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Sixth meeting

The Hague, 7-19 April 2002

Item 17.1 of the provisional agenda*

IDENTIFICATION, MONITORING, INDICATORS AND ASSESSMENTS

*Millennium Ecosystem Assessment: Report to the Conference of the Parties
of the Convention on Biological Diversity*

Note by the Executive Secretary

1. In paragraph 25 of its decision V/20, the Conference of the Parties recognized that there is a need to improve the quality of the scientific, technical and technological advice provided to it and to undertake sound scientific and technical assessments, including in-depth assessments of the state of knowledge on issues critical for the implementation of the Convention. To this end, the Conference of the Parties requested SBSTTA to undertake a number of pilot assessments and to invite the Millennium Ecosystem Assessment to work closely with SBSTTA in this undertaking (see decision V/21, paragraph 10, and V/20 paragraph 29 (b)).
2. The Executive Secretary is pleased to circulate herewith, for the information of participants in the sixth meeting of the Conference of the Parties to the Convention on Biological Diversity, the report of the Millennium Ecosystem Assessment to the Conference of the Parties.
3. The document is being circulated in the form and language in which it was received by the Secretariat.

* UNEP/CBD/COP/6/1 and Corr.1/Rev.1.

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**MILLENNIUM ECOSYSTEM ASSESSMENT REPORT TO THE CONFERENCE OF THE
PARTIES OF THE CONVENTION ON BIOLOGICAL DIVERSITY**

Status and Outline

Information Document

Executive Summary

1. The Millennium Ecosystem Assessment, launched in June 2001, is an integrated assessment, designed to meet some of the assessment needs of the Convention on Biological Diversity, Convention to Combat Desertification, Wetlands Convention and other users including the private sector, civil society, and indigenous peoples. It has been invited by each of these three conventions to provide assessment input to their scientific and technical subsidiary bodies.
2. The technical design phase of the Millennium Assessment was initiated in April 2001, and concluded in January 2002 with approval by its Board of the design. Two technical design workshops (in the Netherlands and South Africa) and numerous consultations with the users of the Assessment were undertaken as part of the design phase. The set of assessment topics that the MA will seek to address was strongly influenced by consultations with CBD Bureau members and the CBD secretariat, specific requests from SBSTTA, and input from Parties and through side events at past COP and SBSTTA meetings. The basic design and substantive outlines to guide the work of the MA were approved by the MA board in January 2002 and are presented in Annex 1. The Assessment phase has now begun and the first product will be released early in 2003. The final documents and a summary for policy makers targeted at the needs of CBD will be forwarded to the SBSTTA in time for the SBSTTA meeting that is anticipated in late 2004.
3. In paragraph 25 of its decision V/20, the Conference of the Parties recognised that there is a need to improve the quality of the scientific, technical and technological advice provided to it and to undertake sound scientific and technical assessments, including in-depth assessments of the state of knowledge on issues critical for the implementation of the Convention. To this end, the Conference of the Parties requested SBSTTA to undertake a number of pilot assessments and to invite the MA to work closely with SBSTTA in this undertaking (see decision V/21 paragraph 10 and V/20 paragraph 29 (b)).
4. The following elements of the decisions related to the assessments needs of the Convention on Biological Diversity (COP IV & V) forms part of the core components of the MA:
 - (a) Assessing the status, uses and threats to biodiversity within the ecosystem categories of the CBD, both globally and for the United Nations regions: Inland waters, Marine/Coastal, Agro-Biodiversity, Forests, Drylands, Mountains (Decisions IV/4A; IV/7.2);
 - (b) Providing knowledge on key processes and influences in ecosystems which are critical for structure, function, and productivity of marine and coastal biological diversity (e.g., Decision IV/5);
 - (c) Identification of assessments and monitoring indicators (Decision V/7);
 - (d) Developing assessment and valuation methodologies for multiple benefits derived from forest biological diversity (e.g., Annexe to decision IV/7);
 - (e) Providing advice on the identification of options for the conservation and sustainable use of forest biodiversity and the mitigation of negative influences and the promotion of positive human influences on forest biodiversity (e.g., Decision IV/7.12; Annex to Decision IV/7);
 - (f) Implementation of capacity building measures for developing and implementing national and sectoral plans for the conservation and sustainable use of inland water ecosystems, including comprehensive assessments of the biological diversity of inland water ecosystems, and capacity-building programs for monitoring the implementation of the program of work and the trends

in inland water biological diversity, and for information-gathering and dissemination among the riparian communities. (Decision V/2, IV/4).

5. In paragraph 6 of its recommendation VII/2, on assessment processes, SBSTTA invites the secretariat of the Millennium Ecosystem Assessment to fully utilize the rosters of experts under the Convention in the process for nominating experts for the working groups of the Assessment. In paragraph 1 (h) of its recommendation VII/6 on forest biological diversity, SBSTTA recommends that the Conference of parties at its sixth meeting invites the United Nations Framework Convention on Climate Change, the Intergovernmental Panel on Climate Change, the International Geosphere-Biosphere Programme, in the context of its global change and terrestrial ecosystems global transect program, and the Millennium Ecosystem Assessment to enhance collaboration in research and monitoring activities on forest biological diversity and climate change, and explore possibilities of establishing an international network to monitor and assess the impact of climate change on forest biological diversity. The MA has forwarded these SBSTTA decisions to each of the relevant working groups of the MA for consideration and incorporation into their work plans. In response to decision VII/2, the MA is consulting the roster of experts of the CBD in the selection of members of the MA working groups. The MA has also contacted each of the CBD focal points for additional nominations. With respect to decision VII/6, the MA would welcome the opportunity for further collaboration with these institutions in assessment of the impact of climate change on forest biodiversity and is in contact with these organizations to begin further exploration of this idea.

6. COP VI could strengthen the contribution of the MA to SBSTTA by supporting and welcoming the draft outline of the MA as contained in Annex I of this document; requesting SBSTTA to continue to identify opportunities for collaboration with the Millennium Assessment in contributing to the assessment needs of the Convention; and urging Parties to provide assistance to developing country Parties to facilitate participation of developing country experts and assessments in the work of the MA.

I. BACKGROUND

7. In paragraph 25 of its decision V/20, the Conference of the Parties recognised that there is a need to improve the quality of the scientific, technical and technological advice provided to it and to undertake sound scientific and technical assessments, including in-depth assessments of the state of knowledge on issues critical for the implementation of the Convention. To this end, the Conference of the Parties requested SBSTTA to undertake a number of pilot assessments and to invite the Millennium Ecosystem Assessment (MA) to work closely with SBSTTA in this undertaking (see decision V/21 paragraph 10 and V/20 paragraph 29 (b)).

In response to these decisions SBSTTA, at its sixth meeting adopted recommendation VI/5 on the development of methodologies and identification of pilot studies for scientific assessments. By this recommendation SBSTTA invited the MA to integrate assessments of the following topics in its work:

- (a) The interrelationship between biodiversity and climate change, in line with SBSTTA recommendation VII/6 and VI/7, which concerns biodiversity and climate change, including cooperation with the UNFCCC;
- (b) Inland water biodiversity, its uses and threats;
- (c) Further aspects of marine and coastal biodiversity, drawing upon the work already conducted by SBSTTA;
- (d) Further aspects of forest biodiversity, as identified by SBSTTA on the basis of the work of the Ad Hoc Technical Expert Group on Forest Biological Diversity established by the COP at its fifth meeting, in May 2000.

8. Accordingly, the Executive Secretary invited the Secretariat of the MA to contribute to the work of the Convention and to ensure that biological diversity concerns are addressed by the Assessment. In response to this invitation, the MA Secretariat initiated a consultation process

between the Assessment co-chairs and the Secretariat of the Convention, as well as with experts involved in work of SBSTTA, to obtain guidance on the focus of the Assessment. Of central importance in this process were two technical design meetings for the MA that considered the overall substantive focus of the Assessment. The first technical design meeting was held in Bilthoven, Netherlands on April 8-11, 2001 and involved approximately 90 individuals from 31 countries. The second design meeting was held in Cape Town South Africa on October 8-11, 2001 and involved approximately 110 individuals from 39 countries. Both meetings involved a number of users as well as experts very familiar with the CBD. In particular, the Chair of SBSTTA participated in both workshops and a representative of the CBD Secretariat participated in the Cape Town workshop. Both meetings also considered how they could meet the needs identified by COP-5 and SBSTTA. This note has been prepared by the Secretariat of the Millennium Assessment to provide the Conference of Parties, a short progress report, a work plan, and to outline potential Millennium Assessment interactions with CBD and more specifically with SBSTTA in addressing identified assessment needs.

II. OVERVIEW AND STATUS REPORT

9. The Millennium Ecosystem Assessment, launched in June 2001, is an integrated assessment, designed to help meet the assessment needs of the Convention on Biological Diversity, Convention to Combat Desertification, Wetlands Convention and other users including the private sector, civil society, and indigenous peoples. MA has been invited by each of these three conventions to provide assessment input to their scientific and technical subsidiary bodies.

10. The objectives of the MA are to help meet the needs of decision-makers for peer-reviewed, policy-relevant scientific information on issues they are confronting concerning ecosystems and human well-being. The MA will provide information and also build human and institutional capacity to provide information. If the MA process is successful in meeting the needs of users, it is anticipated that the process would be repeated at regular intervals (of possibly 5 or 10 years).

