treaties and their related protocols and agreements, including the Convention on Biological Diversity, the Convention on International Trade in Endangered Species, the Convention on Migratory Species and its daughter agreements, the Ramsar Convention on Wetlands, and the World Heritage Convention, as well as the International Treaty on Plant Genetic Resources for Food and Agriculture;

(b) The biodiversity aspects of the other two Rio agreements, the United Nations Framework Convention on Climate Change (UNFCCC) and the United Nations Convention to Combat Desertification, including ways in which the International Panel on Climate Change makes inputs into UNFCCC;

(c) Example of regional agreements, including the Antarctic Treaty System, the Cartagena Convention and SPAW Protocol (as an example of a regional seas convention), and the Berne Convention;

43. Appendix 1 provides an initial review completed for the preliminary report, drawing on existing information sources for the global biodiversity-related treaties (excluding their related protocols and agreements) and the other Rio agreements. This initial review, which is based on official documents, has not yet benefited from stakeholder review. For example, there are several discussions in the scientific literature concerning the effectiveness of the CBD's SBSTTA in addressing science[12,13]. Appendix 1 should therefore be considered a preliminary draft, and preliminary findings are addressed below.

D.2 Review of the scientific advisory bodies and processes of other intergovernmental processes

44. The aim of this review is to understand the processes that already exist, the timetables involved, the means by which scientific advice is currently sought and used, existing reviews of gaps and shortcomings, and efforts that are already underway to improve the current situation. In order to ensure that the task remains manageable, focus would be on biodiversity-relevant aspects of the following, adding experience from other processes as time allows:

(a) United Nations bodies, including UNEP, the Food and Agriculture Organization of the United Nations (FAO), the United Nations Development Programme (UNDP) and the United Nations Educational, Scientific and Cultural Organization;

(b) Key global processes such as the "Earth Summits" (using the World Summit on Sustainable Development as an example), the Commission for Sustainable Development, and the Global Environment Facility's Scientific and Technical Advisory Panel); and

(c) Examples of regional and other sub-global processes, such as the Arctic Council (and its programme on Conservation of Arctic Flora and Fauna), and the African Ministerial Conference on the Environment (as an example of a regional ministerial process).

45. Given time constraints it has not been possible to carry out any of this review prior to the 25th meeting of the Governing Council, so this is not addressed further here. However other documents before the Governing Council concerning strengthening the scientific base of UNEP will be relevant to the review (UNEP/GC.25/INF/20).

D.3 Review of existing coordination mechanisms and opportunities at the international level

46. In recent years there has been an increased focus on improving the coordination of international processes and mechanisms, on increased synergy, and on reducing duplication of effort. This is apparent, for example, from the work of the UN Secretary-General's High-level Panel on UN System wide Coherence in the Areas of Development, Humanitarian Assistance, and the Environment that reported in 2006, increasing efforts to coordinate the work of UN bodies in particular.

47. This review will cover a number of the efforts specific to the science-policy interface for biodiversity and ecosystem services, to learn lessons from what is currently being done and to identify both gaps and opportunities. Appendix 2 provides an initial review completed for the preliminary report, drawing on existing information sources. This initial review only addresses international agreements,

12 Koetz, Bridgewater, van den Hove and Siebenhüner (2008). The role of the Subsidiary Body on Scientific, Technical and Technological Advice to the Convention on Biological Diversity as a science-policy interface. *Environmental Science and Policy* 11(6): 505-516

13 Laikre, Jonsson, Ihse, Marissink, Gustavsson, Ebenhard, Hagberg, Stål, Walter and Wramner (2008). Wanted: Scientists in the CBD Process. *Conservation Biology* 22(4): 814-815

and has not yet benefited from stakeholder review, so should be considered a preliminary draft. Preliminary findings are addressed below.

48. There are other coordination mechanisms that will need to be considered in the next phase of the gap analysis, including, for example, the Collaborative Partnership on Forests (CPF)[14], which has as members 13 UN bodies, international organizations and secretariats. CPF has an initiative on science and technology, which aims to "*bring together leading scientists from around the globe to provide validated and independent scientific information on key issues of political interest*". The experience of the CPF with this and its other collaborative initiatives will be valuable.

49. Of very different nature, but also providing valuable experiences, is the European Platform for Biodiversity Research Strategy (EPBRS)[15]. EPBRS is a forum where scientists involved in national science-policy interfaces (and often also in national delegations to intergovernmental processes), discuss policy-relevant research priorities. Their work influences EC research agendas, and helps to ensure the relevance to policy of publicly funded science. There have been several reviews of the work of EPBRS[16].

50. In addition to the above, it should be noted that it is already common practice for different international mechanisms and processes to use the same scientists in advisory capacities specifically because they have experience of other mechanisms or processes. While not being a particularly robust mechanism for achieving coordination, this does have the potential to ensure that there is at least a degree of "cross-informing" amongst different mechanisms and processes.

D.4 Processes and mechanisms at national and local levels

51. The use of science and scientific expertise to support decision-making and policy development is as important at national and local levels as it is internationally. While decision-makers at these levels draw on material from international processes, in each country there is a range of different mechanisms and processes by which science and scientists could, or should, be involved in decision-making.

52. However while it would be illustrative to review what is currently being done (or not done) this would require significant time and resources. Instead a review of a number of example countries is anticipated, working with knowledgeable experts from these countries. Given time constraints it has not been possible to carry out such a review prior to the 25th meeting of the Governing Council, so this is not addressed further in this preliminary report except in the considerations on capacity development discussed in Section G.

D.5 Summary of identified gaps and needs

53. The key issues that need to be addressed are the strengths and weakness of the current arrangements, how they can be improved, and what they are lacking in order to ensure that policy and decision making processes benefit from efficient and effective use of science and scientists. Given the preliminary nature of this report, it would be premature to present conclusions, but it is anticipated that the following initial findings will help to focus further discussion on this issue as the full gap analysis is undertaken.

54. Mandates: One of the strengths of the existing scientific advisory bodies and science-policy interfaces is that in the majority of cases they are mandated to support particular agreements, processes and organizations, and therefore, in theory at least, they have a ready audience for their advice who are expected to take that advice into account in their decision making. Additionally, the *modus operandi* of the scientific advisory processes reviewed so far suggests that they are both expected to take account of scientific learning and experience, and have the potential to call on and involve scientists.

55. Implementation: The issues are therefore: (i) the extent to which science and scientists are effectively involved in discussion on the agendas set by the policy processes; (ii) the extent to which new issues can be raised based on emerging scientific understanding when they are not on the agenda of these policy processes; and (iii) the degree to which scientific input is affected by political

14 See www.fao.org/forestry/cpf

15 See www.epbrs.org

16 For example: van den Hove, S. and Sharman, M. (2006). Interfaces between science and policy for environmental governance: Lessons and open questions from the European Platform for Biodiversity Research Strategy. In: Guimarães Pereira, Â., Guedez Vaz, S., Tognetti, S. (eds). *Interfaces Between Science and Society.* Greenfield Publishing, Sheffield.

considerations. Each of these has been raised as concerns in one or more fora, and in a number of cases serious attempts are already being made to try to address these concerns.

56. Forward agendas and strategies: Many of the convention scientific advisory bodies have now developed their own workplans and strategies, which in most cases identify the issues that they are addressing in the period up to the next COP. While not being specifically intended for this purpose, this provides interested parties, including scientists with advance information on the issues being discussed, increasing opportunities for making input proactively. Taken together these also provide a valuable indication of the scientific and information needs of the conventions.

57. Participation: In most cases the degree to which scientists are involved in scientific advisory bodies is in the hands of national delegations, which are in a position to decide on who their representatives and advisors are. In some conventions, for example, delegations to scientific advisory bodies include more scientists and there is more scientific discussion, while in other conventions there is more political involvement. Obviously this is affected by the types of issues under discussion, and the degree of national concern engendered by these issues.

58. Cooperation and coordination: At present this is best demonstrated through joint workshops, through collaboration between CITES and CMS on taxonomy and nomenclature, and through more general cooperation on development of outcome-oriented indicators (particularly in the context of the 2010 biodiversity target. Action to increase coordination and cooperation in areas of mutual interest is likely to increase in the coming years, as secretariats and Parties see the added value of doing so.

59. Links to other scientific processes: In only two cases looked at so far are there direct and mandated links between an international convention and a scientific assessment process, UNFCCC and IPCC, and the International Treaty for Plant Genetic Resources for Food and Agriculture and the *State of the World's Plant Genetic Resources for Food and Agriculture*. In other cases use is made of assessment reports, which are often referred to in decisions and resolutions, but the linkage is less direct.

60. Rosters of experts: Both the CBD and UNCCD have attempted to use rosters of experts to further implementation of the convention, but the evidence to date suggests that this has not been very effective. CBD has discontinued the practice, preferring to call on countries to provide particular experts as and when their input is required. UNCCD has tried unsuccessfully on several occasions to get feedback on use made of the roster of experts, and has now established a Group of Experts to support the work of its Committee on Science and Technology.

61. Scientific credibility, independence and peer review: In most cases scientific advisory bodies address the issues of scientific credibility, independence and peer review through the processes by which they garner advice and information, by the manner in which the documents guiding their discussion are prepared, and through discussion of relevant documents delivered through other processes. However the agendas of these scientific advisory bodies are directed by their respective governance bodies, who also control the availability of resources (and hence the capacity of the scientific advisory bodies and secretariats to call on scientists for their input).

62. Clearly these initial findings need to be augmented by further review, including review of other intergovernmental processes and further consideration of processes at the national level, however they provide a useful focus for further discussion as the gap analysis proceeds. Particularly valuable may be further review of the process of expert selections, the peer review process and the acceptance, agreement and adoption of the final reports of the scientific advisory bodies to look for common elements where new, additional or more coordinated support might aid their work.

E. Assessments of knowledge intended to inform policy

63. According to the Chair's Summary, there was broad recognition at the IPBES Meeting that there was a need to improve the science-policy interface, which should use existing relevant assessments and the best available multidisciplinary knowledge (i.e., natural, social and economic sciences, including traditional and indigenous knowledge).

64. While the report of the IPBES Meeting does not refer to them specifically, in addition to assessments *per se*, for a gap analysis to be complete it would also need to address use of science in indicator processes, and how models and scenarios are used for combining scientific information from multiple sources. These issues will be addressed in the following three subsections, looking not only at international applications, but also at links amongst global, regional and national activities.

65. While it is not part of the current review, it is important to also be aware of the extent to which information networks, services and tools can contribute to increasing access to scientific information for supporting policy. For example the information tools provided by organizations such as the Global Biodiversity Information Facility or the UNEP World Conservation Monitoring Centre, the facilitated and capacity building networks such as the Inter-American Biodiversity Information Network or the ASEAN Centre for Biodiversity, and the information services provided by the Clearing House Mechanism established under the auspices of the Convention on Biological Diversity. This is considered further in Section I.

E.1 Review of assessment processes and interrelationships among them

66. Assessments are currently one of the main means of synthesising information from multiple sources and making it available for input to policy processes. The aim here will be to review a range of current processes in order to understand how science and scientists contribute, how well they are focused on addressing policy needs, identified gaps and shortcomings, and efforts that are already underway to improve the current situation. In order to ensure that the task remains manageable, focus would be on the following, adding experience from other processes as time allows, concentrating on aspects of biodiversity relevance:

(a) Key global assessments relevant to biodiversity, such as the Millennium Ecosystem Assessment, the Global Environmental Outlook, the Global Biodiversity Outlook, the Global Forest Resources Assessment, the IUCN Red List, the FAO State of the World's Plant Genetic Resources for Food and Agriculture, the FAO State of the World's Animal Genetic Resources for Food and Agriculture, and The Economics of Ecosystems and Biodiversity;

(b) Examples of other related assessment processes, such as the International Panel on Climate Change, the International Assessment of Agricultural Knowledge, Science and Sustainable Development, the Global International Water Assessment, the World Water Assessment Programme, the OECD Environmental Outlook, the Land Degradation Assessment in Drylands, and the Stern Review on The Economics of Climate Change;

(c) The marine assessments and related work in support of UN General Assembly Resolution 60/30 on oceans and law of the sea, which calls for a regular process for global reporting and assessment of the state of the marine environment, including socio-economic aspects; and

(d) Examples of sub-global assessments, such as the Southern African Sub-Global Assessment, Western China, and the Caribbean Sea among 15 others which have used the Millennium Ecosystem assessment framework as a common denominator. The global MA follow-up strategy calls for a more coordinated approach to undertaking these sub-global assessments, which can be the building blocks for future global assessments.

67. Appendix 3 provides an initial review completed for the preliminary report, drawing on existing information sources including other documents before the Governing Council concerning the global environmental assessment and strengthening the scientific base of UNEP (UNEP/GC/25/4, UNEP/GC/25/4/Add.1, UNEP/GC.25/INF/11, and UNEP/GC.25/INF/20). Initial findings are summarised below.

E.2 Review of indicator processes and interrelationship among them

68. Indicators are increasingly being used to inform policy processes, whether as part of assessment processes, or independently. This is closely related to the increased use of quantitative targets in setting policy. The aim here is to review a range of current processes in order to understand how science and scientists contribute, how scientifically robust the indicators are, how well they are focused on addressing policy needs, where the identified gaps and shortcomings are, and efforts that are already underway to improve the current situation. In order to ensure that the task remains manageable, focus would be on the following, adding experience from other processes as time allows, concentrating on aspects of biodiversity relevance:

(a) Key global indicator processes, such as the CBD 2010 indicators and related work of the 2010 Biodiversity Indicator Partnership, and the indicators of achievement of the Millennium Development Goals and associated targets;

(b) Examples of regional indicator processes, such as the project to Streamline European 2010 Biodiversity Indicators (SEBI2010);

(c) Aspects of other indicator processes; such as the biodiversity-related statistical work of UN Statistical Division, the FAO Statistics Database, OECD Statistics, and Statistical Office of the European Communities (EUROSTAT); and

(d) National indicators on biodiversity promoted by these processes.

69. Appendix 4 provides an initial review completed for the preliminary report, drawing on existing information sources on the 2010 and MDG indicators in particular. This initial review has not yet benefited from stakeholder review, and should be considered a preliminary draft. Preliminary findings are considered below.

E.3 Review of the role of models and scenarios

70. Models and scenarios are increasingly being used as a means of bringing information together from a range of different sources in such as way as to inform policy processes, and as such they are often used as components of assessments. For example in the Millennium Ecosystem Assessment the potential effects of pressures on the environment were explored and demonstrated through the development of four possible future scenarios: global orchestration; order from strength; technogarden and adapting mosaic.

71. The aim will be to review a range of currently used models and scenarios in order to understand how science and scientists contribute, how well the models and scenarios are focused on addressing policy needs, any identified gaps and shortcomings, and the efforts that are already underway to improve the current situation. In order to ensure that the task remains manageable, focus would be on the following, adding experience from other processes as time allows, concentrating on aspects of biodiversity relevance:

(a) Major biodiversity-related scenario exercises, such as those employed in the Millennium Ecosystem Assessment, the Global Environmental Outlook and the Global Biodiversity Outlook and associated reports; and

(b) Key modelling approaches, such as the Global Methodology for Mapping Human Impacts on the Biosphere (GLOBIO) developed by the Netherlands Environment Agency and UNEP (including both UNEP-WCMC and GRID Arendal).

72. Given time constraints it has not been possible to carry out any of this review prior to the 25th meeting of the Governing Council, so this is not addressed further here. However plans are already under way to carry out this review in early 2009 as a contribution to both preparation of the next edition of the Global Biodiversity Outlook and the second phase of The Economics of Ecosystems and Biodiversity review.

E.4 Summary of identified gaps and needs

73. Given the preliminary nature of this report, it would be premature to present conclusions, but it is anticipated that the following initial findings will help to focus further discussion on these issues as the full gap analysis is implemented.

74. Mandates: The evidence suggests that far more attention is paid by governments to those assessment and indicator processes that have been mandated by intergovernmental processes and/or have significant governmental involvement in their development and in their governance.

75. Current assessment landscape: There is currently a wide range of different assessments evaluating both environmental and socio-economic factors with substantial scientific input. However the extent to which they are effectively used in policy process varies widely, as does the extent to which they are effectively targeted on specific policy processes.

76. Future assessment landscape: While there are many different assessments either underway or having been completed in the recent past, there is no single message coming from them, rather a plethora of different and occasionally conflicting messages. This led, for example, to the synthesis prepared for the Governing Council (UNEP/GC.25/INF/11) that drew on eight assessments carried out in 2007-8. Consideration needs to be given to whether improvements in coordination, and a more coordinated delivery of messages arising from assessment processes, might increase their use in policy fora.

77. Timing of assessments: To a large extent ongoing assessments are insufficiently flexible to respond to demands from MEAs for targeted or rapid integrated assessments on emerging issues relating to biodiversity, and indeed their periodicity may preclude responding to many emerging issues in a timely manner to guide decision-making.

78. Multi-scale assessments: There is significant potential for better linking assessments at different geographic scales, and with different but related thematic foci, through the use of a core set of common, scaleable variables. This would allow, for example, for the assessment of linkages between ecosystem services at different scales.

79. Policy effectiveness of assessment findings: There is concern that the uptake of assessment findings within policy and decision-making processes is less than it should be, given the significance of the findings and the degree of urgency they imply. This needs considering further both from the perspective of how the findings are communicated, and how science-policy interfaces address them.

80. Current indicator development: There is currently a remarkable amount of cooperation on development of outcome-oriented indicators, focused on the suite of indicators of achievement of the 2010 biodiversity target. However there is still much to do in developing the indicators and delivering them in appropriate formats to a range of different fora, and the involvement of scientists in this process is key.

81. Missing indicators: Meanwhile there are obvious gaps in the suite of indicators currently available, including indicators relating to genetic diversity, human aspects of ecosystems and biodiversity, and ecosystem services and human well-being. Again, the role of scientists in development of these indicators is vital.

82. Scientific robustness of indicators: There is concern from some scientific quarters that far better indicators could be developed, but at the same time it is important to policy makers to make the best use of what is available now. The key issue is to involve the scientific community more effectively as the current targets and indicators are reviewed, with a view to improving the use of indicators in the future.

83. Multi-scale indicators: In Europe at least, serious consideration is being given to exploring the relationship between national and regional indicators within the SEBI2010 project, which involves policy makers and scientists from right across Europe. Experience from this project needs to be considered in the light of practicalities and needs in other regions.