11. The Millennium Ecosystem Assessment will be undertaken at multiple scales. It consists of a global assessment as well as series of linked regional and national assessments. The Assessment will be carried out through four expert working groups. Each working group will aim to produce a report by 2005 focused on the following topics:

(a) The Sub-Global Working Group will present a generic methodology for conducting multi-scale assessments, and summarise the findings from each of the sub-global assessments associated with the MA. The sub-global components of the MA will directly meet the needs of decision-makers at those scales. In addition, the sub-global components of the MA will strengthen the global findings with on-the-ground reality and inform the local findings with global perspectives, data, and models. Approved assessments that have become components of the MA include: Southern Africa Multiscale Assessment; Norway National Assessment; Integrated Ecosystem Assessment for Western China; Local Assessments in the Mala Village Cluster in India; Local Assessments in Sweden, Alternatives to Slash and Burn sites and Small Islands of Papua New Guinea. In addition, three "candidate" assessments have been proposed in Southeast Asia and one for the tropical coastal region of Australasia and discussions are underway regarding additional candidates that may be proposed for the Baltic Sea, Colombia, and Central America. Any proposed sub-global assessments meeting basic criteria developed by the MA (available on the MA website) can become a full component of the MA process. Additional sub-global assessments will be initiated during the course of the MA, and although some may not be initiated in time to contribute to the official findings, their primary purpose is to meet decision-makers' needs at the scale at which they are conducted. Currently, the MA is able to provide only seed funding for the sub-global assessments, with the bulk of funds raised individually by each sub-global assessment.

(b) The Condition Working Group will describe each major ecosystem service. The condition and geographical distribution and trends of the supply and demand for each service will be considered and the capacity of ecosystems to supply these services, and the impacts of the changes in ecosystems on their provision will be described. A description of the current extent, condition and

trends of ecosystems, presented in commonly referenced ecosystem and biome units (e.g., forests, freshwater, coastal, mountain, etc.) biome by biome, and options for trade-offs between the provision of the various services will be laid out. Chapters will also address issues such as species use of multiple ecosystem types; areas with multiple examples of rapid change; land conversions, and Protected Areas. The final section of the product will aim to assess the impacts of ecosystem change on human well being, covering indicators of health, environmental security, cultural security, economic security and equity;

(c) The Scenarios Working Group will assess the findings of previous global scenario analyses concerning goods and services and develop a set of scenarios providing quantitative estimates of the consequences of various plausible changes in primary driving forces on proximate forces, ecosystem goods and services (including biodiversity), and human well-being. It will illustrate the connection of global changes in ecosystem services at multiple scales (global to local) and the connection of ecosystem services to human well-being; and

(d) The Response Options Working Group will begin with an introduction to the conceptual framework and the typology of response options within categories of disciplinary tradition, social control, drivers and scale. Then there will be an assessment of past and current response options, which will provide the basis for practical recommendations, tools and guidelines for the various users through an evaluation of existing literature and the MA sub-global assessments. Finally, there will be a synthesis of the “ingredients for successful responses”, based on an evaluation of available policies and scenarios.

12. A more detailed outline of the reports of the Working Groups and the conceptual framework for the MA is provided in Annex I. In addition to the full assessment reports, an overall Summary for Policy Makers will be prepared and a specific synthesis report will be prepared addressing the highest priority needs identified by the Convention on Biological Diversity.

13. The MA incorporates the following design elements relevant to the use of MA findings by the CBD:

- (a) *The MA will not report information for individual nations.* The information and findings that the MA will produce will be summarized by region or ecosystem type – not by nation – for the global synthesis. Disaggregated data will be available for use by others in national assessment processes.
- (b) *Sources of information.* The MA will use a wide range of data and information, relying heavily on peer reviewed findings in the published literature and global datasets. The process will also incorporate indigenous and traditional knowledge, national data available from a wide range of ministries, private sector information and so forth. In particular, the MA will seek to incorporate information from National Biodiversity Strategies and Actions and will seek to develop products and build capacity that can be directly helpful in updating National Biodiversity Strategies and Action Plans.
- (c) *Indicators.* The MA will focus on synthesizing knowledge and reviewing best practices concerning methodologies for developing and applying indicators related to ecosystems in order to provide guidance to countries that may wish to develop and use policy- or management-related indicators;
- (d) *The MA will report where appropriate using the basic CBD ecosystem categories.* Where appropriate, the MA findings will be reported using the CBD “ecosystem” breakdown of: forests, dryland, marine/coastal, mountain, and agroecosystems. In addition, findings will be reported for significant ecosystems not well-addressed by those divisions, such as island ecosystems; and
- (e) *The MA will use the ecosystem approach as a guiding paradigm for its assessment.* The MA was designed to be consistent with, and a tool for, implementing the ecosystem approach of the Convention on Biological Diversity as described in decision V/6, including the need to support capacity building to implement the ecosystem approach (paragraph 6).

14. The MA works closely with other environmental and sectoral assessment processes including IPCC, the Global International Waters Assessment (GIWA), the Global Environment Outlook (GEO), the Forest Resources Assessment (FRA), the Land Degradation Assessment (LADA), etc. to ensure that it adds value to activities already underway.

15. Major sponsors of the MA include GEF, UN Foundation, David and Lucile Packard Foundation, and the World Bank with additional financial and in kind support provided by the Government of Norway, CGIAR, UNEP, FAO, UNDP, UNESCO, WHO, Rockefeller Foundation, U.S. National Aeronautics and Space Administration and others. (See Annex III)

16. The MA Board is multisectoral and representative of different communities of ecosystem users. The MA Board includes representatives from both the CBD Secretariat and SBSTTA. Representatives of other conventions (CCD, Ramsar) and other key international institutions such as UNEP, UNDP, FAO, UNESCO, WHO, CGIAR, ICSU, IUCN, GEF, UN Foundation, and the FCCC are also included in the Board. The United Nations Environment Programme (UNEP, Nairobi), World Resources Institute (WRI, United States) and World Fish Center (ICLARM, Malaysia) administer funds for the assessment. UNEP coordinates the distributed secretariat: the MA Director is based at ICLARM; technical support units for the working groups are based at the Scientific Committee on Problems of the Environment (France), UNEP-World Conservation Monitoring Centre (United Kingdom), Institute for Economic Growth (India), and the World Fish Center; engagement and outreach activities are supported through WRI in partnership with Meridian Institute.

17. Because the MA is a 'needs driven' assessment process, during 2001 (and continuing throughout the MA process), a number of steps were taken to involve intended users in the MA design through both formal (e.g., SBSTTA) and informal dialogues:

(a) Information needs from the MA were discussed at the sixth and seventh meetings of SBSTTA as well as the Ramsar Wetlands Convention Scientific and Technical Review Panel (Ramsar STRP) (June 2001), the Committee on Science and Technology of the Convention to Combat Desertification (CCD CST) Bureau (August 2001), and the CCD COP (October 2001);

(b) The MA sub-global assessment activities now underway in Southern Africa, Southeast Asia, China, India, Norway, Sweden, and other countries all include extensive involvement of the users in their planning phase;

(c) A workshop was held in early October 2001 jointly with the World Business Council on Sustainable Development (WBCSD) involving individuals from the private sector to explore how the MA could contribute to sustainable development planning within business;

(d) A series of meetings and consultations are being planned to explore user needs within civil society and indigenous peoples' organizations. To this effect, a small informal meeting with some of the indigenous representatives was held during the SBSTTA 6 meeting in March 2001 and a MA side event and consultation was organized during the Second meeting of the Ad hoc Open-ended Inter-session Working Group on Article 8(j) workshop held in February 2002.

(e) The first draft of the "user needs" outline was made available through the MA website in August 2001 and comments were incorporated based on the input of some 27 individuals and institutions including representatives of governments (8), international organizations (2), NGO's (8), academia (7), and private sector (2).

18. A workplan outlining in more detail the forthcoming steps in the MA is provided in Annex II. The outline (as provided in Annex I) and workplan, drafted in light of the recommendations of SBSTTA meetings and other users were approved by the MA board in January 2002.

III. MEETING CBD NEEDS

19. Clearly, the MA cannot hope to meet all of the specific needs of each audience. Instead, it has identified a set of assessment needs shared widely among various users and a small number of additional "high priority" needs of individual users.

20. With a view to identifying the priorities of the CBD, the MA Secretariat reviewed the decisions of the COP and recommendations of the SBSTTA in light of the MA draft outline to identify opportunities where the MA could directly assist in meeting the identified assessment needs of the Convention. Based on this review and discussions with the Executive Secretary and members of the Bureau of SBSTTA, the MA has identified a list of needs of the CBD and contributions that can be made by the MA that is described in detail in Annex III. Generally, the MA will contribute to the assessments needs of CBD in the following manner:

(a) *Needs identified in SBSTTA recommendation VI/5.* Assessment information pertaining to several of these issues falls into the category of information needs of multiple audiences of the MA (discussed above). Specifically, each of the following items will be addressed as part of the core MA analysis: a) Inland water biodiversity, its uses and threats; b) Further aspects of marine and coastal biodiversity, drawing upon the work already conducted by SBSTTA; and, c) Further aspects of forest biodiversity.

(b) *The interrelationships between biodiversity and climate change.* The MA is working with the IPCC to provide a coordinated set of assessment products concerning the interrelationship between biodiversity and climate change. IPCC was invited by SBSTTA to contribute a technical paper on this topic to SBSTTA-7. That technical paper identified additional needs for assessment information concerning the interrelationship between climate and biodiversity. Based on the findings of that technical paper, and guided by the needs of the ad hoc technical expert group that will be established to prepare scientific advice to integrate biodiversity considerations into the implementation of the FCCC (SBSTTA VII/6.1(h), VI/7.5), the MA will undertake additional assessment work to fill the gaps identified by the IPCC and to provide additional information related to particularly important policy issues.

(c) *Methodologies.* The CBD Secretariat and SBSTTA have encouraged the MA to provide methodologies and tools that can be used at national scales. To meet this need, the first product that will be produced by the MA, in early 2003, will be the *Conceptual Framework and Methodology Report* that will provide guidance for undertaking integrated ecosystem assessments.

(d) *Forest Fragmentation and Biodiversity.* The core MA documents include a synthesis of the 'state of knowledge' concerning the relationship of forest fragmentation and biodiversity since this is a highly policy relevant issue on which a considerable amount of scientific research is now underway.

IV. FUTURE COLLABORATION WITH CBD

21. Cooperation between the MA and the CBD process, in particular SBSTTA, has been extensive. Indeed, there already exist detailed procedures within both process for taking notice of and incorporating the products of one another. Regular reports on the MA will be presented to future meetings of SBSTTA and the MA would welcome the opportunity to provide such reports to COP. Side events or working group discussions will be arranged as needed to provide opportunities for detailed input from parties. Although the technical volumes produced by the Working Groups of the MA will be prepared to meet the needs of multiple users, a separate Summary for Policymakers will be developed specifically to respond to targeted needs of the CBD SBSTTA.

22. More specifically, there are three areas that COP may wish to consider in order to further promote cooperation between the MA process and the CBD.

(a) First, all Parties to the CBD were invited to nominate experts for the Working Groups and the CBD Roster of Experts was consulted to identify experts (SBSTTA VII/2.6). Nominations are still welcome from parties for Lead Authors and expert reviewers. Policies for selection of Working Group members, preparation of documents, and peer review of documents are consistent with the procedures outlined in UNEP/CBD/SBSTTA/6/9 (Scientific Assessments: Development of Methodologies and Identification of Pilot Studies) and UNEP/CBD/SBSTTA/7/3 Annex 1. Specifically, the composition of the group of Coordinating Lead Authors and Lead Authors for a section or chapter of MA reports will reflect the need to aim for a range of views and expertise and a balanced gender and geographical representation (ensuring appropriate representation of experts from

developing and developed countries and countries with economies in transition). Draft reports of the MA will undergo two rounds of peer review, one by experts and one by governments and experts. Though support from SBSTTA and the Parties would help MA ensure that the experts in the Working Groups were regionally balanced and did represent the best experts available, the participation of many developing country experts will be contingent upon the availability financial support and direction from the COP may assist in securing such support.

(b) Second, considerable interest exists among institutions and countries to undertake “sub-global” assessments at national or sub-national scales as part of the MA process. The MA can provide seed funding to such activities in developing countries, but each of these ‘candidate’ assessments must obtain more than half of the financial support for their involvement. The Government of Norway, for example, has provided a significant grant in support of the Southern African multiscale assessment and has also arranged a ‘twinning’ arrangement for the exchange of experts involved in the Southern African and Norway sub-global assessments. Similar actions taken by other governments or direction from COP could assist other countries and institutions in securing the resources needed for their involvement.

(c) Third, the table below lists the proposed MA products that would be available at upcoming CBD meetings and the guidance that would be sought from those meetings. Guidance from the COP regarding this timetable would assist with the planning process of the MA.

Meeting	MA Input	COP/SBSTTA Action and Guidance
April 7-19, 2002 COP-6	Detailed outlines for products MA conceptual framework	COP could provide further inputs on the outlines, conceptual framework, and methodology and guidance regarding the establishment of sub-global assessments.
December (?) 2002 SBSTTA-8		SBSTTA could provide additional priorities for assessment input and recommend the use of these methods and tools in national assessments.
September (?) 2003 SBSTTA-9	MA “Conceptual Framework and Methodology Report” available	SBSTTA could review the findings of this component of the Assessment and introduce findings as appropriate into SBSTTA decisions.
April (?) 2004 COP-7	Tbd	???
November (?) 2004 SBSTTA-10	Full Assessment Reports, “Policy Makers Summary” and CBD Synthesis report available to parties	SBSTTA could review the findings of the Assessment and introduce findings as appropriate into SBSTTA decisions.

23. Based on the foregoing, COP VI could strengthen the contribution of the MA to SBSTTA by supporting and welcoming the draft outline of the MA as contained in Annex I of this document; requesting SBSTTA to continue to identify opportunities for collaboration with the Millennium Assessment in contributing to the assessment needs of the Convention; and urging Parties to provide assistance to developing country Parties to facilitate participation of developing country experts and assessments in the work of the MA

24. The MA looks forward to continuing the fruitful cooperation established with CBD, in particular with its Secretariat and SBSTTA.

ANNEX I.
DRAFT MILLENIUM ASSESSMENT OUTLINE

The Millennium Assessment will produce a variety of publications during the four-year process. The first product of the MA will be the Conceptual Framework and Methodology Report, intended to provide guidance on undertaking integrated ecosystem assessments, which will be released in 2003. The Assessment will conclude with the release in 2004 of: (a) four technical volumes presenting the findings of each of the four MA working groups; (b) a Summary for Policy Makers (SPM) for each of the technical volumes; and, (c) between three and five Synthesis Documents tailored to different groups of users that will draw on the findings of all the technical volumes to present information that is most relevant to key 'stakeholders' involved in the MA (e.g., the Convention on Biodiversity, the Convention to Combat Desertification, the Ramsar Wetlands Convention, the Private Sector, and Civil Society). These synthesis documents will be short and targeted on the specific needs of the users. A more detailed version of this outline is available on the MA Website (<http://www.millenniumassessment.org>).

CONCEPTUAL FRAMEWORK AND METHODOLOGY REPORT OUTLINE

The Conceptual Framework report will be a description and rationale of the conceptual framework and methodologies that will be used in the MA, in order to provide guidance to the authors and inform the user community (see diagram below). For example, the conceptual framework will outline the strengths, weaknesses and controversies surrounding the full range of valuation methodologies and decision-making frameworks, but will not critically assess each of them, because the full range will be evaluated and used in the assessment. In contrast, specific guidance will be given regarding the approach to uncertainties and some aspects of the costing methodologies. This report will undergo two rounds of peer-review, an expert review by all the MA CLAs followed by an expert/government peer-review. The MA Board will then review and approve the report.

Preface

This will place the Conceptual Framework volume in the context of the other volumes of the MA.

Summary for Policy Makers

This will summarize the most policy-relevant aspects of the conceptual framework and the methodologies and tools for policymakers in non-technical language.

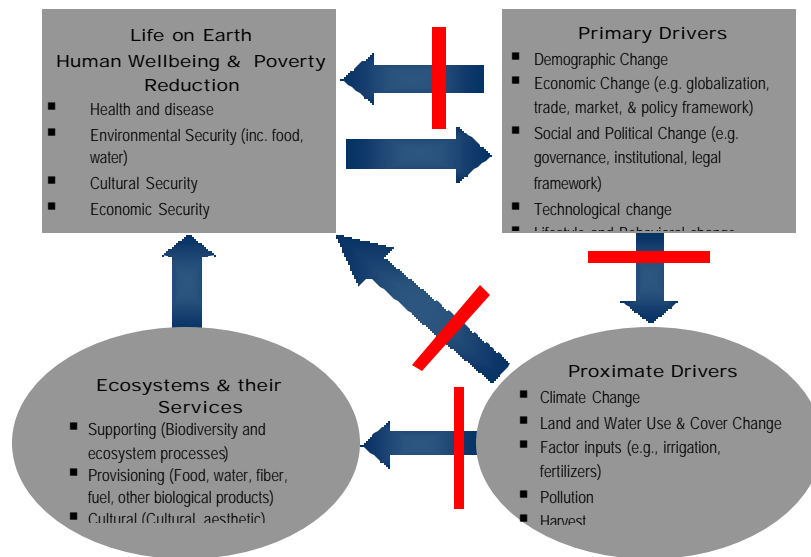
Chapter 1. Overview and conceptual framework

This chapter will introduce the readers to the conceptual framework that will be used in the Millennium Assessment (primary drivers, proximate drivers, ecological services and human-well being), and contrast this framework with others that could have been used (e.g., State-Pressure-Response; Pressure – State – Impact – Response; Supply – Demand – Equilibrium). It will then briefly discuss the definitions and range of primary and proximate drivers; the concept of ecosystem services and the definitions (provisioning of goods, supporting and enriching) used in the MA (why they were chosen, and their strengths and weaknesses in comparison with other definitions); the components of human well-being and poverty addressed in the MA (e.g., livelihoods, health and vulnerability; equity and sustainability); strengths and limitations of the concept of ecological services in addressing concerns related to human well-being and the intrinsic value of biodiversity; and the strategies and interventions (response options) available.

Chapter 2. Role of ecosystems in the provision of ecological services and related ecosystem concepts

This chapter will:

Scale 3
Scale 2
Scale 1



Red bar = Strategies and Interventions

- Assess methods for characterizing ecosystems and their utility in providing ecological services for human well-being; discuss the definitions of ecosystems used in the MA; the concepts of ecosystem structure and function; and the different levels of land/vegetation characterization (biome, land-cover or land-use classes) and thus the scaling issues. It will also assess the services (provisioning of goods, supporting and enriching) ecosystems provide, including whether biodiversity should be viewed as an ecological service, or whether it provides ecological services or both;
- Explain and define concepts and terms such as “ecosystem health,” “integrity”, resilience, fast and slow variables (concept of inertia), ecological footprints, and vulnerability as used in both ecosystem and social contexts and many others.