84. Data availability: While there is certainly more data available than is currently being used for both assessments and indicators, it is widely believed that what can be achieved at all levels is limited by data availability. This needs to be considered further in the light of future requirements for assessments and indicators at national, regional and global levels, and the increasing focus on ecosystem services.

85. National capacity and technical support: The capacity for development, implementation and use of both assessments and indicators varies significant from one country to another, and there is clearly a need both for capacity building, knowledge sharing and other support services.

86. It has been said on a number of occasions, including in the IMoSEB consultation and the IPBES meeting, that there is already a significant amount of data, information and knowledge available, but that it is not always readily accessible or effectively used. There are two issues relevant to this that, while not currently being addressed, are very relevant to both the full gap analysis and to follow up action. These are the issues of information services, networks and tools, many of which already exist, and the notion of building better ‘networks of networks’ (or ‘networks of knowledge’). Both issues are considered further in Section I.

F. Emerging issues of scientific concern

87. It is inherently difficult for policy and decision-making processes to adequately take account of emerging issues. To a significant extent this is because of the need for lead time to allow for all stakeholders to fully understand the issue and decide on their response to it, but also it is because, when government delegations are concerned, there is a need for governments to work out their own positions so that they feel able to take decisions relating to the issue in intergovernmental fora. Meanwhile there is a growing number of horizon scanning and futures processes being undertaken that aim to help in identifying and prioritising issues that may be of increased significance in the future, so the question is how to use these sorts of exercises in increasing the effectiveness of science-policy interfaces.

F.1 Review of the role of futures and horizon scanning exercises in identifying new issues

88. The aim of this review is to consider a range of horizon scanning and futures processes, focusing in particular on those that are relevant to biodiversity and ecosystem services. Appendix 5 reviews a number of these, addressing in turn[17]:

(a) Horizon scanning, which can be defined as the systematic examination of potential threats, opportunities and likely future developments which are at the margins of current thinking and planning (which can include the use of scenarios); and

(b) Futures techniques, where the results of horizon scanning exercises are further explored, usually with the involvement of key stakeholders, and sometimes also in the context of particular science-policy interfaces.

89. It should be noted, that these programmes range from long-term initiatives exploring futures around a small number of issues in depth, to specific reviews intended to guide the priorities and activities of a single organization. They vary widely in the extent to which have specific links to policy processes.

F.2 Review of how new issues are/can be brought into policy advisory processes

90. The full gap analysis will also need to explore how new issues come on to the agendas of the processes discussed earlier, and in particular how they are addressed by the science-policy interfaces. This could include looking at a past "emerging issue", such as bird flu or biofuels and biodiversity, to see how this was addressed and what lessons can be learnt from the ways in which the issue was handled by different science-policy interfaces. Such a review has not yet been carried out, but elements of both Appendix 1 (on scientific advisory processes of international agreements), and Appendix 5 (on futures and horizon scanning) address this issue. Also relevant here may be consideration of the study by the European Environment Agency on *Late Lessons from Early Warnings: The Precautionary Principle 1896-2000*[18].

F.3 Summary of identified gaps and needs

91. Given the preliminary nature of this report, it would be premature to present conclusions, but it is anticipated that the following initial findings will help to focus further discussion on this issue as the full gap analysis is implemented.

92. Potential value: Horizon scanning and futures techniques, including the use of scenarios, can support science-policy interfaces in identifying issues that need to be addressed, and in helping to prioritize both policy actions and research priorities. They provide a valuable tool in informing development of policy.

93. Communication: However the extent to which the results of existing horizon scanning and futures activities are communicated to science-policy interfaces varies significantly, as does the form in which the information is communicated, potentially reducing impact and therefore the attention the results receive.

94. Mandate and commitment: It is important for policy processes to be able to take proper account of emerging issues, and, for example, a number of international agreements have taken steps to improve the ways in which their scientific advisory bodies are able to address such issues. However these processes and mechanisms, and the ways in which emerging issues are drawn to the attention of such bodies needs further consideration.

95. Coordination: Meanwhile, given the broad range of existing initiatives, there is potential for policy makers to be receiving mixed messages. Except in the case where a futures process is established for a particular policy process, it may be valuable to have a more coordinated approach to the use of horizon scanning and futures techniques supporting science-policy processes, and a wider sharing of related knowledge and experience.

17 Defra, UK definition of horizon scanning 2002. See horizonscanning.defra.gov.uk

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96. Responding to need: As well as exploring futures, there is also a need for initiatives that respond to urgent questions that policy makers may have, and to provide rapid assessment of emerging issues. Again more coordination of this may be required, given that emerging issues are often relevant to a range of policy processes.

97. Use of results: In many areas there is also a need for improvement in the ability to assess the likely significance of emerging issues and to develop and appraise response options. This presents challenges not just for international policy processes, but also for capacity at the national level.

98. Note with regard to the above the importance of horizon scanning and futures techniques that address social and economic factors, and cross-sectoral issues relevant to biodiversity. For example the potential impacts of economic trends and market predictions. Discussions and research on the future of biodiversity needs to draw on information and expertise from all relevant disciplines.

G. Targeting policy makers

99. Referred to in the report of the IPBES Meeting variously as "Policy Information" and the need to "translate information into policy options that are understandable for policy makers", this was also a key issue for many of those participating in the IMoSEB consultations. This issue concerns the benefits that accrue from ensuring that policy makers have access to information from science and scientists in a form that best helps them to use it. In other words the information provided is far more likely to be used if it is:

(a) Context specific: the implications of scientific research are expressed in such a manner that their relevance to policy issues and decision making is readily apparent to a non-scientist;

(b) Clearly expressed: the implications of scientific research are expressed succinctly, and in such a manner that the conclusions and implications are readily understood by a non-scientist;

(c) Reliable: arising from credible sources, backed up by appropriate research and supplementary evidence (and where appropriate caveats), and peer reviewed; and

(d) Appropriately communicated: delivered in the most appropriate formats and through the most appropriate channels to ensure that it is taken account of;

(e) Responsive: directly responding to the identified needs of or requests from policy making bodies and decision-makers (whether by direct request or responding to know agendas);

(f) Timely: the information is delivered not only in appropriate formats, but to timetables appropriate for consideration by those developing policy and making decisions.

100. It is suggested that this could be considered in the gap analysis by reviewing existing experience in communicating scientific issues to policy makers, and reviewing the lessons learnt, both positive and negative. Two such reviews are being considered, although others could be suggested:

(a) Millennium Ecosystem Assessment: Independent review of the impact of the MA on policy mechanisms and processes, and the extent to which its deliberations and conclusions have been taken account of; and

(b) Species threat analysis: Review of the ways in which different analysis of threats to species, including *inter alia*, the IUCN Red List, are taken account of by various international conventions and agreements.

101. Given time constraints it has not been possible to carry out any of this review prior to the 25th meeting of the Governing Council, so this is not addressed further here.

H. Capacity building needs

102. There are already many organizations supporting capacity building in one way or another, including UNDP, UNEP and FAO, as well as a wide range of multilateral and bilateral development assistance agencies. For example, the *Bali Strategic Plan for Technology Support and Capacity-building* (UNEP/GC/23/6/Add.1), which guides UNEP's work in this area, supports the implementation of the relevant outcomes of the intergovernmental consultation on strengthening the scientific base of UNEP (UNEP/GCSS.VIII/5/Add.4), which specify a number of important capacity building needs including: the need to strengthen national capacities for data collection, research, analysis, monitoring

and integrated environmental assessment; developing institutional capacities, staff training and support for appropriate and adaptable technologies and methodologies; support for assessments of environmental issues of regional and subregional importance and for the assessment and early warning of emerging environmental issues; support for scientific exchanges and for the establishment of environmental and inter-disciplinary information networks; and promotion of coherent partnership approaches. It also stresses that UNEP should help reinforce the capacities of national Governments to collect and analyse environmental data for use in decision-making and for participation in broader assessment processes.

103. In addressing capacity building needs in the context of this review, there seem to be two inter-related issues, identifying what the key needs are, and reviewing the extent to which these needs are already recognised in national capacity needs assessments and similar reviews so as to better understand what level of priority is being attached to such needs. Increasingly it is these needs assessments and related strategies that are being focused on by those supporting capacity building activities.

104. However it should be noted that this section cannot really be completed until the reviews referred to in the previous sections have been completed, as the key issue is in building capacity to address the needs identified in these sections. What is described here should therefore be taken as preliminary considerations that need to be substantiated and then reviewed with a wide range of stakeholders.

H.1 Identification of the types of capacity building needs

105. Initial review suggests that the following are the key areas where capacity may need building in order to improve the use of science in policy development and decision making:

(a) Understanding: Recognition of the importance of using science and scientists in decision making and policy development, understanding by both scientists and policy makers of how to effectively involve science and scientists in existing science-policy processes;

(b) Dialogue: Increasing opportunities for scientists and decision-makers to discuss issues of concern to each, further contributing to understanding and to efficient and effective implementation of other activities;

(c) Process: Having the necessary policies and procedures in place to ensure that the experience and knowledge of scientists can effectively be drawn upon in decision making and policy development processes;

(d) Research: Ensuring that the scientific research necessary for supporting decision making and policy development is a priority, that scientific capacity and research networks are sufficient, and that scientists are able to collaborate freely with colleagues in other institutions and countries;

(e) Prioritization: Understanding the research needs for supporting decision making and policy development, including not only recognition of what research is necessary, but also understanding of the timeframes necessary for research and the need to consider the longer term;

(f) Communication: Improving the ability of scientists to more effectively communicate to those taking decisions and developing policy, and improving the ability of policy makers to understand the links between biodiversity, ecosystem services, economic development and human well-being;

(g) Resources: Ensuring that the necessary human and financial resources are in place to fulfil these needs, including drawing where necessary on international assistance, partnerships, and collaboration with other organizations.

106. However it is also important to understand the issues that need addressing in building capacity in using science in policy development and decision making with respect to biodiversity and ecosystem services. Again, initial review suggests that these issues can be summarised as:

(a) Awareness and understanding of the concepts of biodiversity and ecosystem services, and why they are important to human well-being;

(b) Understanding and information on the status, properties and potential of biodiversity and ecosystem services, and how this is relevant to human well-being;

(c) Understanding and information on how human actions affect biodiversity and ecosystems and the services they supply, and the likely affects of future action or inaction.

107. It should be noted that the above is true for all science-policy interfaces and countries, and not just for developing countries and those with economies in transition. The only real difference is the extent to which external assistance may be required in order for the activities to take place.

H.2 Review of the extent to which these needs are recognised in seeking assistance

108. It is widely recognised that there is a need to build capacity in developing countries in developing and assessing knowledge, and using it in decision making. The extent to which this is already realised should be reflected in a number of already existing documents. What is therefore proposed is to review the extent to which these capacity building needs are addressed in existing plans and projects. In order to ensure the link back to the science-policy interface, this will in particular address needs for national implementation of international agreements. An exhaustive review is not possible, therefore it is suggested that a review of the following for a range of agreed countries be undertaken:

(a) National needs assessments, such as National Capacity Needs Assessments;

(b) UN Development Assistance Frameworks;

(c) Biodiversity related MEA national strategies, action plans and reports; and

(d) GEF Portfolios, including past and currently projects, and those in the pipeline.

H.3 Summary of identified gaps and needs

109. Given the preliminary nature of this report, it would be premature to present conclusions, but it is anticipated that the following initial findings will help to focus further discussion on this issue as the full gap analysis is implemented.

110. Expertise in Science-policy dialogue: There are already many capacity building initiatives, supported by a wide range of organizations. Many of these include elements of improving the use of science in policy development and decision-making, and these usually respond to priorities identified by national governments. While it may be necessary to increase the level of priority and resources allocated to this area of capacity building, this preliminary gap analysis cannot make judgement on the specific areas where resources should be directed to build the capacity for improved science-policy dialogue.

111. Focus and priority: Capacity building for improvement of science-policy interfaces would almost certainly benefit from greater clarity in what needs to be achieved and how. This requires clearer definition of the information, science and research needed, clearer understanding of how this will support decision making, and increased priority afforded to capacity development in this area. Needs and priorities also need ongoing review, as knowledge is increased, pressures on biodiversity and ecosystems change, and societies evolve.

112. Coordination: While there are capacity building initiatives, and substantial investment, there is perhaps a need for greater coordination based on the priorities and objectives identified in the previous point. This would include reviewing the existing mechanisms for capacity building and the extent to which they address the science-policy interface.

113. Support services: Related to the previous points is the need to share experience and lessons learnt, to provide guidelines and other supporting documentation in multiple formats and languages, to provide access to data and information and the knowledge it can generate, and to provide access to appropriately qualified experts.

I. Summary of preliminary findings

114. In each of the previous sections a number of preliminary findings have been identified, as well as areas requiring further elaboration. These are intended not as conclusions on which future action will be based, but as stimuli for further discussion as the gap analysis progresses.

115. This is also true for the following additional preliminary findings, which draw not only on work in preparation of this preliminary report, but also on discussions during the IMoSEB consultative process and at the IPBES Meeting.

116. Strengthen existing science-policy interfaces: It is clear that there are actions that can and are being taken by existing science-policy interfaces to improve their use of science and scientists. In

several cases improvements are being implemented following review and discussion. Further improvements could be sought.

117. Improve input of scientists to existing science-policy interfaces: If scientists better understood the existing science-policy interfaces, their agendas, timetables and needs, and how to contribute to them effectively, then they might be better able to support these interfaces, resulting in increased use of science and scientists.

118. Coordination of existing activities: There are many complementary and potentially overlapping scientific initiatives that could and should support policy development and decision-makers. It is possible that their impact would be more significant if they cooperated more closely, or were more closely coordinated, in particular as regards delivery of key messages.

119. Development of new activities: There is also a broad range of new and extended activities implied by discussion at the IPBES Meeting and the IMoSEB consultative process, which if it were all agreed to would comprise a significant programme of work.

J. Other issues

120. There are several other issues which do not easily fit within the previous sections, and which were not really addressed in previous discussions on this issue, but which seem relevant. Advice from those reading this preliminary report on the extent to which these issues should be addressed would be welcome. These issues include the following.

121. Specialist organizations working at the science-policy interface: A number of organizations specialize in reviewing scientific data, information and knowledge, and, working with scientists, support policy processes directly through, *inter alia*, convening and facilitating meetings in collaboration with secretariats, working with secretariats to prepare documents, and preparing other materials for briefing participants in scientific advisory bodies. Would it be appropriate to explore further the role of such organizations, and how this can be built upon?

122. Information services, networks and tools: There is a range of services and tools that already increase access to data, information and knowledge created by scientists, and which have the potential to be used in decision making and development of policy. Would it be appropriate to review a range of current services and tools in order to understand how well they are focused on addressing policy needs, how the information is used and delivered, and how this can be built upon? There are particularly strong references to the need for improvements in this area in the IMoSEB regional consultation in Africa.

123. Role of individual scientists, international research programmes and scientific networks: Scientists are essentially individuals, often working in relative isolation, and focused on specific topics. There are many significant scientific organizations and networks, but not all scientists are part of such networks. Would it be valuable to review the ways in which scientists can contribute to activities which might influence policy discussions, to review a range of scientific organizations and networks in order to understand how they encourage and coordinate scientists, to assess how well these organizations are focused on policy needs, and to identify gaps and shortcomings, and efforts that are already underway to address these?

124. Extent to which research funds are available to meet science-policy needs: Much of the work of scientists is influenced by scientific funding bodies. Would it be valuable to review a number of these bodies in order to understand how they influence scientists, and how well they are focused on and respond to policy needs?

125. Network of networks: While this is seen by many as one element of a potential solution to improving the science-policy interface, and therefore perhaps not part of the gap analysis, if a network of networks is to be built into the solution then an analysis would need to be undertaken in order to develop and implement that solution.

K. Next steps

126. This preliminary report is the first step in completing the gap analysis that will inform future discussion on improving the science-policy interface, whether this concerns improving the existing processes and mechanism, improving coordination amongst them, improving the coordination of scientists contributing to these processes, and/or establishing an additional new mechanism. The next steps are as follows:

(a) Feedback on preliminary report: Invite feedback on this preliminary report from all stakeholders, including governments participating in the 25th Meeting of the Governing Council, as guidance for both the structure and content of the full gap analysis;

(b) Support for the full gap analysis: Invite key stakeholders to provide input to the full gap analysis, and to review drafts of the analysis and its component parts as it is developed over the coming months;

(c) Implement the gap analysis: Carry out the gap analysis drawing on all existing information sources and the expertise of the key stakeholders already identified, ensuring that the full breadth of opinion is considered and addressed in the report;

(d) Peer review: Establish a peer review process that includes both those stakeholders providing input and a wide range of other interested parties, both to review and comment on the content, and to seek broader ownership of the resulting gap analysis; and

(e) Complete and disseminate the report: Having previously worked with key stakeholders to agree a dissemination and communication strategy that ensures effective use of the report in subsequent discussions on this issue.

127. The resulting report will be used to guide preparation for and discussion at the proposed second meeting concerning *an intergovernmental science-policy platform on biodiversity and ecosystem services*.

Appendix 1

Preliminary review of the scientific advisory bodies and processes of international agreements

A. Preamble

1. This review addresses the scientific advisory bodies and processes of two sets of international agreements: the six global biodiversity-related treaties[19], and the two other Rio Conventions[20]. The review focuses on the scientific advisory bodies of these treaties, and at present it is based entirely on the available documentation from convention meetings, and has not yet benefited from stakeholder review and comment, and input from other sources.

B. Summary for each agreement

B.1 Convention on Biological Diversity

2. Article 25 of the Convention mandates SBSTTA with the following tasks: *(a) Provide scientific and technical assessments of the status of biological diversity; (b) Prepare scientific and technical assessments of the effects of types of measures taken in accordance with the provisions of this Convention; c) Identify innovative, efficient and state-of-the-art technologies and know-how relating to the conservation and sustainable use of biological diversity and advise on the ways and means of promoting development and/or transferring such technologies; (d) Provide advice on scientific programmes and international cooperation in research and development related to conservation and sustainable use of biological diversity; and (e) Respond to scientific, technical, technological and methodological questions that the Conference of the Parties and its subsidiary bodies may put to the body.*

3. COP 5 recognized the need to improve the quality of scientific, technical and technological advice provided to the COP and to undertake sound scientific and technical assessments on issues critical for the implementation of the Convention. The COP requested SBSTTA to continue to improve the way it conducts its work, and asked SBSTTA to identify and develop methods for undertaking or participating in scientific assessments, to undertake a limited number of pilot scientific assessment projects, and to identify and regularly update assessment priorities and information needs (decision V/20)[21]. In response, SBSTTA 8 considered a draft strategic plan for the subsidiary body.