Chapter 3. Concepts of Value (Economic and Non-Economic)

This chapter will assess the utility of a range of different valuation and costing methodologies. It will describe various ‘types’ of value, including Consumptive value, Non-consumptive value, Option value, and Intrinsic values, why these influence decisions of different stakeholders in different ways and challenges involved in reconciling different philosophical frameworks for considering value. This chapter will assess non-utilitarian approaches to the consideration of ecosystems and biodiversity and how these approaches are or are not compatible with utilitarian approaches. It will discuss the concept of wealth and the difficulties associated with measuring ecological wealth. It will assess factors determining the economic value of ecological services, including their tradability and degree of commercialization; the concept of total value; the value of flows of ecological services and the value of change in stocks (assets/depletion/appreciation; valuation approaches and methods). It will also assess non-economic valuation methodologies, costing issues within the context of the decision-making frameworks, e.g., ancillary benefits, discounting, market failures and external costs, implementation costs, etc.

Chapter 4. Primary and proximate drivers of ecological, social and economic change

This chapter will discuss the socio-economic drivers (e.g., demographic changes, economic growth, governance and governance structures, technological change, globalization, disintegration of communities and loss of culture and tradition; conflicts and war, etc.); ecological drivers (e.g., land-cover change and fragmentation, climate change, nitrogen deposition, etc) and policy drivers (e.g., land tenure policies), including scales of policy implementation, used in the MA.

Chapter 5. Human Well-being and Consequences for other Life on Earth

This chapter will discuss human well-being and poverty alleviation and summarize the links to ecological services, and then discuss the trade-offs and synergies among and within the three types of ecological services (provisioning, regulating, cultural) in improving human well-being and reducing poverty with emphasis on livelihood (food, water) security, equity, health. It will also discuss how the consequences of ecosystem changes for other life on earth can be considered an aspect of human well-being and can at the same time be viewed by some to be a concern independent of human values.

Chapter 6. Data, Models and Scenarios

This chapter will assess the availability and quality of data (socio-economic and biological/physical/chemical (in-situ and remote sensing)) available to the MA and to integrated ecosystem assessments at all scales. It will review the various systems for categorizing ‘ecosystems’ for assessment purposes and review the geographical units of reporting most relevant to different decision-makers. (A full assessment of these systems of categorization will be included in the Condition Assessment.) It will examine both the opportunities for and obstacles to integrating

datasets collected under different analytical frameworks into a common framework for analysis or reporting.

This chapter will also examine the key features (i.e., strengths and weaknesses) of socio-economic, ecological and climate models. (A full assessment of these modeling approaches will be included in one of the Assessment Reports.)

Finally, this chapter shows how diverse biophysical and social parameters can be utilized to derive likely scenarios for the future and how they can provide the information needed to formulate potential response options including information on the tradeoffs inherent in policy decisions.

Chapter 7. Scaling

This chapter shows whether and how information from various spatial and temporal scales can be integrated to provide the comprehensive understanding, and policy options at various levels, relating to the consequences of human actions on the natural support systems that provide for human well-being.

Chapter 8. Decision-making frameworks, criteria and indicators

This chapter will discuss and assess:

- the range of different decision-making frameworks that can be used for policy analysis leading to responses at different scales within the broad context of cost-effectiveness, equity and sustainability (e.g., multi-attribute decision analysis, cost-benefit analysis, cost-effectiveness, tolerable windows/safe landing approach, and ethical and cultural prescriptive rules);
- decision-making processes
- decision-making under uncertainty
- institutional frameworks for decision-making;
- criteria and indicators that can be used to establish “management/policy” priorities within these decision-making frameworks;
- mechanisms by which public and private sector decision-making processes weigh both economic and non-economic considerations

Annex 1: Assessment Guidelines

This chapter will introduce the basic methodological approach for conducting a multiscale ecosystem assessment. Recognizing that the specific steps in such an assessment will differ dramatically across regions, scales and intended users, the Chapter will be written as a ‘process protocol’ rather than a detailed methodology. The rationale is that all ‘multiscale integrated ecosystem assessments’ should include the same basic steps in the process, but the specific methods and approach used to accomplish a particular step in the process must be tailored to the needs of the specific assessment. That said, the process protocol will be illustrated with examples from ongoing and planned assessments. This chapter will provide detailed guidelines on the assessment methods being used in each of the MA working groups, how those methods can be ‘scaled down’ to sub-global levels (e.g., through ‘scalable variables’), and how the MA will address the need for cross-scale interactions in the assessment process. The chapter will be written with the ‘implementers’ of the MA in mind as the primary audience (e.g., the individuals in the Condition, Scenarios and Response working groups as well as the individuals conducting the sub-global assessment) however we anticipate that it will also be of value to other individuals and institutions who may adapt the MA methodology to their specific needs.

A major focus of the MA, and a major challenge facing any assessment process, is the active involvement of the ‘users’ in the Assessment process to ensure that they have ownership of the findings and that the findings are targeted at their needs. This chapter will provide detailed information on mechanisms for involvement of stakeholders in an assessment process at different scales and examine the benefits (and costs) associated with that participation.

- 1.1. *General steps in conducting an assessment*
- 1.2. *Relating any scale to other scales of attention*
- 1.3. *Building a Supportive Infrastructure for Assessments*
 - 1.3.1. *Processes to enhance the usefulness of the assessment*
 - 1.3.2. *Processes to assure the scientific quality of the assessment*
 - 1.3.3. *Processes to enable evaluation of the assessment experience*
 - 1.3.4. *Processes to build local capacity*
 - 1.3.5. *Processes to promote stakeholder involvement*
 - 1.3.6. *Processes to promote stakeholder acceptance*
- 1.4. *Condition Assessment Methods*
- 1.5. *Scenarios Assessment Methods*
- 1.6. *Response Options Assessment Methods*
- 1.7. *Institutional Arrangements*
- 1.8. *Products*
- 1.9. *Evaluation of Multi-Scale Component of the Millennium Assessment*

Annex 2: Nomenclature and guidelines for handling uncertainty in the MA

This chapter presents guidelines for how scientific uncertainty will be presented in the MA. Background material for this chapter will be obtained from a paper with the same title prepared for the IPCC and feedback from experts in the IPCC on the strengths and weaknesses of that approach. The credibility of assessments like the IPCC and MA is as closely linked to how they address what is not known as in how they address what is known.

Annex 3: Glossary

SUB-GLOBAL ASSESSMENT REPORT OUTLINE

This volume, to be released in 2004, will assess the experiences and lessons from the sub-global component of the MA. It will include the Executive Summaries from the various sub-global assessments, but its primary focus will be a comparative analysis of key elements of the sub-global assessments (Part II) and an evaluation of the strengths and weaknesses of the “multi-scale” approach used in the MA.

SUMMARY FOR POLICY MAKERS

Part I: Introduction, Methods and Tools

Chapter 1. Introduction

Chapter 2. Methods and Tools

Part II: Cross Assessment Synthesis

Chapter 3. Primary Drivers

This chapter will explore differences and commonalities among driving forces at different scales and for different regions.

Chapter 4. Proximate Drivers

This chapter will explore differences and commonalities among proximate drivers at different scale and for different regions.

Chapter 5. Ecosystem services

This chapter will explore differences and commonalities concerning the impact of ecosystem change on ecosystem services at different scales and for different regions.

Chapter 6. Well-being, livelihoods and poverty reduction

This chapter will assess the livelihood (socio-ecological) systems and syndromes, including ecosystem types, socio-economic types and transitions (natural, semi-natural and cultural).

Chapter 7. Response options

This chapter will explore differences and commonalities among response options at different scales and for different regions. It will also assess the mechanisms, capacity, resilience and actual adaptations used for adaptation to changing conditions and coping with disturbances or changes to the human ecological system, including human, behavioural, technological, knowledge, ecosystems and policy.

Part III. Evaluation of Multi-Scale Approach

This section will assess the utility of the multiscale assessment approach, examining whether and how scale matters, what has been learned from the process and what difference the multiscale approach makes. For the Assessment Report it will be based on input from those conducting these assessments. Subsequent to the overall assessment a second 'retrospective' independent analysis will be made to examine the influence of the multiscale approach.

Chapter 8. Critical reflections on the process

Chapter 9. Impact on Findings

This chapter will assess how the multi-scale process affected the type or nature of findings of the Assessment.

Chapter 10. Impact on Assessment Capacity

This chapter will assess how the multi-scale process influenced the capacity of the various individuals and institutions to undertake integrated ecosystem assessments and act on their findings.

Chapter 11. Impact on Usefulness

This chapter will assess how the multi-scale process influenced the extent to which findings were used by various stakeholders in changing policies or management practices.

Annex I: Executive Summaries

- A. Executive summary of Assessment #1
- B. Executive summary of Assessment #2
- C. Executive summary of Assessment #.....

CONDITION AND TRENDS ASSESSMENT REPORT OUTLINE

This report will assess conditions and trends of ecosystems and their goods and services, the causes of changes to ecosystems, and the consequences of ecosystem change for human well-being.

SUMMARY FOR POLICY MAKERS

Part I - Introduction

Chapter 1. Preface and Roadmap

Chapter 2. Executive Summary of “Conceptual Framework” Assessment Report

Chapter 3. Methods and Tools

- 3.1. *Methods for assessing how historical changes in ecosystems affect their capacity to provide Ecosystem Services*
- 3.2. *Economic valuation methods and approaches*
 - 3.2.1. *Valuation of food production*
 - 3.2.2. *Valuation of water services*
 - 3.2.3. *Valuation of biodiversity option values*
 - 3.2.4. *Etc*

Part II - Ecosystem Services

Ecosystem Services will be described under a consistent set of headings that explore:

- a) *Current state and historical and recent trend in demand;*
- b) *Current state and historical and recent trend in supply;*
- c) *Relative distribution of demand and supply;*
- d) *Effect of historical changes in ecosystems on the underlying capacity of the ecosystem to supply the service;*
- e) *Proximate and ultimate causes of the observed changes in the service.*

The summary of each chapter will in particular assess the sustainability of the production of the ecosystem services (particularly from biological standpoint).

Chapter 4. Freshwater

Chapter 5. Food

This chapter will address all sources of food including crops, livestock, fisheries and including both domesticated and non-domesticated sources.

Chapter 6. Fibre, Timber, Fuel

Chapter 7. Biodiversity

In the course of addressing the five core issues listed above, this chapter will address such issues as: A) How well can patterns of diversity of well known groups of species (e.g., plants, birds, mammals) be used to predict patterns of diversity in poorly known groups? B) What is the documented rate of species extinction over the past 100 years and how does this compare to rates in

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the fossil record? C) How well are documented species extinctions likely to represent species extinctions in the same taxonomic groups in regions more poorly studied or in more poorly known taxonomic groups? D) Can scientists conclusively detect the “fingerprint” of a current mass extinction episode? E) What has been the recorded and estimated loss and gain of species and genetically distinct populations in undomesticated and domesticated (e.g., agriculture, plantation) ecosystems?

Chapter 8. Nutrient Cycling (Carbon, Nitrogen, Phosphorous, etc.)

Chapter 9. Biological and disease vector control

Chapter 10. Waste Processing

Chapter 11. Flood and Storm Protection

Chapter 12. Cultural Services (Spiritual, Aesthetic, Social Relations, etc.)

This chapter will examine the role of ecosystems as a source of spiritual and aesthetic value to people and the importance of activities surrounding the use and management of ecosystems in establishing and promoting social relations among people. It will examine how ecosystem changes are affecting these cultural attributes and whether these changes differ in their impact across regions, groups or gender. It will examine how much traditional knowledge of ecosystems and their management has been lost. And it will examine the causes of these changes.

Chapter 13. Other Services

This chapter will explore in somewhat less depth the same five basic topics listed above for a variety of other Ecosystem Services, including: biochemicals/medicines; non-living material derived from biological processes (such as Calcium Carbonate from reefs); soil formation; climate regulation; pollination; landscape interconnection and structure; and space (e.g., the availability and pattern of use of land and water for development, transport, etc.)

13.1. Other biological products

13.1.1. Biochemicals/medicines

*13.1.2. Non-living materials derived from biological processes
(e.g., CaCO₃ from reefs)*

13.2 Soil formation

13.3 Climate regulation

13.4 Atmospheric Composition regulation

13.5 Pollination

13.6 Landscape interconnection and structure/refugia

13.7 Space – availability and pattern of use of land and water (including urban centres, transport and industry)

Part III. Condition and Causality - Analyzed by Ecosystems

The core question for this part is: “In what state are our ecosystems and what is the current trend”? This will not be assessed in an “is it good or bad?” mode but rather simply by providing the baseline information on the state of ecosystems and their supply of Ecosystem Services. A list of ecosystems/biomes representing a complete global coverage (with some overlap in accounting) will be used and each will be dealt with by a similar set of questions:

a) What is the extent of the system, what processes are modifying it (and how reversible are the changes), what is our state of knowledge regarding the system and what are major uncertainties?

b) What are the impacts of changes to the ecosystem on the ecosystem goods and services it provides?

- c) *How have the historical changes in the eco system affected its underlying biological capacity to provide ecosystem services in the future?*

Chapter 14. Terrestrial Biomes/Ecosystems

This chapter will address: Agroecosystems, Deserts and Aridlands, Forests and Woodlands, Grasslands, Shrublands, Urban ecosystems and Mountain Ecosystems. The section on Deserts and Aridlands will include a specific analysis of these issues within the region of focus of the Convention to Combat Desertification. Significant emphasis will be given to the issue of transformation of ecosystems from one category to another.

14.1 Agroecosystems

14.1.1 Overview of the ecosystem

14.1.1.1 Extent, location and trends in transformation to and from this type of ecosystem

14.1.1.2. Processes by which the ecosystem is modified and reversibility of the changes

14.1.1.3 .Assessment of state of knowledge

14.1.1.4. Major Uncertainties

14.1.1.5. Metrics specific to the ecosystem indicative of condition and trend (given data availability)

14.1.2. Impacts on the ecosystem (summation across the EGS they provide)

14.1.2.1. Biodiversity

14.1.2.2. Structure

14.1.2.3. Resilience

14.1.2.4. Locations of rapid change

14.1.3. Implications of historical changes in the ecosystem on its capacity of the ecosystem to continue to provide EGS

14.1.3.1 Proximate forces involved in managing the various EGS provided by this ecosystem that have the greatest impact on the ecosystem state and rate of change

14.1.3.2. Options and trade offs that are possible in the provision of the EGS consistent with current inputs and socio-economic constraints

14.1.3.3. Types and importance of conflicts over the provision of different EGS

14.1.3.4. Reversibility of changes

14.1.3.5. Options for modified/transformed portions of this ecosystem to be converted to other states including conversion to the conditions found under minimal humanly disturbance

14.1.3.6. Dependence / impact of providing the EGS for this ecosystem on other ecosystems.

14.2. Deserts and Arid lands

This section will address both deserts as a 'biome' and arid lands covered within the scope of the Convention to Combat Desertification

14.3. Forest and woodlands

14.4. Grassland

14.5. Shrublands

14.6. Subterranean (caves)

14.7. Urban

14.8. Mountains

Chapter 15. Freshwater Biomes/Ecosystems

This chapter will address inland waters and wetlands (including groundwaters), both as defined ecologically and as defined by the Ramsar Wetlands Convention. It will include treatment of river basins, lakes, rivers, floodplains, farm ponds, rice fields, etc. Significant emphasis will be given to the issue of transformation of ecosystems from one category to another.

Chapter 16. Coastal, and Marine Biomes/Ecosystems

This chapter will address oceans and coastal ecosystems (including small islands). Categories will include Open Ocean, coastal realm, estuaries and lagoons, inshore shelf, upwelling systems, coral reefs, etc. Significant emphasis will be given to the issue of transformation of ecosystems from one category to another.

16.1. Polar (may be dealt with also under terrestrial)

Chapter 17. Synthesis

The section will synthesize the assessment findings across ecosystems and in particular focus on issues that: a) cannot be adequately addressed within the confines of discrete ecosystems (e.g., migratory species, protected areas); and b) reveal new insights when viewed in the aggregate (e.g., areas with multiple examples of rapid change; land conversion; changing landscapes).

17.1. Migratory, nomadic and other species that use multiple ecosystems

17.2. Areas with multiple examples of rapid change

17.3. Land conversions

17.4. Changing landscapes

17.5. Protected areas

Chapter 18. Measures and Indicators of well-being

This chapter will introduce the constituents and determinants of human well-being in relation to ecosystems, assess the literature concerning indicators of human well-being, and present a set of indicators relevant to ecosystems and their goods and services.

Chapter 19. Ecosystem Condition and Human Well-being

This chapter will assess trends and conditions related to the consequences of ecosystem change on human well-being and in particular address the question: How do changes in ecosystems' conditions affect the determinants and consequently constituents of human well-being?

Chapter 20. Human Well-being and Primary Drivers

Changes in the state of human well-being feed back and influence the primary drivers of social, economic and ecological change. This chapter will assess the feedback between changes in human well-being related to ecosystems and the induced impact on primary drivers, noting in particular where feedbacks are positive and where they are negative.

SCENARIOS ASSESSMENT REPORT

This report will assess the findings of previous global scenario analyses concerning goods and services and develop a set of scenarios providing quantitative estimates of the consequences of various plausible changes in primary driving forces on proximate forces, ecosystem goods and services (including biodiversity), and human well-being. It will illustrate the connection of global changes in ecosystem services at every scale (global to local) and the connection of ES to human well-being. The objectives of the volume are to: a) highlight (major) trade-offs among ecosystem services; b) evaluate the effectiveness of policy to provide ES while maintaining the capacity to provide ES in the future (sustainability); c) fulfil the objectives of users.

SUMMARY FOR POLICY MAKERS

Part I. Introduction, Methods, and Baseline

Chapter 1. Introduction

This chapter will summarize the objectives of the Report, the scenario methodology used in the Assessment and describe the similarities and differences between the MA Scenarios and other scenario studies.

Chapter 2. Executive Summary of “Conceptual Framework” Assessment Report

Chapter 3. Methodology

This chapter will lay out the conceptual framework and explain the processes used for constructing the MA scenarios. It additionally summarizes the ‘state of the art’ for various modelling approaches that can be used to a) project plausible futures of primary drivers; b) provide quantitative estimates of the consequences of changes in those primary drivers on the characteristics of ecosystems and the goods and services they provide; and c) provide quantitative estimates of the impacts of changes to Ecosystem Services for various attributes of human well being. The chapter will review the strengths and weaknesses of different models and the uncertainties associated with the use of the models.

Chapter 4. Assessment of findings of global scenario studies relevant to ecosystems and their goods and services.

This chapter will summarize the existing literature related to predictive, forecasting and scenarios studies relevant to ecosystems and their goods and services. It will provide a comprehensive synthesis of global studies and selectively examine various regional, national and local studies relevant to the MA analysis. It will examine areas of agreement and disagreement among studies.

Chapter 5. Current Conditions and Trends

This chapter will draw from the findings of the Condition and Trends Working Group and present the ‘baseline’ used in the Scenarios Analysis, noting the areas of uncertainty surrounding those baseline conditions. The chapter will also present the baseline conditions used for the primary driving forces.