4. COP 7 tasked the Ad Hoc Open-ended Working Group on Review of Implementation of the Convention (WGRI) with a review of the impacts and effectiveness of existing processes under the Convention, including SBSTTA (decision VII/30). Following the 1st meeting of WGRI, COP 8 endorsed a consolidated *modus operandi* for SBSTTA. The consolidated *modus operandi* identifies strategic ways and means of improving the quality of scientific, technical and technological advice of SBSTTA as follows (decision VIII/10):

Improving the scientific, technical and technological inputs into SBSTTA meetings by, inter alia: (a) Strengthening relationships with the scientific and technical community through: (i) providing material about the work of the Subsidiary Body in a format that is accessible and relevant to the scientific and technical community; (ii) Actively disseminating the results of the work of the Subsidiary Body through scientific literature, both as reporting items and scientific papers, as reviewed and approved by the Conference of the Parties; (iii) Participating in, and contributing to, the scientific and technical components of other biodiversity-related processes; (iv) Using other bodies as a bridge

19 Convention on Biological Diversity (CBD), Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Convention on Migratory Species (CMS), Ramsar Convention on Wetlands, World Heritage Convention, International Treaty on Plant Genetic Resources for Food and Agriculture.

20 United Nations Framework Convention on Climate Change (UNFCCC), United Nations Convention to Combat Desertification (UNCCD)

21 An overview of the challenges to SBSTTA is provided in the report of the Brainstorming Meeting of SBSTTA Chairs on Ways and Means to Improve the Effectiveness of the Subsidiary Body (UNEP/CBD/SBSTTA/brainstorming/1/4).

between the Subsidiary Body and the scientific and technical community in relation to work programmes; (v) Engaging the scientific community in scientific assessments.

Improving the scientific, technical and technological debate during SBSTTA meetings by, inter alia: (a) Raising delegates' awareness about, and encouraging informal debate on, key issues through the provision of scientific and technical publications, keynote speakers, poster sessions, round-table debates and other side events during meetings of the Subsidiary Body; (b) Identifying other opportunities to prepare delegates, particularly those with limited experience, for the discussions on scientific and technical matters; (c) Dedicating sufficient time to the consideration of results of scientific and technical assessments.

5. The *modus operandi* of SBSTTA allows for the establishment of a limited number of Ad Hoc Technical Expert Groups (AHTEGs) on specific issues identified by the COP to '*provide scientific and technical advice and assessments.* The establishment of AHTEGs is guided by the following[22]:

(a) AHTEGs should "*draw on the existing knowledge and competence available within, and liaise with as appropriate, international, regional and national organizations, including non-governmental organizations and the scientific community, as well as indigenous and local community organizations and the private sector*";

(b) SBSTTA is requested, whenever it convenes AHTEGs "*to provide oversight to ensure that terms of reference clearly indicate their mandate, duration of operation, expected outcomes and reporting requirements, and that their mandates are limited to the provision of scientific and technical advice and assessments*";

(c) Parties are asked to nominate experts from AHTEG meetings, and in doing so are requested "*to give priority to the nomination of appropriate scientific and technical experts*", from these nominations, the Executive Secretary, in consultation with the SBSTTA Bureau, "*will select scientific and technical experts from the nominations submitted by Parties*" for each AHTEG; and

(d) The reports produced by the AHTEG should, as a general rule, "*be submitted for peer review*".

6. To date AHTEGs have reviewed and reported on a wide range of issues based on terms of reference usually prepared by SBSTTA and agreed by COP. These issues are as follows: marine and coastal protected areas; mariculture; forest biodiversity; biodiversity of dry and sub-humid lands; genetic use restriction technologies; biological diversity and climate change; in-depth review of the implementation of the programme of work on forest biodiversity; mountain biodiversity; integrated marine and coastal area management; protected areas; technology transfer and scientific and technical cooperation; gaps and inconsistencies in the international regulatory frameworks in relation to invasive alien species; traditional knowledge and the Clearing-House Mechanism; indicators for assessing progress towards the 2010 target; island biodiversity; and innovative financial mechanisms. Based on SBSTTA recommendations, the COP has frequently welcomed and made extensive use of AHTEG reports.

7. The original *modus operandi* of SBSTTA included the compilation of rosters of experts in the relevant fields of the Convention, with the following purpose: "*The experts on the rosters are invited to make available, upon request of the Executive Secretary, Parties or other countries and relevant bodies, their specific expertise in order to contribute to the further development of the scientific, technical and technological issues of the work programme of the Convention on Biological Diversity. Such requests could entail, inter alia, peer reviews, questionnaires, clarifications or examinations of scientific, technological and technical issues, specific contributions to the compilation of documents, participation in global and regional workshops and assisting in connecting the Convention-process to international, regional and national scientific, technical and technological processes*" (decision IV/16). However, through decision VIII/10, the COP decided to discontinue the use of the roster of experts.

8. In summary, the Convention has taken up the challenge of improving the quality of scientific, technical and technological advice provided to the COP, and of undertaking sound scientific and technical assessments on issues critical for the implementation of the Convention. There have been several suggestions for improving the workings and operations of SBSTTA, including the endorsement of a consolidated *modus operandi*. SBSTTA and COP have drawn extensively on the reports of AHTEGs, which are compiled of experts nominated by Parties and selected by the Executive Secretary in cooperation with the SBSTTA Bureau. The use of a roster of experts in relevant fields of the

22 Taken from decision VIII/10, although earlier guidance is provided by decision IV/16

Convention was discontinued in favour of the more flexible mechanism of Party nominations of experts for AHTEG meetings.

9. However, despite all efforts, in the closing session of SBSTTA 13 in 2008 some Parties expressed "*regret at the failure to make significant progress on most of the matters addressed"*, and "*disappointment that despite the scientific and technical advice mandate of SBSTTA, there had been very little focus on scientific and technical issues during the thirteenth meeting…. Given the urgency of the situation of global biodiversity, SBSTTA must refocus its work to deal with scientific, technical and technological issues in order to fulfil its mandate"* (report of SBSTTA 13, document UNEP/CBD/COP/9/3).

B.2 Convention on Migratory Species

10. Article VIII of the Convention provides for the establishment of the Scientific Council to provide advice on scientific matters. The functions of the Scientific Council are defined as: providing scientific advice to the COP, the Secretariat, and, if approved by the COP, to any body set up under the Convention or an Agreement or to any Party; recommending research and the coordination of research on migratory species, evaluating the results of such research in order to ascertain the conservation status of migratory species and reporting to the COP on such status and measures for its improvement; making recommendations to the COP as to the migratory species to be included in Appendices I and II, together with an indication of the range of such migratory species; making recommendations to the COP as to specific conservation and management measures to be included in Agreements on migratory species; and recommending to the COP solutions to problems relating to the scientific aspects of the implementation of the Convention, in particular with regard to the habitats of migratory species.

11. The COP frequently directs the Scientific Council to provide specific advice. For example, COP 3 requested the Council to provide recommendations and advice on a range of issues related to the conservation of Appendix I and II species, species to be added to the Appendices, and other issues (resolution 3.4). Through resolution 4.5, COP 4 directed the Scientific Council to provide further advice on Appendix species, existing Agreements and potential new ones and on small-scale pilot projects promoting the Convention's implementation. Resolution 7.12 of the COP, on the background of the growing number of Parties and hence members to the Scientific Council, acknowledged the need for a review of the Scientific Council's working practice '*to optimise its productivity and capability to deal with the scientific and technical aspects of numerous issues relevant to the conservation and sustainable use of migratory species*' and instructed the Scientific Council to produce a strategy on its scientific and conservation work. The 12th meeting of the Scientific Council elaborated on a Strategic Implementation Plan of the Council in light of the emerging Strategic Plan for the Convention. It also considered the *modus operandi* of the Council, with a focus on how to better involve the councillors in the work of the Convention, in particular during intersessional periods. The 13th meeting of the Scientific Council adopted its Strategic Implementation Plan. The Plan outlines the contributions of the Scientific Council to the CMS Strategic Plan 2006-2011. The 13th meeting also discussed the resources and working practices of the Council and agreed to retain its current format.

12. In summary, the Scientific Council has provided advice on issues as outlined by article VIII of the Convention. The challenges that have been recognised do not relate to the provision of advice on scientific matters *per se* but to the operations of the Council. With the growing number of countries acceding to the Convention, the membership of the Scientific Council is growing accordingly, which creates financial and logistical challenges to its functioning. The Council, as requested by the COP, has responded to this challenge with the adoption of a Strategic Implementation Plan that mirrors the Convention's Strategic Plan and guides the work of the Council.

B.3 Ramsar Convention on Wetlands

13. The Scientific and Technical Review Panel (STRP) of the Ramsar Convention was established by Resolution 5.5 as a subsidiary body of the Convention to provide scientific and technical guidance to the COP, the Standing Committee, and the Ramsar secretariat. Resolution VII.2 and Resolution VIII.28 modified the composition and *modus operandi* of the STRP. The present *modus operandi* was determined by Resolution IX.11.

14. The Standing Committee originally requested the STRP to concentrate on three specific items: review of the criteria for identifying Wetlands of International Importance; definition of ecological character and change in ecological character in relation to Ramsar sites; and review of the application of the Montreux record (relating to listed wetlands under threat). COP resolution VI.7 requested the Standing Committee to define the principal tasks for the STRP in the coming year. Through resolution

VII.2, the COP emphasized the need for establishing a close link between the STRP and the network of scientists and experts in each Contracting Party. The COP invited Contracting Parties to nominate STRP focal points, invited a number of organizations, including the International Organization Partners of the Convention, and bodies as observers to the STRP, and decided that the STRP membership should have the same regional structure as the Standing Committee.

15. COP resolution VIII.28 approved a revised *modus operandi* for the STRP. The *modus operandi* states that the COP shall establish the priorities for STRP work in the coming triennium and that the Standing Committee shall adopt the definitive list of STRP assignments for the triennium on the basis of the Convention work plan and resolutions adopted by the COP, and will provide additional guidance on priority tasks. The *modus operandi* identifies the Terms of Reference of the STRP and its members as follows:

a) review the tasks and nature of the products requested of it by COP Resolutions and the Convention's Work Plan;

b) undertake strategic review of the current tools and guidance available to Parties and new and emerging issues for the Convention;

c) determine and agree a mechanism for the delivery of each of these tasks, including the establishment of Expert Working Groups as appropriate, advise on which tasks it does not have the expertise or capacity to progress, and receive the advice of the Standing Committee for this work plan;

d) identify, for each task the Panel proposes to undertake, and with the advice of any Working Group on the topic, the best global expert(s) either from within or outside the Panel to undertake drafting work, taking into account geographical and gender balance and language ability;

e) identify, for each product in the work plan, and with the advice of any Working Group and the STRP Support Service, additional experts to undertake review by correspondence of draft materials, as necessary;

f) make expert review of the draft products in its work plan, taking into account the views expressed by additional experts in d) above, agree any amendments needed, and transmit these revised products for consideration by the Standing Committee;

g) ensure, with the assistance of the Ramsar Bureau, that the work of the STRP contributes to and benefits from the work undertaken by similar subsidiary bodies of other multilateral environmental agreements (MEAs).

16. Through resolution IX.11, the COP recognised the concern expressed by STRP about aspects of its operations, and its capacity and resourcing to deliver all of its required tasks. The COP consequently approved a revised *modus operandi* and established an STRP Oversight Committee, reporting to the Standing Committee, to deliver the responsibilities as defined by the revised *modus operandi*. The revised *modus operandi* identifies its key objective as "*to establish ways and means of ensuring that the STRP mechanism delivers the best available scientific and technical advice to the Convention, in the most efficient and cost-effective manner, through the work of widely recognized wetland conservation and wise use experts and networks*".

17. In 2008, COP 10 adopted resolution X.9, which confirms the *modus operandi* of the STRP with some refinements. Resolution X.10 outlines the tasks and priorities of the STRP for 2009-2012 under the following headings: ongoing functions of the STRP; strategic scientific and technical implementation; general wise use of wetlands; wetland inventory, assessment, monitoring and reporting; wetlands and human health; wetlands and climate change; wetlands and water resources management; Wetlands of International Importance; wetland management – restoration, mitigation and compensation; communication, education, participation and awareness. The COP notes that "*it has not been possible to progress some elements of STRP's priority work in the 2006-2008 triennium and that full delivery of the Panel's programme remains subject to resources*" (resolution X.10).

18. In summary, the STRP has been confronted with issues of lack of capacity and resourcing. In response, the COP has established a *modus operandi* for the scientific body and detailed outlines of the tasks to be undertaken by the STRP. While the mechanisms of producing scientific and technical guidance for the COP as well the Standing Committee and the Secretariat work well, the workload of the STRP remains substantial and is likely to continue to provide enormous challenges, including financial ones.

B.4 Convention on International Trade in Endangered Species

19. CITES has two scientific committees, the Animals Committee and the Plants Committee. A third scientific committee, the Nomenclature Committee, ceased to exist as its own body with COP 14 as it was thought that it would best function as a working group of the Animals and Plants Committees. The Plants and the Animals Committee were established through resolution Conf. 6.1. Both committees were subsequently re-established; the latest resolution in this regard is resolution Conf. 11.1 (Rev. CoP13). The same resolution agreed the terms of reference for both committees as, *inter alia*, to:

- provide scientific advice and guidance…on all matters relevant to international trade in… species included in the Appendices, which may include proposals to amend the Appendices;
- deal with nomenclatural issues;
- assist implementation of the Resolution on the Identification Manual and Decisions related to it and review proposals to amend the Appendices with regard to possible identification problems;
- cooperate with the Secretariat on the implementation of its programme of work to assist Scientific Authorities;
- develop regional directories that list the botanists and zoologists in each region who are experts in CITES-listed species;
- establish a list of those taxa included in Appendix II that are considered as being significantly affected by trade, and review and assess all available biological and trade information including comments by the range States on these taxa
- assess information on those species for which there is evidence of a change in the volume of trade or for which specific information is available to indicate the necessity for review;
- undertake a periodic review of animal or plant species included in the CITES Appendices;
- draft resolutions on scientific matters related to animals or plants, for consideration by the Conference of the Parties, with a budget for the work involved and an indication of the source of funding.

20. Document SC54 Inf. 4, describes the evolution of the terms of reference of the committees and of the duties and responsibilities of the committee members, together with the results achieved, resources and support available to the committees and a comparison with practices in other biodiversity-related multilateral environmental agreements (MEAs).

21. COP 13 directed the Standing Committee to determine a process for the review of the scientific committees and to proceed with the review. The Standing Committee established an External Evaluation Working Group to undertake the review. Document CoP14. Doc. 12 outlines the recommendations from the External Evaluation Working Group. The Working Group acknowledged that the scientific committees achieved a generally high level of performance in the high-priority tasks assigned to them and often with very limited resources or a reliance on voluntary effort. The Working Group undertook a gap analysis of duties performed and factors that could be compromising the scientific committees' performance, ways to improve or modify relevant procedures. The recommendations include, *inter alia*, the following:

- To achieve increased performance, particularly in lower-priority tasks, it would be necessary to increase budgetary funds and other resources in relation to those tasks, especially for translation and intersessional work.
- Performance of the scientific committees would further improve if greater consideration were given by the COP and the Standing Committee at the time tasks are assigned to the scientific committees, particularly with regard to whether these tasks are within their mandates and the forthcoming Strategic Plan, and whether the tasks are adequately resourced.
- The COP should take into account the workload of the committees in assigning tasks to them.

In addition, the Working Group made recommendations relating to the efficiency of the scientific committees and to means and mechanisms to deliver the products of the revision, including options for ongoing or periodic review of the committees, and indicators to monitor the improvement of the performance.

22. Responding to those recommendations, COP 14 directed the Animals and Plants Committees to '*evaluate the need to further review and revise the terms of reference* [for the establishment of the Animals and Plants Committees] *in Resolution Conf. 11.1 (Rev. CoP14) and as necessary revise the terms of reference for presentation at the 15th meeting of the Conference of the Parties*'.

23. In summary, CITES is unusual in having two (and for a long time having had three) scientific committees, requiring a large amount of resources. The Committees were established in the 1980s and had remained largely unchanged although they had been charged with additional tasks. The review process that has been initiated more recently has been trying to address the challenges of finding structural amendments that better enable the Committees to fulfil their tasks, including the provision of scientific advice and guidance to the bodies of the Convention.

B.5 World Heritage Convention

24. The World Heritage Convention does not have a scientific advisory body *per se*, but the Convention recognises and calls upon the competence and expertise of the International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM), the International Council of Monuments and Sites (ICOMOS) and IUCN, the International Union for the Conservation of Nature, and these organizations have been providing advice to the World Heritage Committee for more than 30 years.

B.6 International Treaty on Plant Genetic Resources for Food and Agriculture

25. In 2007, the 2nd session of the Governing Body of the International Treaty on Plant Genetic Resources for Food and Agriculture agreed that the establishment of a permanent subsidiary body was premature. It was decided that *ad hoc* technical bodies with focused, specialized and outcome-oriented terms of reference offered the best approach for the time being. However it is worth also noting here the link between the Treaty and the FAO assessment on *The State of the World's Plant Genetic Resources for Food and Agriculture* which is explicitly referenced in Article 17.3 of the Treaty, and which contributes to development and implementation of the *Global Plan of Action* that is referenced in Article 14.

B.7 United Nations Framework Convention on Climate Change

26. Article 9 of the Convention establishes the Subsidiary Body on Scientific and Technical Advice (SBSTA) "*to provide the Conference of the Parties and, as appropriate, its other subsidiary bodies with timely information and advice on scientific and technological matters relating to the Convention…Under the guidance of the Conference of the Parties, and drawing upon existing competent international bodies, this body shall:*

(a) Provide assessments of the state of scientific knowledge relating to climate change and its effects;

(b) Prepare scientific assessments on the effects of measures taken in the implementation of the Convention;

(c) Identify innovative, efficient and state-of-the-art technologies and know-how and advise on the ways and means of promoting development and/or transferring such technologies;

(d) Provide advice on scientific programmes, international cooperation in research and development related to climate change, as well as on ways and means of supporting endogenous capacity-building in developing countries; and

(e) Respond to scientific, technological and methodological questions that the Conference of the Parties and its subsidiary bodies may put to the body."