Chapter 6. Driving Forces

This chapter will explain how the selection of driving forces was made for these scenarios. Furthermore, the drivers and their trends used for building the MA Global Scenarios are described and their possible linkages to Ecosystem Services and Human Well-Being outlined.

Part II. Ecosystem Scenarios

Chapter 7. Overview of Scenarios

This chapter will present the “storyline” in a few pages for each scenario.

Chapter 8. Plausible Futures of Primary Drivers

This chapter will provide information (including quantitative estimates where possible) about the changes in primary drivers under the different story lines. For example, under each story line, the chapter will provide estimates of change in population size at national or subcontinental scale over time steps of 20 to 25 years out 2050.

Chapter 9. Plausible Futures of Proximate Drivers

This chapter will provide quantitative information about the changes in proximate drivers under the different story lines and feedback to the primary drivers. For example, under each story line, the chapter will present estimates for land cover change, nutrient discharge, and habitat fragmentation at national or sub-continental scale over time steps of 20 to 25 years out 2050.

Chapter 10. Plausible Futures of Ecosystem Services

This chapter will provide quantitative information about the changes in ecosystem services under the different story lines and feedback to the primary and proximate drivers. For example, under each scenario the chapter will present quantitative estimates of cereal production (and its economic value), fisheries production (and economic value), water filtration (and its economic value), species extinction (and economic value), areas of hypoxia (and economic impact), at national or sub-continental scale over time steps of 20 to 25 years out to 2050.

Chapter 11. Future Trends in and Implications for Human Well-being

Chapter 12. Implications for Conventions and the Private Sector

This chapter will address the implications of the various scenarios for specific 'user' audiences including the Convention on Biological Diversity, Convention to Combat Desertification, the Wetlands Convention and the Private Sector.

RESPONSE OPTIONS TECHNICAL VOLUME

SUMMARY FOR POLICY MAKERS

Part I. Conceptual Framework for Evaluating Response Options

Chapter 1. Introduction

- 1.1. Components of well-being and ecosystem services (Health, food & water security, poverty reduction, equity, sustainability, livelihood security)
- 1.2. Interventions constitute link between ecosystem services, drivers and proximate forces in MA framework
- 1.3. Relationships between policy, ecosystem states and well-being (tradeoffs and synergies)

Executive Summary of "Conceptual Framework" Assessment Report

Chapter 2 Typology of response options

This section will introduce various tools and instruments that can be used to address ecosystems including in the context of their links to human well-being. It will not provide the formal assessment of the 'state of knowledge' regarding the effectiveness of these different instruments which instead will be addressed in Part II but rather introduce the typology and introduce the strengths and weaknesses of different typologies for considering these instruments. In brief summary, response options can be examined by a) disciplinary tradition (e.g., economic instruments, institutions, governance, technology, etc.), b) by actor (e.g., state, private sector, NGO), by scale of operation of the decision-maker (global, national, local), or by the driver addressed (e.g., primary driver or proximate driver). Each of these typologies will be introduced..

1.4. By disciplinary tradition (economic instruments, laws, institutions, participatory processes, etc.) (An alternative: Economic instruments (change the costs/benefits); institutional instruments (this includes legal, land tenure etc.) (change the structure in which decisions are made); Governance (change the power structure—addresses participation, co-management, corruption, etc.); Technological approaches; Behavioral approaches)

- 1.4.1. Legal interventions
- 1.4.2. Economic and financial interventions
- 1.4.3. Institutional interventions
- 1.4.4. Social and behavioral interventions

- 1.4.5. Technological interventions
- 1.5. By impact on primary and proximate drivers
 - 1.5.1. Behavior (individual and social)
 - 1.5.2. Economic growth and decline
 - 1.5.3. Trade, market and policy frameworks
 - 1.5.4. Others
- 1.6. By scale of operation of decision-maker
 - 1.6.1. Global (conventions, MEAs, global environmental change)
 - 1.6.2. National & regional (national policies, transboundary problems; biomes; watersheds)
 - 1.6.3. Local (municipal, ecosystems & landscape s)
 - 1.6.4. Interactions among policies at different scales (trade -offs and synergies)
- 1.7. By actor
 - 1.7.1. State
 - 1.7.2. Traditional and local management systems
 - 1.7.3. Private sector

Chapter 2 Assessing the effectiveness of the response options

This Chapter will introduce the characteristics of ‘desirable’ response options (those that have an impact, are politically feasible over the medium to long term (up to 30 years) and have low implementation costs. It will develop a set of criteria and indicators to use in valuating response options and establish the methodology that will be used in Part II.

- 1.8. Characteristics of “desirable” response options
 - 1.8.1. The actual impact on ecosystems state and functioning
 - 1.8.2. The political feasibility in the medium and long term (up to 30 years)
 - 1.8.3. The applicability across sectors and scales
 - 1.8.4. Implementation time and costs
- 1.9. Criteria and indicators to assess the effectiveness of the response options
- 1.10. Evaluation methodology based upon white paper

Part II. Assessment of Past and Current Response Options

Part II provides the basis for practical recommendations, tools and guidelines for the various users. It is structured around the experience of applying a suite of different response options to address a specific problem related to ecosystems and their goods and services and also examines how those response options affect the ‘non-target’ goods and services at the same scale and at different scales. Each chapter is built around a specific issue and the relevant response options are illustrated by case studies selected according to the criteria below.

Each of the Chapters in Part II will assess the literature pertaining to the effectiveness of response options to deal with a particular issue concerning the intrinsic value of biodiversity, ecosystem services, and the consequences of changes in ecosystems on human wellbeing. These issues will be illustrated by case studies from several regions and specific contexts. These case studies will highlight the effectiveness of response options in different settings. Where possible, these case studies will be selected from the sub-global components of the MA. Each chapter will be a compilation of many case studies drawn from the literature or from the subglobal assessment. Only the assessment of the broadest set of available studies will enable the generation of the more general lessons learned in section 3 of this report. Each of the chapters should have the following structure:

- A. *Description of the issue as it relates to the MA conceptual framework (ecosystem services, the intrinsic value of ecosystems and their biodiversity, and the consequences of changes in ecosystems for human wellbeing). This section introduces therefore the issue and associates it to specific ecosystems and regions and response options.*
- B. *Important response options used and their management objectives (e.g. to augment and increase sustainability of production of a particular Ecosystem Service) in relation to the issue. Each discussion of a response option should have the following structure:*
- B.1 *Description and analysis of relevant case study material from literature and the subglobal MA assessment. The analysis will include the following elements, which ideally will cover most of the different elements of the response-options typologies:*
- *Socio-economic state*
 - *Ecosystem state by category (stable, vulnerable, degraded, etc.)*
 - *What responses have been applied? (typologies; cost-effectiveness) (Select 5 to feature based on the criteria developed in the white paper – e.g., most important and most experimental?)*
 - *Impact on proximate drivers and ecosystem state (time frame, nature, reversibility)*
 - *Impact on stakeholders and well-being (provision, regulation, enriching)*
 - *Evaluation of responses*
- B.2 *Consequences of the responses for other ecosystem services and scales*
- *Importance of trade-offs and synergies*
- B.3 *Lessons learned from responses related to the issue and applicability of those lessons in different social, cultural and economic settings and at different scales.*
- C. *Conclusion: lessons learned of all important response options related to the issue.*

Chapter 2. Introduction

Chapter 5 will introduce the material in Part II and explain the criteria used for selecting response options case studies. These criteria will include: a) the issue is relevant to needs of target MA users; b) the issue involves the link between ecosystem services and human well-being (through provisioning, regulating, and cultural services); c) the response options applied deal with a mix of both those dealing directly with changes in ecosystem services and those dealing indirectly (e.g., through primary drivers or ‘upstream’ factors); d) the issues involve a range of different stakeholders (from international conventions to indigenous people and local communities)

Chapter 3. Food

- 1.11. Introduction of issue
- 1.12. Summary of experience and effectiveness of policies to augment and increase sustainability of production of food.
 - 1.12.1. Food and input pricing policies (including subsidies)
 - 1.12.2. Changes in land tenure
 - 1.12.3. New agricultural technologies (from drip irrigation to biotech)
 - 1.12.4. Other responses (Etc).
 - 1.12.5. Tradable permits in fisheries
 - 1.12.6. Fisheries co-management
 - 1.12.7. Other responses (Etc).
- 1.13. Lessons learned from responses

Chapter 4. Water

- 1.14. Introduction
- 1.15. Summary of experience and effectiveness of policies to augment and increase sustainability of production of water
 - 1.15.1. Creation of water markets
 - 1.15.2. Institutional mechanisms to capture water ecosystem service values (e.g. paying upstream owners for watershed protection)
 - 1.15.3. Water purification technologies
 - 1.15.4. International laws to manage transboundary freshwater resources
 - 1.15.5. Etc.
- 1.16. Lessons learned

Chapter 5. Fuel, Wood and Fibre

- 1.17. Introduction
- 1.18. Summary of experience and effectiveness of policies to augment and increase sustainability production of fuel
 - 1.18.1. Fuelwood substitution
 - 1.18.2. Sustainable forest rangeland management for fuel production
 - 1.18.3. Sustainable forest management for timber production
- 1.19. Lessons learned

Chapter 6. Biodiversity

- 1.20. Introduction
- 1.21. Summary of experience and effectiveness of policies to augment and increase sustainability of the conservation, sustainable use, and equitable sharing of benefits of biodiversity
 - 1.21.1. Conservation
 - 1.21.2. Sustainable use
 - 1.21.3. Equitable sharing of benefits
 - 1.21.4. Indicators and Targets
- 1.22. Lessons learned

Chapter 7. Nutrient Cycling

- 1.23. Introduction
- 1.24. Summary of experience and effectiveness of policies to augment (or restrict) and increase the sustainability of various aspects of nutrient cycles
- 1.25. Consequences of those policies for other ecosystem services and scales
- 1.26. Lessons learned

Chapter 8. Waste Processing

- 1.27. Introduction
- 1.28. Summary of experience and effectiveness of policies to augment and increase

sustainability of waste processing

1.29. Consequences of those policies for other ecosystem services and scales

1.30. Lessons learned

Chapter 9. Flood and Storm Protection

1.31. Introduction

1.32. Summary of experience and effectiveness of policies to augment and increase sustainability of flood and storm protection

1.33. Consequences of those policies for other ecosystem services and scales

1.34. Lessons learned

Chapter 10. Health: Biological Disease and Vector Control

1.35. Introduction

1.36. Summary of experience and effectiveness of policies to augment and increase sustainability of control of disease and vectors

1.37. Consequences of those policies for other ecosystem services and scales

1.38. Lessons learned

Chapter 11. Climate regulation

1.39. Introduction

1.40. Summary of experience and effectiveness of policies to increase sources and sinks of carbon

1.41. Consequences of those policies for other ecosystem services and scales

1.42. Lessons learned

Chapter 12. Cultural Services

1.43. Introduction

1.44. Summary of experience and effectiveness of policies to augment and increase sustainability of cultural services

1.45. Consequences of those policies for other ecosystem services and scales

1.46. Lessons learned

Chapter 13. Integrated Response Options

1.47. Introduction

1.47.1. Definition of integrated response options

1.47.2. Relevance for the conventions and other users

1.48. Restoration

1.48.1. Summary of experience and effectiveness of policies to restore degraded lands

1.48.2. Consequences of those policies for other ecosystem services and scales

1.48.3. Lessons learned

1.49. Co-management of resources

- 1.50. Stakeholder Participation in decision-making
- 1.51. Institutional approaches and frameworks
 - 1.51.1. River basin management
 - 1.51.2. Integrated Coastal Area Management
 - 1.51.3. Integrated forest management
 - 1.51.4. Land-use planning
 - 1.51.5. Multilateral environmental agreements (MEAs)
 - 1.51.6. National sustainable development strategies and structures/processes

Part III. Synthesis: “Ingredients for successful responses”

This section will evaluate available policies and scenarios that provide options capable of ensuring the sustainable management of ecosystems, including the protection of the intrinsic value of biodiversity and their contribution to human well-being.

Chapter 2. Lessons learned

- 2.1. Introduction
- 2.2. What indicators, priorities and linkages have been used in defining changes in ecosystem services and human well being? What were their limitations?
- 2.3. What options have been used to deal with changes in ecosystem services: with what possible consequences for ecosystems and human wellbeing?
- 2.4. What options address the CBD objectives of the conservation, sustainable use, and equitable sharing of benefits of biodiversity?
- 2.5. What response options can be used to address concerns of poverty alleviation?
- 2.6. Impact of responses in changing the availability of ecosystem services
- 2.7. Which options were successful, which failed and why?
- 2.8. Cumulative impacts of interventions across scales
- 2.9. Trade-offs and synergies
- 2.10. Conclusions

Chapter 3. Priority Setting, Data Needs, and Indicators

Given the suite of response options available, this chapter will address the steps that decision-makers would need to take to select among the responses and prioritize their implementation. It would identify the types of data that will be needed to select and apply responses and review the strengths and weaknesses of different methods for setting priorities. In this regard, it would focus on methods for priority setting that will reveal opportunities for “linked” responses that address multiple goods and services or multiple user needs.

- 3.1. Introduction
- 3.2. Data and Indicators
 - 3.2.1. What data sets are various countries or provinces currently gathering or monitoring that could be used to assess long-term trends related to ecosystem change and people in particular regions?
- 3.3. Priority Setting
 - 3.3.1. What methods exist for priority setting concerning actions to address the

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- consequences of ecosystem change for people?
- 3.3.2. What are the scientific strengths and weaknesses of different mechanisms for priority setting for ecosystem and biodiversity conservation?
 - 3.3.3. How can priority setting mechanisms best address differences in perspectives and values of different stakeholders and stakeholders at different scales?
- 3.4. Linkages. What are the linkages among responses to the impacts of land degradation on biodiversity, international waters and climate change as well as the underlying socio-economic factors?

Chapter 4. Responses in regional and global scenarios

Response options that directly address 'primary drivers' or major 'proximate drivers' such as land cover change will also be examined in the Scenarios Assessment Report. (However, many of the response options addressed in the Response Options Assessment Report will have their impact at too small a scale to be 'observed' within the Scenario Assessment Report.) This Chapter will examine these options in light of the findings of the Scenario Assessment Report and other related scenario studies in order to provide additional perspectives on the potential long-term impact of different options on ecosystems and human well-being. It will also provide recommendations on how future scenario studies could better incorporate plausible response options.

- 4.1. Introduction
- 4.2. Review of response options in existing scenarios studies and MA scenarios
- 4.3. Implications of scenarios findings for future response options (authored jointly with scenarios group)
- 4.4. Gaps in scenarios studies in relation to their use in the assessment of response options
- 4.5. Recommendations for future scenarios studies and assessments

Chapter 5. Uncertainties in assessing the effectiveness of response options regarding ecosystem services

- 5.1. Introduction
- 5.2. Uncertainties in the evaluation methodologies
 - 5.2.1. Advantages and shortcomings of valuation techniques
 - 5.2.2. Advantages and shortcomings of decision support systems
 - 5.2.3. Advantages and shortcomings of indicators
 - 5.2.4. Advantages and shortcomings of scenarios
- 5.3. Adaptation, mitigation and other response options
- 5.4. Integrated response options
- 5.5. Trade-off and synergies between response options
- 5.6. Recommendations for future research

Chapter 6. Consequences for Increased Wellbeing and Poverty Reduction

This chapter will summarize the consequences of the response options reviewed in Part II (and other response options related to ecosystems that are intended to enhance human well-being) for different aspects of well-being, including the differential impact of the response options on different regions, groups, and gender.

- 6.1. Introduction

- 6.2 Summary of experience and effectiveness of policies related to ecosystem services intended to improve human well being (summarized from Part II)
 - 6.2.1 Equity: Across stakeholders
 - 6.2.2 Equity across generations: the inter-temporal perspective.
 - 6.2.3 Food, Water Security
 - 6.2.4 Livelihood Security
 - 6.2.5 Poverty Reduction
- 6.3 Review of other ecosystem-related policies unrelated to ecosystem services designed to improve human well-being

ANNEX II. MA WORKPLAN

2000

July 2000 1st MA Board Meeting (Norway)

2001

April 1st Technical Design Meeting (Netherlands)

October 2nd Technical Design Meeting (Cape Town)

November Call for Nominations for Working Groups

2002

January 2nd MA Board Meeting (Kuala Lumpur)

March to June 1st MA Working Group Meetings

2003

Release of 1st MA Product "Conceptual Framework and Methodology Report"
2nd Working Group meetings

2004

Review Process for Assessment Reports
Release of Final Products

Note: Active consultation with the users of the MA will continue throughout the process, both through the direct involvement of representatives of the users on the MA Board and through active involvement of the users and stakeholders in the process.

ANNEX III.

MA CONTRIBUTION TO CBD DECISIONS AND RECOMMENDATIONS

The MA Secretariat has reviewed CBD COP and SBSTTA recommendations regarding assessment needs and summarized that information below to assist in determining opportunities where the MA can assist the CBD in meeting its assessment needs. The second column presents information on how the work of the MA could meet these assessment needs.

	CBD COP DECISIONS AND SBSTTA RECOMMENDATIONS	MA PROPOSED ACTION
STATUS AND USE		
1.	Globally, and for the United Nations regions, assess status, uses, and threats to biodiversity within the ecosystem categories of the CBD: Inland Waters, Marine/Coastal, Agro-Biodiversity, Forests, Drylands, and Mountains. (e.g., Decisions IV/4A; IV/7.12)	This is a core component of the MA.
2.	Encourages Parties to address the lack of information on the status of inland water biological diversity as a basis for future decisions on inland water at the national level and to include this information in their national reports; (Decision V/2, IV/4)	The MA will provide both additional data and methodological tools for use at national level. The sub-global assessments will directly meet these national needs in the regions where they are undertaken
3.	Provide knowledge on key processes and influences in ecosystems which are critical for structure, function, and productivity of marine and coastal biological diversity (e.g., Decision IV/5)	This is a core component of the MA.
4.	Reduce gaps in knowledge in the areas of fragmentation of habitats and population viability to include mitigation options such as ecological corridors and buffer zones in forest ecosystems (e.g., Annex to Decision IV/7)	The MA proposes a special report on fragmentation and biodiversity to be released in 2003 to address this need.
5.	<p>SBSTTA-6 invited the MA to integrate assessments of the following topics in its work:</p> <ul style="list-style-type: none"> a. The interrelationship between biodiversity and climate change, in line with SBSTTA recommendation VI/7, which concerns biodiversity and climate change, including cooperation with the UNFCCC b. Inland water biodiversity, its uses and threats c. Further aspects of marine and coastal biodiversity, drawing upon the work already conducted by SBSTTA; d. Further aspects of forest biodiversity, as identified by the SBSTTA on the basis of the work of the Ad Hoc Technical expert Group on Forest Biological Diversity established by the COP at its fifth meeting, in May 2000. (SBSTTA-6 Decision VI/5) <p>SBSTTA –7 recommends that the conference of the Parties at its sixth meeting invites the United Nations Framework Convention on Climate Change, the Intergovernmental Panel on Climate Change, the International Geosphere-Biosphere Programme, in the context of its global change terrestrial ecosystems global transect programme, and the Millennium</p>	The MA will carry out the work requested in this invitation.