27. The COP has identified two key areas of work for SBSTA: promoting the development and transfer of environmentally friendly technologies, and conducting technical work to improve the guidelines for preparing national communications and emission inventories. The SBSTA also carries out methodological work in specific areas, such as the land use, land-use change and forestry (LULUCF) sector, hydrofluorocarbons and perfluorocarbons, and adaptation and vulnerability. In addition, the SBSTA plays an important role as the link between the scientific information provided by expert sources such as the Intergovernmental Panel on Climate Change (IPPC) on the one hand, and the policy-oriented needs of the COP on the other. It works closely with the IPCC, sometimes requesting specific information or reports from it, and also collaborates with other relevant international organizations that share common objectives.

28. The COP, through decision 6/CP.1, noted that SBSTA "*will be the link between the scientific, technical and technological assessments and the information provided by competent international bodies, and the policy oriented needs of the Conference of the Parties*." In annex I to the same decision, SBSTA was tasked with, *inter alia*, the provision of assessments of the state of scientific knowledge relating to climate change and its effects; summarizing scientific and other information provided by bodies such as the IPCC; preparing scientific assessments on the effects of measures taken in the implementation of the Convention; and providing advice on scientific programmes and on international cooperation in research and development related to climate change.

29. The report of the 28th session of SBSTA gives an example of the understanding of the remit of the body's work in terms of assistance to Parties: "*The SBSTA affirmed that its activities…are undertaken to assist all Parties, in particular developing countries, including the LDCs and small island developing States…to improve their understanding and assessment of impacts, vulnerability and adaptation, and to make informed decisions on practical adaptation actions and measures to respond to climate change on a sound scientific, technical and socio-economic basis, taking into account current and future climate change and variability in accordance with decision 2/CP.11*."

30. SBSTA's specific role in providing links with the scientific information provided by the IPPC can be illustrated by the way SBSTA addressed the IPCC 4th Assessment Report (AR4) released in 2007. At its 27th session, SBSTA agreed to conclude its consideration of AR4 at its 29th session (held in December 2008). In response to a request by the SBSTA at its 27th session, the Secretariat organized a workshop on the AR4 at SBSTA 28, under the guidance of the Chair of the SBSTA and with the participation of IPCC experts. The information in the workshop report was made available to SBSTA for its consideration of AR4 at its 29th session.

31. The COP, at its 10th session, requested SBSTA "*to develop a structured five-year programme of work on the scientific, technical and socio-economic aspects of impacts, vulnerability and adaptation to climate change, which would address the following issues: methodologies, data and modelling; vulnerability assessments; adaptation planning, measures and actions; and integration into sustainable development*" in the context of its terms of reference (decision 1/CP.10). Through decision 2/CP.11, the COP at its 11th session, adopted this programme of work for SBSTA, the objective of which is to "*assist all Parties, in particular developing countries, including the least developed countries and small island developing States, to improve their understanding and assessment of impacts, vulnerability and adaptation, and to make informed decisions on practical adaptation actions and measures to respond to climate change on a sound, scientific, technical and socioeconomic basis, taking into account current and future climate change and variability*" (Annex to decision 2/CP.10).

32. In summary, SBSTA plays an essential role in providing scientific and technical advice to the COP and, essentially, to the Parties to the Convention, as stressed in various COP decisions and SBSTA reports. To fulfil this role, SBSTA addresses major issues of the Convention as tasked by the COP, and makes use of workshops and expert groups. SBSTA also provides the link between the IPCC – a body independent of the UNFCCC – and the Convention, by making available to the Convention bodies and assessing the information provided by the IPCC.

B.8 United Nations Convention to Combat Desertification

33. The Committee on Science and Technology (CST) was established by article 24 of the Convention as a subsidiary body of the COP to provide it "*with information and advice on scientific and technological matters relating to combating desertification and mitigating the effects of drought*". The same article requested COP to establish a roster of independent experts with expertise and experience in the relevant fields and, as necessary, appoint *ad hoc* panels to provide it, through the CST, with information and advice on specific issues regarding the state of the art in fields of science and technology relevant to combating desertification and mitigating the effects of drought.

34. The terms of reference for the CST were adopted by COP 1 through decision 15/COP.1. They specify the mandate provided by Article 24 of the Convention in terms of advisory functions, data and information functions, research and review functions, functions related to technology, and evaluation functions. Decision 16/COP.1 decided that at each session the CST will address in depth a priority issue relating to the implementation of the Convention.

35. The following issues have been addressed in depth by CST: traditional knowledge (CST2); early-warning systems (CST3); the application of traditional knowledge, benchmarks and indicators and early warning systems to the monitoring and assessment of sustainable soil and water management in dryland areas (CST4); strategies for the communication of information and its use to generate best practices for combating desertification and mitigating the effects of drought (CST5); land degradation, vulnerability and rehabilitation: an integrated approach (CST6/7); and the effects of climatic variations and human activities on land degradation (CST8). CST 9 will address biophysical and socio-economic monitoring and assessment of desertification and land degradation, to support decision-making in land and water management.

36. Following considerations at CST4, COP 4 encouraged Parties to hold extensive consultations on ways of improving the efficiency and effectiveness of the CST (decision 17/COP.4). Parties' submissions, as well as consultations between regional groups, were introduced to COP 5 through document ICCD/COP(5)/3/Add.2. The document summarises Parties' main concerns as: the competence of participants in the CST; the political nature of discussions, rather than a focus on scientific and technological issues; the lack of continuity of representatives to the CST; and inadequate time within the agenda of the CST to allow for in-depth analysis and debate of the issues. Through decision 17/COP.5, the COP adopted ways and means to improve the effectiveness and efficiency of CST including through, among others, giving the CST a role in the review of national reports, better integrate of the work of the CST into national and regional activities, and establishing a Group of Experts on combating desertification and mitigating the effects of droughts.

37. The Group of Experts (GoE) met for the first time in 2003 and reported to the CST. COP 6 adopted a framework of the two-year work plan for the GoE, requested the GoE to focus on issues emerging from the review of national subregional and regional programmes and provide advice, through the CST, to the Committee for the Review of Implementation of the Convention (CRIC) (decision 15/COP.6). With decision 15/COP.7, the COP requested the GoE to continue its priority activities, including developing a communication and information strategy, and a land degradation and poverty strategy, and requested the CST Bureau to review the functions and the work of the GoE. The COP, through decision 17/COP.8, took note of the final report of the GoE.

38. COP 3 invited Parties to report to the Secretariat on the use that they have made of the roster of experts (decision 15/COP.3). COP 4 noted that little response had been received from Parties on the use they had made of the roster and repeated the call on Parties to submit such information (decision 15/COP.4). COP again repeated the call on Parties to submit information on the use of the roster (decision 15/COP.5). Cop 6 not only repeated the same call, but also asked the CST to utilize the roster through its Group of Experts (decision 14/COP.6).

39. With decision 3/COP.8, COP adopted the 10-year Strategic Plan and Framework to enhance the implementation of the Convention (2008-2018). Operational objective 3 of the 10-year Strategic Plan anticipates CST becoming "*a global authority on scientific and technical knowledge pertaining to desertification/land degradation and mitigation of the effects of drought*". Decision 3/COP.8 requests the Executive Secretary, in consultation with the COP Bureau and CST, to prepare a costed draft two-year work programme for the CST in line with the strategy, taking a results-based management approach. Decision 13/COP.8 decided that future ordinary sessions of the CST should be organized in a predominantly scientific and technical conference-style format in consultation with a lead institution/consortium, which is qualified in and has expertise in the relevant thematic topic selected by the COP, and should focus on one specific thematic topic determined by the COP.

40. In summary, the UNCCD Committee on Science and Technology has provided advice to the Convention's bodies on scientific and technological matters, in particular through the in-depth consideration of priority issues chosen by the COP. It was assisted by the roster of experts and in particular the Group of Experts. The adoption of the 10-year Strategic Plan at COP 8 offered the opportunity to reshape the operations of the CST, by introducing new ways and means of working, including conference-style sessions held in consultation with an institution or consortium qualified in the field of the specific session topic.

C. Observations on the scientific advisory bodies of the global biodiversity-related treaties and the Rio Conventions

41. A number of observations can be drawn from the review of the scientific bodies of the biodiversity-related and the Rio treaties. All of these treaties have scientific advisory bodies, with the exception of the World Heritage Convention – which draws on the advisory capacity of three independent organisations – and the International Treaty on Plant Genetic Resources for Food and Agriculture, which as a young convention has not yet seen the need to establish a standing scientific advisory body. Most advisory bodies report to the Conference of the Parties; only the Ramsar Convention's Scientific and Technical Review Panel reports to the Standing Committee.

42. The membership of the advisory bodies is either open to all Parties (CBD, CMS, UNFCCC, UNCCD) or consists of appointed and/or regional members (CITES, Ramsar). Some conventions encourage Parties to nominate scientists in their delegations to the scientific bodies but there are no mechanisms to guarantee this to happen. The percentage of scientists participating in the advisory bodies varies greatly between conventions and, within conventions, between one national delegations and another.

45. The tasks of the scientific bodies are convention-specific, with the bodies of most treaties focusing on scientific advice, with the bodies of other conventions having also a strong technical focus. For example, the UNFCCC SBSTA is tasked to provide scientific advice, but also to promote the development and transfer of technologies and to conduct technical work on national communications and emission inventories.

43. There are various ways for the scientific advisory bodies to draw on external scientific and technical information, and independent experts are frequently invited to contribute in one way or another. For the UNFCCC, a completely independent external institution exists with the Intergovernmental Panel on Climate Change, with SBSTA considering and assessing the information from IPCC and making it available to the Convention bodies and Parties.

44. Several conventions make use of expert groups. For example, limited duration ad hoc technical expert groups play a particularly important part in the CBD, where they address specific issues and provide input to the SBSTTA, while the UNCCD has established a Group of Experts on Combating Desertification and Mitigating the Effects of Drought.

45. The UNCCD is the only convention that foresees the establishment of a roster of experts in its articles. The COP has faced problems in receiving information from Parties on the extent to which they have made use of the roster of experts and has, through establishing the Group of Experts, found a way to formalise the roster. The CBD established a roster of experts under SBSTTA but later discontinued its use; it was found more effective to invite Parties to nominate experts for the ad hoc technical expert groups.

46. The treaties have to various extents initiated reviews of the effectiveness of their scientific advisory bodies. CITES established an external evaluation working group to review the scientific committees, and the UNCCD initiated extensive consultations on ways of improving the efficiency and effectiveness of their CST. Two distinct sets of challenges have been identified. For most conventions, the increasing workload of the scientific bodies in combination with lack of (financial) resources and capacity are severe problems that the review processes have highlighted. Within CBD and UNCCD, the tendency of the scientific bodies to undertake considerations in a rather political instead of scientific manner has caused concerns with Parties and has contributed to the initiation of review processes. There are strong voices within the CBD indicating that this situation has not been sufficiently rectified.

47. In most conventions, the COP has adopted a *modus operandi* or terms of reference for the scientific body in order to clearly define its work and the way it provides scientific and technical advice. These *modus operandi* vary between the conventions in length and detail. The CMS Scientific Council has adopted its own Strategic Implementation Plan, aligned to the Strategic Plan of the Convention. Various other ways and means to improve the effectiveness of the advisory bodies have been suggested, including closer links with the scientific community and different meeting styles – the UNCCD has agreed to hold its future CST meetings like scientific conferences led by identified institutions or consortiums.

Appendix 2

Preliminary review of existing coordination mechanisms and opportunities

A. Preamble

1. This appendix reviews existing coordination mechanisms established by the multilateral environmental agreements addressed in Appendix 1, specifically the Biodiversity Liaison Group and the meetings of the Chairs of Scientific Advisory Bodies of Biodiversity-related Conventions, and the Joint Liaison Group of the Rio Conventions. At present the review is based entirely on the available documentation from meetings of the coordination bodies, and does not yet benefit from stakeholder review and comment, and input from other sources.

B. Biodiversity Liaison Group

2. The Biodiversity Liaison Group (BLG) was established following decision VII/26 of the Convention on Biological Diversity (CBD), which called for the establishment of a liaison group to enhance coherence and cooperation in the implementation of the biodiversity-related conventions. The group initially consisted of the heads of the secretariats of the CBD, Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Convention on Migratory Species (CMS), Ramsar Convention on Wetlands and World Heritage Convention. In 2006, the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) joined the group.

3. Following an informal first meeting in June 2004[23], the second meeting of the BLG was held in October 2004. The BLG decided to limit the number of issues it would deal with, in order to ensure focus and progress in implementation. Two priority issues were agreed: the 2010 biodiversity target, and the proposed Global Partnership on Biodiversity. The focus would be on individual contributions to both issues, and what could be strategically done together towards achieving the 2010 target, monitoring and measuring progress in its implementation and reporting[24].

4. At the third meeting in May 2005, the BLG agreed that the 2010 biodiversity target "*can provide a unifying focus for cooperation among all relevant Conventions and organizations*". It was further recognised that "*the Framework of goals and targets to evaluate progress towards the 2010 target (adopted by CBD Decision VII/30) can be applied* mutatis mutandis *to all five conventions*". The group agreed that "*it would be useful for each Convention, as appropriate, to adopt indicators that are consistent with the Framework of goals and targets adopted by the CBD. This would help to promote coherence among the conventions in policy and implementation and would, for example, foster greater efficiency in reporting*". It was also agreed to prepare a joint paper on options for enhanced cooperation among the five biodiversity-related conventions, which would be made available to upcoming meetings of the participating MEAs[25].

5. The fourth meeting of the BLG, which took place in October 2005, discussed a comparison of the mode of work of the scientific bodies of the five conventions undertaken by CITES. It was agreed that such a review could help to identify possible ways to strengthen communication among the scientific bodies of the conventions. In this regard, the BLG also considered that an informal meeting of the Chairs of their respective scientific bodies would be of great benefit, noting that "*of particular interest will be to compare how the scientific bodies define their role and how they find the right balance between science and politics*". In addition, the value of harmonizing taxonomic standards and usage of scientific names among the conventions was identified[26,27].

6. At its fifth meeting in September 2006, the 2010 biodiversity target was further discussed, in addition to the Addis Ababa Principles and Guidelines on Sustainable Use of Biodiversity as adopted by

23 See www.cbd.int/cooperation/BLG-1-rep-final-en.doc.

24 See www.cbd.int/cooperation/BLG-2-rep-final-en.doc.

25 See www.cbd.int/cooperation/BLG-3-rep-final-en.doc.

26 See www.cbd.int/cooperation/BLG-4-rep-final-en.doc.

27 The comparison of the mode of work of the scientific bodies of the five conventions eventually appeared in the annex to document SC54 Doc. 13.1 of the CITES Standing Committee (October 2006) and was used to inform the first meeting of the Chairs of the Scientific Advisory Bodies of Biodiversity-related Conventions in July 2007 (UNEP/CBD/CSAB1/3).

the CBD. The meeting welcomed the decision by the GEF Council to approve the 2010 Biodiversity Indicators Partnership (2010 BIP), recognising that the project would deliver information relevant to all conventions by disaggregating data according to the components of biodiversity on which the conventions focus. The meeting discussed specific expectations from each partner vis-à-vis the 2010 BIP, and their contributions to the process, and it was agreed that BLG members should inform the project about their needs. It was also agreed to include the 2010 BIP as a standing item on the agenda of future BLG meetings, and to invite UNEP-WCMC to report on progress. In addition, the meeting agreed to organise a meeting of chairs of the scientific and technical bodies or advisory bodies of the biodiversity-related conventions together with representatives of the secretariats and UNEP[28].

7. Following on from the meeting of the Chairs of the Scientific Advisory Bodies of Biodiversity-related Conventions (see below), the BLG, at its sixth meeting in May 2008, addressed, among others, the harmonization of nomenclature and taxonomy. CITES and CMS were reported to be working towards harmonizing their nomenclature and taxonomy, work which would be finalised in 2009. The meeting also discussed the forthcoming third edition of the *Global Biodiversity Outlook*, to be published by the CBD in 2010. It was stated that BLG input was desirable to develop a feeling of 'ownership' of the process and products. By contributing to the work on indicators, for example by disaggregating species-related information to allow specific statements about migratory species or endangered species in trade, BLG members were already part of the process. The meeting also discussed the 2010 BIP and decided that the individual MEAs should pursue establishing their specific indicators in full harmonization with the CBD framework on targets and indicators and the 2010 BIP and should also engage in the process of designing a post-2010 target[29].

8. In summary, the Biodiversity Liaison Group has addressed a small number of items related to the use of science by the biodiversity-related conventions, such as the 2010 biodiversity target and the related 2010 biodiversity indicators, and the use of standardised species nomenclature and taxonomy. It has discussed possible ways for all participating MEAs to contribute to related activities, for example the publication of the *Global Biodiversity Outlook.* It has therefore provided some of the impetus for ensuring a more coordinated approach to issues where there are strong scientific interests.

C. Meetings of the Chairs of the Scientific Advisory Bodies of Biodiversity-related Conventions

9. The first meeting of the Chairs of the Scientific Advisory Bodies of Biodiversity-related Conventions took place in July 2007. In addition to representatives of CBD, CITES, CMS, Ramsar Convention and World Heritage Convention, the meeting was attended by representatives of the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention), IUCN, UNFCCC, UNEP, the GEF Scientific and Technical Advisory Panel, and WWF International.

10. The participants agreed[30] that the meeting had provided a useful forum for initiating discussion on areas of cooperation and collaboration on the scientific issues of the various convention processes and their translation into policy, and expressed the hope that the discussions might foster similar approaches and considerations at the national level. While they recognised that the conventions' scientific advisory bodies have different mandates with regard to the issues on which they provide advice to their governing bodies, ranging from strict response to requests by their governing bodies to flexible ways of response both in terms of timing of delivery and identification of emerging issues, participants agreed that it may be possible to benefit from the guidance provided by other conventions' bodies on emerging issues.

11. The meeting also agreed on practical cooperation on the issues of climate change and biodiversity and on the 2010 biodiversity target, including work on a framework beyond 2010. In addition, the group concluded the following[31]:

(a) There is abundant data and information on biodiversity but these data are often not available to the Conventions' scientific advisory bodies. If a need for [IPBES] *is confirmed it should be ensured that its work focuses not on collecting additional data but on bringing together various sources of scientific information, including traditional ecological knowledge, in a coherent and comparable form.*

28 See www.cbd.int/cooperation/BLG-5-rep-final-en.doc.

29 See www.cbd.int/cooperation/BLG-6-rep-final-en.doc.

30 See www.cbd.int/doc/meetings/csab/csab-01/official/csab-01-03-en.doc.

31 See www.cbd.int/doc/meetings/csab/csab-01/official/csab-01-03-en.doc.

(b) There are many examples where guidance and guidelines developed by one convention have been endorsed – fully on in part – by other conventions, or where guidance have been jointly developed. It will be useful to fully examine all relevant guidance, including from IUCN, and their respective relevance and adaptability to the work of other conventions... The meeting may wish to consider gaps in the development or application of tools and guidance and deliberate on options for addressing these gaps in a coherent way.