	CBD COP DECISIONS AND SBSTTA RECOMMENDATIONS	MA PROPOSED ACTION
	Ecosystem Assessment to enhance collaboration in research and monitoring activities on forest biological diversity and climate change, and explore possibilities of establishing an international network to monitor and assess the impact of climate change on forest biological diversity (SBSTTA VII/6.1(h))	
METHODOLOGIES FOR ASSESSMENT AND VALUATION		
6.	Review methodologies for the assessment of biodiversity and develop and disseminate regional guidelines for rapid assessment of biodiversity for different types of inland water ecosystems (e.g., Decision IV/4C; Decision IV/4A, SBSTTA recommendation IV/5)	The MA will synthesize state of knowledge concerning assessment techniques
7.	Develop methods and techniques for the valuation of goods and services of inland water ecosystems (e.g., Decision IV/4A)	The MA will synthesize state of knowledge concerning valuation techniques.
8.	Develop rapid assessment methods for marine and coastal biological diversity, in particular guidelines for ecosystem evaluation and assessment. (SBSTTA recommendation IV/5)	The MA will contribute information on methodologies for multiscale assessments but does not plan to focus on rapid assessment techniques for particular ecosystems. It can do so if requested.
9.	Develop assessment and valuation methodologies for the multiple benefits derived from forest biological diversity (e.g., Annex to Decision IV/7)	This is at the core of the conceptual framework of the MA, which seeks to examine the entire range of benefits provided by ecosystems and the biodiversity they contain.
10.	Review the specific indicators of forest biodiversity that have been derived by the major ongoing international processes. (e.g., Annex to Decision IV/7)	The MA will assess the state of knowledge concerning the development of indicators of biodiversity conservation, sustainable use, and the equitable sharing of benefits in order to provide guidance to countries in their selection and use of indicators.
11.	Requests the Executive Secretary to develop: (a) A set of principles for designing national-level monitoring programs and indicators; (b) A key set of standard questions and a list of available and potential indicators, covering the ecosystem, species and genetic levels, taking into account the ecosystem approach, that may be used by Parties at their national level and in national reporting and that also allow for regional and global overviews on the state and trends of biodiversity and, if possible and appropriate, any responses from policy measures; (Decision V/7: Identification assessments and Monitoring and Indicators.)	The MA will assess the state of knowledge concerning the development of indicators of biodiversity conservation, sustainable use, and the equitable sharing of benefits in order to provide guidance to countries in their selection and use of indicators.
12.	Invites the Millennium Ecosystem Assessment to incorporate the issues	The MA will carry out the work

	CBD COP DECISIONS AND SBSTTA RECOMMENDATIONS	MA PROPOSED ACTION
	<p>identified in paragraph 4 above, and to report on this matter at the seventh meeting of the Subsidiary Body on Scientific, Technical and Technological Advice;</p> <p>[Para 4. Promotes on the basis of the ecosystem approach a wider assessment of the interlinkages between biological diversity and climate change, in order to develop more comprehensive scientific advice to integrate biodiversity considerations into the implementation of the United Nations Framework Convention on Climate Change and its Kyoto Protocol, including:</p> <p>(a) The impacts of climate change on biological diversity and the impacts of biodiversity loss on climate change;</p> <p>(b) The potential impact on biological diversity of mitigation measures that may be carried out under the United Nations Framework Convention on Climate Change and its Kyoto Protocol, and identification of potential mitigation measures that also contribute to the conservation and sustainable use of biological diversity;</p> <p>(c) The potential for the conservation and sustainable use of biological diversity to contribute to climate adaptation measures;</p>	<p>requested in this invitation.</p>
	LESSONS FROM MANAGEMENT AND POLICY EXPERIENCES	
13.	<p>Provide case studies of watershed, catchment, and river basin management experiences and best practices, synthesize lessons from those studies, and disseminate information through the clearinghouse and other appropriate mechanisms (e.g., Decision IV/4A)</p>	<p>MA response options will review best practices in these areas.</p>
14.	<p>Assess experiences gained in national and regional processes, identifying common elements and gaps in the existing initiatives and improving the indicators for forest biodiversity (e.g., Annex to Decision IV/7)</p>	<p>MA response options will review best practices in these areas.</p>
15.	<p>Assemble management experiences and scientific, indigenous and local information at the national and local levels to provide for the sharing of approaches and tools that lead to improved management practices with regards to forest biodiversity (e.g., Annex to Decision IV/7)</p>	<p>The sub-global MA assessments will provide a mechanism for this review of locally relevant approaches.</p>
16.	<p>Provide advice on the identification of options for the conservation and sustainable use of forest biodiversity and the mitigation of negative influences and the promotion of positive human influences on forest biodiversity (e.g., Decision IV/7.12; Annex to Decision IV/7)</p>	<p>This is at the core of the MA conceptual framework and will be directly addressed by the MA.</p>
17.	<p>Urges Parties, other Governments and relevant bodies to implement response measures to the phenomenon of coral bleaching by:</p> <p>(a) Identifying and instituting additional and alternative measures for securing the livelihoods of people who directly depend on coral-reef services;</p> <p>(b) Encouraging and supporting multidisciplinary approaches to action relating to coral-reef management research and monitoring, including the use of early-warning systems for coral bleaching, and collaborating with the International Coral Reef Initiative and the Global Coral Reef Monitoring Network;</p> <p>(Decision V/3 (implementation of the program of work on Marine and coastal biodiversity based on decision IV/5), SBSTTA Recommendation VI/2)</p>	<p>The scenarios component of the MA will assist governments in exploring various options for additional and alternative measures for securing the livelihoods of individuals dependent on sensitive ecosystems.</p> <p>The MA will help to identify best practices concerning coral reefs. The MA will examine the consequences of coral reef degradation for human well-being and response options for mitigating impacts and restoring reefs.</p>
18.	<p>Requests the Subsidiary Body on Scientific, Technical and Technological</p>	<p>The MA will contribute</p>

	CBD COP DECISIONS AND SBSTTA RECOMMENDATIONS	MA PROPOSED ACTION
	<p>Advice to consider the impact of, and propose sustainable practices for, the harvesting of non-timber forest resources, including bush meat and living botanical resources;</p> <p>Requests the Executive Secretary to invite relevant organizations and forest-related bodies, institutions and processes, including criteria and indicator processes, as well as indigenous and local communities, non-governmental organizations, and other relevant stakeholders to contribute to the assessment of status and trends, including gaps and priority actions needed to address threats to forest biological diversity;</p> <p>(Decision V/4, Decision IV/7: (Progress report on the implementation of the program of work for forest biological diversity.)</p>	<p>information on forests, their goods and services, biodiversity, and response options.</p> <p>The MA was invited by SBSTTA-6 to contribute to the assessment needs in this area.</p>
	<p>To provide a comprehensive analysis of status and trends of the world's agricultural biodiversity and of their underlying causes (including a focus on the goods and services agricultural biodiversity provides), as well of local knowledge of its management.</p> <p>Promote and develop specific assessments of additional components of agricultural biodiversity that provide ecological services, drawing upon the outputs of program element 2. This might include targeted assessments on priority areas (for example, loss of pollinators, pest management and nutrient cycling).</p> <p>Carry out an assessment of the knowledge, innovations and practices of farmers and indigenous and local communities in sustaining agricultural biodiversity and agro-ecosystem services for and in support of food production and food security.</p> <p>Promote and develop assessments of the interactions between agricultural practices and the conservation and sustainable use of the components of biodiversity referred to in Annex I to the Convention.</p> <p>Develop methods and techniques for assessing and monitoring the status and trends of agricultural biodiversity and other components of biodiversity in agricultural ecosystems, including: *</p> <p>(Decision V/5: Agricultural Biodiversity)</p>	<p>The MA will include such an assessment, largely synthesizing extensive research work undertaken by scientists, FAO, IPGRI, and others.</p> <p>Because of the Goods and Services focus of the MA, it will pay particular attention to meeting the assessment needs of components of agrobiodiversity providing ecological services.</p> <p>The MA will emphasize the assessment of best practices in sustaining agrobiodiversity.</p> <p>*These methodologies are already likely under development by FAO and IPGRI and may not be a priority for the MA</p>
CAPACITY BUILDING		
19.	Expand research capacity to develop and assess options incorporating the applications of traditional knowledge to minimize or mitigate negative influences and to promote the positive effects (e.g., Annex to Decision IV/7)	The MA will include both local assessments and assessments conducted by indigenous peoples that will enhance capacity in these areas.
20.	Enhance the capacity of countries to implement biodiversity criteria and indicator frameworks (Decision IV/7)	The MA will provide methods and data that will enhance capacity of countries to implement biodiversity criteria and indicators.
21.	Urges the implementation of capacity-building measures for developing and implementing national and sectoral plans for the conservation and sustainable use of inland water ecosystems, including comprehensive assessments of the biological diversity of inland water ecosystems, and capacity-building programs for monitoring the implementation of the program of work and the trends in inland water biological diversity, and for information-gathering and dissemination among the riparian communities. Decision V/2, IV/4, SBSTTA Recommendation VI/3,	The core MA activities will contribute to meeting these capacity needs.

Annex 4.

Donors and Supporting Institutions

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