12. The second meeting of the Chairs of the Scientific Advisory Bodies of Biodiversity-related Conventions was held in May 2008, and was also attended by the International Treaty on Plant Genetic Resources for Food and Agriculture and UNCCD. The meeting considered processes and approaches of the Conventions' scientific bodies on providing scientific advice[32], in particular in the following areas.

(a) The meeting welcomed the progress made on merging the follow-up process to the Millennium Ecosystem Assessment with discussion on the potential establishment of an international platform to provide scientific advice on biodiversity to multilateral environmental agreements, based on the IMoSEB consultative process.

(b) The Ramsar Convention reported on progress in mapping the gaps and complementarities in guidance developed by the conventions (as agreed by the first meeting). Progress had been slower than anticipated, because of the multitude of different guidance systems developed for different target groups. An ecosystem-based mapping approach was recommended, which would list the guidance relevant to each ecosystem. The aim of the mapping exercise was to develop a 'Guide to the Guidance', which would help the different national focal points of the Conventions identify relevant guidance across the MEAs.

(c) While pointing to a draft resolution for its Standing Committee on priority issues and tasks for the Ramsar Convention during the next triennium, including new and emerging issues, Ramsar flagged the opportunity for joint projects or joint programmes of work. In this context, CITES presented its Work Programme for the CITES Committees from 2007 to 2010, with the aim of identifying possible common areas of interest. It was agreed that sharing of plans and programmes could be used as a basis for identifying opportunities for more coordinated an harmonized approaches to particular issues.

13. The two meetings of the Chairs of the Scientific Advisory Bodies of Biodiversity-related Conventions can be seen as complementary to those of the Biodiversity Liaison Group, from which they have been mandated, although they are attended by more institutions than the BLG. They have identified a small number of issues where the biodiversity-related conventions could cooperate in improving the scientific advice to their bodies and to Parties, including mapping the guidance developed by the individual conventions and coordination in the requests for scientific advice on various topics.

D. Joint Liaison Group of the Rio Conventions

14. The Joint Liaison Group (JLG) of the CBD, UNFCCC and UNCCD – the so-called Rio Conventions – was established in 2001 as an informal forum for exchanging information, exploring opportunities for synergistic activities and increasing coordination. The JLG comprises the officers of the conventions' scientific subsidiary bodies, the Executive Secretaries, and members of the secretariats[33]. The JLG has met eight times, but as reports of the first three meetings and the sixth meeting are not available online, this brief review focuses on the fifth, seventh and eight meetings of the JLG [34].

15. At the fifth meeting in January 2004, the JLG discussed cooperation on a range of issues, including adaptation, capacity-building and technology transfer; joint activities on information, education and awareness, and research and systematic observation. It was agreed to hold a joint workshop on Strengthening Synergy among the Rio Conventions through Forests and Forest Ecosystems and to develop a paper on options for enhanced collaboration[35].

32 See www.cbd.int/doc/meetings/csab/csab-02/official/csab-02-03-en.doc.

33 Some of the meetings were attended by the Ramsar Convention Secretariat.

34 See www.cbd.int/cooperation/liaison.shtml and unfccc.int/cooperation_and_support/cooperation_with_international_organizations/items/3464.php.

35 See unfccc.int/files/meetings/workshops/other_meetings/application/pdf/reportjlg5.pdf.

16. The paper on options for enhanced collaboration[36], which was made available to the governing bodies of all three conventions, lists examples of collaboration between the conventions, including the following relevant to the coordination of scientific advice: two workshops to examine synergy among the Rio Conventions, organized by the UNFCCC in collaboration with CBD and UNCCD; the joint programme of work on the biodiversity of dry and sub-humid lands between CBD and UNCCD; and the joint workshop on strengthening synergy among the Rio Conventions through forests and forest ecosystems organized by UNCCD in collaboration with CBD and UNFCCC. Among the options for enhanced cooperation identified by the paper, the following are particularly relevant for collaboration on and coordination of scientific advice: collaboration among the scientific advisory bodies to the conventions; and cooperation in the development of advice, methodologies and tools. Cooperation in research and monitoring/systematic observation, for example on the global earth observation system of systems (GEOSS) is mentioned specifically.

17. The seventh meeting of the JLG, held in June 2007, noted that the document on options for enhanced cooperation had been welcomed by Parties to all three conventions. The meeting identified some areas for future collaboration, including reducing deforestation, and adaptation to climate change. It was agreed to draft an information note on the links between forests, climate change, desertification and biodiversity; as well as an information note on adaptation activities, plans and programmes adopted within the framework of each convention; and to further analyze a list of activities at the level of the secretariats. The latter list includes the facilitation of joint meetings between the chairs of the scientific bodies of the conventions[37].

18. The eight meeting of the JLG was held in September 2007. The meeting considered progress in the drafting of joint information notes on forests and on adaptation. As to the list of activities at the level of secretariats, the meeting agreed to categorize these activities in terms of activities that are already on-going, activities that the secretariats could start implementing in the short term, and activities that need further consideration[38].

19. The work of the Joint Liaison Group has been welcomed by the COPs of the participating conventions. For example, the COP of the UNFCCC, in decision 13/CP.8, supported the mandate of the JLG and requested SBSTA to continue and enhance cooperation with the scientific subsidiary bodies of both CBD and UNCCD.

20. CBD COP decision IX/16 provides an example of the way the Conventions have taken up outputs of the JLG. The decision notes with appreciation various outputs of the JLG, including the lists of activities at the level of secretariats, and requested the Executive Secretary to implement relevant activities and to continue discussions within the JLG on other activities. In the same decision, the COP requested "*the Executive Secretary, as far as possible in collaboration with the secretariats of the other two Rio conventions, to compile and synthesize information on interactions between acidification, climate change and multiple nutrient-loading as possible threats to biodiversity during the in-depth reviews of the programmes of work on inland water and marine and coastal biodiversity*."

21. In summary, the Joint Liaison Group of the Rio Conventions has addressed a wide range of issues of relevance to the three conventions, including several relating to the coordination of scientific advice, such as collaboration among the scientific advisory bodies to the conventions, and cooperation in the development of advice, methodologies and tools. A number of joint documents have been drafted and have been taken up by convention bodies, and joint workshops have been organized. Issues for future collaboration have been identified and will be further considered by the relevant bodies of the three conventions and the Joint Liaison Group.

E. Observations on the coordination mechanisms of the biodiversity-related and the Rio Conventions

22. The Biodiversity Liaison Group (BLG) of the biodiversity-related conventions and the Joint Liaison Group (JLG) of the Rio Conventions are general coordination mechanisms for the treaties involved. The coordination of scientific advice is a key issue – probably more so for the BLG than the JLG – but is only one issue among others being addressed.

23. Both groups have initiated practical cooperation and may be regarded successful and useful. This is reflected in the acknowledgments the two groups have received from various COPs to the

36 See www.cbd.int/doc/meetings/sbstta/sbstta-10/information/sbstta-10-inf-09-en.pdf.

37 See www.cbd.int/doc/reports/jlg-07-report-en.pdf.

38 See www.cbd.int/doc/reports/jlg-08-report-en.pdf.

participating treaties. The work of the BLG has also resulted in the meetings of the Chairs of the Scientific Advisory Bodies of Biodiversity-related Conventions, which are also considered to have been productive.

24. Regarding cooperation on scientific issues through the BLG, the two issues of the 2010 biodiversity target and indicators, and harmonization of taxonomic standards and usage of scientific names may be highlighted. These areas have been identified by the BLG as ones for which cooperation should be beneficial to the participating treaties.

(a) On the 2010 biodiversity target, they have agreed to cooperate, *inter alia*, through developing convention-specific indicators that fit into the CBD framework of 2010 targets and indicators. The 2010 Biodiversity Indicators Partnership has been particularly welcomed by the BLG as a mechanism for the delivery of indicators of relevance to all conventions participating in the BLG.

(b) On the taxonomic standards and use of scientific names, the BLG identified the need to harmonize approaches, and two participating treaties, CITES and CMS, have agreed to work towards harmonization of their nomenclature and taxonomy.

25. The JLG has resulted, *inter alia*, in workshops regarding synergies between the three Rio Conventions, and in a paper outlining options for enhanced collaboration. The latter has been taken up by the Conferences of the Parties of the three treaties, which have requested implementation of specific aspects of the paper.

26. In summary, both the BLG and JLG provide examples for a framework for cooperation between conventions that have related subjects and objectives (and a wide overlap in participating Parties). In particular the BLG has been able to identify issues highly relevant for the harmonization of scientific advice and to initiate further joint work on these issues. Parties to the treaties in question have, through decisions of the Conferences of the Parties, acknowledged the work of these two coordination bodies, recognizing the need for and effectiveness of synergies between treaties that incorporates joint activities on scientific matters.

Appendix 3

Preliminary review of existing assessment processes

A. Preamble

1. This draft appendix provides a summary synthesis of the existing global assessment landscape for biodiversity and ecosystem services, and draws conclusions on the coverage and gaps in global assessment. The appendix also briefly considers the relationship among the growing number of sub-global assessment initiatives, at scales from local to continental. The paper draws on a range of information sources from individual assessments, various available syntheses, and from the information document on the assessment landscape provided for this meeting (UNEP/GC/25/4/Add.1). Although a tabular overview of key elements of assessments is provided, the paper does not provide extensive descriptions of the various assessment initiatives individually. This information can be found for over 60 global, regional and sub-regional assessments initiatives at the UNEP PEARL website[39], and on the web pages of the individual assessments themselves.

B. Background

2. During the last decade, there has been a proliferation of global assessments relating to biodiversity and ecosystem services, at global and sub-global scales. Drawing on early experiences of the IPCC and other assessments such as on ozone and on biodiversity in the 1990s, the most recent series of global assessments have increasingly been designed to be policy-relevant, credible and legitimate. They have also increasingly aimed to be more integrated in the manner in which issues are assessed.

3. Key amongst recent global assessments of biodiversity and ecosystem services have been the Millennium Ecosystem Assessment (MA), the 4th Global Environment Outlook (GEO4), the IPCC 4th assessment report (AR4), the International Assessment of Agricultural Science and Technology for Development (IAASTD), the Comprehensive Assessment of Water Management in Agriculture (CAWMA), the 2nd Global Biodiversity Outlook (GBO2), the 2005 Forest Resources Assessment (FRA), and the Global International Waters Assessment (GIWA).

4. In addition to the proliferation of global assessments, there has also been an increasing number of sub-global assessments conducted and planned in the last decade. The MA, GIWA, GEO4 and IAASTD explicitly included sub-global (in most cases regional, and in the case of the MA some multi-scale) assessment components. A range of independent regional assessments have also been conducted, such as the Arctic Climate Change Impact Assessment, and there have been many national level assessment-type activities, often wrapped up in national state of the environment reporting. In the marine realm, the Global and Regional Marine Assessment Database (GRAMED) lists more than 70 regional assessments.

C. Scope and coverage of existing and planned assessments

5. The thematic focus of recent global assessments varies between those focussing strictly on biodiversity assessment, such as the GBO or IUCN Red List assessments, those encompassing a broad ecosystem service assessment, such as the MA and GEO, and those focussing on a narrower range of specific ecosystem services, such as FRA, GIWA, IAASTD, and LADA. Likewise, many of the recent and ongoing global assessments cover a full range of ecosystems, such as in the MA, GEO, and IPCC, and some focus on specific ecosystem types, such as GIWA, LADA and FRA. There has been relatively less biodiversity and ecosystem services assessment focussed in some key biomes and system types, including islands, mountains, wetlands, oceans, polar and urban systems.

6. Most recent and ongoing assessments evaluate both environmental and socio-economic factors. Key elements include: status and trend of natural resource and its relationship with development, environmental issues and impacts, and scenarios and response options. Only one of the global assessments, the Global Biodiversity Outlook (GBO), additionally evaluates the implementation of a specific corresponding policy mechanism (the CBD) for its impact on biodiversity and ecosystem services. The World Water Development Report (WWDR) and the Comprehensive Assessment of

39 See hqweb.unep.org/pearl

Water Management in Agriculture (CAWMA) also considered the effectiveness of resource management, but not with regards to a particular policy, and the MA considered the effectiveness of a broad range of policy responses, but not comprehensively with regard to particular policy mechanisms.

7. Whilst there are expected to be ongoing periodic assessments planned that focus on climate (IPCC), water (WWDR), forest resources (FRA) and biodiversity (GBO), (see Figure 3.1) few of these or other ongoing assessments provide flexible mechanisms to respond to demands from Multilateral Environmental Agreements for targeted or rapid integrated assessments on emerging issues relating to biodiversity and the full spectrum of ecosystem services. In addition, the periodicity of the ongoing global assessments precludes responding to many emerging issues in a timely manner to guide decision-making.

8. Sub-global assessments also vary considerably in their scope and coverage, depending on the geographic location and information needs for decision-making at the scale of assessment. Many of the existing or planned global assessments also include sub-global, and in some cases multiple scale elements, including the IPCC, FRA, GEA, GEO, and LADA.

9. The growing number of sub-global assessments use a wide variety of data and indicators, which has allowed for those assessments to better respond to user needs at the scale of operation. However, this has also complicated the synthesis of lessons across assessment initiatives, and hampered the process of drawing conclusions about multi-scale aspects of biodiversity and ecosystem services. There therefore remains significant potential for better linking assessments at different geographic scales, and with different but related thematic foci, through the use of a core set of common, scaleable variables. This would allow for the assessment of linkages between ecosystem services at different scales – for example global climate regulation and local climate-related hazard prevention. Likewise, effective and coherent assessments linking global and local values of biodiversity conservation have been limited to date.

10. Many assessment initiatives have been limited by data and information availability. This is the case at all geographic scales for a range of ecosystem services and for biodiversity. Gaps in data for biodiversity and non-provisioning ecosystem services are particularly widespread, and in many cases prevent more comprehensive assessment being completed at global, regional, national or local scales.

D. Assessment process and design

11. In addition to variation in content and coverage, recent assessments also vary considerably in their design and process. Some, such as the MA and GIWA, were designed as one-off assessments that could be repeated in the future should the demand and resources exist. Others, such as GEO, GBO, IPCC, and FRA, are part of ongoing assessment initiatives (see Figure 3.1 and Table 3.1). Some, such as the MA, the IPCC and GEO, involve a broad spectrum of the scientific community, whilst others, such as the GBO and FRA, are based on contributions from a more selective group of experts (see Table 3.1). The breadth of stated target audiences also varies considerably between assessments.

12. A number of recent global assessments, such as GEO4, and the IPCC 4th assessment, have been overseen by intergovernmental governance bodies, providing significant legitimacy for their findings amongst national governments. In the case of the MA and IAASTD, the assessments were overseen by a multi-stakeholder board, including governmental, non-governmental and private sector stakeholders. Experiences from these and earlier assessments strongly suggest that strong governmental involvement in assessment governance supports uptake of the findings by governments.

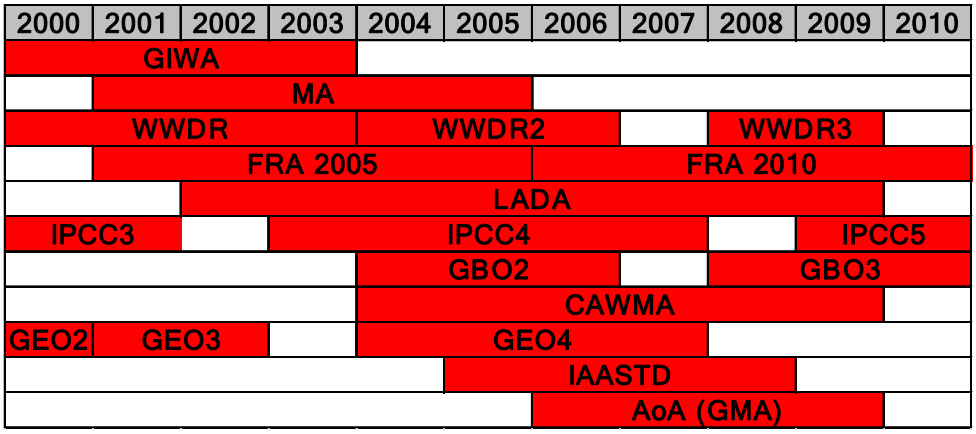
13. Although many recent assessments have been designed with the intention of influencing decision-makers within the context of Multilateral Environmental Agreements, only very few, including the MA, IPCC, LADA and GBO, have been explicitly endorsed by the multilateral environmental agreements. Of the assessments explicitly endorsed by MEAs, only the IPCC and GBO are anticipated to be repeated in the future - the remainder were conceived as one-off initiatives. Other assessments, such as GEO and GIWA have been endorsed by other decision-making, or intergovernmental, fora such as the UNEP Governing Council.

14. In the case of many ecosystem services, and especially with respect to biodiversity, the vast majority of the data and expertise is found in civil society – in various science institutions and networks, and in non-governmental organisations. However, there is a wide range of scientific community and non-governmental involvement in assessments. Assessments with high numbers of individual involvement (1000-2500 individuals) include MA, IPCC, GIWA, and the RedList assessments. Assessments with medium involvement (400-900 individuals) include CAWMA and the GEO. Assessments with low involvement (<60 individuals) include AoA (GMA), FRA, TEEB, GBO, and WWDR. Despite the relatively smaller number of scientists involved in some of these processes, many

of these assessments have very strong and credible scientific involvement within multi-stakeholder advisory groups or guidance teams.

15. As with scope and content of sub-global assessments, there remains relatively little coherence (or coordination) between approaches to sub-global initiatives within and between scales (with the exception of those within the MA follow-up sub-global network). A wide variety of conceptual frameworks are used for assessment design and implementation, although at a global scale for recent integrated assessments, and in many regional and national assessments, there has been an increasing convergence on variations of the framework developed in the MA global and sub-global assessments. The publication of the MA methodology manual, currently being completed by UNEP-WCMC and partners, is likely to help considerably in bringing coherence to assessment process and design in the future.

Figure 3.1. Schedule of International Assessments, 2000-2010.



GIWA - Global International Waters Assessment; **MA** – Millennium Ecosystem Assessment; **WWDR** – World Water Development Report; **FRA** – Forest Resources Assessment; **LADA** – Land Degradation Assessment; **IPCC** – Intergovernmental Panel on Climate Change; **GBO** – Global Biodiversity Outlook; **CAWMA** – Comprehensive Assessment of water management in agriculture; **GEO** – Global Environmental Outlook; **IAASTD** – International Assessment of Agricultural Science and Technology for Development; **AoA (GMA)** – building the foundations for a Regular Process for the Global Reporting and Assessment of the state of the marine environment, including socio-economic aspects.

Table 3.1 Global assessment initiatives relating to biodiversity and ecosystem services

Assessment	Focus	Key elements	Scale	Scientific Involvement	Target audience	Timeframe (see also table 3.2)	Website
AoA (GMA)	Marine environment	Status assessment of marine environment and socio-economic factors	Global	~22 experts	Marine decision-makers	Initial scoping assessment, anticipated to lead to full Global Marine Assessment.	www.unga-regular-process.org
CAWMA	Water and Agriculture	Benefits, Costs and impacts of water management	Global and national (developing countries)	~700 agricultural and environmental scientists	Investors, private sector, decision-makers	One-off assessment	www.iwmi.cgiar.org/Assessment/
FRA	Global forest resources	State of global forests, drivers of pressures and change	Global, regional, and national assessments	Global advisory group guides compilation of national data.	National policy-makers, international negotiations.	Periodic (5 years) assessments	www.fao.org/forestry/fra
GBO	Global biodiversity	Status and trends of biodiversity and analysis of CBD implementation	Global	Summary of existing information by selected experts.	CBD	Two assessments: 2001, 2006, GBO3 to be released in 2010.	www.cbd.int/gbo
GEA	Energy	Issue analysis and assessment of challenges	Global, regional, national, typological	~25 experts	UNCED, CSD, EU Energy Initiative for Poverty Irradication	One-off assessment	www.iiasa.ac.at/Research/ENE/GEA
GEO	Environmental change and development	State and trends of environment, human dimensions of change, scenarios	Global and regional assessment	~400 individual scientists involved as authors and reviewers in GEO4	UNEP Governing Council	Periodic global and regional assessment. Ongoing sub-global reporting.	www.unep.org/geo
GIWA	International waters	Status and scenarios for transboundary waters (coastal and inland)	Global, Regional, and subregional assessments	~2000 experts and scientists involved in assessment	Decision-makers, environmental managers, GEF and its partners	One global assessment in 2006, sub global assessments in 2005.	www.unep.org/dewa/giwa/
IAASTD	Agriculture	Agricultural knowledge, science and technology.	Global and 5 regional assessments	~900 experts and scientists involved in assessment	National and local governments, international agencies.	One-off assessment	www.agassessment.org/
IPCC	Climate change	Assessment causes, impacts, and scenarios for adaptation and mitigation	Global, regional, and sub-regional assessments	~2500 authors and reviewers in AR4	Public, private sector, national and international conventions	Periodic (~5 years) assessments. Four assessment reports currently available.	www.ipcc.ch
LADA	Land degradation	Status assessments, monitoring methodology, strategy recommendations	Global, national and local	22 international and national partner organizations and agencies	CCD, and national governments	One-off assessment	www.fao.org/nr/lada/

Assessment	Focus	Key elements	Scale	Scientific Involvement	Target audience	Timeframe (see also table 3.2)	Website
MA	Ecosystem Services and Human Well-being	Assessment of status, scenarios and response options	Global and ~30 sub-global assessments from local to regional	~1300 individual scientists involved as authors and reviewers	CBD, Ramsar, UNCCD, CMS, and Private Sector	One-off global assessment 2001-2005. Sub-global assessments ongoing.	www.MAweb.org
RedList	Conservation status of species in the wild	Threat assessment of species.	Global	~2500 members of IUCN's Species Survival Commission.	Species conservation practitioners and policy makers	Ongoing assessment, with periodic updates	www.iucn.org/redlist
TEEB	Economics of biodiversity and ecosystem services	Analysis of costs of biodiversity loss and ecosystem services, and costs of management	Global	Selected experts invited to participate.	Decision-makers, CBD	One-off assessment	ec.europa.eu/environment/nature/biodiversity/economics
WWDR	Water resources	Status assessment on freshwater resources and analysis of management	Global, regional, and basin assessments	24 UN agencies + international partners	Decision-makers	Periodic (3 years) : 2003, 2006, 2009	www.unesco.org/water/wwap/wwdr

AoA (GMA) – building the foundations for a Regular Process for the Global Reporting and Assessment of the state of the marine environment, including socio-economic aspects; **CAWMA** – Comprehensive Assessment of water management in agriculture; **FRA** – Forest Resources Assessment; **GBO** – Global Biodiversity Outlook; **GEA** – Global Energy Assessment; **GEO** – Global Environmental Outlook; **GIWA -** Global International Waters Assessment; **IAASTD** – International Assessment of Agricultural Science and Technology for Development; **IPCC** – Intergovernmental Panel on Climate Change; **LADA** – Land Degradation Assessment; **MA** – Millennium Ecosystem Assessment; **TEEB** – The Economics of Ecosystems and Biodiversity. **WWDR** – World Water Development Report.

Appendix 4

Preliminary review of indicator processes and interrelationships among them

A. Introduction and scope of the review

1. Indicators are increasingly being used to inform policy processes, whether as part of assessment processes, or independently. Many of the international policy processes have established strategic, results-based plans with targets relating to biodiversity, and these require appropriate indicators to track progress.

2. In order for the information provided by these indicators to be accepted by policy-makers, they need to be scientifically credible, independent and impartial (i.e. policy-relevant rather than policy-prescriptive). Indeed the UN Statistical Division has adopted a set of principles (endorsed by 24 international agencies including UNEP) to guide the development and functioning of the international statistical system, which makes reference to the importance of professional scientific standards and criteria, and of international co-ordination and co-operation to enhance capacity and avoid duplication of efforts[40]. This underscores the significant role that science and the scientific community must play in the development and use of indicators for policy processes.

3. This appendix reviews the use of indicators in a range of policy processes, focusing particularly on the use of indicators that relate to the condition and trends in biodiversity, in threats to biodiversity, and in the ecosystem services provided to society from biodiversity. The objectives are to:

(a) Identify the extent to which biodiversity indicators are used in policy processes, and how interrelated the different policy processes are in terms of the indicators they use;

(b) Assess how scientifically robust the indicators are, in terms of how science and scientists contribute to the development and use of these indicators;

(c) Outline current efforts to improve the situation and begin to identify gaps and opportunities for further improvement.

4. In order to keep the review manageable in the time available, it has been restricted to the following indicator processes:

(a) Globally, those of the five major international biodiversity conventions, namely CBD, CMS, CITES, Ramsar Convention and the World Heritage Convention, together with UNCCD and the Millennium Development Goals (MDGs);

(b) Those of selected regional indicator initiatives, namely in Europe (SEBI2010), the Arctic region (CBMP), the African-Eurasian Waterbirds Agreement (AEWA), and the indicators used by the Organization for Economic Co-operation and Development (OECD); and

(c) Some brief additional detail on other information services and on indicators at the national level is also provided.

B. Global biodiversity conventions

5. This section describes the indicators used in a range of global biodiversity conventions, including consideration of how science has influenced their development and how they have been packaged and used for policy-making.

40 Principles Governing International Statistical Activities, unstats.un.org/unsd/methods/statorg/Principles_stat_activities/principles_stat_activities.asp

B.1 Convention on Biological Diversity

6. In 2002, in decision VI/26, Parties to the CBD agreed "*to achieve by 2010 a significant reduction of the current rate of biodiversity loss at global, regional and national level as a contribution to poverty alleviation and to the benefit of all life on Earth*". Assessment of progress in achieving the 2010 biodiversity target and sub-targets is addressed in decisions VII/30 and VIII/15, which also introduce and elaborate a framework of 22 headline biodiversity indicators under seven focal areas, to be used to track progress towards the achievement of these targets.

7. The process of developing the CBD indicator framework and choosing appropriate indicators involved significant scientific input, despite the fact that the final choice of indicators was policy-driven. Various meetings and workshops in 2003-2005 provided opportunities for scientific debate[41]. Moreover much of the data and expertise for monitoring biodiversity rests within the scientific community, and several of the more developed indicators being used within the CBD framework are delivered by scientific agencies using peer reviewed, scientifically validated methodologies.

8. When the framework was adopted in 2004, some of biodiversity indicators were ready for immediate use at the global scale, but others required further development and testing. Both mature and emerging indicators are being tracked and developed at the global scale by a wide range of scientific organizations as part of the CBD-mandated 2010 Biodiversity Indicators Partnership (2010BIP)[42]. The 2010BIP has established an independent Scientific Advisory Body to provide scientific oversight, review and validation of the indictor methodologies.

9. The CBD also relies on governments to report every two years on their activities in support of the strategic plan. This includes reporting of biodiversity indicators at the national level. Although a rigorous analysis has not been carried out, it is apparent that the development and implementation of the CBD biodiversity indicators at a national scale is variable. A number of initiatives are underway, including through the 2010BIP, to build national capacity to develop, monitor and report biodiversity indicators at a national scale.

10. The third edition of the Global Biodiversity Outlook (GBO-3), which is due for publication in 2010, is the flagship product that will package the indicator data and storylines to provide an analysis of the achievement of the 2010 biodiversity target for policy-makers. It is being prepared by the CBD Secretariat in collaboration with the other biodiversity-related conventions, UNEP-WCMC and the 2010BIP, and relies on data from national reporting as well as from global indicators delivered by international scientific agencies.

11. The current indicator framework adopted by the CBD is recognised to be incomplete; reference to climate change as a threat to biodiversity is conspicuous by its absence, measures of ecosystem integrity do not incorporate recent advances in scientific thinking, and the linkages between biodiversity loss and the provision of ecosystem services is not adequately articulated or understood. Moreover, there is a sense within the scientific community that the CBD indicator set is not as scientifically robust as it could be. There have been calls for greater scrutiny of the adopted indicators, the science that underpins them and the extent to which they are the best proxies for the complex phenomenon of biodiversity[43].

12. In this regard the 2010BIP and the CBD secretariat are beginning a consultative process to review the efficacy of the current suite of indicators in order to make recommendations for post-2010. This consultation will culminate in a scientific meeting in mid-2009 at which recommendations will be developed for submission to the CBD's SBSTTA. Through this process, the biodiversity science community will be invited to play a key role in informing the drafting of future biodiversity policy targets and in ensuring the best use is made of scientific data for monitoring progress.

41 Such as the meeting organizated by the Royal Society on "Beyond Extinction Rates: Monitoring Wild Nature for the 2010 targets" (Balmford et al, 2005)

42 www.twentyten.net

43 Mace, G.M. & Baillie, J.E.M. (2007) The 2010 Biodiversity Indicators: Challenges for Science and Policy. *Conserv. Biol*. **21**, 1406-1413.

B.2 Ramsar Convention on Wetlands

13. The Ramsar Convention adopted a set of eight outcome-oriented indicators (with 11 sub-indicators) to monitor effectiveness of the implementation of the Convention, and the following information on this is adapted from a document submitted to Ramsar COP10[44].

14. The eight initial indicators were considered to be those that are currently feasible to implement with existing, or readily collectible, data and information. In several cases this information will consist of qualitative evaluations rather than statistical data.

15. Fact sheets providing guidance for the application and operation of each of these indicators and sub-indicators were developed by the STRP, and were provided to member states at COP9. Further work was then foreseen to elaborate details concerning construction and operation of the indicators, including sub-indicators, processes and mechanisms for data collection, compilation, analysis, assessment, reporting, publishing and disseminating the results and conclusions generated. The STRP was tasked with establishing and implementing mechanisms for these activities.

16. The STRP has contracted additional scientific expertise from UNEP-WCMC, which also coordinates the 2010BIP in which the Ramsar Convention is a key partner; and so synergies and full compatibility across the respective work streams for the 2010BIP and Ramsar indicators have been assured.

17. Methodological development for the Ramsar indicators varies. Some will be based on national reporting, others will use different sources. Workshops and focus groups are being planned with scientific experts and agencies to further this development, however in some cases gaps will remain due to a lack of time and resources to access available data (for example, for the sub-indicator on status and trends in ecosystem extent[45].

18. Due to the fact that the Ramsar indicators have only recently been adopted, there are as yet no update reports that synthesise and package the indicator data for policy audiences. However such reports are anticipated.

19. The Ramsar indicators and sub-indicators have substantial overlap with the CBD indicators. Institutionally there is also close engagement between CBD and Ramsar indicator processes. Through participation in expert group meetings, members of the STRP and Ramsar Secretariat have contributed to the development of the CBD indicators, whilst the Ramsar Indicators are being developed in close partnership with UNEP-WCMC and the 2010BIP.

B.3 Convention on Migratory Species

20. The CMS strategic plan includes 31 indicators under four objectives[46]. Besides process indicators relating to the implementation of the CMS strategy, the CMS indicator framework includes a number of impact indicators relating to the status and trends in, threats to, and level of protection of, migratory species.

21. Development of migratory species indicators was recognized at CMS COP8 as an appropriate step towards an assessment of the contribution of the Convention in the achievement of the 2010 target. In this regard the CMS Secretariat is working closely with the CBD Secretariat and the 21010BIP in order to adopt indicators that contribute to measuring the achievement of the 2010 Target.

22. The CMS Scientific Council is participating in developing migratory species indices, alongside external scientific agencies. Consideration is being given to applying two existing species-based indicators, the Living Plant Index and the Red List Index, that are also being used within the CBD framework, to migratory species[47].

44 Ramsar (2008). Further development of indicators of effectiveness of the implementation of the Convention. RAMSAR COP10 DOC.23, paragraphs 2-5.

45 Personal communication from the Ramsar Secretariat.

46 CMS strategic plan 2006-2011. UNEP/CMS/Resolution 8.2, Nov 2005.

47 CMS (2008). Follow-up to COP8 Decisions: Development of Migratory Species Indicators (Res. 8.7). UNEP/CMS/ScC15/Doc.14.

B.4 Convention on International Trade in Endangered Species

23. CITES has a Strategic Vision 2008-2013, that includes 40 indicators under 16 Objectives[48]. These indicators are almost entirely process-based, with no indicators relating directly to the status or trends in biodiversity.

24. The CITES Secretariat is a member of the 2010BIP and are collaborating on an indicator of the status of species in trade, however this is not being utilised by CITES and is purely a contribution to assessing progress towards the CBD 2010 target.

B.5 World Heritage Convention

25. The World Heritage Convention has adopted a results-based management framework with 12 indicators under four strategic objectives[49]. These include two indicators that relate to the state of conservation of sites, and one relating to the level of threat to sites.

26. Assessments of these indicators appear to be by the World Heritage Committee and/or its Advisory Bodies, on the basis of reports from site managers or mission reports. Member states are requested to report on a 6-yearly cycle by region. Since the adoption of the performance indicators in 2005, Europe and North America and the Arab states have completed reporting rounds. An update report by each individual site is requested annually.

27. Member states are encouraged to take up the use of the indicators in their reporting but an analysis of the extent to which they have done so in reporting to date has not been made.

B.6 UN Convention to Combat Desertification

28. *To be completed.*

C. Millennium Development Goals

29. The MDGs are a set of eight goals, with associated time-bound targets, adopted by nations in order to reduce poverty in all its forms. Goal 7, to ensure environmental sustainability, incorporates four targets including the CBD 2010 Biodiversity Target. Indicators of achievement of the MDGs have been elaborated by the UN Secretary General, and are now used as a basis for periodic reporting[50]. This includes an indicator of protected area coverage already used by the CBD, and other biodiversity-related indicators on forest and fisheries.

30. The proposal in 2006 by the UN Secretary General to incorporate the CBD 2010 target as a new target into MDG7 was broadly welcomed by governments and civil society. However, at the time specific indicators for tracking progress towards the 2010 target in the context of the MDGs had not been agreed. Since that time UNEP-WCMC has worked with the Inter-Agency and Expert Group (IAEG) on MDG indicators and other agencies to identify specific biodiversity indicators to be included in the MGD process, and to secure the formal adoption and uptake of those indicators. This resulted in a new biodiversity indicator, the proportion of species threatened with extinction, being formally adopted under the new 2010 biodiversity target of the MDGs, and reported on for the first time in the 2008 MDG Annual Report launched in September 2008.

31. The indicators are delivered into the MDG process by specialist UN agencies, which are all members of the IAEG. The IAEG meets twice yearly to discuss indicator development and compile the annul MDG progress report with updated indicator data and storylines. UNEP-WCMC, on behalf of IUCN and others, represents the biodiversity indicators under Target 7b whilst FAO represents the forest and fisheries indicators under Target 7a.

48 CITES (2008). *Strategic Vision 2008-2013: Development of Indicators.* SC57 Com.6

49 WHC (2006). Performance Indicators for World Heritage. WHC-06/30.COM/12.

50 UN (2001). Road map towards the implementation of the United Nations Millennium Development Goals. A/56/326

32. The UN Statistical Division maintains a database of MDG indicator data[51] that is disaggregated by region and country, and by year. One of the major challenges is rationalising national data (from national reporting) with global data from the international agencies. There are ongoing efforts to achieve this. The same issues apply, regarding national capacity to measure and report on the indicators under MDG-7, as for the CBD indicators.

D. Regional and other thematic indicator processes

33. This section describes the indicators used in a range of regional biodiversity indicator initiatives, including consideration of how science has influenced their development and how they have been packaged and used for policy-making.

D.1 Streamlining European 2010 Biodiversity Indicators (SEBI2010)

34. Both the European Union and pan-European processes have adopted the target of *halting* the loss of biodiversity by 2010. SEBI2010 is a pan-European initiative led by the European Environment Agency (EEA) to ensure the development and uptake of a common set of biodiversity indicators to track progress towards this target.

35. SEBI2010 has 26 indicators under seven focal areas[52], and not unsurprisingly there is considerable overlap with the content of CBD indicator framework. Indeed this was actively worked towards, and the project coordination team included not only European agencies but also UNEP-WCMC with the intention of ensuring close linkages with other initiatives.

36. SEBI2010 is co-ordinated by the European Environment Agency (EEA), and has a co-ordination team with members from a number of international agencies. Six expert groups were convened early in the initiative to assess candidate indicators, and the preliminary report was opened to an online consultation process, both of which enabled broad scientific engagement with the indicator development process.

37. SEBI2010 is preparing to report on progress towards achieving the EU 2010 Biodiversity Target in 2010. A draft indicator report has been circulated for review in late 2008, containing quantitative information on the majority of the 26 indicators[53]. The audience for this report will be the EU Member States and other European countries, and the CBD more broadly.

D.2 Circumpolar Biodiversity Monitoring Programme (CBMP)

38. The CBMP was established to provide an integrated and sustained Arctic Biodiversity Monitoring Network. The CBMP functions as an international forum of key scientists and conservation experts from all eight Arctic countries, the six international indigenous organizations of the Arctic Council, and a number of global conservation organizations. The following four paragraphs are adapted from the CBMP Implementation Plan[54].

39. The purpose of CBMP is to strive for the conservation of biological diversity in the Arctic, to halt or significantly reduce the loss of this biodiversity, and to provide information to the indigenous peoples of the Arctic, other Arctic residents, and stakeholders inside and outside the region, on the sustainable use of the region's living resources. The CBMP is, first and foremost, a coordinating entity for: existing Arctic biodiversity monitoring programs; identifying new programs to address gaps in knowledge; gathering, integrating, and analyzing data; and communicating results.

51 See unstats.un.org/unsd/mdg/Default.aspx

52 EEA (2007) *Halting the loss of biodiversity by 2010: proposal for a first set of indicators to monitor progress in Europe*. EEA Technical Report No 11/2007.

53 EEA (2008, unpublished) Halting the loss of biodiversity in Europe - a first assessment report based on a set of biodiversity indicators. Draft report.

54 CAFF (2008) *CBMP Five-Year Implementation Plan*.

40. To facilitate effective and consistent reporting, the CBMP has chosen a suite of indices and indicators that provide a comprehensive picture of the state of Arctic biodiversity – from species to habitats to ecosystem processes to ecological services. They were chosen through an expert consultation process to reflect existing monitoring capacity and expertise.

41. Criteria used to select the indicators included sensitivity to natural or anthropogenic drivers; scientific validity; understandable and relevant to diverse audiences (e.g., local communities, decision-makers, global public); ecological relevance; sustainability of monitoring capacity; subjection to targets and thresholds; and practicality. The indices and indicators were also chosen to represent and incorporate information from all major Arctic biomes at various scales, all known Arctic pressures, all major trophic levels, all major Arctic biodiversity components (e.g., genes, species, habitat) including humans, and critical ecosystem services and functions — using both community- and science-based monitoring approaches. Data generated by the CBMP's networks will underpin these indicators and indices.

42. The process for selecting indicators drew from and considered other existing international initiatives of relevance such as the CBD global indicators, CMS, and findings from the Arctic Climate Impact Assessment. A series of review and selection workshops enabled wide representation from scientific organisations.

43. The CBMP is due to develop 13 indicators during 2008-2010 and a further nine indicators in 2011-2012. The CBMP indicators and indices will facilitate the reporting of the Arctic's progress towards the Convention on Biological Diversity's 2010 target to reduce the rate of loss of biodiversity. In that regard there is significant correspondence with the CBD indicator framework.

D.3 African Eurasian Waterbird Agreement (AEWA)

44. The African Eurasian Waterbird Agreement (AEWA) is a stand-alone Multilateral Environmental Agreement (MEA) concluded in 1995 to improve the conservation and management of waterbirds in the African-Eurasian region on Appendix II of CMS.

45. AEWA has adopted a strategic plan for 2009-2017, the goal of which is "*to maintain or to restore migratory waterbird species and their populations at a favourable conservation status throughout their flyways*". The strategic plan includes 28 indicators under five objectives[55]. These are primarily process-based, although some of them relate to the CBD focal areas of sustainable use, threats to biodiversity and resource transfer. It also has a range of targets under the overall goal that relate to improving status and trends of migratory waterbird species and populations.

D.4 Organisation for Economic Cooperation and Development (OECD)

46. The OECD is a unique forum where the governments of 30 democracies work together to address the economic, social and environmental challenges of globalisation. The OECD maintains a database of national environmental indicators as essential tools for tracking environmental progress, supporting policy evaluation and informing the public. These indicators fall into ten categories.[56]

47. The indicators are endorsed by Environment Ministers and updated reports produced annually based on data provided by Member states' authorities through national reporting, and from other sources. Reports are prepared by the OECD secretariat with support from the OECD Working Group on environmental Information and Outlooks. The OECD does note that that definitions and measurement methods vary among countries, and that inter-country comparisons require careful interpretation.

E. Interrelationships among indicator processes

48. The CBD indicator framework is the most comprehensive and well-developed suite of biodiversity indicators, and the CBD 2010 biodiversity target is supported or adopted by many of the other global and regional initiatives. Additionally there is an obvious willingness to collaborate in discussing development and complementarity of indicators as evidenced by discussions of the BLG and at 2010BIP meetings. Particular focal areas that are well represented by several indicators across

55 AEWA (2008). *Draft Strategic Plan For The Agreement On The Conservation Of African-Eurasian Migratory Waterbirds For The Period 2009-2017*. AEWA/MOP 4.19.

56 OECD (2008). *Key Environmental Indicators*. OECD Environment Directorate, Paris.

different processes include: status of threatened species, status of resources (people and funding), and management (of sites, resources, people, etc). However the measures used can be very different across different processes.

49. As an example, table 4.1 (below) summarises the level of comparability of the indicators being developed by the Ramsar Convention against not only the CBD suite of indicators, but also the SEBI2010 and MDG indicators. This analysis was prepared by the Ramsar Convention Secretariat for COP 10 to demonstrate the interlinkages between difference processes.

50. Further analysis is needed to demonstrate the extent to which the approaches of the different processes are complementary and supportive of one another, but initial indications are promising.

F. Indicator information services

51. The World Bank, the UN Statistical Division, FAO and others maintain public online databases of indicators, usually disaggregated to the national level. These usually comply with the UN-endorsed principles for international statistics. While there are biodiversity indicators in these databases, there is little beyond what is already included in the indicator frameworks of the conventions and regional initiatives described above.

G. National level indicators

52. National governments recognise the need to develop their own indicator monitoring programmes, both for national biodiversity planning and for reporting against international commitments like the CBD 2010 Target and the MDGs. This is also encouraged by a number of decisions taken by intergovernmental processes.

53. The timeframe for this preliminary review has not enabled a thorough assessment of national indicator processes, however, there is a general perception that further development of national capacity to develop, monitor and report against agreed indicators is required in large parts of the world. National focal points for conventions like the CBD are often required to complete indicator-based reports without access to all of the necessary data (or the technical agencies capable of delivering it) to facilitate accurate, up-to-date, scientifically credible and comparable reporting.

54. Various initiatives, including the 2010BIP are working to build better linkages between national, regional and global scales, in order to raise awareness and capacity in indicator development and use. The 2010BIP, for example, is running a series of regional workshops worldwide, the most recent in the Caribbean region with 15 governments represented, to share tools and methodologies for biodiversity indicator development.

55. What is still generally lacking, however, is sustained resources and follow-up to support national agencies in developing indicators, together with a focus on developing national and regional scientific networks of agencies and data-providers to assist national authorities by providing scientific guidance on indicator development and access to relevant data.

H. Preliminary findings

56. Given the different mandates, objectives and needs of the different policy processes being discussed, the degree to which they are working together on indicators is significant, as are the interest of the BLG in promoting such collaboration, and the inclusive nature of projects such as the 2010 Biodiversity Indicator Partnership.

57. However, although a wide range of indicators are contained in the various process and initiatives described, in many cases they are not well developed methodologically, and data are not available. For example, within the CBD framework, five of the 22 headline indicators will not be developed at all in time for 2010.

58. Particularly notable gaps include the following:

(a) There is insufficient inclusion of indicators demonstrating trends in genetic diversity of plants and animals other than in the CBD framework, and even there the indicators remain at an early stage of development;

(b) Insufficient attention has been paid to the human aspects of ecosystems and biodiversity by any of the processes described, except CBMP for the Arctic (where there is a strong and vocal indigenous representation) and UNCCD; and

(c) Indicators of ecosystem service and human wellbeing are much less well developed than core biodiversity indicators, despite the fact that this is an area of increasing interest in assessments, including TEEB and the sub-global assessments under the MA Follow-up.

59. While there is certainly more data available than is currently being used, it is widely believed that what can be achieved at all levels is limited by the absence of systematic biodiversity monitoring. Efforts are underway within the scientific community to build better collaboration in collection, access to and use of data, as is evidenced by projects such as the establishment of a global biodiversity observation network (GEO-BON) that would provide more rigorous and systematic monitoring data[57].

60. Given their role in both decision-making and in communication, indicators need to be both credible and reliable, and therefore also need to scientifically robust. Beyond 'in-house' advisory committees and the like, there is some engagement of the broader scientific community through joint activities and consultations, however scientific involvement in indicator processes mainly falls to specialist agencies. It appears more difficult for individual scientists and the broader academic community to engage, although some initiatives have made efforts in this regard.

61. Meanwhile there is a very real challenge in reconciling the need for academic rigour with the need for policy expediency. Many of the indicators needed in policy processes are not available or sufficiently developed, and it is often the case that imperfect proxies are the only available option. This leads to a select few indicators being relied on heavily even if they are considered imperfect. It also leads to criticisms from the scientific community that policy processes are insufficiently rigorous in their use of science.

62. What may be needed is a mechanism for greater engagement of the broader scientific community in a way that is responsive to the priority needs of countries as expressed through the international biodiversity conventions. Meanwhile, at the national level, there is a need for further capacity-building support for indicator development and use.

Table 4.1 Areas of Overlap of Various Indicator Processes with the CBD Biodiversity Indicator Framework, an example using selected processes, adapted from Ramsar COP10 Doc.23

Ramsar Indicators of Effectiveness	Global 2010 indicators	SEBI2010 (Europe)	MDG indicators
A: The overall conservation status of wetlands (i) Status and trends in ecosystem extent (ii) Trends in conservation status of wetlands – qualitative assessment	Trends in extent of selected biomes, ecosystems and habitats	Trends in extent and composition of selected ecosystems in Europe Change in status of habitats of European interest	None
B: The status of the ecological character of Ramsar sites (i) Trends in conservation status of Ramsar sites – qualitative assessment	Ecosystem integrity and ecosystem goods and services: connectivity / fragmentation of ecosystems	Change in status of habitats of European interest Changes in patch size distribution of natural areas Status and trends in the fragmentation of river	None

57 Scholes RJ, *et al*. (2008) Toward a Global Biodiversity Observing System. *Science* **321**: 1044-1045

Ramsar Indicators of Effectiveness	Global 2010 indicators	SEBI2010 (Europe)	MDG indicators
		systems	
C: Water quality (i) Trends in dissolved nitrate / nitrogen concentration (ii) Trends in Biological Oxygen Demand (BOD)	Ecosystem integrity and ecosystem goods and services: water quality of freshwater ecosystems	Nutrients in transitional, coastal, and marine ecosystems Water quality in freshwater	None
D: The frequency of threats affecting Ramsar sites (i) The frequency of threats affecting Ramsar sites – qualitative assessment	Trends in nitrogen deposition Trends in invasive alien species	Critical load exceedance for nitrogen Alien and invasive alien species in Europe Impact of climate change on biodiversity: species abundance indicator	None
E: Wetland sites with successfully implemented conservation or wise use management plans (i) Trends in management effectiveness in Ramsar sites (ii) Management effectiveness in Ramsar sites – distribution of scores	Protected areas management effectiveness	None	None
F: Overall population trends of wetland taxa (i) Status and trends of waterbird biogeographic populations	Trends in abundance and distribution of selected species	Trends in abundance and distribution of selected species: European butterflies and common birds	None
G: Changes in threat status of wetland tax (i) Wetland Red List Index	Change in status of threatened species	IUCN Red List for European Species Change in status of species of European interest	MDG7: Ensure environmental sustainability 7.7 Proportion of species threatened with extinction
H: The proportion of candidate Ramsar sites designated so far (i) Coverage of the wetland biodiversity resource by designated Ramsar sites	Coverage of protected areas and overlays with biodiversity Status of resource transfers: official development assistance in support of the Convention	Trends in national establishment of protected areas Designated sites under the EU Habitats and Birds Directives	MDG7: Ensure environmental sustainability 7.6 Proportion of terrestrial and marine areas protected.
		Financing to biodiversity	

Appendix 5

Preliminary review of the role of futures and horizon scanning exercises in identifying new issues for policy attention

A. Background

1. Policy and decision-makers across all sectors are today challenged to make decisions in a world of rapid change, growing uncertainty and increasing complexity. Changes in important components of biological diversity were more rapid in the past 50 years than any other time in history[58]. Projections and scenarios indicate that the most significant drivers of change (e.g. population growth; land use pressure; climate change; urbanisation) will continue to intensify. At the same time, increasingly open access to information and rapid proliferation in technical development (e.g. in biotechnology and genomics) will bring both challenges and opportunities for biodiversity conservation. Such innovations will originate from more diffuse sources and proliferate more widely making regulation and control of novel technologies more challenging and increasing the risk of unintended results[59]. These projections bring unprecedented challenges for the biodiversity conservation community in anticipating future evolutions and issues, assessing their likely impacts on biodiversity and designing response strategies.

2. There is a growing number of horizon scanning and futures processes helping to identify and prioritise issues that may be of increased significance for biodiversity conservation in the future. The aim of this task is to review a range of such activities and, at the same time to explore how new issues are communicated to and taken up on the agendas of policy processes such as the international biodiversity-related agreements; and to identify gaps and shortcomings, and efforts that are already underway to improve the current situation.

3. **Horizon scanning** can be defined as 'the systematic examination of potential threats, opportunities and likely future developments which are at the margins of current thinking and planning'[60]. It can be used as the first stage in a **futures** or **foresight** approach - where horizon scanning identifies emerging issues and trends that can then be explored in detail using a diversity of **futures techniques**. Such approaches are best developed in the business sector for analysis of future markets, strategic planning and risk management, but have been increasingly used by governments, particularly in response to international security and health concerns. The environment, including biodiversity, has increasingly featured in such exercises with recognition that environmental degradation will have a significant impact on future development, security and the economy. In turn, a number of programmes have emerged to assess the potential impacts of future social, economic and environmental trends on biodiversity.

B. Horizon scanning and futures techniques

B.1 The horizon scanning process

4. A useful generic framework for horizon scanning is proposed by the SKEP (Scientific Knowledge for Environmental Protection) ERA-Net project, based on their review of environmental horizon scanning across EU member states[61]. This presents a process with three main elements:

(a) Gathering knowledge: a first step that generates a large volume of information on future issues and trends from a wide range of sources e.g. science and technology publications; conference proceedings, patent applications; media sources; policy and political developments; and individual testimonies from experts, activists, analysts, politicians, business leaders and lay people. This information can be gathered with broad literature and internet reviews; and by stakeholder engagement through interviews and workshops.

58 Millennium Ecosystem Assessment, 2005. *Ecosystems and Human Wellbeing. Biodiversity synthesis*. World Resources Institute, Washington.

59 Development Concepts and Doctrine Centre (DCDC)/UK MOD *Strategic Trends Programme 2007-2036.* See www.dcdc-strategictrends.org.uk

60 Defra, UK definition of Horizon scanning 2002. See horizonscanning.defra.gov.uk/

61 SKEP ERA-net : Scientific Knowledge for Environmental Protection. *How to identify emerging long term strategic issues for environmental research and policies: A diversity of possible approaches.* See www.skep-era.net/site/files/WP6_%20Diversity%20of%20approaches191206.pdf.

(b) Organising knowledge: developing scenarios, sorting issues for their likely importance and prioritising issues for further exploration. This tends to involve the use of criteria that 'rank' issues on likely importance, and consultative process with stakeholders.

(c) Using the outputs: e.g. to inform research strategies, design policies or to initiate and inform dialogue with stakeholders.

5. This review stresses the need for adequate stakeholder engagement in each stage of this process to gather knowledge from all relevant sources; confront different perspectives; make planning procedures more legitimate and democratic and ensure stakeholders are committed to implementation. This is particularly important where issues are highly contentious or there is a high degree of uncertainty. This will require adequate participation of all stakeholders including researchers, policy makers and the public.

B.2 Scenarios

6. Scenarios are 'stories' describing alternative plausible futures. They do not predict the future but integrate information on what is known (e.g. trends likely to persist and key drivers of change) with how uncertain aspects of the future could play out. Experts and other stakeholders are engaged in thinking about these uncertainties and the consequences of different evolutions. Scenarios can also be more 'probabilistic', such as the IPCC climate change scenarios.

7. Scenarios have been used across sectors and at a range of scales from local (e.g. local stakeholder 'visioning' for biodiversity and development planning) through to the international (e.g. the Millennium Ecosystem Assessment Scenarios; and Global Environment Outlook and Global Biodiversity Outlook). Scenarios can be a useful tool in engaging stakeholders in thinking about the future and to communicate plausible or probable outcomes. The next step is identifying and developing adaptive strategies and capabilities to respond to different plausible outcomes.

B.3 Futures techniques and initiatives

8. A vast range of other futures techniques can be used to explore issues raised through horizon scanning, ranging from the simple workshop-based techniques, to the highly sophisticated. The review in the following sections is preliminary, and provides examples for illustration only. In the time available for this initial report it was not possible to do a comprehensive review of all relevant international, regional and national initiatives. A full review should aim to assess:

(a) Existing processes at national and international level aiming to identify and explore futures issues of concern for biodiversity; the extent to which these are linked to international and national policy processes, and whether these have been effectively communicated to policy makers;

(b) The capacity of existing scientific assessment mechanisms to provide both early warning of potential issues; and rapid assessment of newly emerging issues for biodiversity conservation;

(c) Country capacity (particularly developing countries) to assess implications of emerging issues for national policy and to devise response strategies; and

(d) The adequacy of engagement of different stakeholders e.g. policy makers, researchers, business and the public in existing initiatives.

C. Existing futures initiatives

9. Examples of national and international futures initiatives with relevance for the environment and biodiversity are listed in Table 5.1, with a description of their activities and outputs. Some of these are described in more detail below.

C.1 Millennium Ecosystem Assessment and sub-regional follow up

10. The Millennium Ecosystem Assessment scenarios present the possible evolution of ecosystem services during the 21st century in terms of plausible future changes in drivers, ecosystems, ecosystem services and human wellbeing. Three of four of these scenarios suggest that significant (and substantial) changes in policies, institutions and practices could mitigate some of the negative consequences of growing pressures on ecosystems. A number of countries have or are in the process of developing national scenarios and predictions in follow up to the MA and for sub-regional assessments.

C.2 OECD International Futures Initiative

11. The OECD International Futures Programme aims to provide the organisation with an early warning of emerging issues, pinpoint major developments, and analyse key long-term concerns to help governments respond. The Programme uses a variety of tools including multiyear projects, high-level conferences, expert workshops, and consultations, a futures-oriented online information system, and a network of contacts from government, industry, academia and civil society. Ongoing projects include 'The Bioeconomy to 2030'[62] – focusing on the broad range of economic activities arising from the biosciences (including biofuels).

C.3 The Africa Biodiversity Collaborative group- mapping future trends and interventions for biodiversity policy over the next 10 years

12. On 15 May 2008 The Africa Biodiversity Collaborative Group (ABCG) organised a meeting on 'Mapping future trends and interventions for Biodiversity conservation in Africa over the next 10 years' supported by the USAID/Africa Programme[63]. The meeting sought to identify the drivers of past, present and future change in biodiversity in Africa, map trends and identify predictable trends and key uncertainties. This meeting was followed by a workshop on 'The Future of Biodiversity in Africa' (Dar as Salaam, September 2008) where African conservation leaders were engaged in narrating alternative futures for biodiversity in Africa and interventions appropriate for USAID and other stakeholders into the future. This exercise produced a shared vision statement and highlighted key necessary interventions for biodiversity. This was used by African partners and by US AID and other donors in their biodiversity programming.

C.4 IUCN Future of sustainability

13. The IUCN Future of Sustainability Initiative is an international consultative process aiming to develop a new sustainability vision and strategy relevant to the global challenges of the 21st century such as climate change, peak oil, continuing loss of biodiversity, poverty and unsustainable production and consumption. It aims to engage leading thinkers and institutions from around the world at global and regional level, and from different constituencies including conservation and environment leaders; government representatives; economists; the social justice community; business leaders; and young people. It is employing traditional discussion forums as well as Web2 and mobile phone technologies to generate and share new concepts. The ideas generated by the initiative will help inform the long-term direction and strategy of IUCN.

C.5 Wildlife Conservation Society 'Futures of the Wild'

14. The Wildlife Conservation Society (WCS) futures group was formed in 2004 to give WCS broad guidance on how it should think about the long-term future. Through a process led by Bio-era (an independent research consulting firm) the group developed a series of scenarios[64] to explore how conservation activities and strategies might shift over the next 20 years in response to global circumstances and the interplay between politics, technology, economics; and to highlight where WCS might need to adapt its strategies and develop new capabilities. WCS view these scenarios as a 'first

62 See www.oecd.org/department/0,3355,en_2649_36831301_1_1_1_1_1,00.html

63 Reports and documents at www.abcg.org/

64 See www.wcs.org/media/file/Futures_of_the_Wild.pdf

step' in thinking about how opportunities and challenges for conservation could change in the future; and to engage stakeholders in further discussion.

C.6 Shell energy scenarios

15. To assist thinking about the future of energy, Shell has developed two scenarios[65] to describe alternatives ways that energy consumption and production may develop. Shell uses these scenarios to test their strategy against a range of possible long-term developments and to examine and communicate ways in which a more sustainable future could be achieved.

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C.7 National horizon scanning and foresight initiatives

16. A number of countries have established national horizon scanning or foresight initiatives that cover sustainable development and environment issues, including biodiversity (some examples are in Table 5.1). These have not been reviewed comprehensively at this stage but are likely to provide important sources of information that could be integrated into international assessments.

C.8 Published research

17. Even a quick literature review can reveal a significant extent of published research concerned with future trends and scenarios for biodiversity - including those linked to one or to multiple drivers of biodiversity loss such as agriculture, land use change, climate change, energy scenarios etc. Without more extensive review it is not possible to know how involved policy makers have been in this research or the uptake of such research in policy making.

C.9 Observations on existing futures initiatives

18. The purpose of futures initiatives ranges from those designed to stimulate dialogue and open up debate on possible futures; to those designed to identify and explore particular issues in depth and those seeking to identify research priorities. Some perform more than one of these functions.

19. Many existing futures initiatives are broad initiatives focusing across government policy or sustainable development agendas; or exploring sector specific interests of the organization concerned. As such, their coverage of biodiversity issues may be quite shallow but they are important sources of information and expertise on drivers of future change that could usefully be integrated into biodiversity assessments. In addition, a growing number of biodiversity specific futures initiatives are emerging and it could be useful to integrate, or provide better means of access to information from these initiatives.

20. These initiatives vary in the extent to which they have specific links to policy processes and it is difficult to determine from this review the extent to which these existing initiatives have been communicated to and taken into account by policy makers. Many of those listed are discrete futures programmes that, even within the same organisation, might be managed quite separately to policy departments. Reviews of such programmes have highlighted their value in thoroughly and creatively exploring futures but that their usefulness can be limited if they do not communicate with and link with appropriate decision making and planning processes or answer the more urgent questions that policy makers may have[66].

21. A number of the foresight programmes listed are fairly long-term initiatives exploring futures around a small number of issues in-depth. They are not necessarily set up to provide the 'rapid' assessment that might be necessary on emerging issues.

65 See www.static.shell.com/static/aboutshell/downloads/our_strategy/shell_global_scenarios/SES booklet 25 of July 2008.pdf

66 See www.skep-era.net/site/files/WP6_%20Diversity%20of%20approaches191206.pdf, and also horizonscanning.defra.gov.uk/ViewDocument_Image.aspx?Doc_ID=192

D. Scientific assessment of emerging issues

22. There are a range of initiatives that aim to identify research priorities and provide scientific assessment of emerging issues for the policy agenda. These include mechanisms that are specifically linked to national and international policy processes. Some examples are described below.

D.1 The Convention on Biological Diversity

23. Concerns have been expressed on the perceived politicization and lack of scientific independence of the CBD Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA), including in its assessment of newly emerging issues, such as biofuels. Recent decisions of the Conference of Parties (COP) have sought to address these concerns.

24. In decision VIII/10, the CBD COP adopted a consolidated *modus operandi* for SBSTTA that lists among the specific functions that SBSTTA should identify new and emerging issues relating to the conservation and sustainable use of biodiversity. At its ninth meeting the COP adopted a new process for new and emerging issues to be address by SBSTTA such that Parties and relevant organisations shall be invited after each Conference of Parties to propose and to submit information on new and emerging issues. These proposals, and any additional information and views, will be synthesised by the Executive Secretary and presented to SBSTTA. SBSTTA will then review and discuss the proposals and, as appropriate, identify new and emerging issue[s], elaborate a scientific and technical analysis with options for action for consideration and to submit this analysis to the Conference of the Parties for its consideration.

25. The COP also established a useful set of criteria for identifying new and emerging issues that might be addressed by the CBD including relevance to the Convention; existence of new evidence of unexpected or significant impacts on biodiversity; urgency of addressing the issue; the magnitude of actual and potential impact on biodiversity; actual geographical coverage and potential spread; evidence of the absence or limited availability of tools to limit or mitigate the negative impacts of the identified issue and the magnitude of actual and potential impact of the identified issue on human well being.

26. The first call for proposals of new and emerging issues was issued in July 2008 and thus it is too early to assess the effectiveness of this mechanism, for example, in enabling SBSTTA to be able to commission independent scientific assessments of new and emerging issues and for a timely response by the COP to new issues.

D.2 Ramsar Convention on Wetlands

27. The mandate of the Ramsar Convention Scientific and Technical Review Panel includes a requirement to review new and emerging issues for the Convention. The STRP are mandated to identify and to progress analysis of newly emerging issues intersessionally, commissioning additional research as required (and subject to available resources), and to present advice on these issues to the next COP. This enables fairly rapid assessment of newly emerging issues, as has most recently been the case for issues such as Avian Flu, Biofuels and Climate change. However, concerns have been expressed on the capacity and resources available to the STRP to fully progress its workload.

D.3 DIVERSITAS

28. DIVERSITAS aims to provide an integrated research framework to the international scientific community. The Programme is a partnership of inter-governmental and non-governmental organisations formed to promote, facilitate and catalyse scientific research on biodiversity to bring added value to national and regional biodiversity research projects.

29. Through establishment of international, multidisciplinary networks of scientists DIVERSITAS addresses priorities presented in its science plan and has a number of core projects. In addition, it creates cross cutting networks to investigate specific topics of global importance. In its current consultation on its new scientific strategy DIVERSITAS is seeking to identify the top challenges that science for biodiversity must address in the next 3 to 5 years.

D.4 ICSU and SCOPE

30. The International Council for Science (ICSU) is a non-governmental organization with a global membership of 116 national scientific bodies and 30 international scientific unions, providing a forum for discussion of policy relevant issues for international science. ICSU hosts SCOPE – a Scientific Committee on Problems of the Environment. SCOPE is an interdisciplinary body of scientific expertise aiming to operate at the interface between science and policy and to produce state of the art reviews of key current or potential environmental issues. Its publications include a UNEP-SCOPE-UNESCO series of policy briefs on 'emerging or 'critical' environmental issues. These build on international expert workshops to review current knowledge, highlight trends and controversies and offer insights for policy makers, decision-makers and other stakeholders.

D.5 European Platform for Biodiversity Research

31. The European Platform for Biodiversity Research (EPBRS) is just one of the regional mechanisms aiming to identify emerging research priorities for biodiversity. It aims to engage natural and social scientists, policy makers and other stakeholders and to keep close connections with relevant international bodies, national governments. It meets twice a year under successive EU Presidencies to discuss and give recommendations on strategic research priorities for biodiversity, addressing themes of importance in Europe and internationally. Recent assessments include those on biodiversity and climate change; biodiversity and health; islands and archipelagos; invasive organisms; water and forest; the ecosystem approach and indicators.

D.6 Observations on scientific assessment mechanisms

32. It is clear that international conventions have taken steps to improve the effectiveness of scientific assessment of emerging policy issues. Capacity also exists outside the conventions in a number of international and regional scientific mechanisms. However, the extent to which these involve policy makers is likely to vary and they do not all have clear mechanisms for uptake of their recommendations and findings in the policy processes. Though international platforms such as DIVERSITAS observe policy priorities of national and international policy they may not be specifically mandated to serve their needs.

E. The policy response

33. It is widely known that the global community has responded too late to many environmental problems and hazards. A key feature in this has been the length of gap between problems being identified in science and a response being taken. Though adequate information may be available, information might not have been brought to the attention of appropriate decision-makers early enough, or has been discounted for one reason or another. Sometimes 'loud and late' warnings (e.g. on asbestos, the Great Lakes, sulphur dioxide and acidification) have been effectively ignored by decision-makers because of short-term economic and political interactions (European Environment Agency 2001)[67]. Costs of such inaction have been most recently highlighted by the Stern report on climate change[68].

34. Analysis of such cases highlights not only the importance of long term monitoring, high quality science and mechanisms that communicate science effectively to policy makers; but the importance of effective and inclusive policy mechanisms to determine which issues or warning signals are likely to be of most significance, and to develop and appraise options for response. This presents challenges for international policy processes and for national governments, particularly developing countries. Some recent reviews of perceived late response to global events such as the 'credit crunch' have highlighted not an absence of foresight, but a lack of understanding of this foresight by decision-makers or lack of institutional capacity to respond.

35. It is recommended that the full gap analysis explores the capacity of existing policy mechanisms to appraise and respond to new issues, using a recent case study such as avian flu or biofuels, and makes recommendations (as appropriate) for such mechanisms to be strengthened. Country capacity, particularly of developing countries, to respond to newly emerging issues should also be reviewed.

67 EEA 2001. *Late Lessons from early warnings: the precautionary principle 1896-2000*. See reports.eea.europa.eu/environmental_issue_report_2001_22/en

68 See www.hm-treasury.gov.uk/sternreview_index.htm

F. Preliminary findings

36. Horizon scanning and foresight exercises perform a number of different roles including identifying specific priorities for organisations concerned, identifying research priorities and highlighting issues of future concern for society as a whole. It is important that all these mechanisms are closely linked to, or effectively communicated to policy processes- both to ensure that research addresses policy needs; and that their results are input to policy processes where relevant. As well as exploring futures, there is also a need for initiatives that respond to urgent questions that policy makers may have, and to provide a rapid assessment of emerging issues.

37. At the same time, there is a need for inclusive and effective policy mechanisms and means to assess the likely significant of emerging issues and to develop and appraise response options. This presents challenges not just for international policy processes but also for capacity at country level.

38. A number of international and national initiatives are emerging specifically to assess the impact of future economic, social and environmental trends on biodiversity. In addition, there is an extensive scientific literature predicting futures or assessing new issues for biodiversity. There would be value in better communication of such initiatives to policy makers, and in the synthesis and dissemination of relevant research. This would require commitment from the countries and organisations involved to share this information.

39. In addition, there is a diversity of existing futures initiatives, across other sectors, which will provide valuable insights for biodiversity assessments and scope for improvement in the extent to which such analyses (e.g. economic trends and market predictions) are integrated into biodiversity assessments. Discussions and research on the future of biodiversity should draw on information and expertise from all relevant disciplines.

40. International conventions (e.g. the CBD) have taken steps to improve the effectiveness of scientific assessment of emerging policy issues. It is too early in some cases to assess whether these will be effective. However, issues of concern remain on the scientific independence and on the capacity of existing statutory bodies to perform this role. Additional scientific assessments could therefore be of value if they can build on and enhance the capacity of existing mechanisms to assess emerging issues, particularly where issues are cross-cutting across Conventions or policy mechanisms (this could help eliminate duplication of effort). This function might be most usefully served by a mechanism mandated by the international Conventions but independent of any one convention. A more thorough review of the role and capacities of existing organisations (e.g. DIVERSITAS, ICSU and SCOPE, as well as regional scientific mechanisms) would be useful.

41. It is important to have multi-sector and multi-stakeholder discussion on emerging and future issues, particularly for highly contentious and controversial issues. Such processes needed to communicate effectively to, and engage decision-makers throughout. It is unclear the extent to which this has been effectively achieved by existing mechanisms and a more extensive review of this, and of the processes that exist to communicate and input outputs from these mechanisms to the policy process would be useful.

Table 5.1 Examples of futures initiatives

Organisation	Programme	Description	Outputs	Reference
Africa Biodiversity Collaborative Group	Mapping future trends and interventions for biodiversity policy over the next 10 years.	Workshop events to explore trends and uncertainties and establish necessary interventions into the future.	Vision for biodiversity and reports	www.abcg.org/
Institute for Futures Studies and Technology Assessment		German non-profit research institute. Addresses a range of sustainable development issues.	Various	www.izt.de/en/research-areas/sustainability-management-and-economics/projects/projekt/futures%20and%20visions%20-%20forest%202100/
IUCN	Future of Sustainability	International consultative process aiming to develop a new sustainability vision and strategy relevant to the global challenges of the twenty first century.	Various	www.iucn.org/about/work/initiatives/futureofsustainability/about_futire_of_sustainability/index.cfm
Landcare Research	Future Scenarios for New Zealand Biodiversity	Four contrasting futures scenarios.	Reports and Scenarios game	www.landcareresearch.co.nz/services/sustainablesoc/futures/about_biodiversity.asp
OECD	International Futures Programme	Analysis of emerging issues and long-term concerns.	Various	www.oecd.org/department/0,3355,en_2649_33707_1_1_1_1_1,00.html
Scientific Knowledge for Environmental Protection- EU Framework project	Workpackages include investigating emerging issues for future research planning	Network of Environmental research funders with aim of improving co-ordination of research.	Various. Including on emerging technologies and review of horizon scanning approaches across European Member states.	www.skep-era.net/site/80.asp www.skep-era.net/site/files/WP6_%20Diversity%20of%20approaches191206.pdf
Shell	Global energy scenarios 2050	Alternative scenarios determining how futures in energy might develop to 2050	Scenarios reports and toolkits	www.shell.com/static/aboutshell-en/downloads/our_strategy/shell_global_scenarios/shell_energy_scenarios_2050.pdf
Siemens	Pictures of the future programme	Scenarios of tomorrow's world and technologies over next two decades, including environmental technologies	Quarterly publications	w1.siemens.com/innovation/pool/en/publikationen/publications_pof/pof_fall_2007/pof_2_2007_e_dp.pdf
The next 20 years series	Forecasts on the future	Online discussion and (US-based) seminar series on emerging trends and scenarios	Online resource includes selected articles on all key trends	www.tnty.com/

Organisation	Programme	Description	Outputs	Reference
University of Cambridge, UK and the Cambridge Conservation Initiative	Conservation Futures Programme	Partnership between the university of Cambridge and 8 conservation organisations (BirdLife International, British Trust for Ornithology, Fauna and Flora International, RSPB, IUCN, TRAFFIC, Tropical Biology Association and UNEP-WCMC) to identify and address emerging issues for conservation and to foster closer integration between research and policy	Includes Sutherland et. al. 'An assessment of the 100 questions of greatest importance to the conservation of global biodiversity' a collaborative exercise between CCI and a range of other partners. *In press*	conservation.cam.ac.uk
University of Stellenbosh	South African Institute for Futures research	Specialises in futures research as support for corporate strategic management	Various (e.g. ecosystems and business)	www.ifr.sun.ac.za/publications/default.htm
UK Global Environmental Change Committee	Global Biodiversity Subgroup	Group consisting of key government and other funders of biodiversity research in UK. Set up to identify and review research gaps and recommend strategic priorities for UK and EU science.	Most recent reports on Ocean Acidification and Biodiversity and climate change.	www.ukgecc.org/dvl_Biodiversity.htm

Organisation	Programme	Description	Outputs	Reference
UK Government Office for Science	Horizon Scanning and Foresight programmes	Regular cross-government strategic Horizon Scans- particularly to spot implications of emerging science and technology; and in depth exploration of selected issues using a range of futures techniques. Current topics include Land Use and Sustainable Energy	Sigma scan- issues across public policy agenda Delta scan-future science and technology issues and trends and their implications Briefing papers on key S+T issues Reports on future evolutions and challenges and options to address these	www.sigmascan.org/ humanitieslab.stanford.edu/deltascan/Home www.foresight.gov.uk/HORIZON_SCANNING_CENTRE/Reports/S-TClusters/Clusters.html www.foresight.gov.uk/About_Foresight/index.html
US Environmental Protection Agency	Environmental Futures Programme	Programme to develop organisational capacity for foresight and pilot futures activity on key issues	Recent outputs include a review of 'Second life' and potential opportunities for EPA	www.epa.gov/osp/efuture.htm
Wildlife Conservation Society	Futures Group	One year programme with Bio-era to investigate long term scenarios that could impact on WCS mission	''Future of the wild' report- 6 scenarios and key questions raised for WCS/conservation	www.wcs.org/media/file/Futures_of_the_Wild.pdf